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design@pitagrozt.pt
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Um Novo Capítulo na História da Urologia Portuguesa *A New Chapter in the History of Portuguese Urology*

Ricardo Leão 

Editor-chefe da Acta Urológica Portuguesa

Este é o último número da Acta Urológica Portuguesa.

Escrevo estas linhas com um profundo sentido de responsabilidade, mas também com serenidade e convicção. A Acta Urológica Portuguesa chega ao fim do seu percurso editorial não por esgotamento, mas por evolução. Cumpru, ao longo de décadas, um papel absolutamente central na afirmação científica da Urologia portuguesa, tendo sido espaço de partilha, formação e crescimento para várias gerações de urologistas.

A história da Acta Urológica Portuguesa confunde-se, de forma indissociável, com a própria história da Urologia em Portugal. Durante décadas, foi o espaço natural de divulgação científica, de afirmação académica e de identidade coletiva dos urologistas portugueses. Nela se formaram gerações, publicaram-se os primeiros trabalhos científicos de muitos colegas e construiu-se um património científico que honra a especialidade.

A Acta Urológica foi, e continuará a ser, símbolo de dedicação, rigor e compromisso com o conhecimento. O seu percurso é indissociável do esforço contínuo de sucessivos corpos editoriais, revisores e autores que, de forma muitas vezes silenciosa, contribuíram para manter viva uma revista que representou a Urologia portuguesa durante décadas.

No entanto, a ciência evolui e com ela devem evoluir as suas plataformas de divulgação. O contexto atual da investigação biomédica é global, competitivo e altamente exigente. A visibilidade internacional, o impacto científico e a integração em redes editoriais globais tornaram-se elementos centrais para a afirmação do trabalho desenvolvido pelos nossos clínicos e investigadores.

É neste enquadramento que surge um novo e decisivo passo para a Urologia portuguesa.

A International Brazilian Journal of Urology (IBJU) passará a ser o órgão científico oficial da Associação Portuguesa de Urologia (APU). Esta decisão estratégica resulta de um trabalho conjunto e articulado entre o atual Corpo Editorial da Acta Urológica e a Direção da APU, refletindo uma visão partilhada sobre o futuro da publicação científica da Urologia no nosso país.

Paralelamente, em 2026 nascerá uma nova revista, com um novo corpo editorial, concebida para dar continuidade ao espírito da Acta Urológica, agora projetado numa dimensão internacional. Esta nova publicação representa evolução, não rutura: herda o legado científico, ético e académico construído ao longo de décadas, ao mesmo tempo que se abre a novos horizontes, novas colaborações e maior visibilidade global.

A integração da Urologia portuguesa na estrutura editorial da IBJU permitirá uma presença ativa dos nossos urologistas — enquanto editores, revisores e autores — num dos fóruns científicos mais relevantes da especialidade. Este passo reforça a projeção internacional da nossa comunidade, cria novas oportunidades para os mais jovens e consolida a posição de Portugal no panorama urológico global.

Este momento marca, assim, um ponto de maturidade institucional. Nada do que agora se inicia seria possível sem o trabalho sério, persistente e generoso desenvolvido ao longo dos anos pela Acta Urológica, pelos seus editores, colaboradores e autores. A todos eles é devido um reconhecimento profundo e sincero.

O futuro constrói-se com memória, visão e coragem. A criação de uma nova revista integralmente editada e publicada em inglês e a associação da APU à IBJU são expressão dessa visão — uma aposta clara na qualidade, na internacionalização e no fortalecimento da Urologia portuguesa.

This is the final issue of the Acta Urológica Portuguesa.

I write these words with a deep sense of responsibility, but also with serenity and conviction. The Acta Urológica Portuguesa reaches the end of its editorial journey not out of exhaustion, but as a result of evolution. Over several decades, it has played a central role in the scientific affirmation of Portuguese Urology, serving as a space for sharing, education, and growth for successive generations of urologists.

The history of the Acta Urológica Portuguesa is inseparable from the history of Urology in Portugal itself. For decades, it was the natural forum for scientific dissemination, academic affirmation, and collective identity among Portuguese urologists. It was within its pages that generations were formed, that many colleagues published their first scientific works, and that a scientific legacy was built — one that honors our specialty.

The Acta Urológica has been, and will continue to be, a symbol of dedication, rigor, and commitment to knowledge. Its journey is inseparable from the sustained efforts of successive editorial boards, reviewers, and authors who, often quietly, ensured the continuity of a journal that represented Portuguese Urology for decades.

However, science evolves, and with it, so must its platforms for dissemination. Today's biomedical research landscape is global, competitive, and highly demanding. International visibility,



Um Novo Capítulo na História da Urologia Portuguesa

scientific impact, and integration into global editorial networks have become essential elements for the recognition of the work developed by our clinicians and researchers.

It is within this context that a new and decisive step for Portuguese Urology emerges.

The International Brazilian Journal of Urology (IBJU) will become the official scientific journal of the Portuguese Association of Urology (APU). This strategic decision results from joint and coordinated work between the current Editorial Board of the Acta Urológica and the Board of the APU, reflecting a shared vision for the future of scientific publishing in Portuguese Urology.

In parallel, 2026 will mark the launch of a new journal with a new editorial board, designed to carry forward the spirit of the Acta Urológica, now projected onto an international stage. This new publication represents evolution rather than rupture: it inherits the scientific, ethical, and academic legacy built over decades, while opening itself to new horizons, new collaborations, and greater global visibility.

The integration of Portuguese Urology into the editorial structure of the IBJU will allow for an active presence of our urologists—as editors, reviewers, and authors—within one of the most relevant scientific forums in the field. This step strengthens our international projection, creates new opportunities for younger generations, and consolidates Portugal's position within the global urological community.

This moment therefore, marks a point of institutional maturity. Nothing that now begins would be possible without the serious, persistent, and generous work carried out over the years by the

Acta Urológica, its editors, contributors, and authors. To all of them, we owe our deepest gratitude.

The future is built with memory, vision, and courage. The creation of a new journal entirely edited and published in English and the association of the APU with the IBJU are a clear expression of that vision—a firm commitment to quality, internationalization, and the continued strengthening of Portuguese Urology.

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A Utilização dos Novos Fármacos para o Cancro da Próstata Metastizado Resistente à Castração no Norte de Portugal

The Use of New Therapies for Metastatic Castrate Resistant Prostate Cancer in the North of Portugal

Francisco Botelho^{1,2}, André Miranda², Isaac Braga^{2,3}, Ricardo Leão⁴, Frederico Teves⁵, Jorge Dias⁶, Filipe Rodrigues⁷, Jorge Oliveira³, Isabel Augusto⁸, Catarina Portela⁹, Joana Febra¹⁰, Sandra Custódio¹¹, Patrícia Liu¹², Patrícia Gago¹², Carlos Silva^{1,13}, Luís Pacheco-Figueiredo^{2,14}

Resumo

Introdução: Novos fármacos, como a abiraterona (Abi), enzalutamida (Enz), cabazitaxel (Cab) e rádio-223 (Rad), foram recentemente aprovados para utilização nos doentes com cancro da próstata metastizado resistente à castração (mCRPC). No entanto a sua utilização é largamente desconhecida, pelo que o objectivo deste projecto de investigação é descrever a utilização destes fármacos nos doentes mCRPC nos hospitais públicos do norte de Portugal.

- 1 – Serviço de Urologia do Centro Hospitalar Universitário S. João, Porto, Portugal
- 2 – Instituto de Ciências da Vida e da Saúde, Escola de Medicina, Universidade do Minho, Braga, Portugal
- 3 – Serviço de Urologia do Instituto Português de Oncologia do Porto Francisco Gentil, Porto, Portugal
- 4 – Serviço de Urologia da CUF e do Hospital de Braga, Braga, Portugal
- 5 – Serviço de Urologia do Centro Hospitalar Universitário do Porto, Porto, Portugal
- 6 – Serviço de Urologia do Centro Hospitalar de Vila Nova Gaia/Espinho, Vila Nova de Gaia, Portugal
- 7 – Serviço de Urologia do Centro Hospitalar de Trás-os-Montes e Alto Douro, Vila Real, Portugal
- 8 – Serviço de Oncologia do Centro Hospitalar Universitário S. João, Porto, Portugal
- 9 – Serviço de Oncologia do Hospital de Braga, Braga, Portugal
- 10 – Serviço de Oncologia do Centro Hospitalar do Porto, Porto, Portugal
- 11 – Serviço de Oncologia do Centro Hospitalar de Vila Nova Gaia/Espinho, Vila Nova de Gaia, Portugal
- 12 – Serviço de Oncologia do Centro Hospitalar de Trás-os-Montes e Alto Douro, Vila Real, Portugal
- 13 – Serviço de Urologia da Faculdade de Medicina da Universidade do Porto, Porto, Portugal
- 14 – Serviço de Urologia Hospitais Privados Trofa Saúde, Portugal

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Métodos: Todos os doentes mCRPC tratados com estes fármacos nos Centro Hospitalar de Vila Nova Gaia/Espinho, Centro Hospitalar de Trás-os-Montes e Alto, Centro Hospitalar Universitário S. João, Instituto Português de Oncologia do Porto Francisco Gentil, Hospital de Braga ou no Centro Hospitalar Universitário do Porto foram incluídos. Após obtenção das respectivas aprovações, os dados foram retrospectivamente colhidos do registo clínico informático, de uma forma padronizada.

Resultados: Foram incluídos um total de 1075 tratamentos, sendo que a sua frequência foi aumentando anualmente até 2018. Foram tratados 368 (34,2%) doentes com Abi e 524 (48,7%) doentes com Enz, sendo estes fármacos sobretudo prescritos em 2ª linha pós-docetaxel até 2016, depois mais em 1ª linha (pré-docetaxel). Com Cab foram tratados 147 (13,7%) doentes, sobretudo em 2ª linha pós-docetaxel ou em 3ª linha, sendo que estes doentes são mais novos ($p < 0,001$) e têm maior probabilidade de ter neoplasias mais indiferenciadas ($p = 0,007$) e com metástases viscerais ($p < 0,001$). Foram tratados com Rad 36 (3,3%) doentes, geralmente em 3ª linha de tratamento e que se distinguem dos outros por não terem metástases viscerais e em 97,2% terem mais de 3 metástases ósseas.

Conclusão: O uso destes fármacos na prática clínica diária refletiu as respectivas aprovações terapêuticas. O estudo é limitado pelo seu desenho retrospectivo e observacional e pode não ser um retrato fiel da situação nacional, mas traduz numa grande amostra, a realidade vivida pelos doentes com mCRPC com estes novos fármacos, nos seis maiores hospitais do norte de Portugal.

Palavras-chave: Neoplasias de Próstata Resistentes à Castração/secundário; Neoplasias de Próstata Resistentes à Castração/tratamento farmacológico

Abstract

Introduction: New drugs such as abiraterone (Abi), enzalutamide (Enz), cabazitaxel (Cab) and radium 223 (Rad) were recently approved for metastatic castrate resistant prostate cancer



(mCRPC) patients. However, their use in clinical practice is largely unknown, so the objective of this research is to describe their use in mCRPC patients in public hospitals in the north of Portugal.

Methods: All mCRPC patients treated with these drugs in Centro Hospitalar de Vila Nova Gaia/Espinho, Centro Hospitalar de Trás-os-Montes e Alto, Centro Hospitalar Universitário S. João, Instituto Português de Oncologia do Porto Francisco Gentil, Hospital de Braga and in Centro Hospitalar Universitário do Porto were included. After obtaining the respective authorizations from all hospitals involved, data were retrospectively and standardized collected from the digital clinical records.

Results: A total of 1075 treatments were included. From these, 368 (34.2%) patients were treated with Abi and 524 (48.7%) patients with Enz. These drugs were mainly prescribed in 2nd line (post-docetaxel) until 2016 and afterwards in 1st line (pre-docetaxel). Cab was used in 147 (13.7%) patients, mostly in 2nd line (post-docetaxel) or in 3rd line. Patients treated with Cab were younger ($p<0.001$), were more likely to have undifferentiated neoplasms ($p=0.007$) and have visceral metastasis ($p<0.001$). Only 36 (3.3%) patients were treated with Rad, usually in the 3rd line and none of them had visceral metastasis and 97.2% had more than 3 bone metastases.

Conclusion: The use of these drugs replicated their respective therapeutic approvals. This study is limited by the retrospective and observational design and might not represent the entire country but is based in a multicentric big sample of the six biggest hospitals in the north of Portugal and reflects the reality experienced by patients.

Keywords: Prostatic Neoplasms, Castration-Resistant/drug therapy; Prostatic Neoplasms, Castration-Resistant/secondary

Introdução

O cancro da próstata (CP) é a segunda neoplasia mais frequente no mundo e a mais frequente na Europa nos homens, correspondendo respectivamente a 14,1% e 20,2% dos casos incidentes.¹ Em Portugal, estima-se que em 2020, tenham sido identificados 6759 novos casos, constituindo a neoplasia mais frequente nos homens (20,4% dos casos incidentes) e a terceira causa de morte oncológica masculina (1917 mortes).

A mortalidade pelo CP está a diminuir na maioria dos países desenvolvidos, sendo que na União Europeia tem diminuído cerca de 3,8%/ano desde 2006. Em Portugal esta tendência também se verifica, estando demonstrada uma diminuição da mortalidade por CP de 3,1%/ano desde 1998.²

Nas fases mais avançadas da doença é quando o cancro se torna metastático e resistente à castração (mCRPC). Até recentemente a única terapêutica com benefício comprovado na sobrevida era quimioterapia com docetaxel. Na última década foram disponibilizados novos tratamentos para doentes com

cancro da próstata metastizado resistente à castração: abiraterona (Abi), enzalutamida (Enz), cabazitaxel (Cab) e rádio 223³ (Rad). Foram inicialmente aprovados após o uso do docetaxel, mas posteriormente a Abi e a Enz também foram aprovadas em primeira linha (pré-docetaxel) e actualmente também são utilizados em fases mais precoces da doença.³ O Rad sofreu uma restrição em 2018, passando a ser usado quase só em terceira linha.⁴

Estes fármacos constituem tratamentos dispendiosos e, dado o aumento progressivo das suas indicações a um número cada vez mais alargado de doentes, colocam-se questões relevantes relativamente à sustentabilidade financeira no tratamento destes doentes. O uso destas terapêuticas em Portugal é largamente desconhecido, nomeadamente o padrão da sua aplicação clínica e a evolução da sua utilização ao longo do tempo.

O objectivo deste trabalho é descrever a utilização destes fármacos nos doentes mCRPC nos hospitais públicos do norte de Portugal.

Métodos

Todos os doentes com mCRPC que iniciaram tratamento com Abi, Enz, Cab ou Rad no Centro Hospitalar de Vila Nova Gaia/Espinho e no Centro Hospitalar de Trás-os-Montes e Alto Douro até Dezembro de 2019 ou no Centro Hospitalar Universitário S. João, Instituto Português de Oncologia do Porto Francisco Gentil, Hospital de Braga ou Centro Hospitalar Universitário do Porto até Dezembro de 2020 foram incluídos. Doentes que foram incluídos em ensaios clínicos foram excluídos desta investigação. O critério para a seleção destes hospitais foi devido ao facto de serem os seis hospitais públicos com maior volume assistencial de Urologia no norte de Portugal e a escolha do período de avaliação esteve relacionada com a disponibilidade dos dados e conveniência para o estudo.

O consentimento dos Conselhos de Administração e das Comissões de Ética de cada hospital foi obtido. Em todos os hospitais o departamento de Farmácia forneceu a lista dos doentes tratados com estes fármacos. Os seus dados clínicos foram retrospectivamente recolhidos através dos registos clínicos informatizados, utilizando uma base de dados estruturada e padronizada.

Na comparação das características dos participantes, por fármaco administrado, foi utilizada o teste ANOVA para a estimativa do valor de p na comparação das variáveis contínuas paramétricas (idade e PSA basal) e o teste qui-quadrado na comparação das variáveis categóricas (ECOG Performance Status, grau ISUP, metástases viscerais e fase da doença). A análise dos dados foi realizada com o software IBM® SPSS® Statistics versão 26 e foi considerado como estatisticamente significativo um valor de $p<0,05$.



Resultados

Foram realizados 1075 tratamentos inovadores para doentes com mCRPC nos seis hospitais incluídos no estudo. O número de tratamentos iniciados por ano revelou um aumento significativo até 2018, sendo que em relação a 2020 não existem dados disponíveis para dois hospitais (Fig. 1).

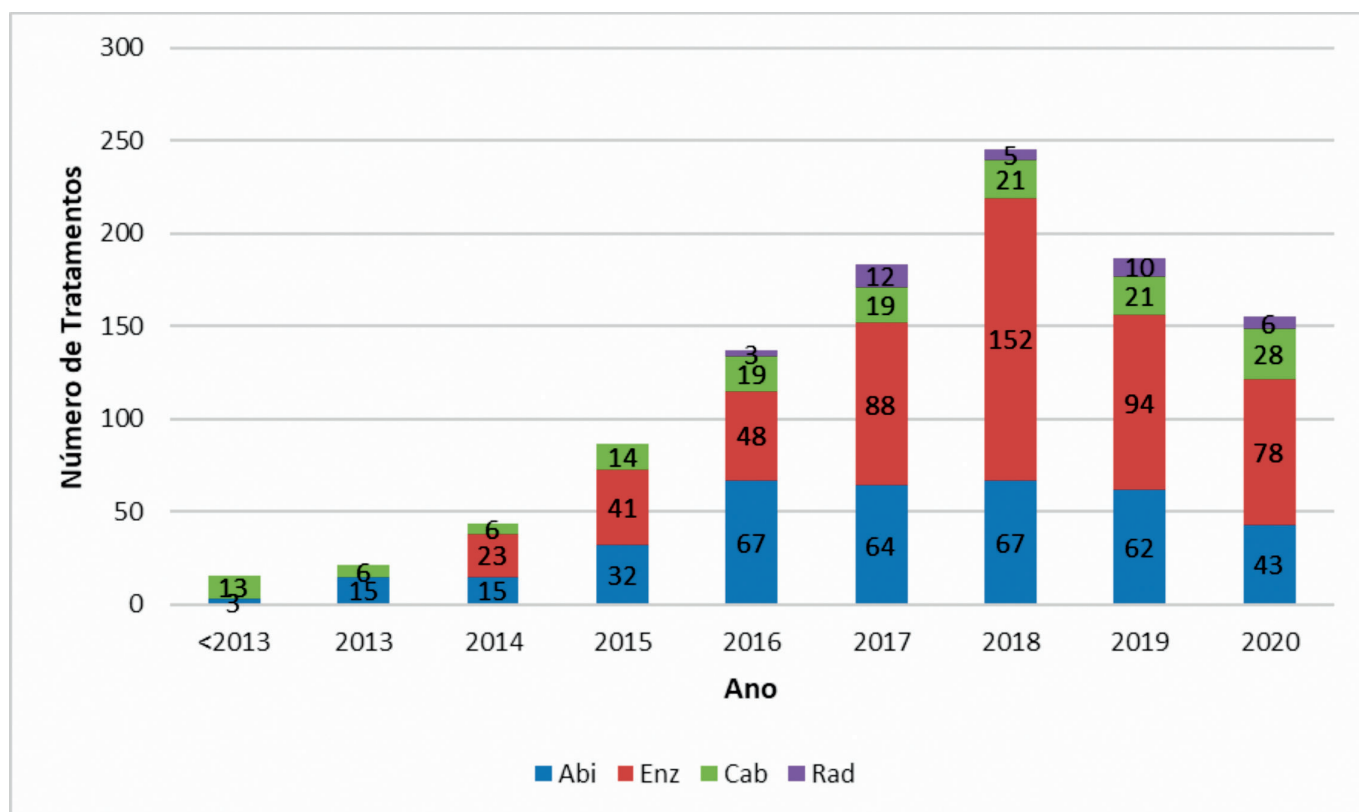
No total foram tratados 368 (34,2%) doentes com Abi, 524 (48,7%) doentes com Enz, 147 (13,7%) doentes com Cab e 36 (3,3%) doentes com Rad. Globalmente foram prescritos nas seguintes situações: 470 (43,7%) em primeira linha (pré-docetaxel), 373 (34,7%) em segunda linha após docetaxel, 194 (18,0%) em terceira linha após docetaxel e outra hormonoterapia de 2ª geração e 38 (3,5%) em segunda linha após outra hormonoterapia de 2ª geração.

A Tabela 1 descreve as características dos doentes estratificadas por fármaco. Os tratamentos com Abi e Enz foram realizados sobretudo em 1ª e 2ª linha pós-docetaxel, enquanto a utilização de Cab foi efectuada em 2ª linha pós-docetaxel ou em 3ª linha. A utilização do Rad ocorreu sobretudo em 3ª linha, particularmente após a restrição em 2018 (81% casos após vs 60% pré 2018). Ao longo dos anos, a percentagem de utilização

de Abi e Enz aumentou em primeira linha e reduziu em 2ª linha pós-docetaxel (Fig. 2).

O grupo de doentes avaliados apresentava uma média de idade de $72,5 \pm 8,5$ anos (média $\pm$ desvio padrão), um PSA basal médio de 327 ± 60 ng/mL, 83,7% tinham *ECOG Performance Status* de 0 ou 1 e 61,5% tinham *ISUP* grau 4 ou 5. Analisando estas variáveis por fármaco, os doentes tratados com Cab eram cerca de 5 anos mais novos que os tratados com outros fármacos ($p < 0,001$), e apresentavam maior frequência de neoplasias mais indiferenciadas ($p = 0,007$); no entanto, não se verificaram diferenças estatisticamente significativas para o PSA basal e ECOG, embora os doentes tratados com Abi tivessem uma média de PSA basal ligeiramente inferior.

Em relação ao padrão de metastização, apenas 125 doentes (13,4%) tinham metástases viscerais, 61,9% não tinham metástases viscerais e tinham mais do que três metástases ósseas, 15,5% não tinham metástases viscerais e tinham três ou menos metástases ósseas e 9,2% não tinham metástases viscerais ou ósseas, apresentando apenas metástases ganglionares à distância. Analisando por fármaco, os doentes tratados com Cab foram os que apresentaram maior frequência de metástases viscerais



Abi – Abiraterona; Enz – Enzalutamida; Cab – Cabazitaxel; Rad – Radio 223; mCRPC: cancro da próstata metastático resistente à castração

* - para o ano de 2020 não existem dados relativos a dois hospitais

Figura 1 – Número de tratamentos para o mCRPC, por ano e por fármaco

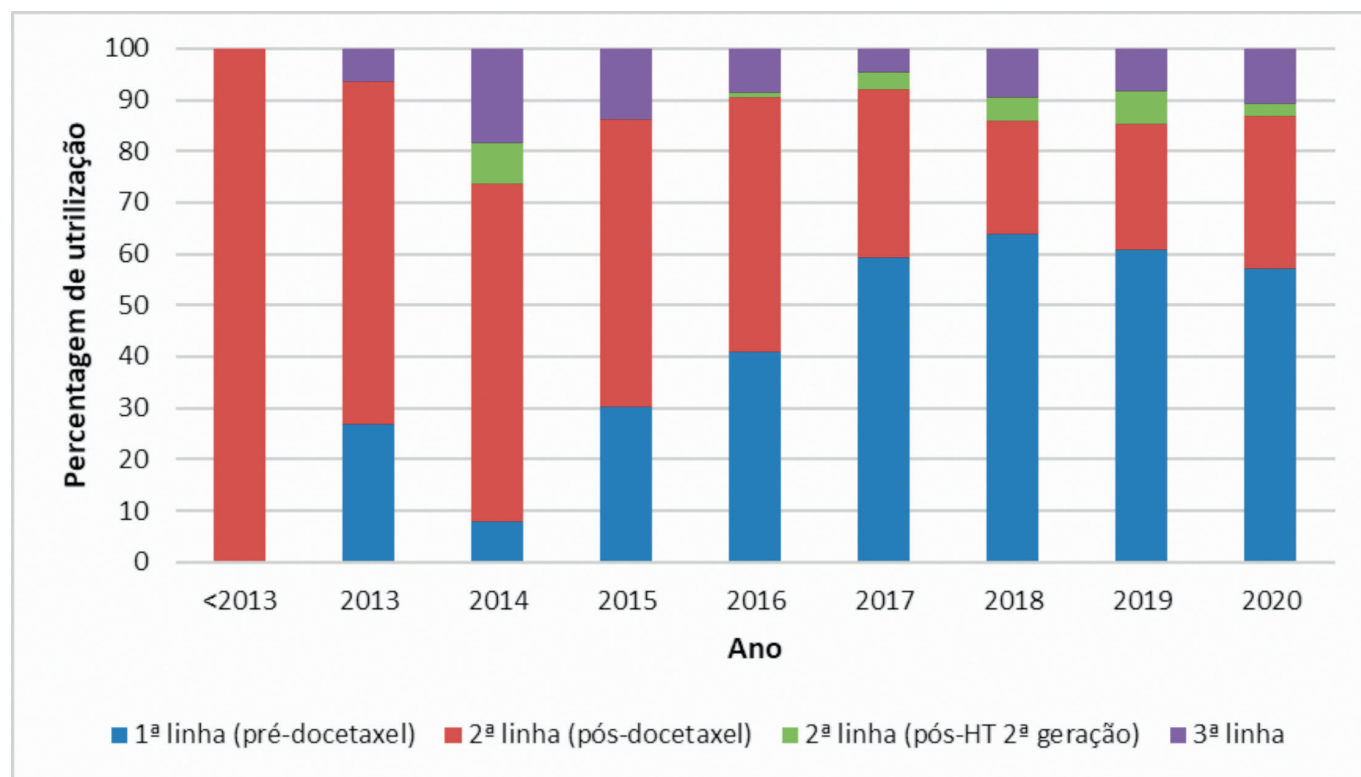


Tabela 1 – Características dos doentes estratificadas por fármaco

	Total	Abi	Enz	Cab	Rad	p
N	1075	368	524	147	36	
Idade§	72,5±8,5	72,7±8,9	73,8±8,0	67,5±7,4	72,1±7,8	<0,001
ECOG PS=1	83,7%	82,6%	85,5%	85,4%	90,7%	0,225
Grau ISUP=4	61,5%	56,0%	61,3%	76,3%	61,3%	0,007
PSA basal¥	327±60	258±29	361±120	376±55	334±99	0,873
Metástases viscerais	13,4%	14,7%	11,3%	21,1%	0%	<0,001
Fase						
1ª linha	43,7%	44,3%	58,6%	0%	0%	<0,001
2ª linha após docetaxel	34,7%	43,5%	28,2%	40,1%	16,7%	
2ª linha após HT 2ª geração	3,5%	3,3%	3,8%	0,7%	13,9%	
3ª linha	18,0%	9,0%	9,4%	59,2%	69,4%	

Abi – abiraterona; Enz – enzalutamida; Cab – cabazitaxel; Rad – radio 223;

§ - média ± desvio padrão, em anos; ¥ - - média ± desvio padrão, em ng/mL;



*: cancro da próstata metastático resistente à castração

Figura 2 – Percentagem de utilização da abiraterona e enzalutamida por fase da doença, nos doentes mCRPC*, ao longo dos anos



(21,1%) enquanto os tratados com Rad não tinham metástases viscerais; todos tinham metástases ósseas e 97,2% tinham mais de 3 metástases. Cerca de 93% dos doentes com apenas metástases ganglionares ou com menos de 3 metástases ósseas foram tratados com hormonoterapias de 2ª geração (dados não apresentados na Tabela 1).

Dos doentes tratados em primeira linha, 126 (26,8%) ainda estavam estabilizados nesse tratamento à data da última avaliação, enquanto 344 (73,2%) já o tinham suspenso. Destes 344 doentes que já o tinham suspenso, 245 (71,2%) já tinham falecido. Dos doentes tratados em segunda linha (pós docetaxel ou hormonoterapia de 2ª geração), 41 (10,0%), ainda estavam estabilizados nesse tratamento à data da última avaliação, enquanto 370 (90,0%) já o tinham suspenso. Destes 370 doentes que já o tinham suspenso, 310 (75,4%) já tinham falecido.

Discussão

O uso destes novos tratamentos para o mCRPC aumentou de 2013 até 2018 e depois estabilizou ou até diminuiu. Analisando por fármaco, este aumento até 2018 e posterior redução deve-se sobretudo às duas hormonoterapias de 2ª geração (Abi e Enz) que foram os fármacos mais usados, tal como noutros países.^{5,6} Esta mudança poderá ser explicada pelo uso destes fármacos numa fase mais precoce da doença, devido à sua aprovação em 2017 para o cancro da próstata resistente à castração não metastizado de alto risco e em 2018 para o cancro da próstata metastizado sensível à castração. É importante ter em atenção que os dados de 2020 podem ser influenciados pelo facto de não termos dados de 2 hospitais (sendo, portanto, a comparação com outros anos enviesada) e a um possível efeito da pandemia COVID-19.

Em relação à utilização destes fármacos nas diferentes fases da doença, confirmamos que os fármacos foram utilizados em diferentes linhas de tratamento, conforme as respectivas aprovações, tal como documentado noutros países.⁵⁻⁷ As duas hormonoterapias de 2ª geração foram utilizadas sobretudo numa fase pós-docetaxel, correspondendo à primeira indicação aprovada; posteriormente foi alargada a sua utilização à primeira linha pré-docetaxel, que a partir de 2017 se tornou predominante.^{8,9} O Cab foi prescrito em homens com mCRPC em que a doença progrediu durante ou após um tratamento de quimioterapia baseado em docetaxel, conforme aprovação.¹⁰ O Rad está aprovado em doentes com mCRPC com metástases ósseas sintomáticas e sem metástases viscerais conhecidas, em progressão, depois de receberem pelo menos duas linhas de tratamento sistémico ou no caso de não existir alternativa terapêutica.¹¹ Esta indicação também explica o facto de os doentes tratados com Rad na prática clínica não terem metástases viscerais.

Também foi verificado nos nossos resultados da vida real que os doentes tratados com Cab têm maior probabilidade de ter

metástases viscerais, tumores com grau ISUP mais elevado e serem mais novos. Este padrão está de acordo com a literatura internacional publicada.^{6,7} A diferença de idades terá estado provavelmente relacionada com o padrão de efeitos laterais que implica a utilização deste fármaco, pelo que doentes mais novos, previsivelmente com menos comorbilidades, terão sido preferencialmente selecionados. A sua maior utilização em doentes com metástases viscerais e tumores mais indiferenciados reflete o facto deste fármaco também ter sido estudado num ensaio clínico com maior percentagem de doentes nestas condições, acarretando assim melhor evidência de benefício nestas populações.

O nosso estudo tem limitações inerentes à sua natureza observacional e retrospectiva. Só foi recolhida informação que fosse registada por rotina na prática clínica, não sendo possível uma avaliação prospectiva, universal e padronizada de todos os doentes incluídos, podendo condicionar a validade externa dos resultados; a possibilidade de ocorrência de erros nos registos e sua interpretação é um factor igualmente a salientar na descrição das limitações do estudo. Este artigo não versou sobre a eficácia e efeitos laterais destas medicações na prática clínica que será sujeita a análise noutra publicação. A utilização dos fármacos foi heterógenea entre os hospitais incluídos (alguns usaram preferencialmente Abi, outros Enz, como hormonoterapias de 2ª geração) e podem não ser representativos de todos os hospitais públicos portugueses, sendo as extrapolações ainda mais difíceis relativamente à utilização destes fármacos nos hospitais privados.

No entanto, a mais-valia deste estudo reside na grande dimensão da coorte de doentes selecionados, resultado de uma colaboração inédita multicêntrica entre os seis maiores hospitais do norte de Portugal, o que permitiu incluir todos os doentes tratados nestas instituições, reflectindo assim a prática clínica diária.

À medida que as indicações para a utilização destes fármacos vão sendo alargadas, será necessário acompanhar a evolução da utilização dos mesmos nos próximos anos, preferencialmente numa amostra mais representativa dos hospitais portugueses e com mais anos de seguimento.

Responsabilidades Éticas

Conflitos de Interesse: Os seguintes autores declaram que receberam remunerações de palestras ou consultadoria das seguintes empresas:

Francisco Botelho: Astellas, Janssen-Cilag, Bayer.

Ricardo Leão: Roche, Janssen-Cilag, Ipsen.

Carlos Silva: Astellas, Janssen-Cilag, Astra Zéneca, Menarini, Ferring, Pfizer, Glaxo, Bayer.

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Proteção de Pessoas e Animais: Os autores declaram que os procedimentos seguidos estavam de acordo com os regulamentos estabelecidos pela Comissão de Ética responsável e de acordo com a Declaração de Helsínquia revista em 2024 e da Associação Médica Mundial.

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Autor Correspondente/Corresponding Author:

Francisco Botelho

Rua Júlio Dinis, 230 B2 15ºesq – 4050-318 PORTO, Portugal

francisco.botelho@gmail.com

<https://orcid.org/0000-0002-6666-0883+351913650130>

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AM, IB, RL, FT, JD, FR, JO, IA, CP, JF, SC, PL, PG, CS – Recolha de dados, Redação – revisão e edição

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Assessing the Impact of Old Age on Upper Tract Urothelial Carcinoma: A Retrospective Analysis from a Portuguese Tertiary Center

Avaliação do Impacto de Idade Avançada no Carcinoma Urotelial do Alto Aparelho: Uma Análise Retrospectiva de um Centro Terciário Português

Frederico Portugal Gaspar¹, Filipe Lopes¹, Jorge Correia², João Carvalho², Rui Freitas², Isaac Braga², José Sanches Magalhães², Vítor Silva², Francisco Lobo², António Moraes²

Abstract

Introduction: Upper tract urothelial carcinoma is an infrequent but aggressive disease. Radical nephroureterectomy is the standard of care for nonmetastatic tumors. The potential implications of old age in the management of upper tract urothelial carcinoma are still controversial. Our aim was to analyze the effect of old age on perioperative and oncological outcomes after radical nephroureterectomy.

Methods: We performed an observational and retrospective analysis of patients submitted to radical nephroureterectomy for nonmetastatic upper tract urothelial carcinoma in our centre between January 2018 and June 2023. Seventy-nine patients were included and divided according to their age at the time of surgery (<80 or ≥80 years old). Perioperative variables and oncological outcomes were compared between the groups. Kaplan-Meier analysis and univariable Cox regression models were used to evaluate disease-free survival, metastasis-free survival and overall survival distribution between the groups.

Results: Sixteen patients (20.5%) were aged 80 or older. We found an association between older age and a higher proportion of invasive disease (pT2 or higher; $p=0.048$). We also observed that omission of bladder cuff excision was more common in older patients ($p=0.008$). We found no differences regarding perioperative outcomes. Also, no differences in oncological outcomes, namely, disease-free survival ($p=0.884$), metastasis-free survival ($p=0.867$) and overall survival ($p=0.916$) were found.

Conclusion: Older age at the time of radical nephroureterectomy had no detrimental effect on perioperative and oncological outcomes. Our results suggest that older age by itself should not preclude radical nephroureterectomy.

Keywords: Aged; Carcinoma, Transitional Cell; Nephroureterectomy; Neoplasm Recurrence, Local; Ureteral Neoplasms; Urinary Bladder Neoplasms

Resumo

Introdução: O carcinoma urotelial do alto aparelho é uma doença agressiva, apesar de ser pouco frequente. A nefroureterectomia radical é o tratamento de eleição aquando ausência de metastização. As implicações da idade avançada no tratamento do carcinoma urotelial do alto aparelho são controversas. O objetivo deste trabalho é analisar o efeito da idade avançada nos resultados perioperatórios e oncológicos de doentes com carcinoma urotelial do alto aparelho submetidos a nefroureterectomia radical.

Métodos: Foi realizada uma análise observacional e retrospectiva dos doentes submetidos a nefroureterectomia radical por carcinoma urotelial do alto aparelho em fase não metastática no nosso centro, entre janeiro de 2018 e junho de 2023. Setenta e nove doentes foram incluídos e divididos consoante a idade no momento da cirurgia (<80 ou ≥80 anos de idade). As variáveis perioperatórias e resultados oncológicos foram comparados entre os grupos. Análise de Kaplan-Meier e regressão univariável de Cox foram utilizadas para avaliar a sobrevida livre de doença, sobrevida livre de metastização e sobrevida global.

Resultados: Dezas seis doentes (20,5%) apresentavam 80 anos ou mais. Foi observada uma associação entre idade avançada e uma maior proporção de doença invasiva (pT2 ou mais elevado; $p=0,048$). Também foi observado que a omissão de cistectomia peri-meática foi mais comum nos doentes mais velhos ($p=0,008$). Não foram observadas diferenças nos resultados perioperatórios. Também não foram observadas diferenças nos resultados oncológicos, nomeadamente na sobrevida livre de doença ($p=0,884$), sobrevida livre de metastização ($p=0,867$) ou sobrevida global ($p=0,916$).

Conclusão: A idade avançada no momento da nefroureterectomia radical não parece comprometer os resultados perioperatórios ou oncológicos nos casos de carcinoma urotelial do alto aparelho. Deste modo, os nossos resultados sugerem que a ida-

1 – Serviço de Urologia, Hospital Egas Moniz – Unidade Local de Saúde Lisboa Ocidental, Lisboa, Portugal

2 – Serviço de Urologia Instituto Português de Oncologia Francisco Gentil do Porto, Porto, Portugal

de avançada por si não deve levar à evicção de nefroureterectomia radical.

Palavras-chave: *Carcinoma de Células de Transição; Idoso; Nefroureterectomia; Neoplasias da Bexiga Urinária; Neoplasias do Ureter; Recidiva Local de Neoplasia*

Introduction

Upper tract urothelial carcinoma (UTUC) is an infrequent malignancy, comprising only for 5% of all urothelial carcinomas (UC).¹ It is an aggressive disease, with an estimated overall five-year cancer-specific survival (CSS) of approximately 75% after surgical treatment, with survival further decreasing in less favorable cases such as high-stage disease.^{2,3} Radical nephroureterectomy (RNU) with bladder cuff excision remains the standard-of-care for non-metastatic high-risk UTUC.⁴

Life expectancy is increasing worldwide, resulting in an increase of the elderly population globally. One expected consequence of this global ageing is an increase in cancer diagnosis.⁵ This may be of particular relevance for UTUC given its estimated peak incidence between 70 and 90 years old.^{1,6}

The risk-benefit balance between surgical aggression and potential gains in oncological control is particularly challenging in the elderly. This directly translates to the management of UTUC. RNU is a major surgery with considerable perioperative risks, but it is also the only curative option for an aggressive disease. Previous studies regarding the management of UTUC in the elderly population and, more precisely, the applicability of RNU in this particular population, have shown inconsistent findings. Firstly, worse oncological outcomes, such as inferior CSS and overall survival (OS), were observed by some authors in the older patients.⁷⁻⁹ These results support the notion that older age imposes a negative influence in the outcome of UTUC. However, other works have not found this detrimental effect of old age.¹⁰⁻¹² More specifically, these studies presented similar results regarding recurrence-free survival (RFS) and CSS between younger and older patients.

In our work, we aim to analyze a population of nonmetastatic UTUC patients submitted to RNU and elucidate the role of advanced age in the perioperative and oncological outcomes. Our main hypothesis is that older age does not confer, by itself, worse oncological outcomes. We also hypothesize that older age may confer worse perioperative outcomes.

Methods

Population

An observational and retrospective study was performed by reviewing the clinical records of all patients diagnosed with non-metastatic UTUC and submitted to RNU with curative intent in our

centre between January 2018 and June 2023. Seventy-nine cases were identified and divided according to age at surgery: i) less than 80 years old (group 1, n=63); ii) 80 or more years old (group 2, n=16). This age cutoff was chosen mainly for two reasons. First and foremost, it aligns with the Portuguese life expectancy¹⁴. Additionally, we consider the 80 years threshold more challenging regarding surgical decision than other cut-offs seen in the literature, such as the 70-year mark. Surgical approach (open or laparoscopic) was discussed at the department's meeting in a case-by-case basis before the intervention. The bladder cuff excision (BCE) technique was not standardized and decided by the senior surgeon. Template-based lymph node dissection (LND) was performed when bulky nodal disease was identified at staging computerized tomography or intraoperatively. Two patients underwent adjuvant chemotherapy, while neoadjuvant chemotherapy was not used.

Demographics, clinical and tumor-specific variables including gender, previous history of UC, presence of ureterohydronephrosis (UHN), tumor location (renal pelvis, ureter or both), size of lesion (categorized as smaller or larger than 2 cm), multifocality and previous radical cystectomy status were collected and analyzed. Surgical details, such as the surgical approach (open or laparoscopic) and the method of BCE were also studied. Pathological characteristics were also assessed, with tumor staging according to TNM classification of AJCC¹⁵ and tumor grading by WHO.¹⁶ Other pathological variables assessed were the presence of histological subtypes,¹⁶ lymphovascular invasion (LVI), carcinoma *in situ* (CIS) and margin status.

We evaluated perioperative outcomes between groups, namely: any complications, classified by Clavien-Dindo (CD) classification, 17 major complications (CD≥3), reintervention rate, perioperative mortality and transfusion rate. Operative time and hospital stay duration were also compared. Patients submitted to synchronous radical cystectomy were excluded from the perioperative analysis.

Oncological outcomes were also analyzed. Follow-up of the patients was performed as standardized in our institution, with cystoscopy, urine cytology and computed tomography (with urography) performed routinely in a risk-based schedule. The events studied were local recurrence, bladder recurrence, metastatization and death. We also performed a survival analysis regarding disease-free survival (DFS), defined as the time between nephroureterectomy and the occurrence of any of the previous events except for bladder recurrence, metastasis-free survival (MFS), defined as the time between nephroureterectomy and the finding of metastasis, and overall survival (OS), defined as the time between nephroureterectomy and death from any cause.

We defined as our primary endpoints for the oncological outcomes analysis DFS and MFS distributions according to age at



the time of surgery. Also, for the perioperative analysis, rate of overall complications was defined as the primary outcome.

Statistical Analysis

Categorical variables are presented as frequencies and percentages. Continuous variables are presented as mean $\pm$ standard deviation or median; IQR (interquartile range) as appropriate. Chi-square (χ^2) or Fisher's exact tests were used for categorical variables. T student test and Mann-Whitney U test were performed for continuous variables, whether with or without normal distribution, respectively. The distribution of disease-free survival, me-

tastasis-free survival and overall survival was estimated using the Kaplan–Meier analysis with log-rank test. A univariable Cox regression model was also performed for disease-free survival, metastasis-free survival and overall survival. A *p*-value inferior to 0.05 was considered statistically significant. Analyses were performed with the IBM SPSS Statistics v.26 for Windows software (IBM Corp, Armonk, NY).

Results

Table 1 shows the demographics, clinical and surgical data of the 79 patients with nonmetastatic upper tract urothelial carcinoma

Table 1 – Demographic, clinical and surgical characteristics and their association with age at the time of surgery for the 79 patients submitted to radical nephroureterectomy for upper tract urothelial carcinoma

	<80 years (n=63)	≥80 years (n=16)	<i>p</i> -value ^a
Median age (y); IQR	69; 13	84; 5	-
Median follow-up (mo); IQR	21; 29	22; 21	0.834
Male, <i>n</i> (%)	49 (77.8)	8 (50)	0.057
Previous UC, <i>n</i> (%)	15 (23.8)	1 (6.3)	0.170
UHN, <i>n</i> (%)	30 (47.6)	7 (43.8)	1
Lesion >2 cm, <i>n</i> (%)	48 (76.2)	11 (68.8)	0.535
Tumor location			0.050
Renal pelvis, <i>n</i> (%)	42 (66.7)	9 (56.3)	
Ureter, <i>n</i> (%)	20 (31.7)	4 (25)	
Both, <i>n</i> (%)	1 (1.6)	3 (18.8)	
Laterality			0.586
Left, <i>n</i> (%)	29 (46)	6 (37.5)	
Right, <i>n</i> (%) (93.8)		34 (54)	10 (62.5)
Multifocality, <i>n</i> (%)	13 (20.6)	3 (18.8)	1
Previous Cy, <i>n</i> (%)	4 (6.3)	-	0.354
Surgical approach			0.056
Open, <i>n</i> (%)	19 (31.1)	1 (6.3)	
Laparoscopic, <i>n</i> (%)	42 (68.9)	15	
Bladder cuff management			0.008
Open cuff excision, <i>n</i> (%)	29 (52.7)	6 (40)	
Laparoscopic cuff excision, <i>n</i> (%)	11 (20)	-	
Laparoscopic ureterectomy without cuff excision, <i>n</i> (%)	4 (7.3)	6 (40)	
Endoscopic excision, <i>n</i> (%)	11 (20)	3 (20)	

Y - years; mo - months; IQR – interquartile range; UC – urothelial carcinoma; UHN – ureterohydronephrosis; Cy – cystectomy.

^a Mann-Whitney U test for continuous variables. Fisher's exact test and Chi-square test (presence of UHN and laterality) for categorical variables.



submitted to radical nephroureterectomy. Sixteen (20.5%) patients were older than 80 years at the time of RNU, with a median age of 84 years (Interquartile range of 5 years). Follow-up was available for 78 patients (one patient from group 2 lost follow-up) with an average time of 26 ± 2.1 months. We observed a trend favoring female sex in the older patients (22.8% vs 50%; $p=0.057$), and also between older age and evidence of disease in both renal pelvis and ureter ($p=0.050$). All the other clinical characteristics at presentation were similar between the groups, namely history of UC or radical cystectomy before the diagnosis of UTUC, UHN at the time of diagnosis, a lesion size greater than 2 cm or disease multifocality. Regarding surgical management, although not statistically significant, a minimally invasive approach (transperitoneal laparoscopic) was preferred in the elderly patients (93.8% (15/16) vs 68.9% (42/63); $p=0.056$). Bladder cuff management at the time of the RNU was significantly different between the groups ($p=0.008$), with a higher proportion of patients in the elderly group submitted to RNU without formal bladder cuff excision (7.3% vs 40%).

The pathological features of the RNU specimens are summarized in Table 2. A higher tumor stage was observed in the older patients, with 81.3% (13/16) being pT2 or higher, against 52.4% (33/63) in group 1 ($p=0.048$). Other pathological features were not statistically different between the groups.

The perioperative results are shown in Table 3, while Table 4 depicts the oncological results. There were no differences between the groups regarding any outcome studied. Furthermore, there were no differences regarding disease-free survival, metastasis-free survival and overall survival between the two groups studied (Fig. 1).

Oncological Results of Omission of Bladder Cuff Excision

Regarding the subgroup of elderly patients managed without bladder cuff excision, these showed an average age of 85.8 ± 1.2 years. The majority were female (83.3% (5/6)), with an isolated tumor of the renal pelvis (66.7% (4/6)). 83.3% (5/6) of the cases were pT2 or higher. Follow-up was only available for 5 patients, for

Table 2 – Pathological features and their association with age at the time of surgery for the 79 patients submitted to radical nephroureterectomy for upper tract urothelial carcinoma

	<80 years (n=63)	≥80 years (n=16)	p-value ^a
pT stage			0.452
T0, n (%)	3 (4.8)	–	
Ta, n (%)	11 (17.5)	1 (6.3)	
T1, n (%)	16 (25.4)	2 (12.5)	
T2, n (%)	10 (15.9)	3 (18.8)	
T3, n (%)	18 (28.6)	7 (43.8)	
T4, n (%)	5 (7.9)	3 (18.8)	
pT≥2, n (%)	33 (52.4)	13 (81.3)	0.048
LA (pT3-4 and/or pN+), n (%)	24 (38.1)	10 (62.5)	0.095
Positive surgical margin, n (%)	7 (11.1)	4 (25)	0.219
Tumor grade			0.234
Dysplasia, n (%)	2 (3.2)	–	
Low grade, n (%)	–	1 (6.3)	
High grade, n (%)	61 (96.8)	15 (93.8)	
Histological subtype, n (%)	16 (25.4)	5 (31.3)	0.753
Lymphovascular invasion, n (%)	17 (27)	7 (43.8)	0.229
CIS, n (%)	16 (26.2)	3 (18.8)	0.747

LA – locally advanced; CIS – carcinoma in situ

^a Fisher's exact test and Chi-square test (distribution of pT≥2 disease or LA disease) for categorical variables.



Table 3 – Perioperative results and their association with age at the time of surgery for the 70 patients submitted to radical nephroureterectomy for upper tract urothelial carcinoma without synchronous radical cystectomy

	<80 years (n=55)	≥80 years (n=15)	p-value ^a
Complication (CD)			0.541
No, n (%)	40 (72.7)	9 (60)	
I, n (%)	3 (5.5)	1 (6.7)	
II, n (%)	9 (16.4)	4 (26.7)	
III, n (%)	1 (1.8)	1 (6.7)	
IV, n (%)	-	-	
V, n (%)	2 (3.6)	-	
Major complication (CD≥3), n (%)	3 (5.5)	1 (6.7)	1
Reintervention, n (%)	3 (5.5)	1 (6.7)	1
Perioperative mortality, n (%)	2 (3.6)	-	1
Transfusion, n (%)	4 (7.3)	2 (13.3)	0.602
Mean operative time ± SD (min)	173.8 ± 7.1	181 ± 15.7	0.651
Median hospital stay (d); IQR	6; 3	6; 2	0.816

CD – Clavien-Dindo; SD – standard deviation; min – minutes; d – Days; IQR – interquartil range.

^a Mann-Whitney U and T student tests for continuous variables. Fisher's exact test for categorical variables.

Table 4 – Oncological outcomes and their association with age at the time of surgery for the 78 patients submitted to radical nephroureterectomy for upper tract urothelial carcinoma with adequate follow-up

	<80 years (n=63)	≥80 years (n=15)	p-value ^a
Local recurrence, n (%)	9 (15)	2 (13.3)	1
Bladder recurrence, n (%)	10 (18.2)	3 (20)	1
Distant recurrence, n (%)	17 (28.3)	4 (26.7)	1
Death, n (%)	20 (32.3)	5 (33.3)	1

^a Fisher's exact test for categorical variables.

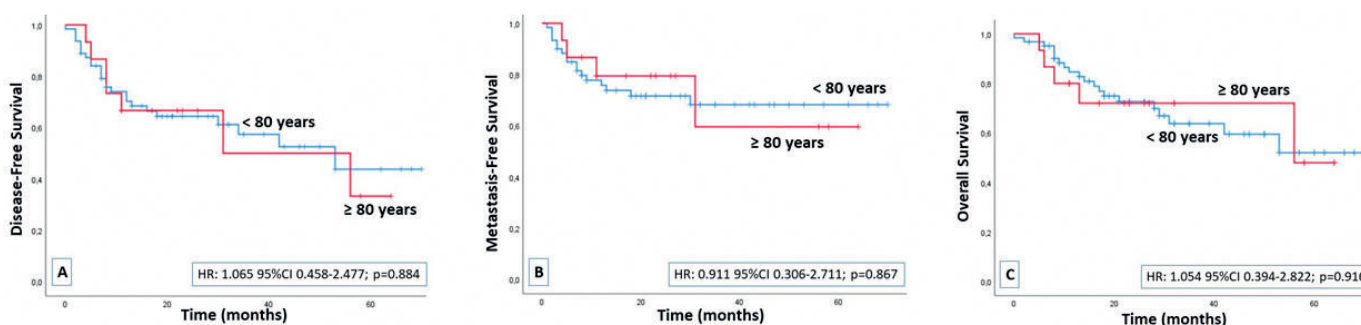


Figure 1 – Kaplan-Meier plots of survival analyses according to age at surgery (<80 vs ≥80 years old) for: disease-free survival (A); metastasis-free survival (B) and overall survival (C)



an average time of 16.6 ± 5.4 months. Bladder recurrence, local recurrence, metastization and death (of any cause) occurred in 2/5 patients (40%), with only one patient out of five remaining totally disease-free during the entire follow-up.

Given the omission of bladder cuff excision in these patients, the surgical margin status is a matter of particular interest. Three cases (out of 6) had positive surgical margins. However, one case had locally advanced disease (pT4) with positive surgical margin only at the perirenal fat, with disease progression and death in five months. Other case also had a locally advanced disease (pT4) with positive surgical margin both in perirenal fat tissue and ureter margin. This patient has lost follow-up. The third patient had a microscopic positive margin of the ureteric stump. This patient developed local recurrence at 8 months, and was managed with ureterectomy of the remnant ureter. Bladder recurrence followed at 15 months, which was managed with transurethral resection, being currently without evidence of disease.

Discussion

The impact of old age in the management of UTUC remains a controversial topic in our work, we retrospectively analyzed a population of elderly UTUC patients regarding perioperative and oncological outcomes. We found no significant differences between the two age groups in our primary endpoints for oncological outcomes, namely, DFS ($p=0.884$) and MFS ($p=0.867$), supporting our hypothesis that advanced age, by itself, may not confer worse oncological outcomes for UTUC. Also, the other oncological outcomes, such as OS distribution, local recurrence, bladder recurrence, distant recurrence and death of any cause, were similar between the groups, further supporting our hypothesis. We hypothesized, however, that older age would confer worse perioperative results, namely with a higher overall surgical complications rate. This was not the case, with a non-statistical difference between the groups, not only in our primary endpoint of overall complications, but also in all other perioperative outcomes. These results would let us conclude that age by itself does not pose a detrimental effect on perioperative results. However, this conclusion must be made with caution, given the fact that the two subgroups are not truly comparable regarding the surgical approach and bladder cuff excision method, which limits this analysis.

The implications of advanced age in the management and outcomes of UTUC have already been studied by several authors, although with contradictory results. Shariat *et al.*,⁷ in a multicentric study with 1453 patients, found an association between older age and worse CSS and OS. The same results were observed in a study by Chromecki *et al.*,⁸ in a study with more than 1000 patients, with older age being associated with worse RFS, CSS and OS. More recently, in a large multicentric Italian study, Ferro *et al.*⁹

found the same results, with older age associated with worse CSS and OS. It is noteworthy, however, that differences in patient management were observed between older and younger patients. Firstly, in all the studies, adjuvant chemotherapy was less frequently used in elderly patients. Also, elderly patients were less frequently submitted to LND in the two older studies.^{7,8} These discrepancies in patient management led the authors to raise the possibility that suboptimal management in the elderly patients may have also contributed to the worse outcomes found. In line with that hypothesis, in the study of Chromecki *et al.*,⁸ after adjusting for the ECOG performance status, the impact of age in RFS and CSS was no longer observed. This led the authors to conclude that chronological age per se is not a contraindication for RNU. Furthermore, Teoh *et al.*¹⁸ showed in their work that being submitted to RNU was associated with better DFS regardless of age. Although this gain was more pronounced in younger patients, it was also observed in the older ones. Therefore, the authors concluded that RNU should always be considered when deemed feasible. Additionally, considering that older patients are less likely to undergo chemotherapy, the authors highlight the potential curative effect of RNU in this subset of patients.

Other works found an absence of clinical impact of age in the outcomes of UTUC. Ye *et al.*¹⁰ studied 588 UTUC patients to whom a RNU was performed and observed no differences in CSS between older and younger patients. Similar results regarding CSS were found by Yamada *et al.*,¹¹ Koterazawa *et al.*,¹² and Ishikawa *et al.*¹³ These works also reported on RFS, that was similar between the two age groups. Inferior OS was reported in two studies,^{11,12} with an inferior survival being attributed by the authors to other-cause mortalities. Perioperative complications and outcomes were only analysed in the work of Koterazawa *et al.*¹² These were similar between older and younger patients, underlining the feasibility of RNU in the elderly population.

Our work is not without limitations, that must be acknowledged. First of all, the retrospective design of the study is a limitation given the inherent shortcomings of this design. There is also a potential selection bias based on surgical eligibility, mainly in the elderly group. It is possible that the present cohort of elderly patients may not represent the entire population aged above 80 years old. Another limitation is the fact that a comprehensive analysis of comorbidities and functional status was not taken into account. Also, it can be pointed as a limitation the relatively small number of patients in our series. Despite this being true, it represents the experience of a high-volume centre, ensuring a more standardized follow-up and perioperative management, a limitation commonly seen in other works. Another limitation is the chosen age cut-off of 80 years old. This fact represents a limitation since that, in the literature, different age thresholds are chosen by different authors. This lack of uniformity limits the direct compa-



ri-son and external applicability of all these studies and ours as well.

Another limitation is the unstandardized performance of LND and also the unstandardized management of the bladder cuff during RNU. Bladder cuff excision is a matter of extreme controversy. The uncertainties reside not only in the superiority between surgical techniques, but also in the real benefit of performing the cuff excision. Bladder cuff management has, in the one hand, been shown to be an important factor influencing intravesical recurrence.¹⁹⁻²¹ On the other hand, the same authors found that RFS, CSS and OS outcomes were not influenced by bladder cuff management.¹⁹ The same results were found recently in the work of Yong *et al*²² where the omission of BCE did not influence MFS, CSS or OS but was associated with an increase in bladder recurrence. Therefore, although the unclear effect on survival, BCE is considered part of the standard-of-care procedure for UTUC, given the increased risk of bladder recurrence derived from its omission. However, it is not universally performed. This is observed in large multicentric retrospective studies, where the percentage is less than 75%.^{23,24}

These uncertainties regarding the oncological benefit of BCE are even more significant in patients with an isolated urothelial tumor of the renal pelvis. Lughezzani *et al*²³ analysed more than 4000 patients with a renal pelvic tumour and found an association between the omission of the excision of bladder cuff and worse cancer specific mortality, but only in locally advanced disease. However, as it is pointed out by Zlotta²⁵ this finding is quite perplexing given the fact that these patients are expected to progress to distant recurrence irrespective of the bladder cuff excision. It is also noteworthy that the patients in which the bladder cuff excision was not performed were older, with higher pT stage, higher tumor grade and also with significantly higher proportion of nodal involvement, which may interfere with the findings. Conversely, other authors found that the omission of the bladder cuff excision may not compromise oncological outcomes. Nazzani *et al*²⁴ performed a large multicentric retrospective study based on the SEER database. The authors analysed more than 4000 patients with T1-T3 renal pelvic urothelial tumors and found that the omission of bladder cuff excision did not influence CSS or other cause mortality.

In our series, we observed a higher proportion of elderly patients in whom bladder cuff excision was omitted. These patients were extremely old and with a very high proportion of muscle-invasive disease. Although with a very small number and therefore without power for statistical analysis, some considerations can still be made. Firstly, the option of sparing the bladder cuff resulted in evident suboptimal surgery in two cases, given the positive margin in the ureteric stump. One of these patients had a worse outcome directly due to that decision, with local and bladder

recurrence with need of a deferred ureterectomy and transurethral resection. However, this patient was thereafter without evidence of disease. Secondly, we must also observe that the rate of any oncological event, more importantly, distant progression, was 40%, which was slightly higher than in the overall series, even in the presence of a shorter follow-up time. The very low number of patients and the very aggressive histology found in these patients, higher than the overall series, precludes drawing conclusions regarding the possible impact of BCE on progression and in our series. On another note, the impact of BCE omission in the perioperative outcomes was not studied. If a more favourable perioperative profile were to be seen with the omission of BCE, one could argue that it may justify the inferior local and bladder control, assuming that survival will not be affected. Although this represents an enticing hypothesis, our work is unable to provide answers in this regard, with further studies with a larger number of patients being needed.

Conclusion

In conclusion, the perioperative and oncological outcomes showed no difference between older and younger patients with UTUC. Our results suggest that age in itself should not preclude RNU for nonmetastatic UTUC if the patient is deemed fit-for-surgery. Additionally, a less aggressive surgery, by omitting the excision of bladder cuff in selected tumors of the renal pelvis, may be a surgical option with a more favorable risk-benefit ratio for older patients, albeit still needing further studies for its validation.

Responsabilidades Éticas

Conflitos de Interesse: Os autores declaram a inexistência de conflitos de interesse na realização do presente trabalho.

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Proteção de Pessoas e Animais: Os autores declaram que os procedimentos seguidos estavam de acordo com os regulamentos estabelecidos pela Comissão de Ética responsável e de acordo com a Declaração de Helsínquia revista em 2024 e da Associação Médica Mundial.

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Protection of Human and Animal Subjects: The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and those of the Code of Ethics of the World Medical Association (Declaration of Helsinki as revised in 2024).

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JC (J. Correia), JC (J. Carvalho), JSM, VS, FL (F. Lobo), AM: Revisão e aprovação final da versão a ser publicada.

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JC (J. Correia), JC (J. Carvalho), JSM, VS, FL (F. Lobo), AM: Revision and final approval of the version to be published.

Autor Correspondente/Corresponding Author:

Frederico Portugal Gaspar

fgaspar@ulslo.min-saude.pt

Serviço de Urologia, Hospital Egas Moniz – Unidade Local de Saúde Lisboa Ocidental

Rua da Junqueira, 126 1349-019 LISBOA

ORCID: <https://orcid.org/0000-0002-6267-0451>

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Early Experience in Extraperitoneal Robotic Assisted Radical Prostatectomy with HUGO RAS System: A Comparative Analysis with Laparoscopic Radical Prostatectomy

Experiência Inicial na Prostatectomia Radical Extraperitoneal Assistida por Robot com o HUGO RAS: Análise Comparativa com a Prostatectomia Radical Laparoscópica

Miguel Marques Monteiro¹, David Teixeira², Diogo Nunes-Carneiro^{1,2}, João Cabral¹, Frederico Teves^{1,2}, José Soares^{1,2}, Avelino Fraga^{1,2}

Abstract

Introduction: The Hugo™ RAS system represents a novel robotic platform recently implemented in our department. Despite its introduction, there is still a scarcity of data regarding extraperitoneal robot-assisted radical prostatectomy (eRARP) carried out using this system. Our primary aim is to compare perioperative, early functional, and oncological outcomes of eRARP with the Hugo RAS System during our centre's initial foray into robotic surgery with our standard three-dimensional extraperitoneal laparoscopic radical prostatectomy (eLRP).

Methods: We conducted a retrospective analysis, comparing men diagnosed with localized prostate cancer who underwent either eRALP or eLRP at a tertiary referral centre in Portugal. These procedures were carried out by the same major surgeons between 2022 and 2023. Urinary continence was defined as no pads used and was assessed up to 3 months post-surgery. Oncologic outcomes were determined by evaluating the positive surgical margin (PSM) rate and PSA levels ≥ 0.1 ng/mL at 6 weeks. Secondary outcomes included the usage of protective pads at 6 weeks and 3 months post-surgery, total operative time, estimated blood loss, length of hospital stay, and catheterization time. Complications within 3 months post-surgery were classified according to the Clavien-Dindo system. Statistical analysis was conducted using SPSS Statistics 28®, with significance set at a two-sided p -value < 0.05 .

Results: Patients who underwent eRALP ($n=50$) and eLRP ($n=59$) were analysed and compared. Postoperative continence rates at 6 weeks and 3 months after surgery were 52.0% and 70.0% for eRALP and 42.4% and 64.4% for eLRP, respectively ($p > 0.05$).

PSA persistence was observed in 16.7% and 23.7% for the eRALP and eLRP, respectively ($p=0.369$). There was no statistically significant difference in the rates of positive surgical margins (PSM) between the two surgical modalities. Regarding perioperative outcomes, the median total operative time was greater for eRALP compared to eLRP (261 min (238-294) vs 177 min (157-200), $p < 0.001$). For eRALP, the median console time was 137 min (119-196), and the mean docking time was 4.6 min (IQR 4.1–5.2). The median estimated blood loss was 200 mL (250-575) vs 150 mL (100-200) for eRALP and eLRP, respectively ($p=0.151$). The median time to remove the vesical catheter was lower for eRARP (7 days (7–8) vs 8 days (8–10), $p < 0.001$). A percentage of 92% of patients undergoing eRALP had a length of stay less than or equal to two days, while only 52.5% of those undergoing eLRP met this criterion ($p < 0.001$). The only intraoperative complication registered was mechanical failure in one robotic arm, which required conversion to laparoscopy. No intraoperative complications for eLRP were registered. There was also no statistically significant difference in the rates of complication frequency within 3 months after surgery (eRALP 10.0% vs eLRP 10.2%, $p=0.459$).

Conclusion: Robotic-assisted extraperitoneal radical prostatectomy with the Hugo™ RAS demonstrates comparable oncological outcomes and early urinary continence to our standard laparoscopic extraperitoneal radical prostatectomy. eRARP with this novel robotic system seems to allow a seamless transition into robotic surgery.

Keywords: Laparoscopy; Prostate/surgery; Prostatectomy/methods; Prostatic Neoplasms/surgery; Robotic Surgical Procedures

Resumo

Introdução: O sistema Hugo™ RAS representa uma plataforma robótica inovadora, recentemente implementada no nosso departamento. Apesar da sua introdução, ainda existe uma escassez

1 – Urology Service, Unidade Local de Saúde de Santo António, Porto, Portugal

2 – Instituto Ciências Biomédicas Abel Salazar – Universidade do Porto, Porto, Portugal



sez de dados relativamente à prostatectomia radical extraperitoneal assistida por robot realizada com este sistema. O nosso principal objetivo é comparar os resultados perioperatórios, funcionais e oncológicos durante a nossa experiência inicial da prostatectomia radical assistida por robot (eRARP), utilizando o Sistema Hugo™ RAS, com a tradicional prostatectomia radical laparoscópica tridimensional extraperitoneal (eLRP).

Métodos: Realizamos uma análise retrospectiva, comparando homens diagnosticados com cancro da próstata localizado, que foram submetidos a eRALP ou eLRP num centro de referência terciário em Portugal. Estes procedimentos foram realizados pelos mesmos cirurgiões entre 2022 e 2023. A continência urinária foi definida como a não utilização de pensos e foi avaliada aos 3 meses após a cirurgia. Os resultados oncológicos foram determinados através da taxa de margens cirúrgicas positivas (PSM) e da avaliação da persistência de PSA (PSA=0,1 ng/mL às 6 semanas). Os resultados secundários incluíram o uso de pensos protetores às 6 semanas e aos 3 meses após a cirurgia, o tempo operatório total, a perdas sanguíneas estimadas, o tempo de internamento e o tempo de cateterização. As complicações até 3 meses após a cirurgia foram classificadas de acordo com o sistema Clavien-Dindo. A análise estatística foi realizada utilizando o SPSS Statistics 28®, com significância definida para um valor de p de duas caudas $<0,05$.

Resultados: Foram analisados e comparados pacientes submetidos a eRALP ($n=50$) e eLRP ($n=59$). As taxas de continência pós-operatória às 6 semanas e 3 meses após a cirurgia foram de 52,0% e 70,0% para eRALP e 42,4% e 64,4% para eLRP, respetivamente ($p>0,05$). A persistência do PSA foi observada em 16,7% e 23,7% para a eRALP e a eLRP, respetivamente ($p=0,369$). Não houve diferença estatisticamente significativa nas taxas de margens cirúrgicas positivas entre as duas modalidades cirúrgicas. Em relação aos resultados perioperatórios, a mediana do tempo operatório total foi maior para a eRALP comparado com eLRP (261 min (238-294) vs 177 min (157-200), $p<0,001$). Para a eRALP, a mediana do tempo de consola foi de 137 min (119-196), e o tempo médio de ancoragem foi de 4,6 min (IQR 4,1-5,2). A mediana de perdas sanguíneas estimadas foram de 200 mL (250-575) vs 150 mL (100-200) para a eRALP e eLRP, respetivamente ($p=0,151$). O tempo mediano para a remoção do cateter vesical foi menor para aeRARP (7 dias (7-8) vs 8 dias (8-10), $p<0,001$). Dos pacientes submetidos a eRALP, 92% tiveram um tempo de internamento inferior ou igual a dois dias, enquanto apenas 52,5% dos submetidos a eLRP cumpriram este critério ($p<0,001$). A única complicação intraoperatória registada foi a falha mecânica de um braço robótico, que exigiu a conversão para laparoscopia. Não foram registadas complicações intraoperatórias para a eLRP. Também não houve diferença estatisticamente significativa nas taxas de frequência de complicações até 3 meses após a cirurgia (eRALP 10,0% vs eLRP 10,2%, $p=0,459$).

Conclusão: A prostatectomia radical extraperitoneal assistida por robot com o Hugo™ RAS demonstra resultados oncológicos e continência urinária comparáveis com a prostatectomia radical laparoscópica extraperitoneal. A eRARP com este sistema robótico parece permitir uma transição suave para a cirurgia robótica com resultados favoráveis.

Palavras-chave: Laparoscopia; Neoplasias da Próstata/cirurgia; Próstata/cirurgia; Prostatectomia/métodos; Procedimentos Cirúrgicos Robóticos

Introduction

Prostate cancer (PCa) is the second most prevalent malignancy affecting men worldwide.^{1,2} Despite, it is a complex disease with a diverse spectrum of treatment modalities. In the context of clinically localised disease, radical prostatectomy remains the preeminent primary curative intervention. Historically, this procedure was primarily performed through open surgery, typically via a retropubic approach. Nevertheless, the notable incidence of post-prostatectomy complications, including urinary incontinence, sexual dysfunction, considerable haemorrhage, postoperative pain and long convalescence³ has catalysed the introduction of minimally invasive approaches to optimise functional outcomes and recovery period.

The advent of minimally invasive techniques, such as robotic-assisted approaches, has emerged as a viable alternative to open radical prostatectomy (ORP). Robotic-assisted radical prostatectomy (RARP) has gained increasing acceptance, establishing itself as the dominant surgical modality for prostatectomy due to its ability to combine the minimally invasive advantages of laparoscopic RP with enhanced technical proficiency in vesico-urethral anastomosis reconstruction.⁴ Consequently, RARP has become the preferred minimally invasive approach when available. RARP was initially introduced using the Da Vinci® Surgical system (Intuitive Surgical, Inc.) in 2002, which played a significant role in shaping the landscape of robotic surgery. However, the pace of technological advancement has led to the introduction of new robotic systems within the scientific community.⁵

One of the recent additions to the robotic surgical arena is the HUGO™ RAS System, developed by Medtronic. This system comprises an “open” surgical console with an HD-3D passive display, a system tower, and four independent, extendable modular portable arm carts. The open console facilitates the transition from laparoscopy to robotic surgery, while the independent robotic arms offer flexibility and innovative possibilities for configuring operative rooms and techniques. These characteristics allow a magnified three-dimensional vision, heightened precision and improved ergonomics.^{3,6-8}

Despite the enthusiasm surrounding RARP, no evidence exists to conclusively demonstrate its superiority over open and laparoscopic radical prostatectomy (LRP).⁹

Given our extensive experience in laparoscopic radical prostatectomy, questions persist regarding the advantages of RARP over LRP. Drawing from our prior investigations, our study aims to compare perioperative, oncologic, and early functional outcomes between RARP utilising this novel HUGO™ RAS System and LRP in a high-volume centre without prior robotic surgical experience.¹⁰

Methods

1. Study Design and Participants

We conducted a single-centre study within the high-volume urology department of Centro Hospitalar Universitário de Santo António, Porto, Portugal. We retrospectively reviewed patients diagnosed with newly localised prostate cancer who had opted for radical prostatectomy (RP) as their primary treatment, with or without pelvic lymphadenectomy (PLND). The decision to perform PLND was based on a preoperative risk of nodal involvement of 5%.¹¹

The objective of our trial was to compare two distinct modalities of minimally invasive radical prostatectomy. This included the recently introduced extraperitoneal robotic-assisted radical prostatectomy (eRARP) using the novel Hugo RAS System and our established standard approach, the three-dimensional extraperitoneal laparoscopic radical prostatectomy (eLRP).

For laparoscopic radical prostatectomy, we retrospectively collected data from January 2021 to December 2022, while data for RARP were gathered following its implementation in our department, from March 2023 to December 2023.

eRARP procedures were conducted by two surgeons (J.C. and F.T.) during their initial experience with robotic surgery. eLRP was performed by the same surgeons (J.C and F.T), both of whom had large LRP experience. We retrieved demographic, clinical, and disease-specific clinical data from the hospital's electronic clinical records, which were then extracted through a review of medical records. Ethical approval for the study was obtained from the relevant ethical committees and written informed consent was acquired from all participating patients. The study protocol received approval from the Ethics Committee of our university hospital (Reference Number: 2023.257(219-DEFI/209-CE). All procedures adhered to the principles of the Declaration of Helsinki, and patients provided their informed consent to participate.

2. Procedures and Postoperative Care

Extraperitoneal robot-assisted radical prostatectomies (eRARP) were conducted in accordance with previously published methods, as described.⁹ Extraperitoneal laparoscopic radical prostatectomy (eLRP) followed the same procedural technique. Vesical catheter removal was supervised by nursing staff and all patients received instructions to perform pelvic floor muscle exercises postoperatively.

3. Outcomes

Continence and oncological outcomes were assessed by analysing subjective data collected at baseline, at 6 and at 12 weeks postoperatively. Intraoperative data were recorded as per usual practice by the surgical and anaesthetic teams and subsequently obtained by the research team through a review of medical records. Postoperative complications were ascertained via medical records and patient interviews throughout the trial. Data were retrieved from the hospital's electronic clinical process and extracted by medical records review.

3.1 Perioperative Data

Surgical variables were assessed and compared as total intraoperative time (total duration that a patient spent in the operating room), operative time (duration of surgery), console time, estimated total blood loss, incidence of intraoperative adverse events, and need for technical conversion. We also closely examined the duration of indwelling catheter placement, length of hospital stays, postoperative complications (classified according to the modified Clavien-Dindo system) and readmission rates within 90 days following surgery.

3.2. Urinary Continence

Continence data were collected via patient-reported incontinence and the number of pads used at both 6 weeks and 12 weeks after RP. Patients were defined to be continent if they reported no pad usage during the specified periods.

3.3. Oncological Outcomes

Positive surgical margin (PSM) status and postoperatively PSA total levels served as surrogate markers for evaluating oncologic outcomes. PSA persistence was defined as PSA >0.1ng/mL at 6 weeks. Furthermore, the need for postoperative radiotherapy and localization, extension, and focality of surgical margins was documented.

4. Statistical Analysis

To characterise the study cohort, means and standard deviations were calculated for continuous variables, while numbers and percentages were determined for categorical data. Non-normally distributed samples were summarised using the median and quartiles. Shapiro-Wilk and histogram were used to assess normality and the Levene test for variance equality. For the comparison of categorical variables, χ^2 and Fisher's exact tests were utilised, while independent samples t-test and Mann-Whitney U-tests were employed for quantitative variables as appropriate. Uni and Multivariate logistic regression analysis were used to identify independent clinical and pathological predictors. Data preparation and descriptive statistics were performed using IBM SPSS version 29.0 Edition statistical software (IBM Corp., Armonk, NY, USA). The reported *p*-values were two-sided, and values <0.05 were taken to indicate statistical significance.



Results

Patients who underwent eRALP (n = 50) and eLRP (n = 59) were analysed and compared. Baseline, demographic, clinical, and histologic characteristics of radical prostatectomy specimens between the groups were well-balanced and are found in Table 1.

1. Perioperative Outcomes

Regarding perioperative outcomes, the median total operative time was significantly longer for eRALP compared to eLRP (261 min (238-294) vs 177 min (157-200), $p < 0.001$). For eRALP, the median console time was 137 min (119-196), and the mean docking time was 4.6 min (IQR 4.1-5.2). The median estimated blood loss was 200 mL (250-575) vs 150 mL (100-200) for eRALP and eLRP, respectively ($p = 0.151$). The median time to remove the vesical catheter was lower for eRALP (7 days (7-8) vs 8 days (8-10), $p < 0.001$). Ninety-two percent of patients undergoing eRALP had a length of stay of two days or less, while only 52.5% of those undergoing eLRP met this criterion ($p < 0.001$). The sole intraoperative complication registered was a mechanical failure in one robotic arm, which required conversion to laparoscopy. No intraoperative complications were registered for eLRP. There was also no statistically significant difference in the postoperative readmissions and complications within 3 months after surgery (eRALP 10.0% vs eLRP 10.2%, $p = 0.459$). Detailed perioperative outcomes are presented in Table 2.

2. Continence

Postoperative continence rates at 6 weeks and 12 weeks after surgery were 52.0% and 70.0% for eRALP and 42.4% and 64.4% for eLRP, respectively ($p > 0.05$), according to the 0 pads definition at 3-mo FU ($p = 0.341$ and $p = 0.548$). Among incontinent patients, 52.2% and 55.9% for eRALP and eLRP, respectively only used one pad at 6 weeks and these patients' difference increased at 12 weeks (eRALP 60.0% vs eLRP 90.5%, $p < 0.01$). These results are described in Table 3 and Fig. 1.

3. Oncological outcomes

Summary data concerning oncological outcomes are presented in Table 4. There were no significant differences in PSA values between eRALP and eLRP groups across all tumour stages.

PSA persistence was observed in 16.7% and 23.7% for the eRALP and eLRP, respectively ($p = 0.369$). Further analysis can be found in Table 4. There was also no statistically significant difference in positive surgical margins rates between the two surgical modalities. Oncologic outcomes according to stratification in stages and EAU risk classification were reported in Table V.

PSM (OR 3.8 95% CI 1.2-12.2, $p = 0.024$), extraprostatic disease (OR 7.8 95% CI 2.4-25.3 $p < 0.001$) and histologic ISUP grade 3-5 of specimen (OR 6.4 95%CI 2.0-20.6, $p = 0.002$) were independent predictors of PSA persistence at 6 weeks (PSA ≥ 01).

However, in the multivariable analysis only extraprostatic disease (OR 3.9 95% CI 1.1-13.7 $p = 0.034$) and higher ISUP grade of the specimen (OR 4.6 95%CI 1.3-15.8, $p = 0.019$) remained as independent predictors compared to PSM (OR 2.9 95% CI 0.8-10.5, $p = 0.10$). Only extraprostatic disease (OR 4.8, 95% CI 1.8-13.4, $p < 0.001$) emerged as an independent predictor of positive surgical margins in multivariable analysis adjusted for ISUP. Table 5 displays the rates of PSM localization as well.

Discussion

The management of localised prostate cancer remains challenging and controversial. Existing evidence does not definitively establish one method as superior to another in terms of long-term functional and oncological outcomes. Thereby, the choice of therapeutic approach is typically determined collaboratively by a multidisciplinary team taking into the patient's preferences. In the context of radical surgery, there is an ongoing debate regarding the adoption of robotic surgery to minimise functional complications and achieve superior oncologic outcomes, compared to the existing results of laparoscopic or open procedures.⁴

Multiple studies have compared minimally invasive surgical therapies with the classic open retropubic approach, but the only outcomes consistently distinguishing them have been reduced blood loss and length of stay, and safer early catheter removal in minimally invasive approaches.¹¹⁻¹⁵

In addition, comparisons between robotic-assisted radical prostatectomy and laparoscopic procedures have yielded disparate conclusions across the literature.¹⁶⁻¹⁸ Hence, the aim of this study was to compare the outcomes of the recently introduced extraperitoneal robotic-assisted laparoscopic prostatectomy using the novel Hugo RAS System with our conventional extraperitoneal LRP. The goal was to assess whether the initial experience affected the oncological outcomes and continence.

There is a lack of high-quality studies comparing biochemical recurrence rates, prostate-specific mortality, and overall survival between the existing different approaches.¹⁹ Although two RCTs have attempted to compare these outcomes between RARP and LRP, they have not been able to show a statistical difference in this regard.^{16,20} A more recent RCT aimed to address these outcomes in a larger, more inclusive sample, but also failed to reach a statistically significant conclusion.¹⁸

Our results revealed a persistence of PSA (16.7% in the eRALP group vs 23.7% in the eLRP group, $p = 0.369$) similar to those reported by Stolzenburg *et al* (23% RARP vs 21% LRP) but higher than those reported by Asimakopoulos *et al* (8% RARP vs 3% LRP) and Porgiglia *et al* (2% RARP vs 7.5% LRP).^{6,16,20} These discrepancies may be attributed, first of all, to the elevated percentage of high-risk patients that constituted our sample. In fact, 53.1% of our RARP group and 37.3% of the LRP group were classified as high-risk patients, which means an increased risk of

**Table 1** – Baseline and histologic characteristics of radical prostatectomy specimens.

Variable	eRARP (n=50)	eLRP (n=59)	p value
Median age, years (IQR)	70 (64-73)	67 (62-71)	0.257
Mean body mass index, kg/m ² (SD)	26.12 (± 3.12)	26.12 (± 3.12)	0.410
Median preoperative PSA level, ng/mL (IQR)	9.7 (6.3–14.4)	7.4 (6.4–11.6)	0.176
Biopsy ISUP grade group			
Grade group 1, n (%)	10 (20.0)	16 (27.1)	0.385
Grade group 2, n (%)	23 (46.0)	24 (40.7)	0.576
Grade group 3, n (%)	13 (26.0)	12 (20.3)	0.484
Grade group 4-5, n (%)	4 (8.0)	7 (11.9)	0.505
EAU Risk Stratification			0.221
Low risk, n (%)	7 (14.3)	14 (23.7)	
Intermedium risk, n (%)	16 (32.7)	23 (39.0)	
High-risk, n (%)	26 (53.1)	22 (37.3)	
cT stage, n (%)			0.095
Impalpable (cT1)	21 (42.0)	41 (69.5)	
Palpable (cT2–3)	17 (34.0)	16 (27.1)	
Tumour stage on preoperative MRI			0.789
T2, n (%)	38 (76)	45 (76.3)	
T3, n (%)	5 (10)	7 (12.4)	
Median prostate volume on preoperative MRI, cm ³ (IQR)	43 (30-57)	43 (33-64)	0.986
Median prostate weight, g	38 (32-49)	42 (33-56)	0.272
Pathologic ISUP grade group			
Grade group 1, n (%)	0 (0.0)	2 (3.4)	0.499
Grade group 2, n (%)	28 (56.0)	25 (42.4)	0.156
Grade group 3, n (%)	17 (34.0)	21 (35.6)	0.862
Grade group 4-5, n (%)	5 (10.0)	11 (18.6)	0.204
pT stage, n (%)			0.580
pT2	27 (54.0)	32 (54.2)	
pT3a	12 (24.0)	18 (30.5)	
pT3b	11 (22.0)	9 (15.3)	
Extraprostatic extension, n (%)	18 (36.0)	26 (44.1)	0.392
Median of lymph nodes yielded, n (IQR)	2 (0-4)	5 (3-8)	0.012
N+, n (%)	1 (2.0)	0 (0.0)	0.428

EAU=European Association of Urology; ISUP = International Society of Urological Pathology; MRI = magnetic resonance imaging; PSA = prostate-specific antigen; SD= standard deviation; IQR= interquartile range; eRARP= extraperitoneal robotic assisted radical prostatectomy; eLRP= extraperitoneal laparoscopic radical prostatectomy; N+= metastasis in regional lymph node

**Table 2** – Postoperative results for the study cohort

Variable	eRARP (n=50)	eLRP (n=59)	p value
Median total intraoperative time, min (IQR)	261 (238-294)	177 (157-200)	<0.01
Median operative time, min (IQR)	190 (145-200)	120 (99-141)	<0.01
Median console time, min (IQR)	137 (114-161)	–	–
Underwent PLND, n (%)	19 (38.0)	28 (47.5)	0.365
Median estimated blood loss, ml (IQR)	200 (250-575)	150 (100-200)	0.151
Median time to catheter removal, d (IQR)	7 (7-7)	8 (8-10)	<0.01
Median length of hospital stays, days (IQR)	2 (2-2)	2 (2-3)	<0.01
Length of stay ≤2 days, n (%)	46 (92.0)	31 (52.5)	<0.01
Intraoperative complications, n (%)	1 (2)	0 (0)	0.459
90-days complications, n (%)	5 (10.0)	6 (10.2)	0.729
90-days readmission, n (%)	1 (2)	2 (3.4)	1

eRARP= extraperitoneal robotic assisted radical prostatectomy; eLRP= extraperitoneal laparoscopic radical prostatectomy; IQR= interquartile range; PLND= pelvic lymph node dissection

Table 3 – Urinary continence results for the study cohort

Variable	eRARP (n=50)	eLRP (n=59)	p value
Continence Rates			
Pre-operative urinary continence, n (%)	45 (90.0)	56 (94.9)	0.525
Urinary continence at 6 weeks, n (%)	26 (52.0)	25 (42.4)	0.341
Urinary Continence at 12 weeks, n (%)	35 (70.0)	38 (64.4)	0.548
Non-continent patients			
Pads number at 6 weeks ≤1, n (%)	13 (52.2)	19 (55.9)	0.897
Pads number ≤1 at 12 weeks, n (%)	9 (60.0)	19 (90.5)	<0.01

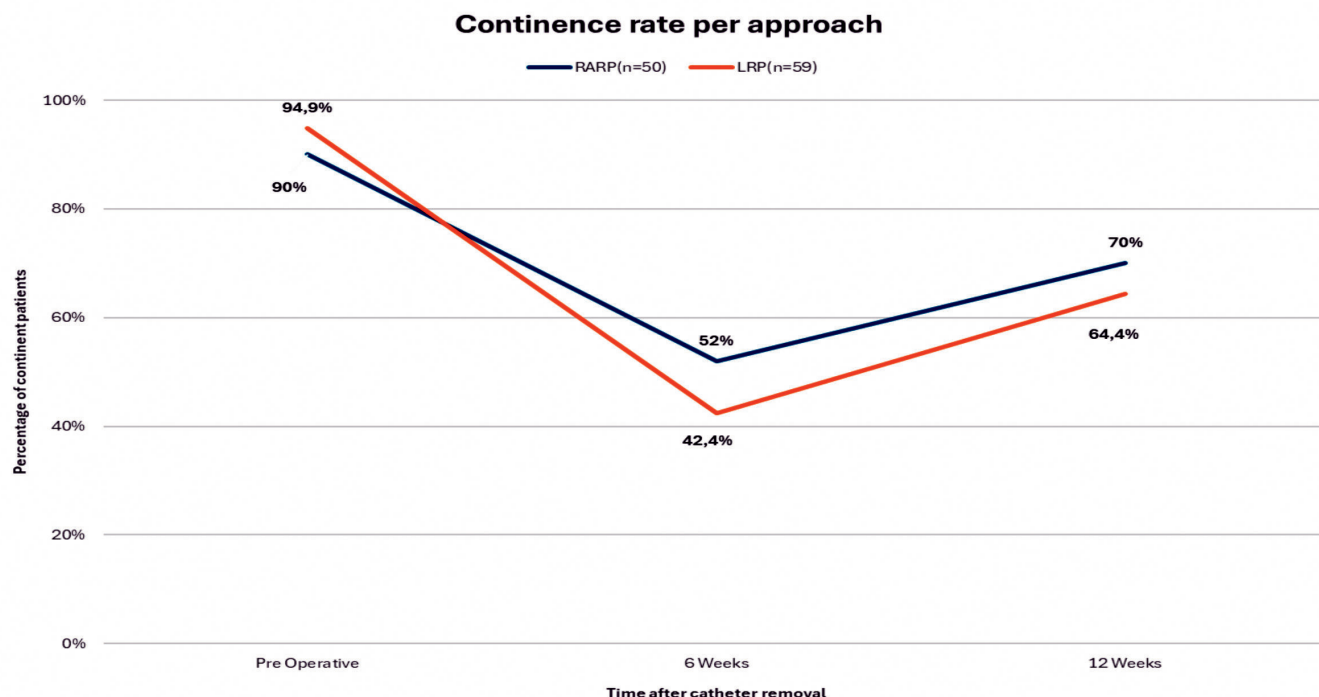
eRARP= extraperitoneal robotic assisted radical prostatectomy; eLRP= extraperitoneal laparoscopic radical prostatectomy

PSA failure, need for secondary therapy, metastatic progression, and death from PCa. Nevertheless, radical prostatectomy is still an option for these patients with low volume tumors, but patients should be aware pre-operatively that surgery may be part of a multimodal treatment, with adjuvant or salvage radiotherapy androgen deprivation therapy.⁴ In our study, we included pT3 patients, which accounted for 46.0% of the eRARP sample and 45.8% of the eLRP sample, as well as ISUP grade 4-5 patients, which are known predictors of PSA persistence. In addition, 36% of the eRARP group and 44.1% of the eLRP had extra prostatic extension, another established predictor of PSA persistence.⁴ Upon analyzing the subgroup of patients with PSA persistence,

we found that 75% of the patients in the eRARP group and 85.7% of patients in the eLRP group were classified as pT3, and 37.5% of patients on both groups had pathologic ISUP grade 4-5 tumors.

Our population appears to be like that of Stolzenburg *et al*,¹⁸ who encompassed 35.8% of T3+ patients in their RARP sample and 38.5% in their LRP group. In contrast, Asimakopoulos *et al*²⁰ included only T1-T2 and Gleason scores =7, and Porpiglia *et al*¹⁶ concentrated only on clinically staged T1–T2N0M0 patients.

Although our study did not find a statistically significant difference in positive surgical margins between eRARP and eLRP, we observed a higher overall percentage of PSM rates compared to similar studies. On the other hand, our PSA persistence results do



eRARP= extraperitoneal robotic assisted radical prostatectomy; eLRP= extraperitoneal laparoscopic radical prostatectomy

Figure 1 – Continence rate per approach

not appear to differ largely from the ones stated by Stolzenburg *et al*, who had similar inclusive parameters in sample selection to our study.¹⁸ Also, in a multivariate analysis, only extraprostatic disease and higher ISUP grade remained as independent predictors. This finding was not observed for positive surgical margins. This can mean that the PSM rates observed in our study may not reflect true pathological findings but rather indicate poor manipulation of the prostatic specimen during surgical procedures. Therefore, a potential conclusion drawn from this trial is the importance of exercising increased caution during radical prostatectomies to minimise distortion of the original specimen.

The improved three-dimensional vision and ergonomics, as well as better precision, offered by the RARP, are generally accepted as potentially positively impacting continence rates. However, there appears to exist no difference between RARP and ORP either at early or long-term continence rates, according to different RCTs and meta-analyses.^{15,21,22} A recently published multicentre RCT, the LAP-01, observed better early continence but found no difference at 12-months of follow-up between RARP and LRP.¹⁸ Finally, although there is seemingly a lack of studies comparing LRP with ORP, the few available ones that we found suggest a superior early continence rate in ORP, with no difference observed in the long-term follow-up.²³

Our study showed that 52% of eRARP patients and 42.4% of eLRP patients were continent at 6 weeks of follow-up, representing a 10.4% difference between groups. This difference decrea-

sed to 5.6% at 12 weeks, with continence rates of 70% and 64.4% in eRARP and eLRP patients, respectively. Although these results did not reach statistical significance, likely due to the limited patient population of this study, they align with the trends observed in previous studies. Our results regarding the difference in continence rates between groups over the follow-up period are similar to findings reported by the three RCTs mentioned above. These studies noted an initial superior continence rate in eRARP that tended to diminish over time, when compared to LRP.^{16,18,20} Our results have also shown that, even in the incontinent patients, the majority of them need ≤ 1 PAD at 12 weeks. Possible explanations for the apparent superiority of RARP over LRP in early recovery continence may be related to the intrinsic characteristics of robotic-assisted procedures. For instance, improved manoeuvrability may enable better quality dissection and preservation of the neurovascular bundle. Additionally, the three-dimensional magnification allows an extremely precise apical/urethral dissection, resulting in an increasing preservation of the length of the membranous urethra.^{6,16} Furthermore, the ability to perform an effective posterior reconstruction with or without the addition of anterior suspension techniques, alongside preservation of the and bladder neck and puboprostatic ligament, could aid in achieving an early return to baseline continence.^{24,25} Likewise, the apparent similarity between ORP and RARP procedures observed in several trials regarding functional outcomes might be surpassed as experience with RARP progresses.^{12,26}

**Table 4** – Oncologic results for the study cohort

Variable	eRARP (n=50)	eLRP (n=59)	p value
PSM, n (%)	30 (60.0)	35 (59.3)	0.943
Non-Limited (>3 mm) PSM, n (%)	15 (35.7)	17 (53.1)	0.721
PSA at 6 weeks <0.05, n (%)	33 (68.8)	43 (72.9)	0.639
PSA at 6 weeks 0.05-0.1, n (%)	7 (14.6)	2 (3.4)	0.075
PSA at 6 weeks > 0.1, n (%)	8 (16.7)	14 (23.7)	0.369
Postoperative radiotherapy, n (%)	6 (12.5)	17 (28.8)	0.041
pT2			
PSM, n (%)	14 (51.9)	13 (40.1)	0.388
Non-Limited (>3 mm) PSM, n (%)	5 (35.7)	4 (36.4)	0.973
PSA >0.1, n (%)	2 (7.7)	23 (9.4)	1
Postoperative radiotherapy, n (%)	1 (3.9)	3 (9.4)	0.618
ISUP 4-5, n (%)	2 (7.4)	2 (6.3)	0.624
pT3			
PSM, n (%)	16 (69.7)	22 (81.4)	0.325
Non-Limited (>3 mm) PSM, n (%)	10 (83.3)	13 (61.9)	0.259
PSA >0.1 n (%)	6 (27.3)	12 (44.4)	0.215
Postoperative radiotherapy, n (%)	5 (29.4)	14 (51.9)	0.175
ISUP 4-5, n (%)	3 (13.0)	9 (33.3)	0.112
pT3a, n (%)			
PSM, n (%)	7 (58.4)	14 (77.8)	0.255
Non-Limited (>3 mm) PSM, n (%)	4 (80.0)	8 (57.1)	0.603
PSA >0.1, n (%)	2 (16.7)	6 (33.3)	0.312
Postoperative radiotherapy, n (%)	1 (8.33)	5 (27.7)	0.170
ISUP 4-5, n (%)	0 (0)	5 (27.7)	0.066
pT3b			
PSM, n (%)	9 (81.8)	8 (88.8)	1
Non-Limited (>3 mm) PSM, n (%)	6 (85.7)	6 (85.7)	1
PSA >0.1 n (%)	4 (40.0)	6 (66.7)	0.370
Postoperative radiotherapy, n (%)	4 (40.0)	9 (100)	<0.01
ISUP 4-5, n (%)	3 (27.3)	4 (44.4)	0.642

eRARP= extraperitoneal robotic assisted radical prostatectomy; eLRP= extraperitoneal laparoscopic radical prostatectomy; PSM= positive surgical margin; ISUP = International Society of Urological Pathology; PSA = prostate-specific antigen

Consequently, we posit that when exclusively conducted by a proficient surgical team and in select patient subsets, RARP may demonstrate superior oncologic and functional outcomes compared to ORP.

Lastly, the variability in the definition of continence across articles in the existing literature, as highlighted by Salazar *et al*, adds complexity to comparing continence outcomes.²⁷ These differences in sample characteristics and study methodologies

**Table 5** – Analysis of PSA persistence, positive surgical margins and EAU Risk classification

PSA Persistence Variable	eRARP	eLRP	p value
Pathologic stage $\geq$ pT3, n (%)	6 (75.0)	12 (85.7)	0.602
Pathologic ISUP 4-5, n (%)	3 (37.5)	5 (37.5)	1
PSM, n (%)	6 (75.0)	12 (85.7)	0.602
Postoperative radiotherapy, n (%)	6 (75.0)	12 (85.7)	0.602
Positive Surgical Margins Variable	eRARP	eLRP	p value
pT2	14 (51.9)	13 (40.1)	0.388
PSA>0.1, n (%)	1 (8.3)	1 (8.3)	1
Bilateral, n (%)	6 (42.9)	2 (16.7)	0.216
Multifocal, n (%)	9 (64.2)	2 (15.4)	<0.01
Apex, n (%)	7 (50.0)	6 (50.0)	1
Lateral, n (%)	5 (35.7)	5 (41.6)	0.756
Base, n (%)	5 (35.7)	2 (16.7)	0.275
pT3	16 (69.7)	22 (81.4)	0.325
PSA>0.1, n (%)	5 (31.3)	11 (50.0)	0.248
Bilateral, n (%)	6(37.5)	4 (18.2)	0.182
Multifocal, n (%)	7 (43.8)	10 (45.5)	0.942
Apex, n (%)	7 (46.7)	5 (22.7)	0.127
Lateral, n (%)	8 (53.3)	8 (36.4)	0.308
Base, n (%)	3 (20.0)	13 (59.1)	0.018
EAU Risk classification Variable	eRARP	eLRP	p value
Low Risk			
Pathologic stage $\geq$ pT3, n (%)	2 (28.6)	6 (42.3)	0.655
Pathologic ISUP 4-5, n (%)	0 (0.0)	0 (0.0)	1
PSM, n (%)	5 (71.4)	7 (50.0)	0.656
PSA >0.1, n (%)	0 (0.0)	1 (7.1)	1
Postoperative radiotherapy, n (%)	0 (0.0)	2 (14.3)	0.533
Intermedium Risk			
Pathologic stage $\geq$ pT3, n (%)	6 (37.5)	9 (39.1)	0.918
Pathologic ISUP 4-5, n (%)	1 (6.25)	3 (13.0)	0.631
PSM, n (%)	9 (56.3)	5 (21.7)	0.061
PSA >0.1, n (%)	2 (12.5)	15 (65.2)	<0.01
Postoperative radiotherapy, n (%)	1 (6.3)	5 (21.7)	0.370
High Risk			
Pathologic stage $\geq$ pT3, n (%)	15 (57.7)	12 (54.5)	0.825
Pathologic ISUP 4-5, n (%)	5 (19.2)	8 (36.4)	0.183
PSM, n (%)	16 (61.5)	13 (59.1)	0.862
PSA >0.1, n (%)	6 (23.1)	8 (36.4)	0.313
Postoperative radiotherapy, n (%)	5 (19.2)	10 (45.5)	0.051

EAU=European Association of Urology; eRARP= extraperitoneal robotic assisted radical prostatectomy; eLRP= extraperitoneal laparoscopic radical prostatectomy; ISUP = International Society of Urological Pathology; PSA = prostate-specific antigen; PSM= positive surgical margin



should be considered when interpreting and comparing the findings of these studies.

Regarding perioperative outcomes, our study revealed a longer operative time using the eRARP, compared to the eLRP ($p < 0.01$). However, the median operative time of 190 min (IQR 145–200) and median console time of 137 min (IQR 114–161) of the eRARP group were not far from what another study abiding the HUGO™ RAS System has shown, with Bravi *et al* observing a median operative time of 180 min (IQR 145–200) and a median console time of 150 min (IQR 145–175).²⁸ On the other hand, Paciotti *et al* described a shorter median operative time of 150 min (IQR 130–170) and median console time of 120 min (IQR 110–150).²⁹

There was no difference in the median blood loss between procedures, which contrasts with conclusions from a systematic review indicating that eRARP resulted in less blood loss compared to LRP.¹² This may also be justified by the learning curve experienced by our surgical team, or could potentially be attributed to alternative factors, such as the surgical technique itself.

The median time to catheter removal was found to be inferior in eRARP compared to eLRP (7 (IQR 7–7) vs 8 (IQR 8–10) days, respectively). These results differ from findings in other studies, where the median time for catheter removal was similar for RARP and LRP.^{6,16,20} A possible explanation for this finding may lie in the technical superiority that robotic-assisted procedures offer, facilitating the creation of a watertight vesicourethral anastomosis, securing a greater safety in the early catheter removal. The variability between institution protocols and techniques used by the surgical teams may also justify the great differences observed in median time to catheter removal within the existing trials, with Develtere *et al* describing catheter removal date as early as 2 days, while Busby *et al* concluded the 7th day of post operation to be the ideal time for catheter removal.^{29–31}

The median length of hospital stay was identical for both surgical approaches (2 days). However, the number of patients who were hospitalised under two days was significantly superior in eRARP (46 (92.0) days for RARP vs 31 (52.5) days for LRP). This suggests that RARP may lead to earlier patient discharge, potentially resulting in lower hospital inpatient costs, reduced overall postoperative complications and early return to work.

Despite early discharge, there were no differences relating to postoperative readmissions and complication rates in our study. These are different results from what the LAP-01 observed, where the LRP group had an increased rate of postoperative complications (21%), compared with the RARP group (15%).⁶

A strength of this study lies on the comparative analysis of the extraperitoneal technique using the Hugo™ RAS with the extraperitoneal laparoscopic radical prostatectomy, using real world data. The fact that there was no patient selection approximates

this trial to the daily medical routine, therefore mimicking the results one might expect more accurately. As explained above, the robotic assisted radical prostatectomy, although without statistical value, seemed to follow the trend previous studies have shown of earlier recovery of continence in the eRARP group, as well as earlier hospital discharge and catheter removal, while maintaining oncological integrity compared to laparoscopic procedures. It is noteworthy that our surgical teams are still within the learning curve for manoeuvring the robotic equipment, underlining the potential for further improvement in outcomes with increased experience, and, despite the large experience operating via eLRP, the eRARP results show to be very promising.

Some limitations of our study include variations in experience levels between the analysed procedures, with a larger experience in laparoscopic surgery compared to the initial stages of robotic surgery, potentially affecting outcomes as the latter may still be within its learning curve. Additionally, the low sample size may underestimate differences in continence between the two groups and limit the use of other statistical methods, such as propensity score matching.

Also, the absence of questionnaires in the patient's follow-up and the retrospective nature of the study may lead to an underreporting of the non-favourable outcomes or an overestimation of the results. Finally, the influence of nerve-sparing was not investigated due to non-report, although it constitutes the preferred approach of our department.

Conclusion

Despite the initial experience, robotic-assisted extraperitoneal radical prostatectomy with the Hugo™ RAS demonstrates comparable oncological outcomes and tends to improve early urinary continence compared to our standard laparoscopic extraperitoneal radical prostatectomy. Also, the robotic approach leads to earlier hospital discharge compared to the laparoscopic one. Extraperitoneal RARP with this novel robotic system seems to prove to be safe and feasible, allowing for a seamless transition into robotic surgery.

Responsabilidades Éticas

Conflitos de Interesse: Os autores declaram a inexistência de conflitos de interesse na realização do presente trabalho.

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Proteção de Pessoas e Animais: Os autores declaram que os procedimentos seguidos estavam de acordo com os regulamentos estabelecidos pela Comissão de Ética responsável e de



acordo com a Declaração de Helsínquia revista em 2024 e da Associação Médica Mundial.

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Autor Correspondente/Corresponding Author:

Dr. Miguel Marques Monteiro
Centro Hospitalar Universitário do Porto
Largo Prof. Abel Salazar – 4099-001 PORTO, Portugal
miguelmarquesmonteiro.urologia@chporto.min-saude.pt
<https://orcid.org/0000-0002-8222-0511>

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Scoping Review on Management of Nephrostomy – and Double J-Stent – Associated Infections

Uma Scoping Review para Identificar a Melhor Gestão das Infecções Associadas à Nefrostomia e ao Cateter Duplo J

Beatriz Oliveira¹, Martinha Magalhães¹, Nuno Vinagre¹, Frederico Teves¹, Avelino Fraga¹

Abstract

Catheter-associated urinary tract infections (CA-UTIs) refer to infections related to indwelling urinary catheters and are the main cause of hospital-acquired urinary tract infections. Most literature, including the European Urological Association (EAU) Urological Infections Guidelines, defines CA-UTIs as infections specifically associated with urethral catheters, excluding catheter-associated infections related to percutaneous nephrostomies and double-J stents. As a result, there are limited guidelines for managing these types of infections, namely, on determining when to change or remove the catheter. This is probably due to the scarcity of information, the lack of uniformization in terminology (bacteriuria versus infection) and the low evidence of available studies.

This scoping review seeks to map the available evidence on infections associated with percutaneous nephrostomies (PN-UTIs) and double-J stents (DJ-UTIs). The review aims to address if studies provide a clear definition of asymptomatic bacteriuria and stent-associated infections; what are the most common pathogens associated with PN- and DJ-UTIs, and what recommendations are outlined in the literature for managing these infections. We performed this scoping review according to the PRISMA-ScR extension for scoping reviews. The search was made in the databases PubMed/MEDLINE, Scopus and Cochrane Library. We defined the following outcomes for analysis: type of stent, definition of bacteriuria and infection, urine and stent culture methods, pathogens, and information on treatment approach.

The search yielded 441 articles, narrowed to 12 based on eligibility, relevance, and currency. Most studies, aside from two systematic reviews, were prospective and retrospective observational cohorts with small sample sizes (median 204 patients) and evidence level 3c. Stent-related infections were defined using inconsistent clinical criteria, with asymptomatic bacteriuria often undefined. Common pathogens included *E. coli* (26%), *Enterococcus faecalis* (17%), and *Pseudomonas aeruginosa* (14%). Urine cultures are typically performed using midstream urine samples,

while stent cultures are primarily conducted for research purposes. Treatment approaches in the literature are highly variable. The management of catheters for source control is a topic with limited discussion, and recommendations vary, including stent replacement either before or after starting empirical antibiotics. A standardized treatment protocol remains to be established.

Keywords: Nephrostomy; Scoping Review; Stents; Urinary Tract Infections

Resumo

As infecções do trato urinário associadas a cateteres (CA-UTI) são a principal causa de infecções adquiridas no hospital. A maior parte da literatura, incluindo as Diretrizes para as Infecções Urológicas da Associação Europeia de Urologia (EAU), define as CA-UTI como infecções especificamente associadas a cateteres uretrais, excluindo as infecções associadas a nefrostomias percutâneas e stents duplo-J. Consequentemente, existem orientações limitadas para a gestão deste tipo de infecções, nomeadamente para determinar quando mudar ou remover o cateter. Este facto deve-se provavelmente à escassez de informação, à falta de uniformização na terminologia (bacteriúria versus infeção) e à baixa evidência dos estudos disponíveis.

Esta scoping review procura mapear a evidência disponível sobre infecções associadas a nefrostomias percutâneas (PN-UTIs) e stents duplo-J (DJ-UTIs). A revisão tem como objetivo determinar se os estudos fornecem uma definição clara de bacteriúria assintomática e infecções associadas a stents; quais são os agentes patogénicos mais comuns, e que recomendações são delineadas na literatura para a gestão destas infeções.

Realizámos esta scoping review de acordo com a extensão PRISMA-ScR para scoping reviews. A pesquisa foi efetuada nas bases de dados PubMed/MEDLINE, Scopus e Cochrane Library. Definimos os seguintes resultados para análise: tipo de stent, definição de bacteriúria e infeção, métodos de cultura da urina e do stent, agentes patogénicos e informação sobre a abordagem de tratamento.

A pesquisa revelou 441 artigos, reduzidos a 12 com base na elegibilidade, relevância e atualidade. A maioria dos estudos, à exceção de duas revisões sistemáticas, eram coortes observa-

1 – Urology Department, Unidade Local de Saúde de Santo António, Porto, Portugal



*cionais prospetivos e retrospectivos com amostras de pequena dimensão (mediana de 204 doentes) e nível de evidência 3c. As infeções relacionadas com stents foram definidas utilizando critérios clínicos inconsistentes, com bacteriúria assintomática frequentemente indefinida. Os agentes patogénicos mais comuns incluíram *E. coli* (26%), *Enterococcus faecalis* (17%) e *Pseudomonas aeruginosa* (14%). As culturas de urina foram normalmente efetuadas utilizando amostras de urina do jato médio, enquanto as culturas de stent são realizadas principalmente para fins de investigação. As abordagens de tratamento na literatura são altamente variáveis. A gestão de cateteres para controlo da fonte de infeção é um tópico com discussão limitada, e as recomendações variam, incluindo a substituição do stent antes ou depois de iniciar antibióticos empíricos. Continua a ser necessário estabelecer um protocolo de tratamento normalizado.*

Palavras-chave: Catéteres; Infeções do Sistema Urinário; Nefrostomia; Scoping Review

Introduction

Urinary infections related to catheters are mentioned in most research and clinical guidelines, including those from the European Association of Urology (EAU) and the Centers for Disease Control and Prevention (CDC), as infections associated with indwelling urethral catheters, specifically Foley catheters (CA-UTIs). These guidelines offer comprehensive strategies for preventing, diagnosing, and treating CA-UTIs.^{1,2} However, they typically exclude other types of urinary catheters, such as percutaneous nephrostomies (PN) and double-J (DJ) stents, even though these devices pose a considerable risk of infection.³

Some effort has already been made to characterize infections associated with percutaneous nephrostomies (PN-UTIs) and double-J stents (DJ-UTIs). A 2020 systematic review encompassing 26 studies investigated potential PN- and DJ-UTIs risk factors. Duration of ureteral stent, diabetes mellitus, female gender, chronic renal failure, diabetic nephropathy, and cancer were found to increase the risk of asymptomatic bacteriuria (ABU) and ureteral stent colonization. However, none of these factors demonstrated a statistically significant association with the development of symptomatic UTIs.³ The causal relationship between ABU and symptomatic UTI in this patient population remains to be established.⁴ The absence of definitive conclusions in this study can be attributed to two factors: the substantial heterogeneity in the criteria used across the literature to distinguish symptomatic UTIs from asymptomatic bacteriuria (ABU), and the inclusion of studies with low levels of evidence, marked by significant methodological variability and correspondingly different results.³

Due to the scarcity of high-quality evidence, DJ- and PN-UTIs remain poorly defined. Consequently, in contrast to other well-studied urological infections, no standardized treatment guide-

lines currently exist for their management. One clinical challenge in treating these infections is implementing the source control strategy, focused on identifying and eliminating the source of infection to prevent continued microbial contamination of otherwise sterile tissues, organs, or body cavities.⁵ It is well accepted as a key element in the management of sepsis and septic shock.⁶ Due to the resistance of bacteria in biofilm to antibiotics, bacteria can adhere, colonize, and survive on indwelling medical devices even when antimicrobial drugs are in use.^{7,8} A common example of source control is infections associated with central venous catheters (CVC), which guidelines state that CVCs are considered a source of infection and shall be removed.⁹ Source control principles also apply to infections of the genitourinary tract: it is well accepted that CA-UTIs require removal of the catheter^{1,2}; in case of obstructive pyelonephritis, decompression is required; and drainage is necessary for kidney or pelvic abscesses.⁵ PN and DJ stents can also be a source of bacterial adhesion and colonization¹⁰⁻¹⁴; however, no specific guidelines exist on how to manage these stents in the case of infection.

With the rising concern regarding antibiotic resistance,¹⁵ effective treatment strategies for patients with systemic infections are a priority area of study. Considering the gaps in knowledge regarding PN- and DJ-UTIs, a scoping review was undertaken, with the following research questions:

- 1) How are ABU, PN-UTIs, and DJ-UTIs defined in the literature?
- 2) Which pathogens are most commonly associated with PN-UTIs and DJ-UTIs (excluding ABU)?
- 3) What management recommendations for PN-UTIs and DJ-UTIs, namely for diagnosis and treatment, are provided in the literature?

Methods

This review was performed according to the PRISMA-ScR extension for scoping reviews.¹⁶

The main eligibility criterion was articles describing and assessing infection (not colonization or ABU) in patients with DJs and PNs. We considered infection as the presence of symptoms (fever and urinary tract symptoms) with a positive urine culture.³ The inclusion and exclusion criteria are summarized in Table 1.

The search was made in PubMed/MEDLINE, Scopus, and Cochrane Library in August 2023.

Search strategies were drafted and refined through team discussion. We used the following search items: “nephrostomy”, “double J stent”, “ureteral stent”, and “infection”, searching in Title in the first three items, and Title/Abstract in the last. In the Scopus database, we also limited the search to articles written in the eligible languages and limited the subject to “medicine”.

Articles were eligible for first review if the eligibility criteria were met through title and abstract analysis by two independent au-


Table 1 – Inclusion and exclusion criteria of the scoping review.

Inclusion criteria	Exclusion criteria
Population: patients older than 18 years with PN- or DJ-UTIs	Population: renal transplant recipients
Language: English, Spanish, Portuguese, German	Commentaries, letters, and reviews
Reviews: only if information/ /expert opinion on treatment	

thors. The first selection of articles was done through *Rayyan@* software, and the final selected articles were exported to a shared online database. The second stage included a full-text screening of the selected articles. Studies that did not meet the inclusion criteria were excluded, and disagreements between the reviewers were resolved through discussion or with the input of a third reviewer.

After the final article selection, we created a data-charting form for exporting information for the scoping review. Two reviewers independently charted data from each eligible article. Any disagreements were resolved through discussion between the two reviewers or further adjudication by a third reviewer.

The items analyzed and exported from the selected articles were: definition of ABU and infection, urine and stent culture methods, pathogens, and treatment approach (choice of antibiotics and management of the PN or DJ stent).

Results

After duplicates were removed, 441 citations were identified from searches of electronic databases. Based on the title and abstract, 411 citations were excluded, with 30 full-text articles to be retrieved and assessed for eligibility. Of these, two were reviews with no information regarding treatment, 12 articles had information only about ABU, and four articles used the same definition for ABU and infection. The remaining 12 studies were considered eligible for the review. As explained in the methods section, the two reviews were included only to extract information on management and treatment. The final results of the search are presented in Fig. 1.

The selected studies, with the design, country, and type of stent are presented in Table 2. The mean sample size of the included studies was 204 patients.

Definition of ABU and infection

Only three of the 12 selected studies defined ABU as a positive urine culture with more than 10^5 colony-forming units (CFU)/mL in

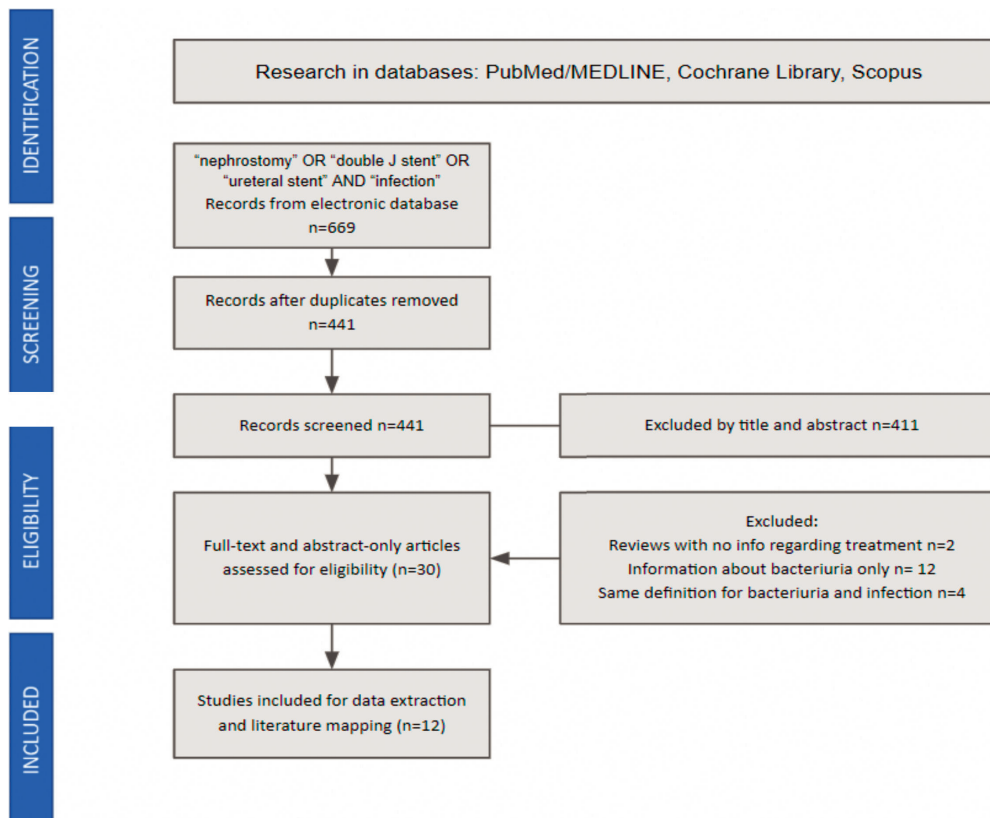

Figure 1 – PRISMA Flow Diagram for selection of sources of evidence.



Table 2 – Information on bacteriuria and infection.

Article		Stent	Information about bacteriuria		Information about infection	
Authors	Year		Defined?	Definition	Defined?	Definition
Li <i>et al</i>	2023	DJ	No	–	Yes	Fever > 37.5°C, urinary tract symptoms (UTS), bacteriuria $\geq 10^5$ CFU/mL.
Kim <i>et al</i>	2023	DJ	Yes	Bacteriuria $\geq 10^5$ CFU/mL from two consecutive urine culture samples, without symptoms.	Yes	Fever, UTS, bacteriuria $\geq 10^5$ CFU/mL.
Bailly <i>et al</i>	2023	DJ	No	–	Yes	Fever, bacteriuria $\geq 10^5$ CFU/mL, without another etiology of fever.
Jiang <i>et al</i>	2020	DJ	No	–	Yes	Fever > 38 °C, UTS, bacteriuria $\geq 10^5$ CFU/mL.
Kozyrakis <i>et al</i>	2018	DJ	No	–	No	-
Souhail <i>et al</i>	2020	DJ	No	–	Yes	UTS, bacteriuria $\geq 10^5$ CFU/mL.
Vallée <i>et al</i>	2021	DJ	–	–	–	-
Mert <i>et al</i>	2023	PN	No	–	Yes	UTS, bacteriuria $\geq 10^4$ CFU/mL.
Szvalb <i>et al</i>	2019	PN	No	–	Yes	UTS, bacteriuria $\geq 10^4$ CFU/mL.
Maramara <i>et al</i>	2018	PN	Yes	Bacteriuria $\geq 10^5$ CFU/mL without symptoms.	Yes	Fever >38°C, UTS, bacteriuria $\geq 10^5$ CFU/mL.
Bahu <i>et al</i>	2013	PN	Yes	Bacteriuria $\geq 10^5$ CFU/mL without symptoms.	Yes	Fever >38°C, UTS, bacteriuria $\geq 10^5$ CFU/mL.
Siddiq <i>et al</i>	2012	PN	No	Bacteriuria $\geq 10^2$ CFU/mL without symptoms.		UTS, bacteriuria $\geq 10^2$ CFU/mL

an aseptically collected specimen in the absence of signs and symptoms.¹⁷⁻¹⁹ In eight articles, the ABU definition was absent. Regarding the definition of PN- and DJ-UTIs, most of the articles (n=9) defined these infections but used slightly different criteria. The majority defined these infections through a conjunction of symptoms like fever (higher than 37.5°C²⁰ or higher than 38°C^{18,19,21,22}), dysuria or flank pain,^{17-19,21,23-25} and a positive urine culture with a bacteriuria threshold that was defined differently, namely as the presence of $\geq 10^4$ or $\geq 10^5$ CFU/mL of a bacterial species isolated from midstream clean urine, as can be seen in Table 2.

Urine and stent culture method

Seven articles mention the technique used for stent or urine culture. In those discussing DJ-UTIs, nearly all authors reported using a second-stream urine culture.^{17,20,21,26} Two of these studies also included stent cultures, specifically from the bladder portion

of the DJ stent.^{4,20} In contrast, articles addressing PN-UTIs did not describe the urine culture method, namely whether urine was collected before or after catheter replacement, or whether the catheter was changed or removed at all. This information is summarized in Table 3.

The article from Kozyrakis *et al*, was removed from this table, since the detailed description of pathogens was only done for bacteriuria. From the reported infections (n=11), seven were caused by multi-resistant bacteria strains, detected in stent cultures.

Pathogens related to PN- and DJ-UTIs

From the included studies in the final analysis, we compiled the available epidemiological data to summarize the average rate of different bacterial species found in urine cultures of patients with DJ- and PN-UTIs. A 10% cut-off for the average rate was retained to include microorganisms in Table 5.


Table 3 – Described urine and stent culture methods in the selected studies.

Authors	Year	Stent	Indication	Urine culture method	Infection rate	Stent culture method
Li <i>et al</i>	2023	DJ	All indications	2nd stream	100% (inclusion criteria)	Bladder segment after removal with ureteroscope
Kim <i>et al</i>	2023	DJ	All indications; Requiring indwelling stents and replaced ureteral stents more than once	2nd stream, before ureteral stent replacement	7.20%	Not done
Bailly <i>et al</i>	2023	DJ	All indications	Not described	7.24%	Not done
Jiang <i>et al</i>	2020	DJ	After PCNL	2nd stream	13.01%	Not done
Kozyrakis <i>et al</i>	2018	DJ	All indications	Not described	18% postoperatively	Bladder segment after removal with ureteroscope.
Souhail <i>et al</i>	2020	DJ	Obstructive pyelonephritis	2nd stream	infection in 6.3%, but only 69% UC of these were positive	Not done
Vallée <i>et al</i>	2021	DJ	<i>Review article</i>	Not described	–	–
Mert <i>et al</i>	2023	PN	Malignancy	Not described	100% (inclusion criteria)	Not done
Szvalb <i>et al</i>	2019	PN	Malignancy	Not described	14%	–
Maramara <i>et al</i>	2018	PN	All indications	Not described	20%	Not done
Bahu <i>et al</i>	2013	PN	Malignancy	Not described	14%	Not done
Siddiq <i>et al</i>	2012	PN	<i>Review article</i>	Drawing urine from the PN	–	–

Table 4 – Average of most frequently identified pathogens related to PN- and DJ-UTIs

Article	Main types of reported pathogens				
Authors	Year	<i>E. coli</i>	<i>Klebsiella pneumoniae</i>	<i>Enterococcus faecalis</i>	<i>P aeruginosa</i>
Li <i>et al</i>	2023	30.55%	16.66%	13.89%	11.11%
Kim <i>et al</i>	2023	22.72%	0	18.18%	13.63%
Bailly <i>et al</i>	2023	38%	9%	14.50%	9%
Mert <i>et al</i>	2020	4.0%	26.67%	1.70%	1.70%
Jiang <i>et al</i>	2018	47.82%	15.21%	19.56%	4.34%
Szvalb <i>et al</i>	2020	17%	0	23%	36%
Maramara <i>et al</i>	2021	14.29%	21.43%	28.57%	35.71%
Bahu <i>et al</i>	2013	21.05%	0%	21.05%	13.16%
Souhail <i>et al</i>	2019	38.46%	7.69%	15.38%	0
MEAN		25.99%	10.74%	17.31%	13.85%



Table 5 – Information on treatment approach, namely type of antibiotic and stent removal.

Article		Stent	Antibiotic	Stent removal/substitution
Authors	Year			
Li <i>et al</i>	2023	DJ	No info	All patients removed the stent
Kim <i>et al</i>	2023	DJ	Targeted	Some were taken out, and others remained
Bailly <i>et al</i>	2023	DJ	Empiric	Some were taken out, and others remained
Jiang <i>et al</i>	2020	DJ	Empiric	–
Kozyrakakis <i>et al</i>	2018	DJ	Targeted	All patients removed the stent
Souhail <i>et al</i>	2020	DJ	Empiric	Some were taken out, and others remained
Vallée <i>et al</i>	2021	DJ	Empiric	–
Mert <i>et al</i>	2023	PN	Empiric	–
Szvalb <i>et al</i>	2019	PN	Empiric	Exchange of PN within four days of antibiotics
Maramara <i>et al</i>	2018	PN	Empiric	–
Bahu <i>et al</i>	2013	PN	No info	Some were taken out, and others remained
Siddiq <i>et al</i>	2012	PN	No info	Exchange PN before antibiotics

Treatment approach

The information on the treatment approach is summarized in Table 6. In two studies, the antibiotic therapy prescribed was already targeted, one because urine was collected for microbiological testing every time the patients electively changed the

stent¹⁷; and another because all the patients had to remove the stent, and stent cultures were done for research purposes.⁴

Regarding managing the DJ stent, in two studies, all the patients removed it because it was no longer needed.^{4,20} In four studies, some patients had DJ stent exchange. In the study by Kim

Table 6 – Information on treatment approach, namely, type of antibiotic and stent removal.

Article	Stent	Antibiotic	Stent removal/substitution
Authors			
Li <i>et al</i>	DJ	No info	All patients removed the stent
Kim <i>et al</i>	DJ	Targeted	Some were taken out, and others remained
Bailly <i>et al</i>	DJ	Empiric	Some were taken out, and others remained
Jiang <i>et al</i>	DJ	Empiric	–
Kozyrakakis <i>et al</i>	DJ	Targeted	All patients removed the stent
Souhail <i>et al</i>	DJ	Empiric	Some were taken out, and others remained
Vallée <i>et al</i>	DJ	Empiric	–
Mert <i>et al</i>	PN	Empiric	–
Szvalb <i>et al</i>	PN	Empiric	Exchange PN within four days of antibiotics
Maramara <i>et al</i>	PN	Empiric	–
Bahu <i>et al</i>	PN	No info	Some were taken out, and others remained
Siddiq <i>et al</i>	PN	No info	Exchange PN before antibiotics



et al, of the 22 patients who developed a DJ-UTI (7.2% of the study population), 15 had their ureteral stents replaced with new stents. In these, the UTI symptoms resolved; in the remaining seven patients, ureteral stents were left in place, although they were treated with appropriate antibiotics. The symptoms related to the infection and the bacteriuria recurred in these patients (mean time to symptom recurrence: 10 days); subsequently, ureteral stents were replaced with new stents, and patients' symptoms were relieved.¹⁷ In the study by Bailly *et al*, of the 48 patients with DJ-UTI (7.24% of the study population), six had their ureteral stent removed. In the remaining, symptoms relapsed in 13 (30.9%). The microorganism isolated during infection recurrence was the same as that identified in the previous infection for five patients (38%).²² Additionally, in the study by Souhail *et al*, in three (23%) of the 13 cases with DJ-UTI (6.3% of the study population), the DJ stent was removed for source control.²³ None of these studies justify the precise criteria for exchanging the DJ stent. Regarding PN-UTIs, in the study by Bahu *et al*, of the 38 patients who developed an infection (19% of the study population), 22 patients underwent exchange or removal for source control. In this case, there was also no defined criterion by the authors for catheter exchange.¹⁹

In only two articles, the authors state how catheters should be managed in case of infection. In the study of Szvalb *et al*, PN catheter exchange within four days of PN-UTI diagnosis ($p=0.048$) and receiving concomitant antimicrobials at the time of PN catheter replacement ($p=0.008$) were independently associated with a decrease in risk of recurrent PN-UTI. Therefore, they defend that PNs should be exchanged once antimicrobial susceptibilities are made available and the patient receives concordant antibiotics, ideally in the first four days of the infection.²⁵ On the other hand, Siddiq *et al*, in their review article, state that once the diagnosis of PN-UTI is established, the catheter should be exchanged immediately to decrease the bacterial load, along with immediate initiation of empiric antibiotics.²⁷

Regarding the choice of antibiotics, most authors defend choosing broad-spectrum antibiotics as empirical therapy. Included studies mostly report the use of ceftriaxone or cefotaxime,^{18,22,23} piperacillin-tazobactam,^{18,22-24} and ertapenem or meropenem.^{18,22,24}

Discussion

Our findings highlight the challenges in establishing optimal recommendations for managing PN and DJ stents in patients with associated infections. The literature search for this review revealed that most studies focus on stent colonization and ABU, with few addressing stent-related infections. In fact, from the 30 studies selected for full-text review, 12 only mentioned ABU, and four articles used the same definition for ABU and PN- and DJ-UTIs.^{12-14,28} This challenge is already addressed in the EAU

Guidelines.¹ To address this issue, it would be essential to clearly define these infections, distinguishing them precisely from CA-UTIs, to allow for better comparison of study results. Only after stating the criteria for diagnosing PN- and DJ-UTIs will it be possible to understand their epidemiology, incidence, and risk factors. Concurrently, each hospital should monitor its local pathogen and antibiotic resistance patterns in stent-related infections and adapt recommendations accordingly to fit the local context, as is true for CA-UTIs.¹⁵

Regarding urine and stent cultures, collecting second-stream urine is considered an appropriate and widely accepted method for obtaining urine samples. In patients with DJ stents, culturing the stent would require catheter replacement each time, making second-stream urine collection the most practical option for guiding antibiotic therapy. However, challenges arise in both collecting and interpreting urine culture results. Many patients present with polymicrobial cultures, complicating effective antibiotic targeting.^{3,7} Additionally, stent cultures may be more likely to identify the primary pathogenic microorganisms. In the study by Li *et al*, culture rates of pathogenic bacteria in DJ stents were significantly higher than those of urine.²⁰ More studies comparing both methods are needed to draw further conclusions.

Regarding antibiotic therapy, there is a trend toward the use of broad-spectrum antibiotics, like Piperacillin-tazobactam, as first empirical therapy. Regardless, we found many differences in clinical practice. Even within hospitals with the same antibiotic protocols, the choice of empirical antibiotic therapy was very heterogeneous.²³ This can be logically due to the lack of guidelines for the choice of antibiotherapy in these cases. However, differences in antibiotic prescription even for non-complicated UTIs (which have well-defined guidelines) are also commonly seen and reported in the literature.²⁹⁻³¹ One important strategy should be reporting local pathogen and resistance patterns, and defining corresponding protocols in each hospital or region. Antibiotic prescription by clinicians should be monitored.

Finally, managing PN or DJ stents for source control remains a matter of debate. Most included studies didn't provide any information regarding their criteria for stent exchange or removal (except when stent maintenance was no longer clinically indicated). Several potentially relevant factors may influence the decision to perform stent exchange, including the patient's clinical response to antibiotic therapy and individual patient characteristics. Additionally, the indication and timing of stent exchange, particularly whether it occurs after starting antibiotic treatment, may be a critical variable. Future research, ideally through multicenter prospective studies, is warranted to evaluate optimal antibiotic regimens and to compare clinical outcomes between early *versus* delayed stent exchange, as well as stent exchange *versus* stent maintenance.



Conclusion

This scoping review highlights inconsistencies in the diagnostic approaches of PN- and DJ-UTIs, namely in their definitions and urine or stent culture techniques. Clear differentiation between asymptomatic bacteriuria and true infection is essential to prevent unnecessary antibiotic use and to establish a reliable foundation for future clinical research. Monitoring local resistance patterns should be a priority to guide therapy. The role of stent exchange as a means of source control remains underexplored but appears to be a relevant factor in the management of these infections. Further prospective studies are needed to refine diagnostic criteria and optimize treatment strategies.

Awards and Previous Presentations: This work was already presented in the LXXXVII Congreso Nacional de Urología, in Palma de Mallorca, Spain, in June 2024.

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Autor Correspondente/Corresponding Author:

Beatriz Oliveira

a.beatriz-oliveira@outlook.com

Urology Department, Unidade Local de Saúde de Santo António

Largo Professor Abel Salazar 4099-001 Porto

ORCID: <https://orcid.org/0000-0002-6062-0688>

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Curative Surgery for Localized Prostate Cancer - Robot-Assisted Versus Laparoscopic Radical Prostatectomy: A Systematic Review of Reviews on Perioperative Efficacy and Safety Outcomes

Cirurgia Curativa para Cancro da Próstata Localizado – Prostatectomia Radical Assistida por Robot Versus Laparoscópica: Uma Revisão Sistemática de Revisões Sobre Resultados de Eficácia e Segurança Perioperatória

Rodrigo Lolli¹; Matheus Henrique Leite e Silva²; Marcelo Esteves Chaves Campos³; Marcelo Mamede⁴

Abstract

Introduction: Several systematic reviews comparing laparoscopic radical prostatectomy (LRP) and robot-assisted radical prostatectomy (RARP) have been published, yielding heterogeneous results. We aimed to summarize this body of evidence.

Methods: A PubMed search was conducted to identify systematic reviews with or without meta-analyses that compared LRP and RARP. Data regarding perioperative parameters, complications, and oncological outcomes were extracted and analyzed.

Results: Intraoperative and postoperative outcomes appear broadly comparable between the two approaches. Most studies demonstrate benefits for RARP in operative time, estimated blood loss, and transfusion rates. Complication rates and positive surgical margin rates tend to be similar. RARP offers a significant advantage over LRP regarding the learning curve for surgeons, albeit at increased cost.

Conclusion: While both techniques yield comparable outcomes, the robotic approach shows modest perioperative benefits.

Study Protocol: PROSPERO database (Registration Number: CRD42025630631).

Keywords: Laparoscopy; Prostatectomy; Prostatic Neoplasms/surgery; Robotic Surgical Procedures

1 – Department of Urology, Centro de Pesquisas Oncológicas, Florianópolis, Brazil

2 – Faculty of Medicine, Federal University of Minas Gerais, Belo Horizonte, Brazil

3 – Department of Urology, Faculty of Medicine, Federal University of Minas Gerais, Belo Horizonte, Brazil

4 – Department of Anatomy and Imaging, Faculty of Medicine, Federal University of Minas Gerais, Belo Horizonte, Brazil

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Resumo

Introdução: Foram publicadas várias revisões sistemáticas que comparam a prostatectomia radical laparoscópica (PRL) com a prostatectomia radical assistida por robot (PRAR), tendo produzido resultados heterogêneos. O nosso objetivo foi sintetizar a evidência.

Métodos: Foi realizada uma pesquisa na PubMed para identificar revisões sistemáticas, com ou sem meta-análises, que comparassem PRL e PRAR. Foram extraídos e analisados dados relativos a parâmetros perioperatórios, complicações e resultados oncológicos.

Resultados: Os resultados intraoperatórios e pós-operatórios parecem, de um modo geral, comparáveis entre as duas abordagens. A maioria dos estudos demonstra vantagens da PRAR no tempo operatório, na perda de sangue estimada e nas taxas de transfusão. As taxas de complicações e de margens cirúrgicas positivas tendem a ser semelhantes. A PRAR parece oferecer uma vantagem significativa relativamente à curva de aprendizagem dos cirurgiões, embora associada a custos superiores.

Conclusão: Embora ambas as técnicas apresentem resultados comparáveis, a abordagem robótica revela benefícios perioperatórios modestos.

Protocolo do Estudo: Base de dados PROSPERO (Número de Registo: CRD42025630631).

Palavras-chave: Laparoscopia; Neoplasias da Próstata/cirurgia; Procedimentos Cirúrgicos Robóticos; Prostatectomia

Introduction

The increase in prostate cancer (PC) screening programs in recent decades has led to a greater number of patients diagnosed in the



early stages of PC and many of these patients are candidates for surgical treatment. While adequate cancer treatment is of paramount importance, considerable effort has been devoted to reducing the surgical morbidity. In this regard, the application of minimally invasive techniques has brought the possibility of reducing surgical complications.

Initially, through the advent of laparoscopy, prostate surgery experienced a revolution. Literature data showing improvements in complications, postoperative pain, length of hospital stay and cosmetic outcome, when comparing to the conventional, open, approach.^{1,2}

More recently, surgery has broken through a new phase with the emergence of robotic procedures, which currently have one of their main applications in prostatectomies. The robotic surgical system allows the surgeon to command robotic arm movements from telehandlers, enabling precise surgical movements and facilitating the execution of operations by minimally invasive access.³

The robotic platform “da Vinci”, with its various versions, all produced by Intuitive Surgical, is the most widely available model for clinical use in the world.⁴ It was approved by the FDA for commercial use in the United States in the year 2000.⁵ Following the approval, an increase in the use of the robotic system to perform radical prostatectomy (RP) was observed, leaping from 13% in 2003 to 72% in 2011⁶ to more than 90%, presently.⁷ However, this rapid increase in the popularity of RARP preceded the accumulation of high-quality evidence demonstrating its superiority over laparoscopy.

Innovative equipment and treatments are, for various reasons, attractive to physicians and patients, who tend to adhere to new technologies even before their merits and weaknesses are fully established. This process can lead to increased health care costs. In this regard, only in recent years have we observed studies of greater scientific rigor comparing the two approaches of minimally invasive surgery for the treatment of PC. This review aims to compile data from other systematic reviews and meta-analyses available in the literature that make a counterpoint between laparoscopic radical prostatectomy and robotic radical prostatectomy.

Methods

A systematic review of the literature was conducted following the criteria of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines^{8,9} to answer the following PICO question: in patients with clinically localized PC, does robot-assisted radical prostatectomy, compared to conventional laparoscopic radical prostatectomy, offers better results, such as lower transfusion rate, shorter hospitalization period and lower rate of positive margins in the surgical specimen? The PRISMA checklist was completed and this review is

formally registered with PROSPERO, bearing the registration number CRD42025630631.

<https://www.crd.york.ac.uk/PROSPERO/view/CRD42025630631>

Inclusion and Exclusion Criteria

The inclusion criteria were systematic reviews with or without meta-analysis comparing the outcomes between the laparoscopic and robotic surgeries for treatment of patients with localized PC. Only studies in English, Spanish or Portuguese were included. No time restraints were employed. Exclusion criteria were studies comparing only laparoscopic and open or robotic and open surgeries; animal studies; unrelated articles; clinical trial articles, case reports and letters to the editor.

Search Strategy

The Virtual Health Library (VHL) system was used to find standardized descriptors. The terms researched were: “prostatectomy”, “minimally invasive surgical procedures”, “laparoscopic surgery” and “robotic surgery”. The MeSH terms used were “prostatectomy”, “minimally invasive surgical procedures”, “laparoscopy” and “robotic surgical procedures”. Other free terms were also included: (robotic OR robot OR da vinci OR “Robotic Surgical Procedures”[Mesh] OR remote surgery OR remote operation) AND (“prostatectomy”[MeSH Terms] OR “prostatectomy”[All Fields] OR “prostatectomies”[All Fields]) AND (“Laparoscopy”[Mesh] OR laparoscopic prostatectomy), which initially resulted in 3132 results.

The research was conducted using the PubMed database. The studies were filtered to include only systematic reviews and meta-analyses and only in English, Portuguese or Spanish, which changed the number of results to 159 publications. The systematic research of the literature was performed until November 23, 2024. All relevant studies were assessed independently by two authors (RL and MHLS), with discrepancies resolved by a third author (MM).

Selection of Studies

After reading the titles and abstracts of the 159 published papers, an initial screening was made for the selection of the relevant papers. Duplicate papers were deleted in this step. Subsequently, the papers were fully read for the selection of the studies. The selected papers were collected and stored in the Mendeley software. Fig. 1 depicts the flow diagram of the study selection process.

Data Extraction and Analyses

Data was extracted by two authors independently, using a standardized online spreadsheet. No statistical conversions were done. When data was unavailable, its absence was accounted for when critically appraising results. All included studies were eligible

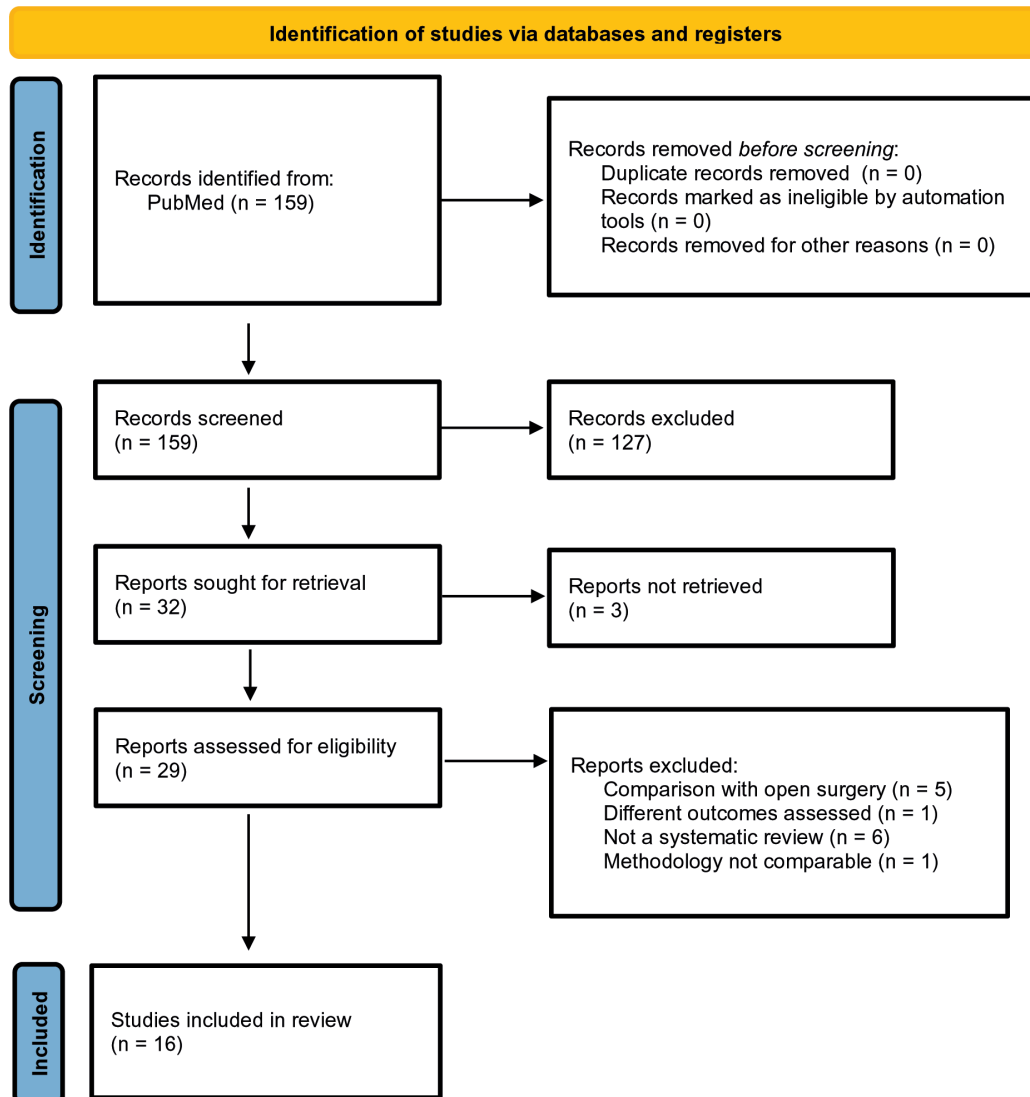


Figure 1: PRISMA Flow Diagram of the study selection process

for qualitative analysis and indirect comparison via tabulation of findings. Risk of bias analyses were conducted according to the original risk of bias evaluations on the included studies.

Results

Initially, 159 articles were found. With no duplicate papers, titles and abstracts were analyzed for all articles and 127 irrelevant studies were excluded. At this point, the studies were fully read to conduct the final selection of the papers and, finally, 16 studies were included.

The meta-analyses included a variable number of clinical trials, ranging from 2 to 54. The two meta-analyses that included only two studies had chosen to include only the best scientific, randomized studies, which were only two at the time. The total number of patients included in the studies ranged from 232 to 16 830.^{10,11}

Regarding the estimation of blood loss, five studies showed statistically significant benefit for robotic surgery, six studies showed no statistical difference between the two modalities, and the rest of the studies did not present data related to this outcome. Similarly, five studies showed a lower blood transfusion rate for robotic surgery, and five studies showed no difference between the two techniques.

Regarding the operative time, three meta-analyses found benefit for robotic surgery, in contrast to seven studies that showed similar operative times between the two techniques. Conversely, one review reported a benefit favoring laparoscopic surgery. Three studies showed a shorter hospital stay for patients submitted to RARP, and six studies did not notice a difference in hospitalization time.

Most reviews used the Clavien-Dindo classification to define and grade surgical complications. Eight meta-analyses showed



no difference in the rate of complications between LRP and RARP, while three studies showed a statistically significant difference in the rate of complications, one of these only in the subgroup of more severe complications (Clavien-Dindo III to V), favoring robotic surgery.¹²⁻¹⁴

Regarding the occurrence of positive margins, four studies showed benefit for each of the modalities. Eight studies did not identify a statistically significant difference. Most of the papers depicted better urinary recovery rates for robotic surgery at various time points of the postoperative period (1, 3, 6 or 12 months), with no one revealing better results for laparoscopic surgery at any reported timepoint, while three showed no differences. Sexual recovery rates had similar findings.

The summary of findings of this systematic review can be seen in Table 1.

Discussion

The literature review depicted a tendency of studies to show benefit for RARP in terms of blood loss and transfusion rate. However, the results are not unanimous. There was an alternation between studies showing benefit for robotic surgery and studies showing absence of statistically relevant difference, but none showed better estimates of blood loss and blood transfusion rate for the pure laparoscopic modality.

Regarding operative time, some studies demonstrated benefits for RARP, possibly due to the shorter learning curve and other relative advantages of the robotic approach, such as improved movement precision, easier knot-tying and suturing, and reduced fatigue for the surgical team. Vallancien *et al* reported an operative time for LRP of 234 min (151 - 453) versus 182 min (141 - 250) for RARP.²⁸ While other studies showed no statistically difference in operative time, highlighting satisfactory time when any of the techniques are performed by skilled surgeons.

Minimally invasive techniques are generally associated with faster postoperative recovery and consequently shorter hospital stays. This review showed that some studies point to similarity in terms of length of hospital stay between the two techniques, which are both minimally invasive. Some tended towards robotic surgery in terms of shorter hospital stay, and the more frequent absence of pelvic drain in the robotic approach might play a role in this.

Regarding the rates of positive surgical margins, the results were the most discrepant. The occurrence of a positive margin may be related to several factors, in addition to the surgical approach itself, such as the surgeon's experience, local staging of the tumor, degree of preservation of the neurovascular bundle used, among others, which limits any conclusion on the influence of laparoscopic or robotic approaches on the results of oncological margins.

Regarding biochemical recurrence (BCR) rates, once again, no study depicted better results for the laparoscopic approach.

Ficarra *et al*²⁹ demonstrated that BCR was significantly influenced by surgical experience, clinical tumor size, and anatomic tumor characteristics.

Recovery of urinary continence and sexual function has shown a trend more favorable to RARP in several meta-analyses, with odds ratios that, in some cases, almost double the chances of early recovery.^{14,16} However, many of these studies presented significant heterogeneity and potential biases related to patient profile and surgical experience.

The analysis of the included studies clearly demonstrates that results remain conflicting, and higher-quality data are still needed to definitively establish the superiority of one surgical approach over the other. Most of the reviews included retrospective studies or prospective cohorts and non-randomized clinical trials. The number of randomized clinical trials is still very low. The high statistical heterogeneity observed in several outcomes (with I^2 often higher than 75%) limits the robustness of the conclusions and highlights the need for caution in interpreting the results. There are several complicating factors that explain the difficulty in performing a higher quality study comparing surgical modalities in radical prostatectomy. First, it encounters the difficulty of randomization because patients hardly accept not participating in the decision of the surgical modality, and usually opt for the approach they understand to be more "modern", in case they have the possibility of choice. Another very important factor is regarding the experience of the surgeon. Most of the included meta-analyses did not mention the criteria adopted to validate the participation of surgeons in the respective trials, as well as the reasons for their choices. It is already known that laparoscopic radical prostatectomy requires a lot of effort and time from surgeons to become skilled in the surgical technique, and that this learning curve is shortened when replaced by the robot-assisted approach.²⁸

Additionally, divergencies in publication timepoints should not be overlooked. Most of the included studies in this review were undertaken more than a decade ago; since then, substantial technological improvements have occurred in both robotic and laparoscopic platforms. Innovations such as enhanced three-dimensional visualization, newer robotic consoles with improved ergonomics, and refinements in laparoscopic instrumentation may influence perioperative and functional outcomes. This temporal gap limits the external validity and applicability of some findings to current clinical practice. Furthermore, while robotic prostatectomy entails higher procedural costs, the potential for improved functional recovery, particularly in urinary continence and sexual function, raises questions about its cost-effectiveness compared to laparoscopy. Robust prospective studies incorporating contemporary technology and comprehensive health economic analyses are warranted to better clarify the balance between clinical benefits and financial implications.

**Table 1** – primary outcomes

Study	Country	Number of studies ^a	Total patients	Blood loss (ml)	Blood transfusion	Operative time (min)	Hospital stay (d)	Clavien-Dindo Complications		
								I-II	III-V	
Du 2018 (15)	China	33	16830	RARP < LRP SMD 0.31 [0.01, 0.61] ^b	RARP < LRP OR 5.32 [1.29, 21.98] ^b	RARP < LRP SMD 0.71 [0.18, 1.25] ^b	-	-	-	-
Steffens 2017 (11)	Australia	2	248	RARP = LRP MD -81.36 [-81.36, 17.16]	-	RARP = LRP MD 9.50 [-0.67, 19.67]	RARP = LRP MD 0.20 [0.02, 0.32]	RARP = LRP RR 1.50 [0.75, 3.01]	RARP = LRP	
Lee 2017 (12)	South Korea	26	9412	-	RARP < LRP RR 0.70 [0.54, 0.91]	RARP < LRP RR -18.74 [-32.15, -5.33] ^b	RARP = LRP MD -1.13 [2.93, 0.67] ^b	RARP = LRP RR 0.87 [0.46, 1.64] ^b	RARP < LRP RR 0.44 [0.23, 0.85]	
Huang 2016 (16)	China	24	9178	RARP < LRP MD 75.94 ml [6.95, 144.94]	RARP < LRP OR 2.08 [1.33, 3.26]	RARP = LRP MD -5.31 min [-19.41, 8.80]	RARP = LRP MD 0.07 [-0.13, 0.26]	RARP = LRP OR 1.13 [0.74, 1.74]	RARP = LRP	
Allan 2015 (10)	Australia	2	232	-	-	-	RARP = LRP	-	-	
Robertson 2013 (17)	United Kingdom	8	3830	-	RARP = LRP OR 0.71 [0.31, 1.62]	-	-	-	-	
Moran 2013 (18)	Ireland	9	2166	RARP = LRP WMD -78 [-199, 43]	RARP = LRP 0.7 [0.31, 1.39]	RARP = LRP -24 [-53, 5]	RARP < LRP WMD -0.7 [-1.2, -0.1] ^b	RARP = LRP RR 1.0 [0.56, 1.62]	RARP = LRP	
Novara 2012 (19-22)	Multiple	8	1400	RARP = LRP WMD 54.21 [-75.17, 183.59] ^b	RARP < LRP OR 2.56 [1.32, 4.96]	RARP = LRP WMD 34.78 [-1.36, 70.93] ^b	-	RARP = LRP OR 1.4 [0.73, 2.69] ^b	RARP = LRP	
Tewari 2012 (13)	United States	7	-	RARP < LRP WMD 127.8 [95.4, 160.2]	RARP = LRP WMD 1.02 [-0.1, 2.1]	-	RARP < LRP WMD 1.04 [0.3, 1.8]	RARP < LRP WMD 6.74 [2.6, 10.9]	RARP < LRP	
Ramsay 2012 (23)	United Kingdom	54	11720	-	RARP = LRP OR 0.71 [0.31, 1.62]	RARP < LRP MD -12.4 [-16.5, -8.1]	-	RARP = LRP	RARP = LRP	
Heer 2011 (24)	United Kingdom	-	-	RARP = LRP	-	-	RARP = LRP	RARP = LRP RR 1.83 [0.78, 4.31]	RARP = LRP	
Parsons 2008 (25)	United States	19	3839	-	RARP = LRP	-	-	-	-	
Wang 2024 (26)	China	4	616	RARP < LRP WMD -31.04 [-54.57, -7.51]	-	RARP = LRP WMD 16.88 [-69.4, 103.2]	-	-	-	
Ma 2023 (14) ^c	China	4	838	RARP = LRP WMD 2.95 [-56.84, 62.74] ^b	-	RARP > LRP WMD 5.64 [0.34, 10.9]	-	RARP = LRP OR 0.87 [0.60, 1.25]	RARP = LRP	
Ma 2023 (14) ^d	China	42	5431	RARP < LRP WMD -71.99 [-99.37, -44.61] ^b	RARP < LRP OR 0.44 [0.35, 0.56]	RARP = LRP WMD 3.00 [-14.0, 20.0] ^b	RARP < LRP WMD -0.41 [-0.68, -0.13] ^b	RARP < LRP OR 0.72 [0.54, 0.96]	RARP < LRP	
Carbonara 2021 (27)	Italy / United States	16	13752	RARP = LRP MD -53.1 [-116.1, 9.7]	-	RARP = LRP MD -16.3 [-46.3, 13.6]	RARP = LRP	-	RARP = LRP OR 0.61 [0.36, 1.04]	

Notes:

SMD = standard mean differences; OR = odds ratio; ORs = combined odds ratios; MD = mean difference; WMD = weighted mean differences; RR = relative risk

a In cases where the review included articles comparing RARP also with open prostatectomy, the number of articles included in the review and the number of patients was changed to include only the studies comparing RARP and LRP

b Results with high level of heterogeneity ($I^2 = 75\%$)

c Results of only the randomized clinical trials

d Results of only the non-randomized studies

Bold: surgical modality with statistically significant benefit ($p < 0.05$)

**Table 1** – primary outcomes (continuation)

Study	Positive surgical margin	Biochemical recurrence at 12 months	Urinary continence recovery rate			Sexual potency recovery rate		
			At 1 month	At 3 months	At 6 months	At 12 months	At 3 months	At 6 months
Du 2018 (15)	RARP < LRP OR 1.27 [1.10, 1.46]	-			RARP > LRP OR 0.66 [0.55, 0.78]		RARP > LRP OR 0.55 [0.31, 0.95]	
Steffens 2017 (11)	RARP = LRP RR 1.39 [0.81, 2.41]	-	-	RARP = LRP RR 0.21 [0.02, 2.68]	-	RARP = LRP RR 0.93 [0.86, 1.00]	RARP = LRP RR 0.47 [0.19, 1.19]	RARP > LRP RR 0.56 [0.32, 0.96]
Lee 2017 (12)	RARP > LRP RR 1.23 [1.05, 1.46]	RARP < LRP RR 0.65 [0.55, 0.78]	-	-	-	RARP > LRP RR 0.43 [0.31, 0.60]	-	RARP > LRP RR 1.38 [1.11, 1.70] ^b
Huang 2016 (16)	RARP > LRP OR 0.88 [0.78, 0.99]	RARP = LRP OR 1.15 [0.12, 10.64]	-	RARP > LRP OR 1.73 [1.30, 2.32]	RARP > LRP OR 2.20 [1.60, 3.04]	RARP > LRP OR 1.62 [1.20, 2.17]	RARP > LRP OR 2.34 [1.43, 3.84]	RARP > LRP OR 2.20 [1.41, 3.43]
Allan 2015 (10)	RARP = LRP RR 1.39 [0.81, 2.41]	RARP = LRP RR 1.01 [0.91, 1.12]	-		RARP > LRP RR 1.14 [1.04, 1.24]		RARP > LRP RR 1.51 [1.19, 1.92]	
Robertson 2013 (17)	RARP < LRP OR 0.69 [0.51, 0.96]	RARP = LRP OR 0.89 [0.24, 3.34]	-	-	-	RARP = LRP	-	-
Moran 2013 (18)	RARP = LRP	-	-	-	-	RARP > LRP RR 1.09 [1.02, 1.17]	RARP = LRP RR 1.49 [0.60, 3.73]	
Novara 2012 (19–22)	RARP = LRP OR 1.12 [0.81, 1.55]	RARP = LRP HR 0.5 [0.2, 1.3]	-	-	-	RARP > LRP OR 2.39 [1.29, 4.45]	-	-
Tewari 2012 (13)	RARP < LRP MD 3.02 [1.1, 5.0]	-	-	-	-	-	-	-
Ramsay 2012 (23)	RARP < LRP OR 0.69 [0.51, 0.96]	RARP = LRP OR 0.89 [0.24, 3.34]	-	-	-	RARP = LRP OR 0.55 [0.09, 2.84]	-	-
Heer 2011 (24)	RARP = LRP RR 0.97 [0.65, 1.46]	-	-	-	-	-	-	-
Parsons 2008 (25)	RARP = LRP	-	-	-	-	-	-	-
Wang 2024 (26)	RARP = LRP OR 1.11 [0.74, 1.68]	RARP = LRP OR 0.61 [0.21, 1.83]	-	RARP = LRP OR 1.01 [0.63, 1.63]	RARP = LRP OR 0.96 [0.47, 1.93]	-	RARP = LRP OR 0.76 [0.36, 1.59]	-
Ma 2023 (14) ^c	RARP > LRP OR 1.48 [1.01, 2.18]	RARP = LRP OR 1.40 [0.85, 2.32]	RARP > LRP OR 2.14 [1.25, 3.66]	RARP > LRP OR 1.51 [1.12, 2.02]	RARP > LRP OR 2.66 [1.31, 5.40]	RARP > LRP OR 3.52 [1.36, 9.13]	RARP > LRP OR 4.25 [1.67, 10.82]	RARP > LRP OR 3.59 [1.78, 7.27]
Ma 2023 (14) ^d	RARP < LRP OR 1.12 [1.03, 1.22]	RARP < LRP OR 0.78 [0.66, 0.92]	RARP > LRP OR 1.89 [1.58, 2.26]	RARP > LRP OR 1.53 [1.36, 1.71]	RARP > LRP OR 1.71 [1.49, 1.98]	RARP > LRP OR 1.38 [1.20, 1.58]	RARP > LRP OR 2.00 [1.69, 2.36]	RARP > LRP OR 1.63 [1.09, 2.43]
Carbonara 2021 (27)	RARP = LRP OR 1.04 [0.78, 1.39]	RARP < LRP OR 0.52 [0.43, 0.63]	-	-	-	RARP > LRP OR 0.38 [0.18, 0.8]	-	RARP > LRP OR 2.16 [1.23, 3.78]

Notes:

SMD = standard mean differences; OR = odds ratio; ORs = combined odds ratios; MD = mean difference; WMD = weighted mean differences; RR = relative risk

a In cases where the review included articles comparing RARP also with open prostatectomy, the number of articles included in the review and the number of patients was changed to include only the studies comparing RARP and LRP

b Results with high level of heterogeneity ($I^2 = 75\%$)

c Results of only the randomized clinical trials

d Results of only the non-randomized studies

Bold: surgical modality with statistically significant benefit ($p < 0.05$)



There is also a large number of articles which have been conducted between 2010 and 2015, contrasting with a relative reduction in publications in the last years. Perhaps this may be explained by the difficulty of performing these investigations and by the acceptance and dissemination of the robotic technique even without the definitive proof of superiority.

Conclusion

In summary, robot-assisted radical prostatectomy demonstrates several practical advantages over laparoscopic prostatectomy, including improved ergonomics, enhanced dexterity, and potentially faster recovery of urinary continence and sexual function. However, perioperative and oncological outcomes remain largely comparable between the two techniques, and significant heterogeneity across studies limits definitive conclusions regarding superiority. Moreover, the higher costs associated with robotic surgery pose important considerations for health systems. Future high-quality randomized trials incorporating contemporary surgical platforms and robust cost-effectiveness analyses are essential to better inform surgical decision-making and optimize patient outcomes.

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Corresponding Author/Autor Correspondente

Marcelo Mamede, MD, DMSc

Anatomy and Imaging Department

Federal University of Minas Gerais

Avenida Prof. Alfredo Balena, 190 Room 175

Zip Code: 30.130-100

Belo Horizonte - Brazil

E-mail: mamede.mm@gmail.com

ORCID:

RL: <https://orcid.org/0000-0001-6105-9688>

MHLS: <https://orcid.org/0000-0002-6223-043X>

MECC: <https://orcid.org/0000-0002-8093-8052>

MM: <https://orcid.org/0000-0001-5818-0954>

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RL, MHLS, MECC and MM: Conceptualization, Methodology, Software, Validation, Formal Analysis, Investigation, Resources, Data Curation, Writing – Original Draft, Writing – Review & Editing, Visualization, Supervision and Project Administration.

All authors approved the final version to be published.

RL, MHLS, MECC e MM: Conceitualização, Metodologia, Software, Validação, Análise Formal, Investigação, Recursos, Curadoria de Dados, Redação – Rascunho Original, Redação – Revisão e Edição, Visualização, Supervisão e Administração do Projeto.

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Hemangioma Cavernoso do Testículo: Uma Apresentação Rara de uma Massa Testicular e Revisão da Literatura

Cavernous Hemangioma of the Testis: A Rare Presentation of Testicular Mass and Review of Literature

Rui Miguel Maciel¹, Raquel Oliveira Rodrigues¹, Rui Amorim¹, Samuel Bastos¹, Ana Sofia Sabença¹, Miguel Lourenço Faustino¹, João Peralta¹, João Ricardo e Silva¹, Maria Inês Nascimento¹, Luis Xambre¹

Resumo

Os hemangiomas testiculares são tumores vasculares benignos extremamente raros, com cerca de 50 casos descritos na literatura.

Reportamos um caso de um jovem de 27 anos que recorre ao serviço de urgência por massa testicular esquerda associada a dor e edema com 6 dias de evolução. A ecografia revelou processo infiltrativo difuso do testículo esquerdo, sem vascularização central. Os marcadores tumorais pré-operatórios encontravam-se dentro da normalidade e a TC-TAP não revelou alterações de relevo.

O doente foi submetido a orquiectomia radical esquerda. O exame histopatológico e imunohistoquímico revelaram achados compatíveis com hemangioma cavernoso do testículo.

A apresentação clínica e imagiológica assemelha-se a outras neoplasias malignas do testículo, tornando difícil a sua adequada distinção. Este caso reforça a importância do correto diagnóstico de neoplasias testiculares. A cirurgia de preservação testicular, acompanhada do exame extemporâneo, poderá permitir a cirurgia poupadora de testículo quando esta seja viável.

Palavras-chave: Hemangioma Cavernoso; Neoplasias Testiculares

Abstract

Testicular hemangiomas are rare benign vascular tumors, particularly when located within the testis, with only around 50 reported cases.

We report a case of a 27-year-old male who arrived at the emergency department with left scrotal swelling and six days of testicular pain. Scrotal ultrasound showed a heterogeneous, lobulated appearance without central vascularization, characteristic

of a diffuse infiltrative process. Tumor markers and imaging were normal.

The patient underwent a left radical orchiectomy. Histopathology and immune markers confirmed a cavernous hemangioma with significant ischemic necrosis. Although hemangiomas are typically asymptomatic, they can cause pain due to ischemia or hemorrhage, frequently impossible to distinguish clinically from other testicular malignancies.

This clinical case underscores the importance of a correct diagnostic approach in suspect testicular masses. Intraoperative pathological evaluation can aid in considering testis-sparing surgery in select cases.

Keywords: Hemangioma, Cavernous; Testicular Neoplasms

Introdução

Os hemangiomas são tumores vasculares congénitos, benignos, com origem na proliferação de células endoteliais vasculares.¹ Em casos raros, podem surgir associados a estruturas intra-esco-tais, como o cordão espermático, epidídimo e túnica vaginal, ou mesmo em localização intraparenquimatosa testicular.² A localização intratesticular destes tumores é extremamente rara, com apenas cerca de 50 casos descritos na literatura até à data.

A maioria é assintomática, podendo ocasionalmente apresentar-se com dor, devido a hemorragia tumoral, isquemia e associação a torção testicular.^{3,4} São mais frequentes em jovens adultos, embora o diagnóstico possa ocorrer em qualquer faixa etária. Constituem um desafio diagnóstico, já que estas lesões são frequentemente clínica e imagiologicamente indistinguíveis de neoplasias de células germinativas e outras neoplasias testiculares. Como tal, o diagnóstico apenas pode ser confirmado pela análise histopatológica da peça operatória.

Descrição de uma apresentação rara de hemangioma cavernoso testicular simulando uma neoplasia testicular.

Caso Clínico

Apresenta-se o caso de um jovem de 27 anos, melanodérmico, sem antecedentes de relevo, história de criptorquidia ou trauma testicular, que recorre ao serviço de urgência por clínica com 6

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Figura 1 – Testículo esquerdo – vista sagital, demonstrando massa heterogênea, sem calcificações internas

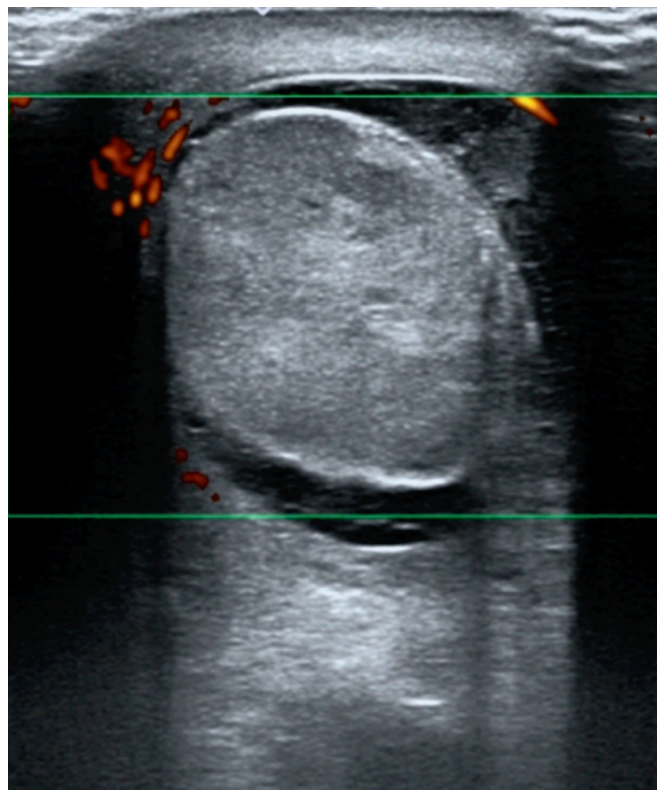


Figura 3 – Testículo esquerdo – Power Doppler, não evidenciando vascularização interna



Figura 2 – Testículo esquerdo – vista oblíqua

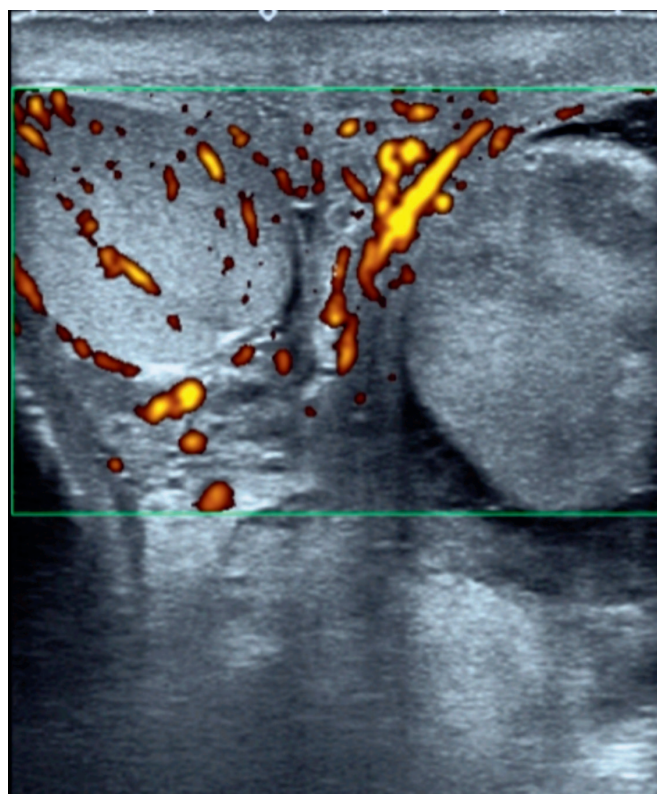


Figura 4 – Power Doppler, comparando testículo direito (com vascularização interna) e testículo esquerdo (sem vascularização interna)

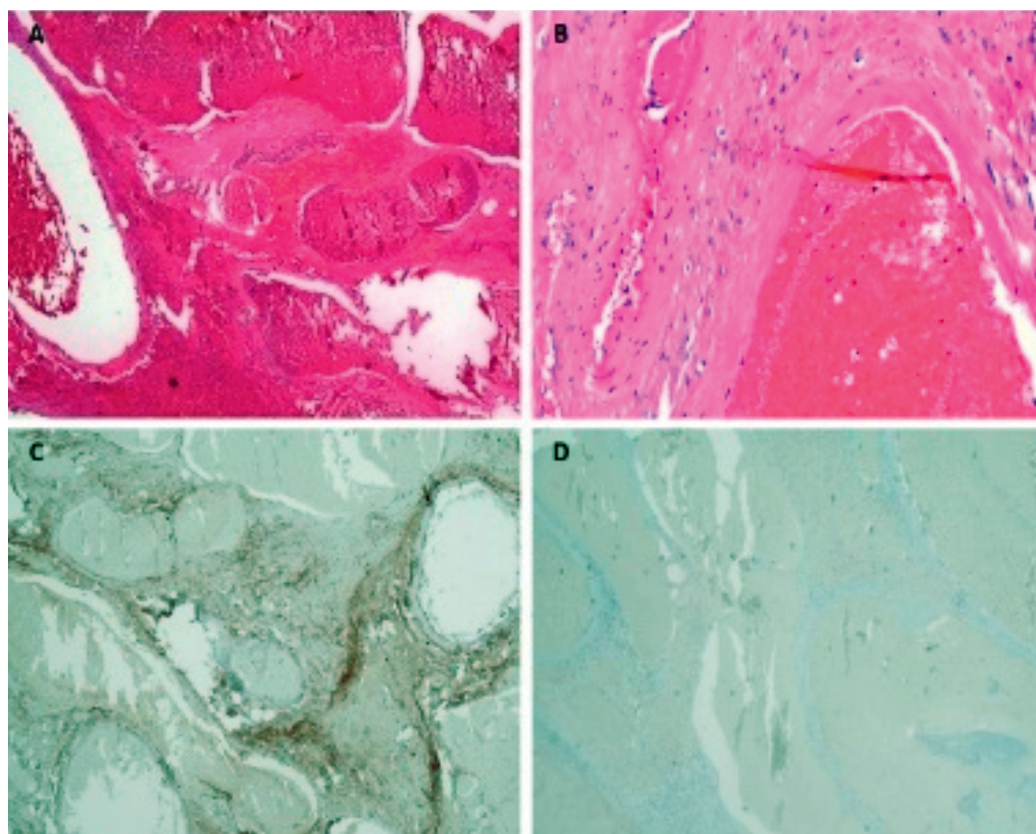


Figura 5 – Histologia e imunohistoquímica – Vasos sanguíneos dilatados e congestivos, parênquima testicular com extensas áreas de necrose isquêmica (A, B); Expressão de CD34 positiva (C); Expressão de citoqueratinas negativa (D)

dias de evolução de massa testicular esquerda dolorosa e com sinais inflamatórios associados. A história clínica era negativa para outros dados de relevo, febre ou sintomas urinários baixos. Ao exame físico, observaram-se edema e sinais inflamatórios do hemiescroto esquerdo. O testículo esquerdo apresenta-se doloroso ao toque e com massa pétreia palpável e indissociável do mesmo. O testículo contralateral e restante exame físico não apresentavam alterações de relevo. A ecografia escrotal revelou um testículo esquerdo heterogêneo, com áreas císticas dispersas e contornos lobulados, sugestivos de um processo infiltrativo difuso. O estudo Doppler complementar revelou ausência de vascularização central, sugestiva de isquemia. Os exames laboratoriais, incluindo marcadores tumorais, revelaram níveis de lactato desidrogenase, alfa-fetoproteína e beta-hCG (β -gonadotrofina coriônica humana) dentro da normalidade. A tomografia computadorizada do tórax, abdômen e pélvis não mostrou evidência de adenopatias suspeitas, metástases ou outros achados de relevo.

O doente foi submetido a orquiectomia radical esquerda por via inguinal. Ao exame macroscópico, o espécime de orquidectomia revelou um testículo de volume aumentado, apresentando uma lesão expansiva e multilobulada, de coloração acastanhada e com características hemorrágicas, indissociável do testículo. A análise histopatológica revelou uma massa constituída por vasos sanguíneos dilatados e intensamente congestivos, sem atipia celular. Observavam-se áreas de necrose isquêmica com hemor-

ragia recente. Na periferia, notavam-se vasos sanguíneos obstruídos por fibrina com fenómenos de recanalização. No parênquima testicular, existiam áreas extensas de necrose isquêmica e evidência de hemorragia recente, com focos ocasionais de espermatogênese ativa. Estes achados são compatíveis com hemangioma cavernoso do testículo.

Discussão

Os hemangiomas são tumores vasculares benignos e relativamente comuns, resultantes da hiperplasia de células endoteliais vasculares. Quatro tipos principais de tumores vasculares encontram-se descritos na literatura, que incluem hemangiomas cavernosos, capilares, histiocitoides e hiperplasia endotelial papilar.⁵ Estes podem surgir em qualquer faixa etária, sendo mais frequentes em crianças e adolescentes. Na população pediátrica, ocorrem mais frequentemente na cabeça e no pescoço (60%), tronco (25%) ou membros (15%), sendo que apenas cerca de 2% dos hemangiomas se localizam na região genital. Podem surgir como lesões isoladas ou no contexto de síndromes hemangiomatosas.^{3,6}

Por norma, os hemangiomas testiculares apresentam-se como uma massa testicular unilateral e indolor, ou mesmo achados incidentais em exames de imagem. A maioria destas lesões incidentais não palpáveis é benigna (cerca de 80%), contrastando com as lesões palpáveis, cuja percentagem de malignidade



ronda os 90%.⁷ A dor é um sintoma inconsistente, podendo indicar isquemia tumoral associada a necrose, hemorragia, torção testicular ou inflamação. Raramente, podem também apresentar-se com ulceração.³

A abordagem diagnóstica de uma massa testicular, particularmente em indivíduos jovens, deve incluir sempre a exclusão de neoplasia testicular maligna, como neoplasias da linha germinativa. A ecografia escrotal é o exame de primeira linha na avaliação de massas escrotais. A maioria dos hemangiomas testiculares apresenta características ecográficas semelhantes às dos tumores testiculares malignos. Os hemangiomas cavernosos podem surgir como massas hipoeogénicas, hipereogénicas ou de aspeto misto, podendo também apresentar macrocalcificações.^{2,8} O padrão Doppler pode variar, mas a hipervascularização extensa e as áreas de baixa resistência no Doppler espectral são altamente sugestivas de hemangioma.^{9,10} Contudo, a ausência de fluxo não exclui a possibilidade de hemangioma cavernoso, sobretudo quando existe torção testicular concomitante.

O hemangioma anastomosante representa outro subtipo de tumor vascular benigno, frequentemente associado ao trato genito-urinário, devendo também ser considerado no diagnóstico diferencial de neoplasias testiculares.^{11,12} Contrariamente ao hemangioma cavernoso, composto por espaços vasculares maiores e dilatados, o hemangioma anastomosante é constituído por um padrão intrincado e interligado de pequenos vasos anastomóticos, com revestimento endotelial com células com aparência em “hobnail” e núcleos hiper cromáticos, sendo frequente a presença de trombos intravasculares e hematopoiese extramedular associada.⁷ O hemangioma anastomosante faz ainda diagnóstico diferencial com o angiossarcoma bem diferenciado, um tipo maligno de tumor vascular. Achados moleculares e imuno-histoquímicos, como mutações do gene *GNAQ*, e a expressão de *p53* e de *HIF-1α* podem ajudar na distinção entre estas entidades.^{7,13}

Outros exames de imagem como a ressonância magnética possuem baixa acuidade diagnóstica para permitir a distinção fiável entre tumores de características benignas ou malignas. Os hemangiomas testiculares apresentam por norma marcadores tumorais, como alfa-fetoproteína, beta-hCG e lactato desidrogenase, negativos. Embora a sua negatividade não exclua malignidade, a sua elevação deve suscitar preocupação quanto à possibilidade de neoplasias malignas da linha germinativa.³

Todos os hemangiomas testiculares descritos na literatura demonstraram um curso benigno, sem casos conhecidos de metástases ou recorrência local após excisão cirúrgica.^{2,3,13} Contudo, alguns autores descrevem complicações possíveis, como rotura da parede com hemorragia, infeção, torção e enfarte com necrose.² Os hemangiomas podem sofrer involução espontânea, podendo ocasionalmente apresentar crescimento rápido e expansivo, com extensão à pelve e abdómen.^{10,11}

Uma vez que a avaliação clínica e imagiológica pré-operatória não permite distinguir com fiabilidade hemangiomas de massas testiculares malignas, a abordagem cirúrgica padrão continua a ser a orquiectomia radical, tanto como método diagnóstico como terapêutico. Por outro lado, o exame extemporâneo intraoperatório pode permitir uma abordagem poupadora de órgão, com benefícios potenciais na preservação da fertilidade, função sexual e aparência estética.^{2,9,12}

Conclusão

Os hemangiomas testiculares representam neoplasias testiculares benignas raras, cuja apresentação pode mimetizar outras neoplasias testiculares mais frequentes, como o seminoma. Embora a ecografia e os marcadores tumorais séricos possam ser importantes no processo diagnóstico, a sua fiabilidade na predição de malignidade é limitada. O caso descrito serve para relembrar da necessidade de considerar diagnósticos alternativos. Uma vez que o diagnóstico só pode ser feito de forma definitiva através de exame histopatológico, o exame extemporâneo intraoperatório poderá ter um papel importante ao permitir a realização de cirurgia poupadora de órgão.

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All authors approved the final version to be published.

Autor Correspondente/Corresponding Author

Rui Miguel Maciel

Email: ruimm7@gmail.com

Endereço postal/Postal address: Rua 28 de Janeiro, 99, B16,
4400-335 VILA NOVA DE GAIA

ORCID: <https://orcid.org/0009-0005-0564-6841>

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Adenocarcinoma do Úraco: Caso Clínico

Adenocarcinoma of the Urachus: Case Report

Samuel Bastos¹; Vítor Oliveira¹; Ana Sabença¹; Rui Maciel¹; Débora Araújo¹; Rui Amorim¹; Luís Xambre¹

Resumo

O adenocarcinoma do úraco é um cancro raro, correspondendo a aproximadamente um terço de todos os adenocarcinomas da bexiga, cerca de 0,01% de todos os tumores do adulto e 0,5% a 2% de todas as neoplasias vesicais.

Apresenta-se o caso de um homem de 70 anos, referenciado por hematuria e mucosúria com dois meses de evolução. A avaliação imagiológica evidenciou uma formação nodular na cúpula vesical, sugestiva de patologia do úraco. A uretroscopia revelou uma lesão exofítica e a biópsia obtida por ressecção transuretral confirmou a presença de um adenocarcinoma do úraco. O doente foi submetido a cistectomia parcial com exérese en bloc do úraco e umbigo, associada a linfadenectomia iliaco-obturadora bilateral laparoscópica, sem intercorrências. O exame anatomopatológico confirmou um adenocarcinoma mucinoso bem diferenciado (pT2bN0M0), com margens negativas e sem envolvimento umbilical ou metastização ganglionar. O doente mantém-se em vigilância clínica e imagiológica periódica com cistoscopia e tomografia computadorizada toraco-abdomino-pélvica, sem evidência de recorrência.

O adenocarcinoma do úraco, apesar de raro, deve ser considerado no diagnóstico diferencial de lesões da cúpula vesical com hematuria associada. A cistectomia parcial associada à exérese do úraco e linfadenectomia constitui uma abordagem eficaz em doentes selecionados. A decisão sobre terapêutica adjuvante deve ser individualizada, e a vigilância pós-operatória é essencial para detetar recidivas precoces e tratar sintomas urinários residuais, contribuindo para uma melhor qualidade de vida.

Palavras-chave: Adenocarcinoma; Neoplasias da Bexiga Urinária; Úraco

Abstract

Urachal adenocarcinoma is a rare malignancy, accounting for approximately one-third of all bladder adenocarcinomas, about 0.01% of all adult tumors, and 0.5% to 2% of all bladder neoplasms.

1 – Departamento de Urologia, Unidade Local de Saúde Gaia e Espinho, Gaia, Portugal

We present the case of a 70-year-old male referred for evaluation due to hematuria and mucosuria with a two-month evolution. Imaging studies revealed a nodular lesion at the bladder dome, suggestive of urachal pathology. Urethroscopy identified an exophytic lesion, and biopsy via transurethral resection confirmed the diagnosis of urachal adenocarcinoma. The patient underwent laparoscopic partial cystectomy with en bloc resection of the urachus and umbilicus, combined with bilateral iliac-obturator lymphadenectomy, without complications. Histopathological analysis confirmed a well-differentiated mucinous adenocarcinoma (pT2bN0M0) with negative surgical margins, no umbilical involvement, and no lymph node metastasis. The patient remains under regular clinical and imaging surveillance, including cystoscopy and thoracoabdominopelvic computed tomography scans, with no evidence of recurrence to date.

Although rare, urachal adenocarcinoma should be considered in the differential diagnosis of bladder dome lesions associated with hematuria. Partial cystectomy with concurrent urachal excision and lymphadenectomy represents an effective treatment approach in selected patients. Decisions regarding adjuvant therapy should be individualized. Postoperative surveillance is essential to detect early recurrences and manage residual urinary symptoms, contributing to improved quality of life.

Keywords: Adenocarcinoma; Urachus; Urinary Bladder Neoplasms

Introdução

O úraco é um remanescente músculo fibroso localizado no espaço de Retzius, rodeado anteriormente pela fáscia transversalis e posteriormente pelo peritонеu, que faz a conexão da bexiga ao cordão umbilical durante a embriogénese.^{1,2}

O adenocarcinoma do úraco é um cancro raro, correspondendo a aproximadamente um terço de todos os adenocarcinomas da bexiga,¹ cerca de 0,01% de todos os tumores do adulto e 0,5% a 2% de todas as neoplasias vesicais.^{2,3}

Caso Clínico

Apresenta-se o caso clínico de um homem de 70 anos, referenciado à consulta de Urologia devido a queixas de hematuria e mucosúria com 2 meses de evolução. O doente negou sintomas do trato urinário inferior (LUTS) de armazenamento ou esvaziamento, pneumaturia ou fecalúria. Entre os antecedentes de relevo destacam-se: litíase renal direita; quadro intestinal oclu-

sivo decorrente de hérnia abdominal com necessidade de correção cirúrgica; cirurgia de prótese de anca esquerda. Sem história prévia de cirurgia vesical ou prostática.

O doente não apresentava alterações clínicas de relevo ao exame físico, nomeadamente, massas abdominais ou suprapúbicas, ou drenagem umbilical. O toque retal apresentava esfínter normotónico, sem palpação de massas retais, próstata de volume ligeiramente aumentado, lisa e regular, sem nódulos suspeitos palpáveis.

Os exames auxiliares de diagnóstico evidenciaram os seguintes resultados: PSA (prostate specific antigen) de 1,18 ng/mL; CEA (antígeno carcinoembrionário) negativo; colonoscopia sem pólipos ou lesões suspeitas do trato gastrointestinal. A ecografia renovesical demonstrou uma “imagem nodular com vascularização periférica da cúpula vesical, de 44x42x34 mm, sugerindo um possível quisto do úraco”.

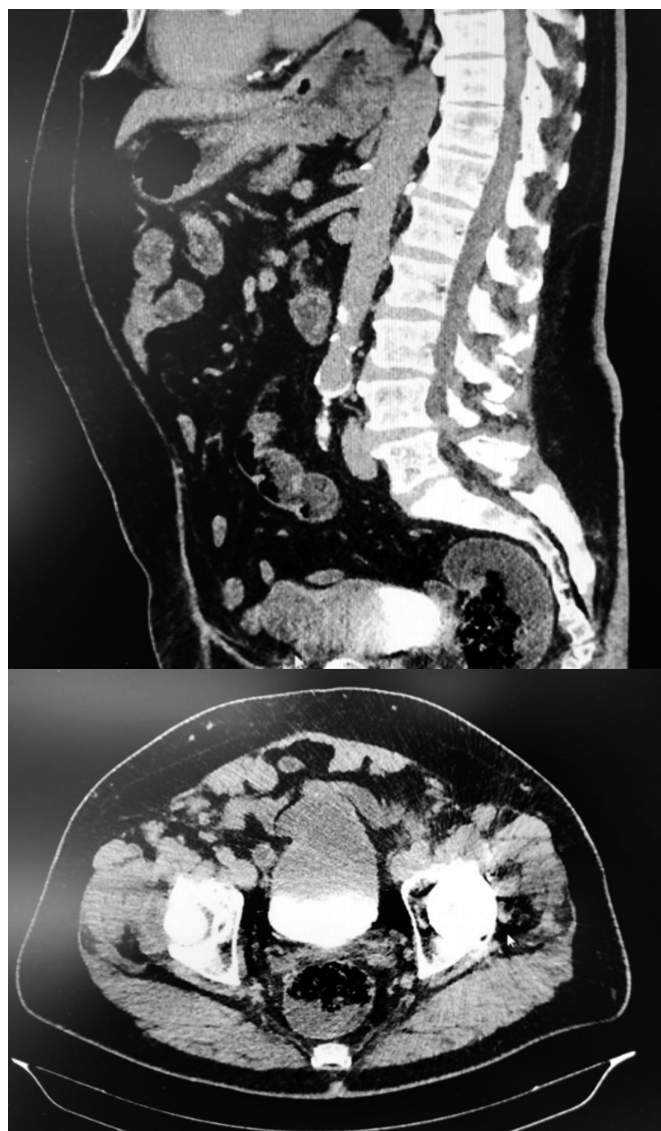


Figura 1 – Formação nodular na cúpula vesical em TC TAP

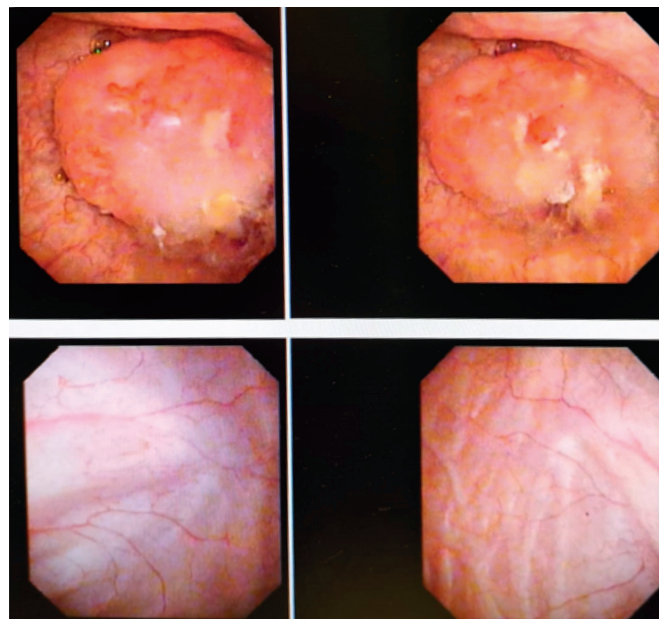


Figura 2 – Uretrocistoscopia – lesão sólida exofítica da cúpula vesical

Com o intuito de esclarecer os achados imagiológicos, foi realizada tomografia computadorizada toraco-abdomino-pélvica (TC TAP) a qual demonstrou “formação nodular na cúpula vesical com cerca de 46x39 mm contendo calcificações aparentemente parietais, heterogénea, hipocaptante, (...) sem plano de clivagem com parede vesical” (Fig. 1)

O doente foi submetido a uretrocistoscopia, que revelou “bexiga de boa capacidade, com uma imagem exofítica de aspeto sólido, com base de implantação larga, localizada ao nível da cúpula vesical, com cerca de 4 cm”. A urina colhida para citologia não evidenciou células uroteliais malignas de alto grau (Fig. 2).

Face aos achados clínicos e imagiológicos, foi proposta a realização de ressecção transuretral vesical (RTU-V), para biópsia da lesão. A análise histológica revelou um adenocarcinoma do úraco. Desta forma, considerando a presença de adenocarcinoma do úraco com extensão local vesical, sem evidência de adenopatias ou lesões metastáticas em TC TAP, o doente foi proposto e submetido a cistectomia parcial associada a exérese do úraco e umbigo em bloc com linfadenectomia ilíaco-obturadora bilateral laparoscópica (Figs. 3 e 4).

O procedimento decorreu sem complicações ou intercorrências durante o pós-operatório, tendo removido a sonda vesical ao 10º dia.

O relatório anatomopatológico confirmou a presença de “adenocarcinoma mucinoso bem diferenciado do úraco, com invasão da muscular própria vesical, sem metástases ganglionares regionais, e umbigo sem alterações de natureza neoplásica”. A classificação histológica foi pT2b N0 M0 R0 (Estadio IIIa de Sheldon – Tabela 1)

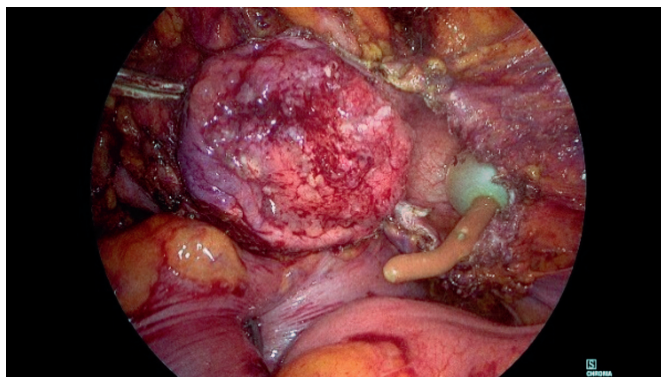


Figura 3 – Cistectomia parcial laparoscópica – exérese de lesão vesical



Figura 4 – Peça anatómica macroscópica – Bexiga e Úraco

Durante o seguimento, o doente referiu um aumento da imperiosidade vesical e um grau ligeiro de incontinência urinária de urgência com bom controlo sintomático após introdução de medicação oral – tansulosina e solifenacina.

Em virtude da ausência de forte evidência científica, optou-se por não realizar quimioterapia adjuvante, mantendo regime de vigilância periódica com cistoscopia e TC TAP. O doente não apresenta sinais de recidiva aos 3 anos de seguimento.

Discussão

O adenocarcinoma do úraco é uma neoplasia rara, representando menos de 1% dos tumores vesicais. Geralmente é diagnosticado em estádios avançados devido à sua localização

extravesical. A maioria dos doentes apresenta uma evolução clínica assintomática nos estádios iniciais. Sintomas como hematuria e mucosúria surgem com a invasão da parede vesical. A apresentação típica envolve uma lesão na cúpula da bexiga, como observado neste caso clínico. O diagnóstico é realizado após cistoscopia, RTU-V e subsequente resultado histológico a demonstrar adenocarcinoma. A TC TAP é o método de imagem usado para sustentar o diagnóstico e realizar estadiamento local e à distância⁴ (Tabela 1).

O tratamento standard para o adenocarcinoma do úraco é a ressecção en bloc da cúpula vesical, úraco e umbigo associada a linfadenectomia ilíaco-obturadora. A cistectomia radical poderá ser considerada tendo em conta o atingimento tumoral.^{1,5,6}

O caso descrito é particularmente relevante por envolver um doente de 70 anos, faixa etária menos comum para o diagnóstico precoce deste tumor, considerando que a maioria dos casos ocorre em indivíduos mais jovens ou de meia-idade.⁷ Além disso, a opção cirúrgica por abordagem minimamente invasiva, permitiu a preservação de órgão e uma recuperação rápida e sem complicações, demonstrando a viabilidade desta técnica em doentes selecionados.

A decisão de não realizar quimioterapia adjuvante foi sustentada nos critérios favoráveis da doença apresentada, como a ausência de metastização ganglionar ou à distância, margens cirúrgicas negativas e grau histológico de diferenciação elevado. Esta conduta está de acordo com as orientações atuais, que não recomendam terapêutica adjuvante em casos de doença localizada completamente ressecada.⁶⁻⁹

Contudo, regimes de quimioterapia devem ser considerados em doentes com atingimento ganglionar e/ou metástases à distância.^{7,9}

Este caso reforça a importância de: incluir o adenocarcinoma do úraco no diagnóstico diferencial de lesões da cúpula vesical, especialmente em doentes com hematuria e mucosúria; considerar abordagens cirúrgicas minimamente invasivas e poupa-

Tabela 1 – Estadiamento TNM

Estadio I	Confinado à mucosa do úraco
Estadio II	Confinado ao úraco
Estadio III	Extensão local
Estadio IIIa	Bexiga
Estadio IIIb	Parede abdominal
Estadio IIIc	Peritoneu
Estadio IV	Metastização

Sheldon *et al* 1984



doras de órgão em doentes com bom estado geral; individualizar a decisão sobre quimioterapia adjuvante com base na histologia e estadiamento clínico; assegurar vigilância no seguimento com cistoscopia e TC, dada a possibilidade de recidiva tardia; monitorizar e tratar sintomas urinários pós-operatórios assegurando melhoria da qualidade de vida dos doentes.

O diagnóstico precoce, aliado a uma abordagem cirúrgica adequada e vigilância estruturada, constituem os pilares do tratamento do adenocarcinoma do úraco.

Este caso ilustra uma estratégia terapêutica eficaz e o contributo para a prática clínica de uma doença urológica rara.

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VO, AS, RM, DA, RA, and LX: Responsible for developing the

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All authors approved the final version to be published.

Autor Correspondente/Corresponding Author:

Samuel Bastos

bastos.ssamuel@gmail.com

Unidade Local de Saúde Gaia e Espinho, Rua Conceição Fernandes S/N 4434-502 VILA NOVA DE GAIA, Portugal

ORCID: <https://orcid.org/0000-0003-2015-9636>

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Tracheobronchial Uptake on [^{68}Ga]Ga-PSMA-11 PET/CT: An Incidental Finding

Uptake Traqueobrônquico em PET/CT [^{68}Ga]Ga-PSMA-11: Um Achado Incidental

Inês Cardoso Ferreira¹, Olívia Leal Silva¹, João Ramos², Joaquim Geraldês Santos¹

Abstract

Prostate-specific membrane antigen (PSMA) PET/CT is widely used in prostate cancer evaluation but may show uptake in non-prostatic tissues. We report the case of a 69-year-old man with severe COPD and multiple comorbidities undergoing [^{68}Ga]Ga-PSMA-11 PET/CT for rising PSA. Imaging revealed heterogeneous prostatic uptake and moderate diffuse tracheobronchial uptake, more intense on the left, along with cervicothoracic ganglia uptake. This case highlights tracheobronchial uptake as a potential pitfall, possibly related to physiologic PSMA expression, and underscores the need for awareness in patients with underlying pulmonary disease.

Keywords: Gallium Radioisotopes; Incidental Findings; Positron Emission Tomography Computed Tomography; Prostatic Neoplasms

Resumo

A tomografia por emissão de positrões com tomografia computadorizada com radioligandos PSMA (PSMA PET/CT) é amplamente utilizada na avaliação do cancro da próstata, podendo, contudo, evidenciar captação em tecidos extraprostáticos. Apresentamos o caso de um homem de 69 anos, com DPOC grave e múltiplas comorbilidades, submetido a PET/CT com [^{68}Ga]Ga-PSMA-11 por aumento progressivo de PSA. O exame revelou captação heterogênea prostática e captação traqueobrônquica difusa moderada, mais intensa à esquerda. Este caso evidencia a captação traqueobrônquica como possível pitfall, sublinhando a importância do seu reconhecimento em doentes com patologia pulmonar.

1 – Centro de Responsabilidade Integrado de Medicina Nuclear – Unidade Local de Saúde de Almada-Seixal, Almada, Portugal;

2 – Serviço de Urologia – Unidade Local de Saúde do Arco Ribeirinho, Barreiro, Portugal

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Palavras-chave: Achados Incidentais; Neoplasias da Próstata; Radioisótopos de Gálio; Tomografia por Emissão de Positrões com Tomografia Computorizada

Prostate-specific membrane antigen (PSMA) PET/CT imaging is increasingly utilised for detecting and staging prostate cancer with high sensitivity and specificity. However, PSMA expression is not exclusive to prostate tissue, being also present in various normal and pathological tissues, potentially leading to diagnostic challenges. Tracheobronchial uptake of PSMA tracers, though an under-recognized pitfall, has been documented and is sometimes associated with underlying pulmonary conditions.

We present the case of a 69-year-old male, active smoker with a medical history of type 2 diabetes, dyslipidemia, arterial hypertension, ischemic cardiomyopathy (previous acute myocardial infarction), chronic renal disease, 10 mm pulmonary nodule (under follow-up) and chronic obstructive pulmonary disease (COPD),

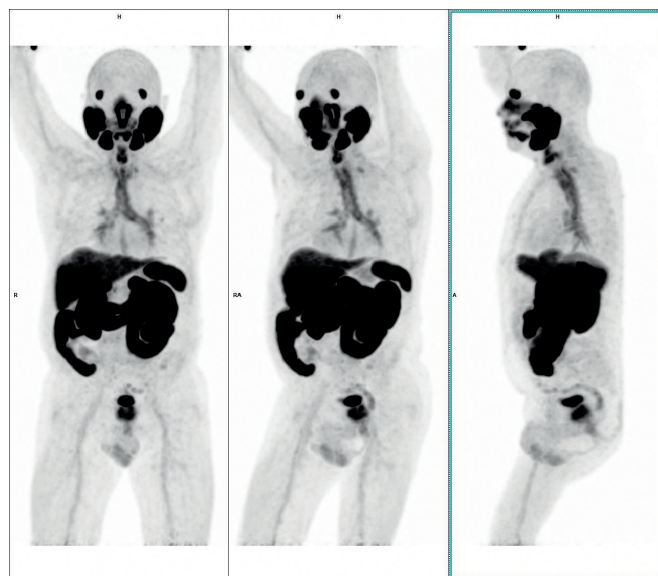


Figure 1 – Full body MIP (maximum intensity projection) images (left to right - in anterior, antero-lateral and left projections) showing moderate diffuse uptake in the trachea and bilateral bronchi, with higher intensity on the left side

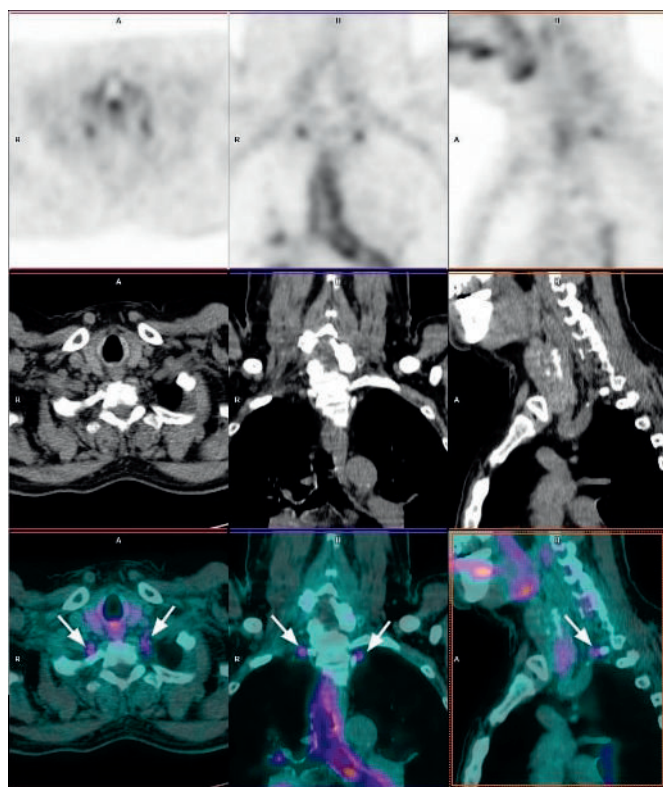


Figure 2 – PET, CT and fused PET/CT images (from top to bottom) in transaxial, coronal and sagittal planes (left to right) showing bilateral uptake in cervicothoracic ganglia of the autonomic nervous system (white arrows).

stable under supplemental oxygen therapy (SOT) 24 hours a day (2 L/min at rest and 5 L/min during exercise). He underwent a [⁶⁸Ga]Ga-PSMA-11 PET/CT scan due to analytical suspicion of prostate cancer (progressive increase in PSA levels).

PET scan revealed heterogeneous uptake in the prostate and moderate diffuse uptake in the trachea and bilateral bronchi, with a higher intensity on the left side. Such a pattern of lower-airway uptake is unusual and nonspecific but has been previously reported. Additionally, uptake in the cervicothoracic ganglia of the autonomic nervous system, a more frequent pitfall, was also seen. Given multiple and complex comorbidities and consequent high risk of complications post-prostatic biopsy, androgen deprivation therapy was started. PSA levels decreased (from 18.39 ng/mL to 7.0 ng/mL). The patient remains clinically stable under SOT.

While PSMA PET/CT is primarily employed for prostate cancer imaging, incidental findings occur. The etiology of tracheobronchial uptake is not fully understood, and it has been observed more frequently in [18F]DCFPyL PET/CT scans compared to [⁶⁸Ga]Ga-PSMA-11 PET/CT.¹ Two published case reports exist of tracheobronchial [⁶⁸Ga]Ga-PSMA-11 uptake associated with inflammation: one with asthma exacerbation² and another with

a case of COVID-19.³ In a study by Osman *et al*,⁴ nonspecific tracheal uptake was noted in 31 of 100 patients undergoing [18F]DCFPyL PET/CT, with histopathologic analysis revealing PSMA expression in bronchial submucosal glands. The authors suggested that tracheobronchial uptake may be attributed to physiologic PSMA expression in these glands, possibly concerning increased autonomic tone. Inflammatory up-regulation, chronic hypoxia or smoking may also be influencing factors. This case underscores the importance of recognising potential pitfalls in PSMA PET/CT imaging, particularly in patients with underlying pulmonary conditions such as COPD. Clinicians should be aware of such incidental findings to avoid misinterpretation and ensure accurate diagnosis and management. Further studies are warranted to better understand the mechanisms and clinical relevance of tracheobronchial PSMA uptake.

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ICF: Conceptualization, methodology, data analysis, and writing.

JGS: Data analysis, validation, and critical review.

OLS: Writing and validation.

JR: Critical review.

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Corresponding Author/Autor Correspondente

Inês Cardoso Ferreira

Email: inesgcferreira@gmail.com

Affiliation: Centro de Responsabilidade Integrado de Medicina Nuclear – Unidade Local de Saúde de Almada-Seixal, E.P.E., Almada, Portugal;

Av. Torrado da Silva, 2805-267 ALMADA.

ORCID: <https://orcid.org/0009-0005-3391-5703>

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Doença Renal Poliquística: Relato de uma Nefrectomia Invulgar *Polycystic Kidney Disease: Report of an Unusual Nephrectomy*

Pilar Burillo Simões¹, Pedro Gabriel Silva², Cristina Jorge¹

Palavras-chave: Insuficiência Renal Crónica/cirurgia;
Nefrectomia; Rim Poliquístico Autossômico Dominante/cirurgia

Keywords: *Kidney Failure, Chronic/surgery; Nephrectomy; Polycystic Kidney, Autosomal Dominant/surgery*

Homem, 46 anos, com doença renal poliquística autossômica dominante (DRPAD), hemodialisado, recorreu ao serviço de urgência por febre, dor abdominal e hematúria.

A tomografia computadorizada (Fig. 1) demonstrou rotura e infeção de quisto direito e compressão das vias biliares. Foi tentada abordagem conservadora com antibióterapia e suporte transfusional sem melhoria da curva térmica, parâmetros inflamatórios ou rendimento satisfatório dos hemoderivados.

Optou-se por nefrectomia bilateral por laparotomia de Chevron (subcostal, permitindo amplo acesso à cavidade abdominal), constatando-se aderência renal ao peritôneo e cólon, com necessidade de descolamento destas estruturas (Fig. 2). A evolução clínica foi favorável.

A infeção recorrente é a principal indicação para nefrectomia na DRPAD. Outras incluem a refratariedade à terapêutica médica dos sintomas decorrentes do conflito de espaço – enfartamento, dor abdominal, obstrução das vias biliares – e a necessidade de gestão do mesmo tendo em vista a futura implantação de enxerto renal, realizada por via laparoscópica ou subcostal.^{1,2} A contemporização da mesma é controversa.³

Neste caso, a recorrência de hemorragia perpetuava o quadro de anemia e sobreinfeção, dificultando a otimização pré-operatória e definição do *timing* cirúrgico. A imagem que apresentamos evidencia as limitações de outras abordagens – laparotomia lombar, paramediana ou laparoscopia – perante a necessidade de um acesso amplo à cavidade abdominal. Personalizar a abordagem de casos semelhantes reduz o risco de lesão de outras estruturas, aderidas em virtude do conflito de espaço e da inflamação crónica.⁴

1 – Serviço de Nefrologia. Unidade Local de Saúde de São José, Lisboa, Portugal

2 – Serviço de Urologia. Unidade Local de Saúde de São José, Lisboa, Portugal



Figura 1 – Tomografia computadorizada demonstrando exuberante policistose renal.



Figura 2 – Peça de nefrectomia direita, de peso 3,7 kg



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Autor Correspondente/Corresponding Author:

Pilar Burillo Simões

Avenida dos Estados Unidos da América, 30 1D

1700-175 LISBOA

pilarbsimoes@gmail.com

ORCID: <https://orcid.org/0000-0002-6651-1378>

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Fístula Renocólica: Uma Complicação Rara de Uropatia Obstrutiva Crónica

Renocolic Fistula: A Rare Complication of Chronic Obstructive Uropathy

Sofia Mesquita¹, Mónica Sampaio¹, Ezequiel Silva², Miguel Silva-Ramos¹

Palavras-chave: Fístula Urinária; Obstrução Ureteral

Keywords: Ureteral Obstruction; Urinary Fistula

Descrevemos o caso de uma doente do sexo feminino com 71 anos encaminhada ao serviço de urgência por dor lombar esquerda súbita e febre com 5 dias de evolução. Referia também náuseas e vômitos. Apresentava seguimento em consulta de Urologia por litíase renal com exclusão funcional do rim esquerdo. Ao exame objetivo à admissão, apresentava febre e hipotensão (96/60 mmHg).

A doente foi admitida na Unidade de Cuidados Intensivos por choque séptico com necessidade de suporte aminérgico.

Foi decidido, numa primeira fase, tratamento conservador, completando ciclo de antibioterapia com piperacilina-tazobactam. Evoluiu favoravelmente, sendo transferida ao quarto dia de internamento para o serviço de Urologia. Ao 14º dia de internamento foi submetida a nefrectomia esquerda transperitoneal laparoscópica com secção do trajeto fistuloso.

Após incisão da goteira parietocólica esquerda e mobilização medial do cólon descendente, foi possível identificar um trajeto fistuloso com cerca de 1 cm entre o ângulo esplénico e o sistema

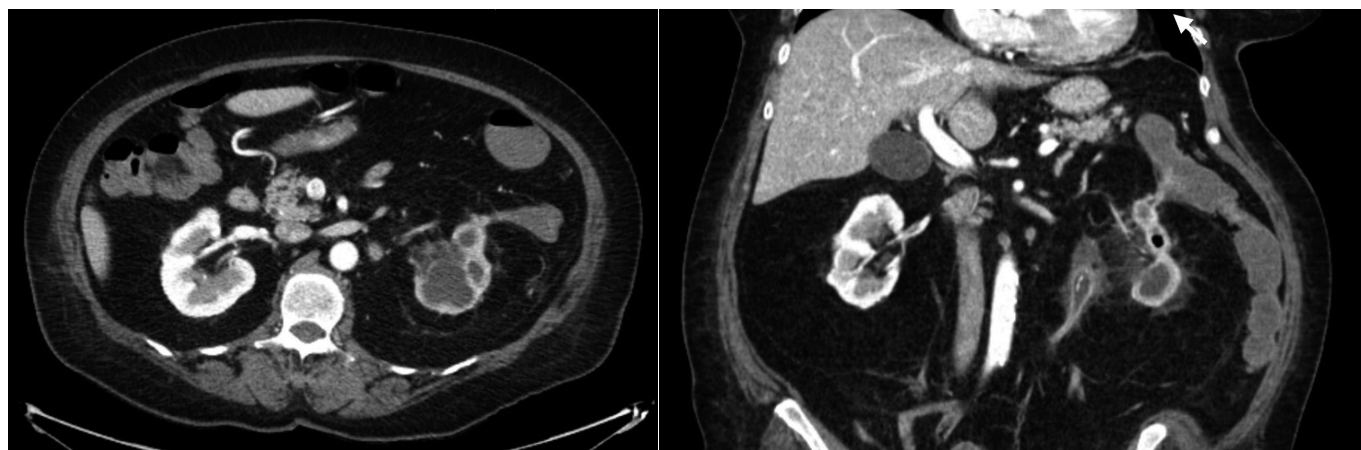


Figura 1 – TC a mostrar trajeto fistuloso entre cólon e grupo calicial superior (seta)

No estudo analítico destacava-se hemoglobina 9,9 g/dL, leucócitos 28000/mm³ e proteína C reativa 186 mg/L. Realizou tomografia computadorizada (TC) que revelava diminuição significativa da espessura parenquimatosa, dilatação pielocalicial e espessamento urotelial com presença de gás no sistema excretor compatível com pielite enfisematosa. Destacava-se também evidência de trajeto fistuloso entre o cálice superior e a parede posterior do ângulo esplénico do cólon (Fig. 1).

1 – Serviço de Urologia, Centro Hospitalar Universitário de Santo António, Porto, Portugal

2 – Serviço de Cirurgia Geral, Centro Hospitalar Universitário de Santo António, Porto, Portugal

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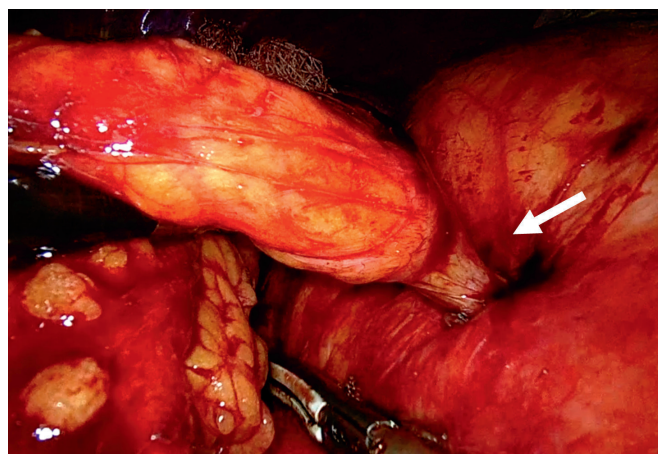


Figura 2 – Trajeto fistuloso entre cólon e rim (seta)

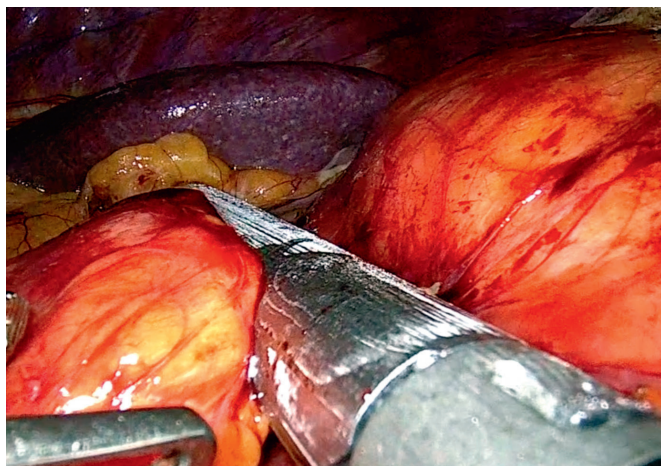


Figura 3 – Secção do trajeto fistuloso

calicial e, conseqüentemente, procedeu-se à sua secção com endoGIA. Procedeu-se a reforço da linha de sutura com V-Loc.

O pós-operatório decorreu sem intercorrências.

Este caso mostra a importância do diagnóstico precoce e abordagem multidisciplinar em doentes complexos com fístulas renocólicas.

A uropatia obstrutiva crônica pode levar perda de função renal com inflamação das estruturas adjacentes, podendo levar à formação de fístulas renocólicas.

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Autor Correspondente/Corresponding Author:

Sofia Mesquita

Largo do Prof. Abel Salazar 4099-001 Porto

sofiaoplmesquita@gmail.com

ORCID: <https://orcid.org/0000-0001-8482-5314>

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Nefrectomia Parcial Assistida por Robot de Tumor Hilar Totalmente Endofítico

Robot-Assisted Partial Nephrectomy for Totally Endophytic Renal Tumor

Sofia Mesquita¹, Diogo Sousa¹, Avelino Fraga¹, Miguel Silva-Ramos¹

Palavras-chave: Laparoscopia; Nefrectomia; Neoplasias do Rim/cirurgia; Procedimentos Cirúrgicos Robóticos

Keywords: Kidney Neoplasms/surgery; Laparoscopy; Nephrectomy; Robotic Surgical Procedures

Descrevemos o caso de um doente do sexo masculino, de 44 anos, com hábitos tabágicos conhecidos de 25 UMA, encaminhado para o serviço de Urologia por achado incidental de duas lesões renais bilaterais. A tomografia computadorizada (TC) mostrava rim esquerdo com lesão nodular sólida heterogénea parcialmente exofítica com 42 mm (cT1b, RENAL score 7) e, ao nível do hilo renal direito, formação nodular sólida heterogénea com 38 mm (cT1a RENAL score 10).

Atendendo à idade do doente e à natureza síncrona bilateral das lesões, o doente foi proposto para nefrectomia parcial assistida por robot (RAPN) com o sistema Hugo™ RAS, tendo sido submetido em primeiro tempo a intervenção à esquerda, sem intercorrências reportadas. A anatomia patológica revelou carcinoma de células renais de células claras pT1a G2 R0. Seis meses após, foi submetido a RAPN direita.

Procedeu-se à colocação de 6 trocares – um trocar de 11 mm para a câmara 5 cm abaixo da margem das costelas na linha médio-clavicular, dois trocares de 8 mm na linha para-retal, um trocar de 8 mm para o 4º braço 2 cm acima da linha médio-clavicular, um trocar de 12 mm para o assistente abaixo do trocar da câmara e um trocar adicional de 5 mm cranial para retração do fígado.

Procedeu-se a mobilização medial do cólon ascendente com identificação do polo inferior do rim esquerdo, músculo psoas e ureter. Procedeu-se a disseção do hilo renal, identificação e referenciação da artéria e veia renais. Procedeu-se à incisão da fáscia de Gerota ao nível do hilo renal (de acordo com localização de lesão em TC). Após identificação do tumor e delimitação da interface entre parênquima normal e tumor com auxílio de sonda de ecógrafo intraoperatória, efetuou-se a clampagem da artéria e veia renais com *bulldogs*.

1 – Serviço de Urologia, Centro Hospitalar Universitário de Santo António, Porto, Portugal

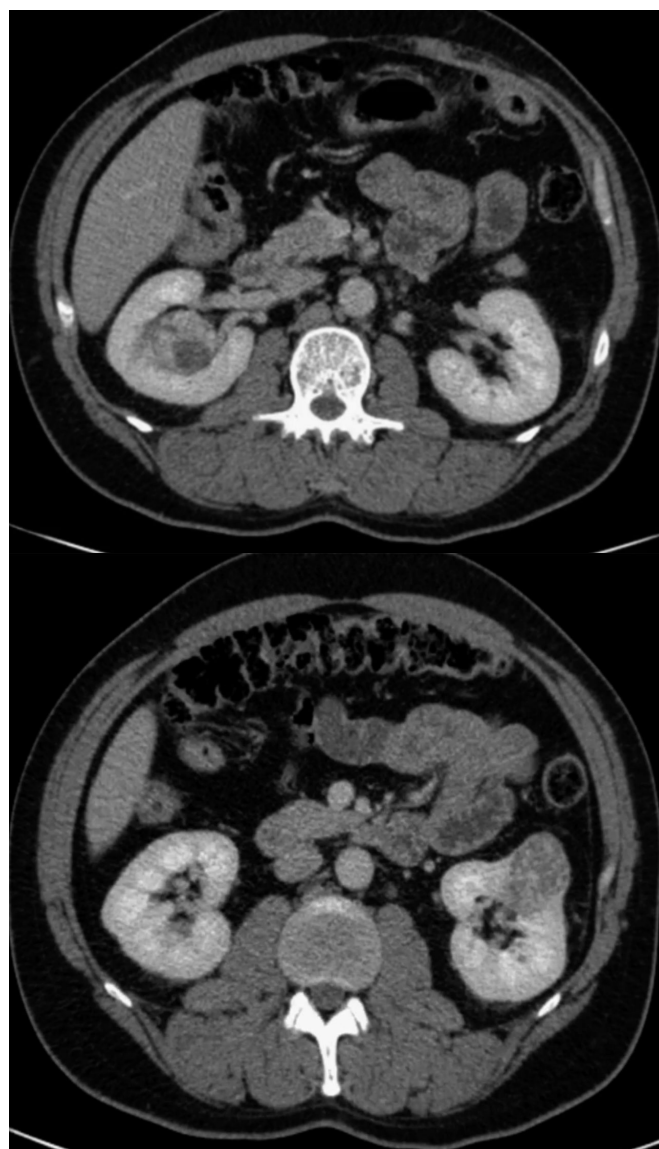


Figura 1 – TC a mostrar lesões tumorais renais bilaterais

Procedeu-se a incisão da cápsula e parênquima renal até identificação de pseudocápsula tumoral. Realizou-se enucleorressecção do tumor sem aparente violação das margens. Efetuou-se sutura do leito tumoral com V-Loc 3/0 e da cápsula com V-Loc 2/0. Após desclampagem dos vasos renais, não foi evidenciada hemorragia residual e foi encerrada a fáscia de Gerota. O procedimento decorreu sem intercorrências.

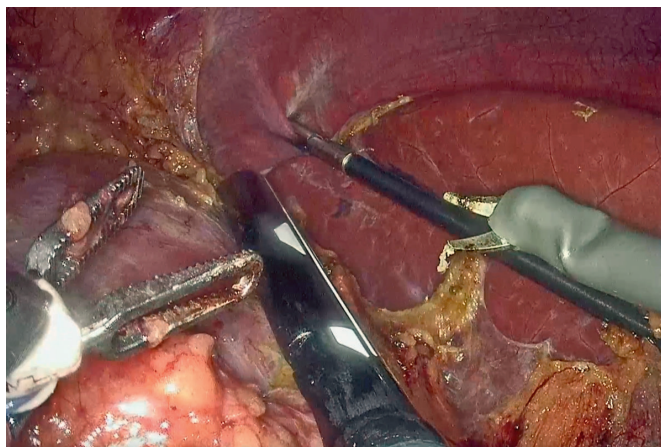


Figura 2 – Delimitação da lesão com ecógrafo intraoperatório

O tempo de isquemia foi de 37 minutos. Os tempos total de cirurgia e de consola foram de 161 e 127 minutos.

Durante o período pós-operatório, o doente evolui com febre persistente e elevação marcada dos parâmetros que motivou a realização de TC no 5º dia de pós-operatório, tendo este mostrado hipodensidade cortical no terço superior com morfologia vagamente triangular, bem como densificação dos planos adiposos adjacentes e pequena quantidade de líquido peri-renal parcialmente loculado com discreto realce periférico junto à segunda porção do duodeno e no espaço hepato-renal, a sugerir sobreinfecção. O doente iniciou antibioterapia profilática com melhoria clínica e analítica, tendo tido alta ao 9º dia de pós-operatório.

A nefrectomia parcial é o tratamento de eleição para tumores T1 e T2 quando tecnicamente exequível. Comparativamente com a nefrectomia radical, a nefrectomia parcial tem mostrado melhoria da sobrevida global, particularmente em doentes jovens e/ou sem comorbilidades aquando da intervenção.^{1,2}

A RAPN é um procedimento exequível e seguro para o tratamento de lesões tumorais hilares completamente endofíticas.^{2,3} O recurso à ecografia intraoperatória pode ajudar na identificação, bem como delimitação dos limites do tumor, potenciando a preservação de parênquima renal normal.⁴

Responsabilidades Éticas

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Autor Correspondente/Corresponding Author:

Sofia Mesquita

Largo do Prof. Abel Salazar 4099-001 Porto

sofiaoplmesquita@gmail.com

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Podem ser de ciência clínica, investigação ou básica. Embora geralmente por convite do Editor-Chefe, ocasionalmente aceitamos artigos de revisão não solicitados sobre assuntos importantes ou sobre avanços recentes. Antes de submeter uma revisão, pedimos que envie ao Editor-Chefe um breve esboço

(não mais de 500 palavras) indicando a importância e novidade do assunto, e por que está qualificado para escrevê-lo. Um convite para submissão não garante aceitação.

Os artigos de revisão não devem exceder 4000 palavras, até 6 tabelas ou figuras e até 100 referências. Um resumo não estruturado com o máximo de 350 palavras.

Revisões Sistemáticas e Meta-Análises

As revisões sistemáticas podem ou não utilizar métodos estatísticos (meta-análises) para analisar e resumir os resultados dos estudos incluídos.

As Revisões Sistemáticas podem ser apresentadas no formato Introdução, Métodos, Resultados, Discussão. O assunto deve ser claramente definido. O objectivo de uma revisão sistemática deve ser produzir uma conclusão baseada em evidências.

Nos Métodos devem fornecer uma indicação clara da estratégia de pesquisa da literatura, extracção de dados, classificação das evidências e análise. Deve ser seguida a normativa PRISMA (<http://www.prisma-statement.org/>).

O texto não deverá exceder 4000 palavras, excluindo um resumo estruturado (máximo de 350 palavras). Não poderá incluir mais de 10 referências, e até 6 tabelas ou figuras.

Caso Clínico

O relato de Casos Clínicos deve incluir as seguintes secções: Introdução, Caso Clínico e Discussão.

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Os Editoriais são da responsabilidade do grupo editorial ou solicitados por convite do Editor-Chefe e constituirão comentários sobre tópicos actuais ou comentários sobre artigos publicados na revista. Não devem exceder as 1200 palavras, um máximo de 20 referências bibliográficas e podem conter uma tabela e uma figura. Não têm resumo.

Cartas ao Editor

As cartas ao Editor consistem em comentários críticos sobre um artigo publicado na revista ou uma nota curta sobre um determinado tópico ou caso clínico. Cartas ao Editor não devem exceder 600 palavras e 10 referências e pode conter uma figura ou tabela. Não têm resumo.

Imagens em Urologia

Esta secção destina-se à publicação de imagens clínicas, radiológicas, histológicas e cirúrgicas relacionadas à urologia, andro-



Article type	Abstract	Keywords	Main text structure	Max. words	Tables/figures	References
Original Article	Max. 350 words; structured (Introduction and Objectives, Methods, Results and Conclusion(s)) Portuguese and English	Up to 6 Portuguese and English	Introduction; Methods; Results; Discussion; Conclusion(s); Acknowledgments, if any; References; and figure legends, if any	4000	Total up to 6	Up to 60
Review Article	Max. 350 words; unstructured Portuguese and English	Up to 6 Portuguese and English	Introduction; thematic sections at the discretion of the authors; Conclusion(s); Acknowledgments, if any; References; and figure legends, if any	4000	Total up to 6	Up to 100
Systematic Review	Max. 350 words; structured Portuguese and English	Up to 6 Portuguese and English	PRISMA	4000	Total up to 6	Up to 100
Case Report	Max. 150 words; unstructured Portuguese and English	Up to 6 Portuguese and English	Introduction; Case report; Discussion; Conclusion(s) (optional); References; and figure legends, if any	2000	Total up to 4	Up to 25
Images in Urology	None	Up to 6 Portuguese and English	Unstructured	500	Total up to 4	Up to 5
Editorial	None	None	Unstructured	1200	Total up to 3	Up to 15
Letter to the Editor	None	Up to 6 Portuguese and English	Unstructured	600	Total up to 1	Up to 10
Current Perspectives	None	Up to 6 Portuguese and English	Unstructured	1200	Total up to 4	Up to 10
Technical Notes	Max. 150 words; unstructured Portuguese and English	Up to 6 Portuguese and English	Unstructured	2000	Total up to 4	Up to 15
Guidelines	Max. 350 words; unstructured Portuguese and English	Up to 6 Portuguese and English	Introduction; thematic sections at the discretion of the authors; Conclusion(s); Acknowledgments, if any; References; and figure legends, if any	4000	Total up to 6	Up to 100

logia, transplante renal, nefrologia e oncologia urológica. O título não deve ter mais de oito palavras. Os autores devem ser no máximo quatro. As imagens devem ser de alta qualidade e valor educativo. São permitidas até 4 figuras. As legendas devem ser breves e informativas. Setas ou outros símbolos devem ser incluídos conforme necessário para facilitar a compreensão das imagens. O texto não deve exceder 500 palavras, até cinco referências, e deve incluir uma breve história clínica e dados relevantes do exame físico, testes laboratoriais e progressão clínica, conforme apropriado. Não têm resumo.

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Este é o tipo de manuscrito é submetido a convite do Conselho Editorial. Pode abranger uma ampla diversidade de temas centrados na urologia, andrologia, transplante renal, nefrologia e

oncologia urológica e saúde: problemas actuais ou emergentes, políticas de gestão e saúde, história da medicina, problemas da sociedade e epidemiologia, entre outros.

Um Autor que deseje propor um manuscrito nesta seção deverá enviar um resumo ao Editor-Chefe, incluindo o título e a lista de autores para avaliação. O texto não deve exceder 1200 palavras, até 10 referências, e até 2 tabelas ou 2 figuras. Não têm resumo.

Notas Técnicas

Trabalho original relacionado com aspectos técnicos de tecnologia; thematic sections at the discretion of the authors; Conclusion(s); Acknowledgments, if any; References; and figure legends, if any. oncologia de ponta ou relata experiência clínica inicial ou de laboratório com uma forte ênfase na tecnologia ou enge-



nharia. Este tipo de manuscrito não deve exceder 2000 palavras, até 15 referências, são permitidas quatro tabelas ou figuras. Resumo não estruturado até 150 palavras.

Guidelines

Os guias de prática clínica não devem exceder 4 000 palavras, até 6 tabelas ou figuras e até 100 referências. Resumo até 350 palavras.

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I. CITAÇÃO NO TEXTO

Certifique-se de que todas as referências citadas no texto também estão presentes na lista de referências (e vice-versa).

As referências devem ser listadas usando algarismos árabes pela ordem em que são citados no texto.

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As referências a artigos publicados em revistas devem incluir o nome do primeiro autor seguido dos nomes dos restantes autores, o título do artigo, o nome da revista e o ano de publicação, volume e páginas.

Certifique-se de que os dados fornecidos nas referências estão corretos. Ao copiar referências, tenha cuidado porque já podem conter erros.

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II. FORMATO

Uma descrição detalhada dos formatos de diferentes tipos de referência pode ser consultada n “Uniform Requirements for Manuscripts Submitted to Biomedical Journals” (http://www.nlm.nih.gov/bsd/uniform_requirements.html). Liste todos os autores se houver seis ou menos. Et al deve ser adicionado se houver mais de seis autores. Título do artigo, nome da revista, ano, volume e páginas.

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Texto: Indicar as referências no texto por número (s) em expoente. Os autores podem ser referidos, mas o número de referência deve ser sempre dado.

Lista: Ordene as referências na lista pela ordem em que aparecem no texto

Exemplos:

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Bex A, Albiges L, Ljungberg B, Bensalah K, Dabestani S, Giles RH, et al. Updated European Association of Urology Guidelines

Regarding Adjuvant Therapy for Renal Cell Carcinoma. Eur Urol. 2017;71:719-22.

Referência de livro:

2. Ware JE, Kosinski M, Dewey JE. How to score version 2 of the SF-36 Health Survey. Lincoln: Quality Metric Incorporated; 2000.

Referência de capítulo de livro:

3. Brooks JD. Anatomy of the lower urinary tract and male genitalia. In: Walsh PC, Retik AB, Vaughan ED, Wein AJ, editors. Campbell's Urology. 7th ed. Philadelphia: WB Saunders Company; 1998.p.89-128.

Referência Web:

No mínimo, o URL completo deve ser dado e a data em que o documento foi consultado. Qualquer outra informação, se conhecida (nomes de autor, datas, referência a uma publicação de origem, etc.), também deve ser dada.

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As notas de rodapé devem ser evitadas. Quando imprescindíveis, devem ser numerados consecutivamente e aparecer ao pé da página apropriada.

Agradecimentos (facultativo)

Devem vir após o texto, e antes das referências, tendo como objectivo agradecer a todos os que contribuíram para o estudo mas que não têm peso de autoria. Nesta secção é possível agradecer a todas as fontes de apoio, quer financeiro, quer tecnológico ou de consultadoria, assim como contribuições individuais.

Abreviaturas

Não use abreviaturas ou acrónimos no título e no resumo e limite o seu uso. Abreviaturas não consagradas devem ser definidas na primeira utilização, por extenso, logo seguido pela abreviatura entre parênteses. A menos que a sigla seja uma unidade padrão de medição. Uso excessivo e desnecessário de acrónimos e abreviaturas deve ser evitado.

Unidades de Medida

Devem ser utilizadas as unidades Sistema Internacional de Unidades. As medidas de comprimento, altura, peso e volume devem ser expressas em unidades do sistema métrico (metro, quilograma ou litro) ou seus múltiplos decimais.

As temperaturas devem ser dadas em graus Celsius (°C) e a pressão arterial em milímetros de mercúrio (mm Hg) ou a hemoglobina em g/dL. Todas as medições hematológicas ou bioquímicas serão referidas no sistema métrico de acordo com o Sistema Internacional de Unidades (SI).



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Identifique com precisão todos os medicamentos e produtos pelo nome genérico. Não é recomendável a utilização de nomes comerciais de fármacos (marca registrada), mas quando a utilização for imperativa, o nome do produto deverá vir após o nome genérico, entre parênteses, em minúscula, seguido do símbolo que caracteriza marca registrada, em sobrescrito (®).

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Tabelas/Figuras devem ser numerados na ordem em que são citadas no texto e assinaladas em numeração árabe e com identificação, Figura/Tabela.

Cada Figura e Tabela incluídas no trabalho têm de ser referidas no texto: Uma resposta imunitária anormal pode estar na origem dos sintomas da doença (Fig. 2). Esta associa-se a outras duas lesões (Tabela 1). Figura: Quando referida no texto é abreviada para Fig., enquanto Tabela não é abreviada. Nas legendas ambas as palavras são escritas por extenso.

Cada Tabela e Figura deve ser acompanhada da respectiva legenda, sucinta e clara. As Legendas devem ser auto-explicativas (sem necessidade de recorrer ao texto).

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Poderão ser publicadas fotografias a cores, desde que consideradas essenciais.

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Estilo

Acta Urológica Portuguesa segue AMA Manual Style (10ª edição).

Última revisão Junho 2017



Guide for Authors

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The title (and abstract and key words if applicable) must be submitted in both English and Portuguese.

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It is important that the file be saved in the native format of the word processor used. The text should be in single-column format.

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Original Articles

Original articles are fully documented reports of original clinical or basic research that must describe full sets of interesting, original experiments in current research. Original articles should include the following sections: Introduction, Materials and Methods, Results, Discussion and Conclusions, Acknowledgements (if applicable), References, Tables and Figures.

Original articles should not exceed 4000 words, excluding up to 6 tables or figures and up to 60 references. Structured abstract up to 350 words.

ARTICLE STRUCTURE

Introduction

State the objectives of the work and provide an adequate background, avoiding a detailed literature survey or a summary of the results.

Material and methods

Provide sufficient detail to allow the work to be reproduced. Methods already published should be indicated by a reference: only relevant modifications should be described.

Results

Results should be clear and concise.

Discussion

This should explore the significance of the results of the work, not repeat them. A combined Results and Discussion section is often appropriate. Avoid extensive citations and discussion of published literature.

Conclusions

The main conclusions of the study may be presented in a short Conclusions section, which may stand alone or form a subsection of a Discussion or Results and Discussion section.

Review Articles

Review Articles are comprehensive papers that synthesize older ideas and suggest new ones. They cover broad areas.

They may be clinical, investigational, or basic science in nature.

Although usually commissioned, we do occasionally accept unsolicited review articles on important and topical subjects with a particular focus on recent advances. Before submitting a review,



we ask that you send the editors a brief outline (no more than 500 words) indicating the importance and novelty of the subject, and why you are qualified to write it. An invitation to submit does not guarantee acceptance.

Review articles should not exceed 4000 words, excluding up to 6 tables or figures and up to 100 references. Unstructured abstract up to 350 words.

Systematic Reviews / Meta-Analysis

Systematic Reviews can be presented in the Introduction, Methods, Results, Discussion format. The subject must be clearly defined. The objective of a systematic review should be to produce an evidence-based conclusion. The Methods should give a clear indication of the literature search strategy, data extraction, grading of evidence and analysis. We strongly encourage authors to comply with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (<http://www.prisma-statement.org/>).

Systematic review articles should not exceed 4000 words, excluding up to 6 tables or figures and up to 100 references. Structured abstract up to 350 words.

Clinical Case Studies/Case Reports

Clinical Case Reports should include the following sections: Introduction, Clinical Case, and Discussion. Clinical case studies should not exceed 2000 words, excluding up to 4 tables or figures and up to 25 references.

Authors should be no more than four.

We strongly encourage authors to comply with the CARE guidelines (<http://www.care-statement.org/>).

Unstructured abstract up to 180 words.

Editorials

Editorials are normally written at the invitation of the Editor and consist of commentary on articles published in the journal or on subjects of particular relevance. Editorials should not exceed 1200 words and 15 references and may include 2 table and 1 figure. Abstract is not required.

Letters to the Editor

Letter to the Editor should consist of critical comments on an article published in the Journal or a short note on a particular topic or clinical case. Letters to the Editor should not exceed 600 words and 10 references and may contain one figure or table. Abstract is not required.

Images in Urology

This section is intended for the publication of clinical, radiological, histological, and surgical images related to urology, andrology, kidney transplantation, nephrology and urologic oncology.

Title should be no more than eight words. Authors should be no more than four. Images should be of high quality and educational value. Up to four figures will be published. Captions should be brief and informative. Arrows or other symbols should be included as needed to facilitate understanding of the images.

The text should not exceed 500 words, up to five references, and should include a short clinical history and relevant data from the physical examination, laboratory tests, and clinical progression as appropriate. Abstract is not required.

Current Perspective

This is the type of manuscript that is submitted upon invitation by the Editorial Board. This shorter review-type article covers current urologic topics of clinical relevance: It may cover a broad diversity of themes focusing on urology, andrology, kidney transplantation, nephrology and urologic oncology and healthcare: current or emergent problems, management and health policies, history of medicine, society issues and epidemiology, among others. An Author that wishes to propose a manuscript in this section is requested to send an abstract to the Editor-in-Chief including the title and Author list for evaluation. The text should not exceed 1200 words, up to 10 references, four tables or figures are allowed. Abstract is not required.

Technical Notes

Original work relating to the technical aspects of a cutting edge technology or reports the initial laboratory or clinical experience with a strong technology or engineering emphasis.

This type of manuscript should not exceed 2000 words, up to 15 references, four tables or figures are allowed. Unstructured abstract up to 150 words.

Guidelines

In general, published statements intended to guide clinical care (e.g. guidelines, practice parameters, recommendations, consensus statements and position papers) should describe:

- The clinical problem to be addressed,
- The mechanism by which the statement was generated,
- A review of the evidence for the statement (if available),
- The statement on practice itself.

To minimize confusion and to enhance transparency, such statements should begin with the following bulleted phrases, followed by brief comments addressing each phrase:

What other guideline statements are available on this topic?

Why was this guideline developed?

How does this statement differ from existing guidelines?

Why does this statement differ from existing guidelines?

Guidelines should not exceed 4000 words, excluding up to 6 tables or figures and up to 100 references. Abstract up to 350 words.



Article type	Abstract	Keywords	Main text structure	Max. words	Tables/figures	References
Original Article	Max. 350 words; structured (Introduction and Objectives, Methods, Results and Conclusion(s)) Portuguese and English	Up to 6 Portuguese and English	Introduction; Methods; Results; Discussion; Conclusion(s); Acknowledgments, if any; References; and figure legends, if any	4000	Total up to 6	Up to 60
Review Article	Max. 350 words; unstructured Portuguese and English	Up to 6 Portuguese and English	Introduction; thematic sections at the discretion of the authors; Conclusion(s); Acknowledgments, if any; References; and figure legends, if any	4000	Total up to 6	Up to 100
Systematic Review	Max. 350 words; structured Portuguese and English	Up to 6 Portuguese and English	PRISMA	4000	Total up to 6	Up to 100
Case Report	Max. 150 words; unstructured Portuguese and English	Up to 6 Portuguese and English	Introduction; Case report; Discussion; Conclusion(s) (optional); References; and figure legends, if any	2000	Total up to 4	Up to 25
Images in Urology	None	Up to 6 Portuguese and English	Unstructured	500	Total up to 4	Up to 5
Editorial	None	None	Unstructured	1200	Total up to 3	Up to 15
Letter to the Editor	None	Up to 6 Portuguese and English	Unstructured	600	Total up to 1	Up to 10
Current Perspectives	None	Up to 6 Portuguese and English	Unstructured	1200	Total up to 4	Up to 10
Technical Notes	Max. 150 words; unstructured Portuguese and English	Up to 6 Portuguese and English	Unstructured	2000	Total up to 4	Up to 15
Guidelines	Max. 350 words; unstructured Portuguese and English	Up to 6 Portuguese and English	Introduction; thematic sections at the discretion of the authors; Conclusion(s); Acknowledgments, if any; References; and figure legends, if any	4000	Total up to 6	Up to 100

References

I. CITATION IN TEXT

Please ensure that every reference cited in the text is also present in the reference list (and vice versa). The references should be listed using Arabic numerals in the order in which they are cited in the text.

References to personal communications and unpublished data should be made directly in the text and should not be numbered. Citation of a reference as 'in press' implies that the item has been accepted for publication. Journal names should be abbreviated according to Medline style.

References to articles published in journals should include the first author's name (surname and given name) followed by the names of the remaining authors, the article title, the journal name, and the publication year, volume, and pages.

Increased discoverability of research and high quality peer review are ensured by online links to the sources cited. Please ensure that data provided in the references are correct.

Please note that incorrect surnames, journal/book titles, publication year and pagination may prevent link creation. When copying references, please be careful as they may already contain errors.

The references list should be added as part of the regular text, never as a footnote. Specific codes from referencemanagement software are not acceptable.

II. FORMAT.

A detailed description of the formats of different reference types can be found in the "Uniform Requirements for Manuscripts Submitted to Biomedical Journals" (<http://www.nlm.nih.gov/>-



bsd/uniform_requirements.html). Selected examples are given below.

List all authors if there are six or fewer; et al. should be added if there are more than six authors. Article title, journal name, year, volume, and pages.

Reference Management Software: The use of EndNote is recommended to facilitate formatting of citations and reference lists. The journal output style can be downloaded from <http://endnote.com/downloads/styles>.

III. REFERENCE STYLE

Text: Indicate references by number(s) in superscript in line with the text. The actual authors can be referred to, but the reference number(s) must always be given.

List: Number the references in the list in the order in which they appear in the text.

Examples:

Reference to a journal publication:

Bex A, Albiges L, Ljungberg B, Bensalah K, Dabestani S, Giles RH, et al. Updated European Association of Urology Guidelines Regarding Adjuvant Therapy for Renal Cell Carcinoma. *Eur Urol*. 2017;71:719-22.

Reference to a book:

2. Ware JE, Kosinski M, Dewey JE. How to score version 2 of the SF-36 Health Survey (standard & acute forms. Lincoln: Quality Metric Incorporated; 2000.

Reference to a book chapter:

3. Brooks JD. Anatomy of the lower urinary tract and male genitalia. In: Walsh PC, Retik AB, Vaughan ED, Wein AJ, editors. *Campbell's Urology*. 7th ed. Philadelphia: WB Saunders Company; 1998.p. 89-128.

Web reference:

As a minimum, the full URL should be given and the date when the reference was last accessed. Any further information, if known (author names, dates, reference to a source publication, etc.), should also be given.

Note: Shortened form for last page number. e.g., 51–9, and that for more than 6 authors the first 6 should be listed followed by 'et al.' For further details you are referred to 'Uniform Requirements for Manuscripts submitted to Biomedical Journals' (see also http://www.nlm.nih.gov/bsd/uniform_requirements.html).

Footnotes

Footnotes should be avoided. When essential, they should be numbered consecutively and appear at the foot of the appropriate page.

Acknowledgements

Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise.

List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

Abbreviations

Abbreviations (with the exception of those clearly well-established in the field) should be explained when they are first used.

Define all abbreviations except those approved by the International System of Units for length, mass, time, temperature, amount of substance, etc. Do not create new abbreviations for drugs, procedures, experimental groups, etc.

Abbreviations or acronyms should not be used in the title and abstract, but only in the text and in a limited way. Abbreviations should be defined at first use, in full, followed by the abbreviation in parentheses. Excessive and unnecessary use of acronyms and abbreviations should be avoided. (All this is checked by our copy editors).

Units of Measurement

Follow internationally accepted rules and conventions: use the international system of units (SI).

Temperatures should be given in degrees Celsius (°C) and blood pressure in millimeters of mercury (mm Hg).

Drug Names

Use generic names of drugs (first letter: lowercase) whenever possible. Registered trade names (first letter: uppercase) should be marked with the superscript registration symbol ® or ™ when they are first mentioned.

Tables and Illustrations

Tables and figures must be numbered (e.g. Figure 1, Figure 2, Table 1) and submitted as separate files.

Captions should be numbered using Arabic numerals in the order in which they appear in the text (e.g., Table 1, Figure 1) and must provide sufficient information to enable their interpretation without consulting the text.

Ensure that each illustration and table has a caption. Supply captions separately, not attached to the figure. A caption should comprise a brief title (not on the figure itself) and a description of the illustration. Keep text in the illustrations themselves to a minimum but explain all symbols and abbreviations used.

Color illustrations are reproduced free of charge.

GENERAL POINTS:

- Make sure you use uniform lettering and sizing of your original artwork.
- Embed the used fonts if the application provides that option.
- Aim to use the following fonts in your illustrations: Arial, Courier, Times New Roman, Symbol, or use fonts that look similar.



- Number the illustrations according to their sequence in the text.
- Use a logical naming convention for your artwork files.
- Provide captions to illustrations separately.
- Size the illustrations close to the desired dimensions of the published version.
- Submit each illustration as a separate file.

FORMATS:

If your electronic artwork is created in a Microsoft Office application (Word, PowerPoint, Excel) then please supply 'as is' in the native document format.

Regardless of the application used other than Microsoft Office, when your electronic artwork is finalized, please 'Save as' or convert the images to one of the following formats (note the resolution requirements for line drawings, halftones, and line/half-tone combinations given below):

EPS (or PDF): Vector drawings, embed all used fonts.

TIFF (or JPEG): Color or grayscale photographs (halftones), keep to a minimum of 500 dpi.

TIFF (or JPEG): Bitmapped (pure black & white pixels) line drawings, keep to a minimum of 1000 dpi.

TIFF (or JPEG): Combinations bitmapped line/half-tone (color or grayscale), keep to a minimum of 500 dpi.

PLEASE DO NOT:

- Supply files that are optimized for screen use (e.g., GIF, BMP, PICT, WPG); these typically have a low number of pixels and limited set of colors;
- Supply files that are too low in resolution;
- Submit graphics that are disproportionately large for the content.

Tables

Please submit tables as editable text and not as images. Tables can be placed either next to the relevant text in the article, or on separate page(s) at the end. Number tables consecutively in accordance with their appearance in the text and place any table notes below the table body. Be sparing in the use of tables and ensure that the data presented in them do not duplicate results described elsewhere in the article. Please avoid using vertical rules.

Multimedia Files

Multimedia files should be submitted in a separate file with the original manuscript and with all subsequent submissions.

Multimedia material must meet production quality standards for publication without the need for any modification or editing.

Acceptable files are MPEG, AVI or QuickTime formats.

Appendices

If there is more than one appendix, they should be identified as A, B, etc. Formulae and equations in appendices should be given separate numbering: Eq. (A.1), Eq. (A.2), etc.; in a subsequent appendix, Eq. (B.1) and so on. Similarly for tables and figures: Table A.1; Fig. A.1, etc.

Submission Checklist

The following list will be useful during the final checking of an article prior to sending it to the journal for review.

ENSURE THAT THE FOLLOWING ITEMS ARE PRESENT:

One author has been designated as the corresponding author with contact details:

- E-mail address
- Full postal address
- All necessary files have been uploaded, and contain:
- Keywords
- All figure captions
- All tables (including title, description, footnotes)
- Further considerations
- Manuscript has been 'spell-checked' and 'grammar-checked'
- References are in the correct format for this journal
- All references mentioned in the Reference list are cited in the text, and vice versa
- Permission has been obtained for use of copyrighted material from other sources (including the Internet)

Style and Usage

AUP follows the American Medical Association Manual of Style¹ (10th ed) in matters of editorial style and usage. All accepted manuscripts are subject to copyediting for conciseness, clarity, grammar, spelling. The corresponding author will receive page proofs to review before publication. If requests for changes are made after the authors have returned corrected proofs. Care should be exercised in this stage of review so as to avoid publication of errata or retractions.

Last revision April 2017



Políticas Editoriais

Objetivo e Âmbito

A **Acta Urológica Portuguesa (AUP)** é a revista científica da Associação Portuguesa de Urologia publica artigos em português (de Portugal) e/ou inglês.

Trata-se de uma revista científica de acesso aberto, científica, com o objectivo de publicar artigos de qualidade destacando as últimas conquistas no campo da urologia, incluindo oncologia urológica, urologia pediátrica, andrologia, transplante renal e nefrologia. O público-alvo da revista são urologistas, nefrologistas, oncologistas, cirurgiões, obstetras, pediatras, clínicos gerais, investigadores mas também enfermeiros, farmacêuticos, psicólogos, epidemiologistas e especialistas em cuidados de saúde.

Razões para publicação com AUP:

- Rapidez: Oferece publicação rápida, mantendo uma rigorosa revisão por pares;
- Qualidade: Comprometida com os mais altos padrões de revisão por pares;
- Indexada no Repositório Científico de Acesso Aberto em Portugal (RCAAP);
- Indexada em IndexRMP;
- Acesso Livre - visibilidade máxima;
- Sem custos: sem quaisquer encargos de publicação.

Liberdade Editorial

A AUP adopta a definição de liberdade editorial do ICMJE descrita pela World Association of Medical Editors, que afirma que o editor-chefe assume completa autoridade sobre o conteúdo editorial da revista. A Associação Portuguesa de Urologia enquanto proprietária da AUP não interfere no processo de avaliação, selecção, programação ou edição de qualquer manuscrito, tendo o Editor-Chefe total independência editorial.

Visão Geral

A submissão de um manuscrito à AUP implica que todos os autores leram e concordaram com o seu conteúdo e que o manuscrito está em conformidade com as políticas da revista.

Os manuscritos submetidos para publicação devem ser preparados de acordo com as Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals do International Committee of Medical Journal Editors (ICMJE), actualizadas em Dezembro 2016.

Este documento está disponível em: <http://www.icmje.org/-recommendations/>.

A AUP segue as guidelines do Committee on Publication Ethics (COPE), que fornece um fórum para editores e editoras de

revistas científicas discutirem questões relacionadas com a integridade do trabalho submetido ou publicado nas suas revistas.

A versão electrónica pode ser acedida em: <https://www.acta-urologicaportuguesa.com/>

Orientação para Apresentação de Estudos

Os textos devem ser preparados de acordo com as orientações do International Committee of Medical Journal Editors:

Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals (ICMJE Recommendations) disponíveis em <http://www.icmje.org>.

A AUP recomenda as linhas orientadoras para publicação da EQUATOR network (<http://www.equator-network.org>). As listas de verificação estão disponíveis para vários desenhos de estudo, incluindo:

- Randomized controlled trials (CONSORT)
- Systematic reviews and meta-analyses* (PRISMA) and protocols (PRISMA-P)
- Observational studies (STROBE)
- Case reports (CARE)
- Qualitative research (COREQ)
- Diagnostic/prognostic studies (STARD)
- Economic evaluations (CHEERS)
- Pre-clinical animal studies (ARRIVE)

*Os autores de revisões sistemáticas também devem fornecer um link para um ficheiro adicional da seção 'métodos', que reproduz todos os detalhes da estratégia de pesquisa.

Os critérios de aceitação para todos os trabalhos são a qualidade e originalidade da investigação e seu significado para os leitores da AUP. Excepto onde indicado de outra forma, os manuscritos são submetidos a peer review cego por dois revisores anónimos. A aceitação ou rejeição final cabe ao Editor-Chefe, que se reserva o direito de recusar qualquer material para publicação.

Os manuscritos devem ser escritos em estilo claro, conciso, directo, de modo que sejam inteligíveis para o leitor.

Quando as contribuições são consideradas adequadas para publicação com base em conteúdo científico, o Editor-Chefe reserva-se o direito de modificar os textos para eliminar a ambiguidade e a repetição, e melhorar a comunicação entre o autor e o leitor. Se forem necessárias alterações extensivas, o manuscrito será devolvido ao autor para revisão.

Os manuscritos que não cumpram as instruções para autores podem ser devolvidos para modificação antes de serem revistos.

Crítérios de Autoria e Formulário de Autoria

Como referido nos Requirements ICMJE, a autoria requer uma contribuição substancial para o manuscrito, sendo necessário



especificar, em carta de apresentação, o contributo de cada autor para o trabalho.

Declaração das contribuições individuais assinada por cada autor (modelo <http://download.thelancet.com/flatcontentassets/authors/tl-author-signatures.pdf>)

Todos aqueles designados como autores devem cumprir os quatro critérios para autoria e todos aqueles que cumprem os quatro critérios devem ser identificados como autores. Os colaboradores que não cumpram os quatro critérios para autoria mas que tenham contribuído para o estudo ou manuscrito, deverão ser reconhecidos na secção de Agradecimentos, especificando o seu contributo.

Cada manuscrito deve ter um “Autor Correspondente”. Porém, todos os autores devem ter participado significativamente no trabalho para tomar responsabilidade pública sobre o conteúdo e o crédito da autoria.

O autor correspondente deverá obter permissão por escrito de todos aqueles que forem mencionados nos agradecimentos.

AUTORES SÃO AQUELES QUE:

- 1) Têm uma contribuição intelectual substancial, directa, no desenho e elaboração do artigo,
- 2) Participam na análise e interpretação dos dados;
- 3) Participam na redacção do manuscrito, revisão de versões e revisão crítica do conteúdo; aprovação da versão final;
- 4) Concordam que são responsáveis pela exactidão e integridade de todo o trabalho.

Além de ser responsável pelas partes do trabalho que tenha feito, um autor deve ser capaz de identificar quais dos co-autores foram responsáveis pelas outras partes específicas do trabalho.

A obtenção de financiamento, a recolha de dados ou a supervisão geral do grupo de trabalho, por si só, não justificam a autoria.

Qualquer alteração na autoria após a submissão deve ser aprovada por escrito por todos os autores.

Alterações à autoria ou à ordem dos autores não são aceites após aceitação do manuscrito.

Se um medical writer esteve envolvido na redacção do manuscrito, é necessária uma declaração assinada pelo autor correspondente com indicação do nome e se houve o financiamento dessa pessoa. Esta informação deve ser acrescentada na secção Agradecimentos.

Exigimos declarações assinadas pelo medical writer indicando que dá permissão para ser nomeado na secção Agradecimentos.

PAPEL DO AUTOR CORRESPONDENTE

O autor correspondente funcionará em nome de todos os co-autores como o correspondente preferencial com a equipa editorial durante o processo de submissão e revisão.

O autor correspondente em nome de todos os co-autores é responsável pela comunicação com a revista durante a sub-

missão, peer review e processo de publicação. Também é responsável por assegurar todos os requisitos administrativos da revista (fornecimento de detalhes de autoria; aprovação da comissão de ética; formulários de conflitos de interesse; consentimento informado).

Consentimento dos Doentes

Os autores são responsáveis por obter o consentimento informado relativamente a cada indivíduo presente em fotografias, vídeos, descrições detalhadas ou em radiografias ou ecografias, mesmo após tentativa de ocultar a respectiva identidade.

Nomes, iniciais ou outras formas de identificação devem ser removidos das fotografias ou outras imagens. Devem ser omitidos dados pessoais, como profissão ou residência, excepto quando sejam epidemiologicamente relevantes para o trabalho. Os autores devem assegurar que não apresentam dados que permitam a identificação inequívoca ou, caso isso não seja possível, devem obter o consentimento informado dos intervenientes.

Estudos em doentes ou voluntários precisam de aprovação da comissão de ética e consentimento informado dos participantes.

Estes devem ser documentados no artigo.

As barras “Blackout” ou dispositivos similares não anonimizam doentes em imagens clínicas: é necessário o apropriado consentimento.

Submissão e Publicação Duplicadas

A AUP não aceita material previamente publicado em forma impressa ou electrónica ou manuscritos em consideração em outra revista.

A AUP endossa as políticas do ICMJE em relação à duplicação de publicações (colocar link para <http://www.icmje.org/recommendations/browse/publishing-and-editorial-issues/overlapping-publications.html>).

Política de Plágio

Seja intencional ou não, o plágio é uma violação grave. Definimos plágio como reprodução de outro trabalho com pelo menos 25% de similaridade e sem citação. Se for encontrada evidência de plágio antes / depois da aceitação ou após a publicação do artigo, será dada ao autor uma oportunidade de refutação. Se os argumentos não forem considerados satisfatórios, o manuscrito será retratado e o autor sancionado pela publicação de trabalhos por um período a ser determinado pelo Editor.

Publicação Fast-Track

Um sistema fast-track está disponível para manuscritos urgentes e importantes que atendam aos requisitos da AUP para revisão rápida e publicação.



Os autores podem solicitar a publicação rápida através do processo de submissão de manuscritos, indicando claramente a razão por que o seu manuscrito deve ser considerado para revisão acelerada e publicação. O Conselho Editorial decidirá se o manuscrito é adequado para publicação rápida e comunicará sua decisão dentro de 48 horas. Se o Editor-Chefe achar o manuscrito inadequado para publicação rápida, o manuscrito pode ser proposto para o processo normal de revisão, ou os autores podem retirar a sua submissão. A decisão editorial sobre manuscritos aceites para revisão rápida será feita dentro de cinco dias úteis.

Se o manuscrito for aceite para publicação, a AUP terá como objectivo publicá-lo electronicamente em 16 dias.

Revisão por Pares

Todos os artigos de investigação, e a maioria das outras tipologias de artigos, publicadas na AUP passam por uma revisão por pares. Os revisores são obrigados a respeitar a confidencialidade do processo de revisão pelos pares e não revelar detalhes de um manuscrito ou sua revisão, durante ou após o processo de revisão por pares. Se os revisores desejam envolver um colega no processo de revisão, devem primeiro obter permissão do Editor.

Os critérios de aceitação para todos os trabalhos são a qualidade, clareza e originalidade da investigação e seu significado para nossos leitores. Os manuscritos devem ser escritos em um estilo claro, conciso, directo. O manuscrito não pode ter sido publicado, no todo ou em parte, nem submetido para publicação em outro lugar.

Todos os manuscritos enviados são inicialmente avaliados pelo Editor-Chefe e podem ser rejeitados nesta fase, sem serem enviados para revisores. A aceitação ou rejeição final recai sobre o Editor-Chefe, que se reserva o direito de recusar qualquer material para publicação.

A AUP segue uma rigorosa revisão cega por pares. A AUP enviará manuscritos para revisores externos seleccionados de uma extensa base de dados.

Todos os manuscritos que não cumpram as instruções aos autores podem ser rejeitados antes de serem revistos. A aceitação final é da responsabilidade do Editor-Chefe.

As cartas ao Editor ou Editorais serão avaliadas pelo Conselho Editorial, mas também poderão ser solicitadas revisões externas.

Na avaliação, os manuscritos podem ser:

- A) Aceite sem alterações
- B) Aceite após modificações sugeridas por revisores
- C) Rejeitado

Após a recepção do manuscrito, se estiver de acordo com as instruções aos autores e cumprir a política editorial, o Editor-Chefe envia o manuscrito para dois revisores. (já referi atrás a questão dos dois revisores).

Num prazo máximo de 30 dias, o revisor deve responder ao Editor-Chefe indicando os seus comentários sobre o manuscrito sujeito a revisão e sugestão de aceitação, revisão ou rejeição do trabalho. Num prazo de 10 dias, o Conselho Editorial tomará uma decisão que poderá ser: aceitar o manuscrito sem modificações; Enviar os comentários dos revisores aos autores de acordo com o estabelecido; rejeição.

Quando alterações são propostas os autores têm 30 dias (período que pode ser estendido a pedido dos autores) para apresentar uma nova versão revista do manuscrito, incorporando os comentários dos revisores e do conselho editorial.

Têm de responder a todas as perguntas e enviar também uma versão revista do manuscrito, com as emendas inseridas destacadas com uma cor diferente.

O Editor-Chefe tem 10 dias para tomar a decisão sobre a nova versão: rejeitar ou aceitar a nova versão, ou encaminhá-la para uma nova apreciação por um ou mais revisores.

Em caso de aceitação, em qualquer das fases anteriores, a mesma será comunicada ao Autor Correspondente.

Nos autores revisão de prova não serão aceites alterações substantivas ao manuscrito. A inclusão dessas mudanças pode motivar a rejeição do manuscrito por decisão do Editor-Chefe.

Em todos os casos os pareceres dos revisores serão integralmente comunicados aos autores no prazo de 6 a 8 semanas a partir da data da recepção do manuscrito.

Na fase de revisão de provas tipográficas, alterações de fundo aos artigos não serão aceites e poderão implicar a sua rejeição posterior por decisão do Editor-Chefe.

Apesar de os editores e revisores desenvolverem esforços para assegurar a qualidade técnica e científica dos manuscritos, a responsabilidade final do conteúdo (nomeadamente o rigor e a precisão das observações, assim como as opiniões expressas) é da exclusiva responsabilidade dos autores.

Custos de Publicação

Não haverá custos de publicação (não tem taxas de submissão nem por publicação das imagens a cores).

Provas Tipográficas

As provas tipográficas serão enviadas aos autores, contendo a indicação do prazo de revisão em função das necessidades de publicação da AUP. A revisão deve ser aprovada pelo autor responsável pela correspondência. Os Autores dispõem 48 horas para a revisão do texto e comunicação de quaisquer erros tipográficos. Nesta fase, os Autores não podem fazer qualquer modificação de fundo ao artigo, para além das correcções de erros tipográficos e/ou ortográficos de pequenos erros.

O não respeito pelo prazo proposto desobriga a AUP de aceitar a revisão pelos autores, podendo a revisão ser efectuada exclusivamente pelos serviços da AUP.



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A AUP publica alterações, emendas ou retracções a um artigo anteriormente publicado, se, após a publicação, forem identificados erros ou omissões que influenciem a interpretação de dados ou informação. Alterações posteriores à publicação assumirão a forma de errata.

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Revisores e Editores assumem que os autores relatam trabalho com base em observações honestas. No entanto, se houver dúvidas substanciais sobre a honestidade ou integridade do trabalho, submetido ou publicado, o editor informará os autores da sua preocupação, procurará esclarecimento junto da instituição patrocinadora do autor e / ou instituição empregadora.

Consequentemente, se estes considerarem o artigo publicado como fraudulento, a AUP procederá à retractação.

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gação, e pode optar por publicar uma nota de preocupação sobre a conduta ou integridade do trabalho.

Patrocínios

Os patrocinadores da revista são empresas da indústria farmacêutica ou outras que geram receitas através da publicidade.

A publicidade não poderá pôr em causa a independência científica da revista nem influenciar as decisões editoriais e terá de estar de acordo com a legislação geral e específica da área da saúde e do medicamento. Outras despesas são suportadas pela Associação Portuguesa de Urologia.

NOTA FINAL – para um mais completo esclarecimento sobre este assunto aconselha-se a leitura das Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals do International Committee of Medical Journal Editors), disponível em <http://www.ICMJE.org>.

Última revisão: Maio 2017



Editorial Policies

Aims and Scope

The Acta Urologica Portuguesa (AUP) publishes articles in Portuguese (from Portugal) and/or English.

It has been published continuously since 2001.

It is an open access scientific peer-reviewed medical journal that aims to publish quality articles highlighting the latest achievements in the field of urology, including urologic oncology, pediatric urology, andrology, kidney transplantation and nephrology. In accordance with this goal, we publish timely, practical, and state-of-the-art contributions on clinical research and experience in the relevant field.

The audience is primarily urologists, andrologists, nephrologists, oncologists, surgeons, obstetricians, pediatricians, general practitioners, medical researchers.

The AUP is signatory of the Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals, issued by the International Committee of Medical Journal Editors (ICMJE Recommendations), and follows the Committee on Publication Ethics (COPE) guidelines.

The online version can be accessed at <https://www.actaurologicaportuguesa.com/>

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APU adopts the World Association of Medical Editors' definition of editorial freedom, which holds that editors-in-chief have full authority over the entire editorial content of their journal and the timing of publication of that content. Journal owners should not interfere in the evaluation, selection, scheduling, or editing of individual articles either directly or by creating an environment that strongly influences decisions. The Editor-in-chief bases editorial decisions on the validity of the work and its importance to the journal's readers, not on the commercial implications for the journal, and is free to express critical but responsible views about all aspects of medicine without fear of retribution, even if these views conflict with the commercial goals of the publisher. The

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General Overview

Submission of a manuscript to the APU implies that all authors have read and agreed to its content and that the manuscript conforms to the journal's policies.

Manuscripts submitted for publication should be prepared in accordance with the "Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals" of the International Committee of Medical Journal Editors (ICMJE), updated in December 2015. This document is available at <http://www.icmje.org/recommendations/>.

The Journal supports COPE (the Committee on Publication Ethics), which provides a forum for publishers and editors of scientific journals to discuss issues relating to the integrity of the work submitted to or published in their journals.

Standards of Reporting

The Journal advocates complete and transparent reporting of biomedical and biological research. We strongly recommend that authors adhere to the guidelines on data reporting established by the Enhancing the QUALity and Transparency Of health Research (EQUATOR) network (<http://www.equatornetwork.org>). Checklists are available for a number of study designs, including:

- Randomized controlled trials (CONSORT)
- Systematic reviews and meta-analyses* (PRISMA) and protocols (PRISMA-P)
- Observational studies (STROBE)
- Case reports (CARE)
- Qualitative research (COREQ)
- Diagnostic/prognostic studies (STARD)
- Economic evaluations (CHEERS)
- Pre-clinical animal studies (ARRIVE)
- Clinical Practice Guidelines (AGREE)
- Quality improvement studies (SQUIRE)
- Study protocols (SPIRIT)

*Authors of systematic reviews should also provide a link to an additional file from the 'methods' section, which reproduces all details of the search strategy.

The acceptance criteria for all papers are the quality and originality of the research and its significance to our readership.

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- 3) Final approval of the version to be published; AND
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Appropriate written consents, permissions, and releases must be obtained where you wish to include any case details, personal information, and/or images of patients or other individuals in the APU in order to comply with all applicable laws and regulations concerning privacy and/or security of personal information. Studies on patients or volunteers need approval from an ethics committee and informed consent from participants. These should be documented in your paper.

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All research articles, and most other article types, published in the APU undergo thorough peer review. Editor-in-Chief will treat all manuscripts submitted in confidence. Reviewers are therefore required to respect the confidentiality of the peer review process and not reveal any details of a manuscript or its review, during or after the peer-review process, beyond the information released by the APU. If reviewers wish to involve a colleague in the review process they should first obtain permission from the Editor.

The acceptance criteria for all papers are the quality, clarity and originality of the research and its significance to our readership. Manuscripts should be written in a clear, concise, direct style. The manuscript should not have been published, in whole or in part, nor submitted for publication elsewhere.

All submitted manuscripts are initially reviewed by the Editor-in-Chief and can be rejected at this stage, without being sent to reviewers. Final acceptance or rejection rests with the Editor-in-Chief, who reserves the right to refuse any material for publication.

APU follows a rigorous single-blind peer review. APU will send manuscripts to outside reviewers selected from an extensive database.

All manuscripts that do not comply with the instructions for authors can be rejected before being reviewed by the scientific advisors. Final acceptance is the responsibility of the Editor-in-Chief.

Letters to the Editor or Editorials will be evaluated by the Editorial Board, but also may be requested an external review.

In the evaluation, the articles can be:

- a) Accepted without changes
- b) Accepted after modifications suggested by scientific advisors
- c) Rejected

Upon receipt of the manuscript, the editor-in-chief sends it to two reviewers if the manuscript is in accordance with the instructions to authors and meets the editorial policy.

Within 30 days, the reviewer should respond to the chief editor indicating their comments on the manuscript subject to revision, and suggestion regarding acceptance, revision or rejection of the work. Within 10 days the Editorial Board will make a decision which may be: accept the manuscript without modifications; sending reviewers' comments to authors proceed in accordance with the stated; rejection.

When changes are proposed Authors have 30 days (which period may be extended at the request of the authors) to submit a new revised version of the manuscript, incorporating the comments of the reviewers and of the editorial board. Answering all the questions and a revised version of the article, with the amendments inserted highlighted with a different colour.

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At the external peer review stage you will need to send signed copies of the following statements:

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Changes to proofs should be made using the Comment functions in Adobe Reader only. Do not re-save the PDF in Adobe Acrobat or other editing software.

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Corrections

After publication, further changes can only be made in the form of an erratum.

If an error is noted in a published article requiring publication of a correction, the correction will appear as an erratum on a numbered page listed in the Table of Contents.

Retractions

The reviewers and the editors initially assume that authors are reporting work based on honest observations. However, if substantial doubt arises about the honesty or integrity of work, either submitted or published, the editor will inform the authors of the

concern, seek clarification, and pursue the issue with the author's sponsoring body and/or employing authority.

Consequently, if the sponsoring body and/or employers find a published paper to be fraudulent, the journal will print a retraction. If, however, this method of investigation does not result in a satisfactory conclusion, the editor may choose to conduct his or her own investigation, and may choose to publish an expression of concern about the aspects of the conduct or integrity of the work. The validity of previous work by the author of a fraudulent paper cannot be assumed. Editors may ask the author's institution to assure them of the validity of earlier work published in their journal or to retract it. If this is not done, editors may choose to publish an announcement expressing concern that the validity of previously published work is uncertain.

Final Note

For further clarification of the above matters authors should consult the ICMJE Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals available at <http://www.icmje.org/recommendations/>.

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