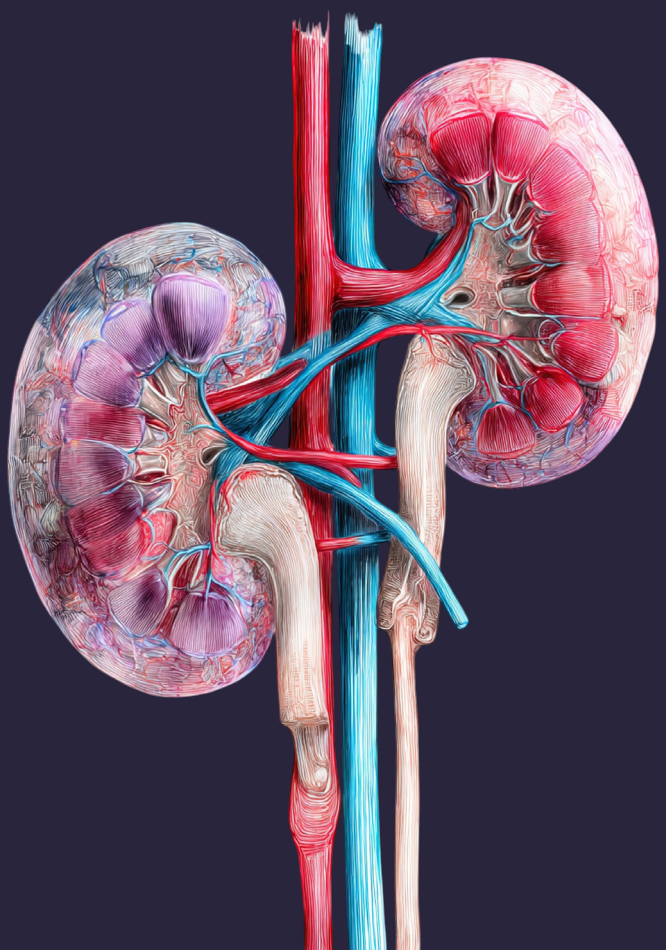
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Rua Nova do Almada No 95 3
1200-288 Lisboa
Lisboa (+351) 213 243 590
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Rooted in Memory, Open to the World

João Magalhães Pina
Editor-in-Chief, APU Journal

This is the first issue of the APU Journal.

I write these opening lines aware that a first issue is never truly a beginning. What reaches you today does not come from a blank page but from decades of work, dedication, and scientific identity. The APU Journal does not start from nothing. It grows out of the Acta Urológica Portuguesa, which for decades was the voice of Portuguese Urology, where many of us published our very first paper and where, issue after issue, a shared scientific legacy was built. Behind those pages, there have always been people: editors, reviewers, and authors who gave their time, often without thanks, so that others could learn and grow. We remember them with gratitude. This is their journal too, and we mean to carry it forward.

The APU Journal remains, above all, the official journal of the Portuguese Association of Urology. Its purpose remains unchanged: to give visibility to research produced in Portugal and to serve as a forum where our community recognises itself. We welcome a broad range of submissions, including original research, reviews, case reports, and clinical studies, aiming to reflect the diverse and evolving landscape of urology. What changes is the horizon. Today's medical research is global, competitive, and demanding, and the platforms that carry it must meet that reality. For this reason, the APU Journal is published entirely in English — not as a departure from our identity but as the means by which that identity can be read, cited, and valued beyond our borders.

And we do not set out alone. The APU Journal begins its life as a sister journal of the International Brazilian Journal of Urology (IBJU), one of the most respected names in our field. A partnership we are proud of. The two journals do not compete; they complement one another. This bond opens our pages to authors and readers across the world, links Portuguese Urology to a far wider community, and provides careful, clinically meaningful work with something every author hopes for: a home, and readers who will genuinely engage with it. Side by side, the two journals reach further than either could alone, and Portuguese Urology takes its place in a conversation that spans the world.

A journal is only as strong as the people who guide it. The APU Journal is served by an editorial board of specialists with clearly defined areas of expertise, recognised not only in Portugal but also internationally. We are committed to rigorous peer review processes that uphold the highest scientific standards. It is, by design, constantly evolving: month after month, it welcomes new members, broadening its competence and perspective. We extend an open invitation to colleagues who wish to lend their knowledge to this effort: the board will continue to grow, and with it, the breadth and depth of what we can publish.

In building this journal, we hold two commitments in balance. We honour the experience of those who built this speciality and who rightly expect from us the rigour, seriousness, and continuity that a national journal embodies. And we open our doors to a younger generation — ambitious, international in outlook, unafraid of new questions and methods — for whom this journal must be a place of opportunity. These are not competing audiences. A journal that keeps faith with its past while offering a stage to its future is exactly the journal that Portuguese Urology now needs.

That commitment is also reflected in our standards. The APU Journal is already indexed in Embase, and we are working towards indexation in PubMed/MEDLINE and Web of Science. This demanding but essential step will provide the fullest possible visibility and discoverability for the work published on these pages. It is a clear statement of intent: our ambition is quality, and quality that is seen.

The future, as was written when the journal that preceded us took its leave, is built with memory, vision, and courage. With this first issue, we begin to build it. We are grateful for what came before, confident in what lies ahead, and open to all who wish to write the next chapters with us.

I invite authors, reviewers, and readers, in Portugal and beyond, to make this journal their own.

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Corresponding Author

João Magalhães Pina, (MD)

Hospital da Luz Lisboa

Av. Lusíada 100, 1500-650 Lisboa, Portugal

E-mail: joaompina@gmail.com

ORCID: https://orcid.org/0000-0002-6253-3211

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30-Year Experience of Treating Refractory Radiation-Induced HemorrhagicCystitis with Hyperbaric Oxygen Therapy: A Retrospective Single-CentreStudy

Guilherme Silva Bernardo[1], Tiago Ribeiro de Oliveira[1], Diogo Cavalheiro[1], Carla Amaro[1].

Abstract

Introduction: Due to its considerable morbidity and mortality, radiation-induced hemorrhagic cystitis is an important complication of pelvic radiotherapy, with current conservative treatments having very limited effectiveness. Hyperbaric oxygen therapy is effective in the treatment of radiation-induced injuries, such as radiation-induced hemorrhagic cystitis. We aim to analyze the efficacy and safety profile of hyperbaric oxygen therapy in refractory hemorrhagic radical cystitis.

Methods: Retrospective analysis of the clinical records of 290 patients with refractory radiation-induced hemorrhagic cystitis treated with hyperbaric oxygen at our centre, between 1994 and 2022. The evolution of macroscopic hematuria was the parameter used to analyze the effectiveness of the treatment.

Results: In 14.8% of patients, other concomitant radiation-induced lesions were found, such as proctitis or enteritis. After an average of 37 sessions, 89.8% of patients had resolution of hematuria. Adverse effects were identified in 5.5% of patients. The need for blood transfusion and the time between radiotherapy and the appearance of macroscopic hematuria had a statistically significant correlation (value < 0.01) with the hematuria resolution rate.

Conclusion: Hyperbaric oxygen therapy was safe and effective inthe treatment of refractory radiation-induced hemorrhagic cystitis. The presence of concomitant radiation-induced injuries wasrelatively common, which makes hyperbaric oxygen an excellent choice as an initial therapy in these patients.

Keywords: Cystitis; Hematuria; Hyperbaric Oxygenation; Radiation Injuries; Radiotherapy/adverse effect.

1 - Underwater and Hyperbaric Medicine Center, Armed Forces Hospital, Lisbon, Portugal

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Introduction

Radiotherapy is one of the options to treat pelvic malignancies,particularly in the treatment of prostate cancer, cervical cancer, rectal cancer or urothelial carcinoma of the bladder. Despite themost recent technical developments, the development of collateral lesions in the surrounding tissues remains frequent, with its incidence ranging from 9.1% to 80%. With considerable morbidity and mortality, radiation-induced hemorrhagic cystitis is one ofthe most important adverse effects of irradiation of the pelvic region. Ionizing radiation impairs cell proliferation, causing progressive obliterating endarteritis and giving rise to hypocellular, hypovascular and hypoxic tissues, which leads to the development ofcystitis, with edema, ulceration, decreased tissue regenerationand fibrosis of the bladder mucosa.[1-4]

Radiation-induced cystitis can be classified as acute when it appears in the first three months after pelvic radiotherapy, with anestimated incidence of 50%, characterized by irritative symptoms, such as increased urinary urgency and frequency, dysuria, bladder spasms or hematuria (although hematuria is rare in the first three months after pelvic radiotherapy). There are validated scales that classify the severity of symptoms on a numerical scale of 1 to 5, according to the intensity of the symptoms and the impact on activities of daily living.[1,3,6] In the acute phase, radiationdirectly affects the cells of the urothelium, making the mucosamore susceptible to infections. These lesions promote the appearance of edema, hyperemia and inflammation of the mucosa. These acute phase changes are generally self-limiting,with the lesions disappearing or improving in the three to six weeks following radiotherapy.[2-4]

Chronic radiation-induced cystitis appears after three months of pelvic radiotherapy, and symptoms may appear several years after the end of pelvic radiotherapy. On average, according to data in the literature, the first symptoms of chronic radiation-induced cystitis appear two to three years after the end of radiotherapy, although cases of symptoms after more than twenty years have been described. The over all incidence is 5%-10%, and symptoms are quite variable, ranging from intermittent mild symptoms to intractable macroscopic hematuria that is refractory to conservative treatment, requiring bladder catheterization, rinsing and transfusion support.[3,4]

The diagnosis of radiation-induced hemorrhagic cystitis isclinical, based on the anamnesis and clinical history, assessing the existence of pelvic radiotherapy in the past, and endoscopic, where hyperemic bladder mucosa, with the presence of telan giectasias and fragile mucosa, are frequently found. Macroscopic hematuria is a frequent finding, and may be intermittent, without hemodynamic repercussions, or frank and uncontrollable, requiring hospitalization, transfusion support, bladder irrigation andvisits to the operating room for bladder fulguration. As a last resort, emergency cystectomy may be the only life-saving option. Radiation-induced cystitis may ultimately result in death.[3,4] Although conservative techniques are currently recommended as first line therapy for hemorrhagic cystitis, their reduced long-term efficacy often means that more invasive techniques are needed to control hematuria.

By increasing tissue oxygenation, hyperbaric oxygen therapy promotes angiogenesis, leukocyte activity, fibroblast proliferationand collagen deposition, and is used to treat hypoxic and scarring lesions, increasing tissue regeneration. Although there has been increasing scientific evidence in favour of the use of hyperbaric oxygen as a treatment for hemorrhagic cystitis, there is a need for studies with a larger number of patients to assess its efficacy.[2,4]

At our centre, the first treatments with hyperbaric oxygen therapy began in 1994, with treatments having been carried out on more than 700 patients in its thirty years of existence.

At our centre, the severity of radiation-induced cystitis is assessed with the Portuguese Navy Radiation-induced Cystitis (PNRC) scale[5] a comprehensive classification that includes five different domains (hematuria, other lower urinary tract symptoms, functional compromise, endoscopic findings and the need for therapeutic intervention), each organized into six progressivelevels of severity.[5]

The purpose of this study was to evaluate the effectiveness ofhyperbaric oxygen therapy (HBOT) to treat refractory radiation-induced hemorrhagic cystitis.

Material and Methods

Population

We evaluated the clinical records of all patients with radiation-induced hemorrhagic cystitis refractory to conservative treatment who were treated with hyperbaric oxygen therapy at our centre between 1994 and 2022. The evolution of macroscopic hematuria at 12 months was the parameter used to analyze the effectiveness of the treatment.

Of the 780 patients treated at the center during the period, 15 (1.92%) were excluded because they were under 18 years of ageat the time of treatment, 26 (3.3%) abandoned treatment before completing the number of sessions initially prescribed, 449 had no data regarding the severity of hematuria or no data regarding the dose of radiotherapy administered (57.5%). Data from 290 (37.2%) patients treated at the center were analyzed and included in this study (Fig. 1).

Study Design

A 12-month time window was used to assess the resolution of hematuria. The rate of resolution of hematuria was also correlated with other categorical and continuous variables, namely sex, age, affected organ, ionizing radiation dose, time from the end of radiotherapy to the appearance of macroscopic hematuria and need for transfusion support. The existence of side effects caused by hyperbaric oxygen therapy was also analyzed as a tool to assess the safety of the treatment.

Inclusion Criteria

The inclusion criteria were age greater than or equal to 18 years, a known history of pelvic radiotherapy, a known history of radical cystitis documented by cystoscopy, with at least one episode of macroscopic hematuria and no previous HBOT. The exclusion criteria for treatment were the existence of contraindications, namely the

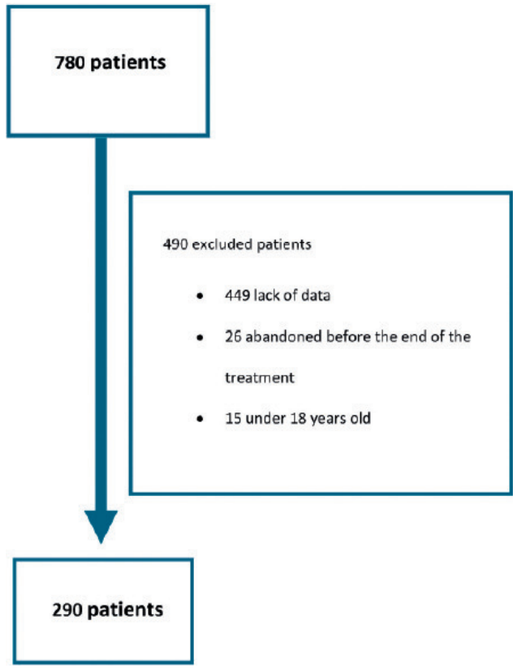


Figura 1 - Patient selection

existence of a diagnosis of epilepsy with seizures less than one year ago, or uncontrolled epilepsy, the existence of pneumothorax, the presence of subpleural bullae, severe claustrophobia, recent barotrauma and refusal or inability of the patient to sign the informed consent.

Statistical Analysis

The data obtained were processed in Microsoft Office Excel 2010 and analyzed in the software Statistical Package for Social Sciences (SPSS version 28.0 for Windows). Continuous variables were expressed as mean ± standard deviation. Categorical variables were presented as percentages. Statistical significance was assessed using the non-parametric Mann-Whitney test, defined as $p<0.01$.

Treatment

Patients were referred for treatment at the center from various urology departments in hospitals in mainland Portugal, after at least one conservative therapy had been proven to be ineffective. All patients treated at the center underwent a clinical assessmentin a Hyperbaric Medicine consultation at the center, to ensure that there were no contraindications for treatment.

After initial assessment and treatment decision, a set of 20 90 minute treatments of 100% oxygen at a pressure of 2.5 atmospheres (ATA) were prescribed in a multiplace chamber, once a day, five days a week (Fig. 2). After completion of the 20 sessions, the patients were reassessed by the center's medical team, who indicated whether to stop or maintain treatment, according to whether the hematuria resolved after the initial 20 sessions.

Results

Population Sample

Of the 290 patients studied, 52.0% were male (151 patients) and 47.9% were female (139 patients). The mean age of the patients was 67.39 years, ranging from 18 to 89 years. Patients with prostate cancer (47.5%) and cervical cancer (40.3%) constituted the majority of patients treated at the center with hemorrhagic cystitis. The total radiation dose ranged from 40 to 71 grays (Gy), with amean of 61.3.

Applying the PNRC scale, 70.6% of patients (205) had grade 2, 22.7% had grade 3 (66), 22.7% had grade 3 (66) and 6.5% (19) had grade 4. No patients were referred for treatment at the center with grade 5. In 91 patients (27.9%), hospitalization and transfusion support were required due to hemodynamic repercussions of hematuria. The mean time between hematuria and the start of treatment with hyperbaric oxygen therapy was 10.41 months.

After an average of 38.9 sessions, 86.2% of patients showed complete or partial resolution of hematuria, the latter defined as an improvement of at least one grade on the PNRC scale (complete resolution in 64.3% of patients). Adverse effects were identified in 5.5% of patients (16).

Assessmentof Hematuria Resolution Rate

During the 12-month follow-up, 64.1% of patients had complete resolution of hematuria (186 patients) and 86.2% of patients had improvement in symptoms, with a decrease in episodes of macroscopic hematuria, hospitalizations and need for transfusion support. When the PNRC scale was applied, 64.1% of patients (186) were classified as grade 1, 26.8% (78) as grade 2, 8.6% (25) as grade 3, and 0.3% (1) as grade 4. No patient was classified as grade 5.

Comparison between Population Subgroups

Several groups were also compared regarding the rate of resolution of hematuria. The need for transfusion support and the time between the end of radiotherapy and the onset of hematuria had a statistically significant correlation. In the subgroup that required transfusion support, 46.8% had complete resolution of hematuria, compared with 73.1% of the subgroup that did not receive transfusion support (p value 0.0019). Comparing

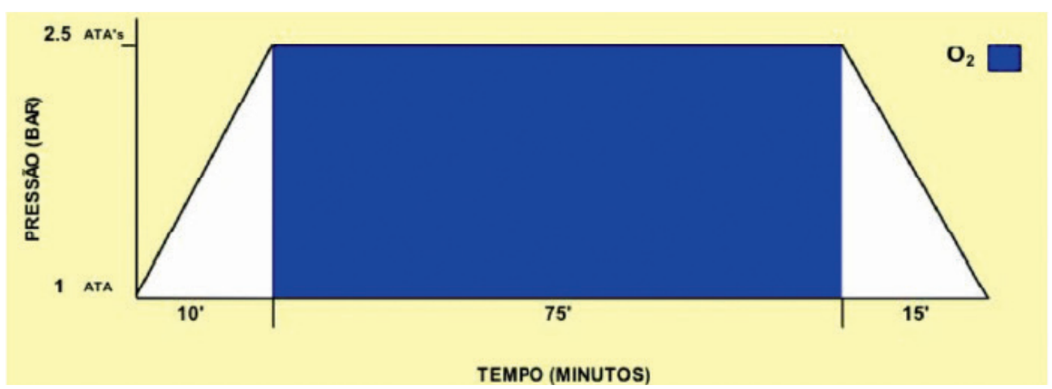


Figura 2 - HBOT Table at2.5 ATA

the time between the end of radiotherapy and the onset of hematuria, complete resolution was higher in the group whose hematuria appeared 60 months (5 years) or more after the end of radiotherapy (p value 0.0042). In the population whose hematuria appeared 60 months or more after the end of radiotherapy, 82% had complete resolution of hematuria at 12 months, compared with 60.2% ofthe group whose hematuria appeared less than 60 months afterthe onset of hematuria.

When comparing sex with the rate of resolution of hematuria, no statistically significant correlation was found. Age also did not reveal a statistically significant correlation with the resolution of hematuria when comparing populations aged 65 years or older and those aged less than 65 years. Comparing the populations with the most frequent cancers in the sample, prostate cancer and cervical cancer, the rate of resolution of hematuria did not have a statistically significant difference between the two samples. The dose of ionizing radiation administered also did not have a statistically significant difference between the population that received a dose less than or equal to 60 Gy and the population that received a dose greater than 60 Gy.

Tabela 1 - Sample characterization (qualitative variables).

SAMPLE CHARACTERIZATION (QUALITATIVE VARIABLES)	%(n)
SEX	
M	52.06 (151)
F	47.94 (139)
CANCER	
Prostate	47.58 (138)
Cervix?	40.34 (117)
Endometrium	5.86 (17)
Bladder	3.79 (11)
Rectum	1.03 (3)
Ewing's sarcoma	0.68 (2)
Ovary	0.34 (1)
Vulva	0.34 (1)

Tabela 2 - Sample characterization (qualitative variables), continuation.

AFFECTION OF MORE THAN ONE ORGAN	%(n)
Yes	14.83 (43)
No	85.17 (247)
TRANSFUSIONS	
Yes	31 , 37 (91)
No	6 8.62 (199)
SIDE EFFECTS	
Yes	5.51 (16)
No	94.48 (274)

Tabela 3 - Sample characterization (quantitative variables)

SAMPLE CHARACTERIZATION (QUALITATIVE VARIABLES)	Mean (min -máx) / Standard deviation
Age (years)	67.39 (1 8 -89)/ ±11.78
Total Radiations dose (GY)	61.3 (40-75)/ ±6
Radiotherapy-Hematuria time (months)	73.64 (0-324)/ ±84.48
Hematuria-OHB time (months)	10.41 (0-168)/ ±9
Radiotherapy-HBOT time (months)	84.05 (5-326)/ ±96
Number of OHB sessions	38.91 (7-179)/ ±21.81
Follow-up period (months)	12 (0-110)/ ±23.4

Tabela 4 - Response rates.

SAMPLE CHARACTERIZATION (QUALITATIVE VARIABLES)	Mean (min -máx) / Standard deviation
HEMATURIA	
Complete Resolution	64.13 (186)
Partial Resolution	22.06 (64)
Maintenance	5.51 (16)
Aggravation	8.27 (24)
HEMATURIA	
Resolved	86.21 (250)
Not Resolved	13.79 (40)

Tabela 5 - Classification (PNRC Scale) at first consultation andafter 12 months.

Classification (PNRC Scale)	1 consultation %(n)	12 months %(n)
1	0 (0)	64.13 (186)
2	70.68 (205)	26.89 (78)
3	22.75 (66)	8.62 (25)
4	6.55 (19)	0.34 (1)
5	0 (0)	0 (0)

Tabela 6 - Complete resolution rate by sex.

COMPLETE RESOLUTION RATE BY SEX	%	
M	60.47	*p* value 0.94
F	42.86	

Tabela 7 - Resolution rate for cancer.

COMPLETE RESOLUTION RATE BY CANCER	%	
Prostate cancer?	77.19	*p* value 0.97
Cervical cancer	64.47	

Tabela 8 - Resolution rate by age.

RESOLUTION RATE BY AGE	%	
>65 years	64.37	*p* value 0.32
<65 years old	69.23	

Tabela 9 - Time from radiotherapy to appearance of hematuria.

TIME FROM RADIOTHERAPY TO APPEARANCE OF HUMATURIA	%	
<60 months	60.3	*p* value 0.004
>60 months	82	

Tabela 10 - Radiation dose resolution rate.

RADIOTHERAPY DOSE RESOLUTION RATE	%	
>60 Gy	56.1	*p* value 0.24
<60 Gy	63.33	

Tabela 11 - Need for transfusion support.

NEED FOR TRANSFUSION SUPPORT	%	
Yes	46.8	*p* value 0.24
No	73.1	

Discussion

In this retrospective single-center study, hyperbaric oxygen therapy (HBOT) demonstrated a high rate of efficacy and afavorable safety profile in the treatment of refractory radiation-induced hemorrhagic cystitis. In a cohort of 290 patients treated over 30 years, complete resolution of hematuria was achieved in 64.1% of cases, while overall clinical improvement was observed in 86.2% of patients, confirming HBOT as a valuable therapeutic option in this challenging clinical setting. Most patients presented with moderate to severe disease at baseline, with more than one quarter requiring hospitalization and blood transfusion. This reflects the significant morbidity associated with radiation-induced hemorrhagic cystitis and emphasizes the need for effective second line therapies when conservative measures fail. The relatively low proportion of patients with the most severe stages maybe explained by logistical constraints related to the transfer ofcritically ill patients, despite the capability of the center to manage such cases. The outcomes observed in this study are consistent with previously published literature. Feldmeier *et al* reported a hematuria resolution rate of approximately 76% in a systematic review of early studies, while Villeirs *et al* reported complete resolution rates of around 65% in a more recent systematic review.[8] Our findings, derived from one of the largest single-center cohorts published to date, further support the efficacy of HBOT in this indication. The need for blood transfusion emerged as a significant negative predictor of complete hematuria resolution. Patients requiring transfusion support had significantly lower response rates, suggesting that greater disease severity and more extensive radiation-induced vascular damage may reduce responsiveness to HBOT. In addition, a shorter interval between the end of radiotherapy and the onset of hematuria was associated with poorer outcomes. Early manifestation of hematuria may reflect more aggressive radiation injury to the bladder wall, leading to slower or incomplete tissue recovery, as previously described by Nakada *et al.*[9] No statistically significant associations were identified between treatment response and age, sex, primary malignancy, or total radiation dose. These findings suggest that the effectiveness of HBOT is largely independent of baseline demographic characteristics and cancer type, supporting it's broad applicability. HBOT was well tolerated, with adverse events occurring in only 5.5% of patients, mainly mild barotrauma and otalgia, all of which resolved with conservative measures. This low complication rate is consistent with, or lower than, rates reported in other published series,[7-11] reinforcing the safety of HBOT when performed in experienced centers. The main limitations of this study include its retrospective design and incompletedata for some variables, inherent to referral-based cohorts. Nevertheless, the large sample size, long observation period, and standardized treatment protocol strengthen the validity of the results. Overall, these findings support hyperbaric oxygen therapy as a safe and effective treatment for refractory radiation-induced hemorrhagic cystitis. Given its ability to promote tissue regeneration and address concomitant radiation-induced injuries, HBOT should be considered early in the therapeutic algorithm for patients with persistent or severe hematuria following pelvic radiotherapy.

Study Limitations

For some patients, it was not possible to obtain detailed information on the characterization of the primary cancer, the total radiation dose, the complementary diagnostic tests performed, and the therapies administered before the start of hyperbaric oxygen therapy, as well as the number of units transfused and the number and severity of each episode of macroscopic haematuria. This lack of data is the main limitation of our study and is because patients treated at our centre are referred from different centres throughout the country.

Conclusion

Hyperbaric oxygen therapy was safe and effective in the treatmentof radiation induced hemorrhagic cystitis. The presence of concomitant radiological lesions and the need for transfusion support were relatively common, which makes hyperbaric oxygen an excellent choice as initial therapy in these patients. The need for transfusion support and the time between the end of radiotherapy and the onset of hematuria had a statistically significant correlation with the rate of resolution of hematuria.

Ethical Disclosures

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Confidentiality of Data: The authors declare that they have followed the protocols of their work center on the publication of patient data.

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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Contributorship Statement

GB: Conceptualization, data curation, investigation, formal analysis, and writing the original draft.

TRO: Methodology, supervision, writing, reviewing and editing. DC: Data analysis, interpretation of data, writing, reviewing and editing.

CA: Supervision, project administration, and critical revision of the manuscript.

All authors read and approved the final version to be published.

Corresponding Author

Guilherme Silva Bernardo, (MD)

Underwater and Hyperbaric Medicine Center

Armed Forces Hospital, Lisbon, Portugal

E-mail: guilhermebernardo17@hotmail.com

ORCID: https://orcid.org/0000-0002-6019-6573

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Peroneal Nerve Neuromodulation for Overactive Bladder: A Pilot StudyAssessing Efficacy and Safety in Patients with Multiple Sclerosis

Sara Freixo[1], Patrícia Pereira[1], João Esteves Sousa[1], Cátia Barbosa Martins[1], Manuela Mira Coelho[1]

Abstract

Introduction: Overactive bladder (OAB) symptoms are highly prevalent among patients with multiple sclerosis (MS), significantly impairing quality of life. Peroneal nerve neuromodulation (PNM) has emerged as a potential alternative to posterior tibial nerve stimulation for managing refractory OAB symptoms, although no studies to date have directly evaluated its effects in MS patients. We aimed to assess the clinical and urodynamic effects of transcutaneous peroneal nerve neuromodulation in patients with MS and neurogenic OAB.

Methods: This prospective single-center open-label pilot studyincluded 18 patients with MS and OAB symptoms refractory orintolerant to first-line treatments. Participants received weekly transcutaneous PNM for 12 weeks. Outcomes included changes in urgency episodes (OAB-SF), symptom severity and impact inquality of life (ICIQ-OAB), and urodynamic parameters. Data were analyzed using paired statistical tests ($p < 0.05$).

Results: Statistically significant improvements were observed inurgency-related items of the OAB-SF and ICIQ-OAB questionnaires, reflecting reduced symptom burden and increased bladder control. Urodynamic data revealed a significant increase in maximum cystometric capacity ($p = 0.041$), with a trend toward improved urgency volume ($p = 0.053$). One mild adverse event (local skin burn) was reported and resolved spontaneously. No other adverse effects occurred.

Conclusion: Peroneal nerve neuromodulation appears to be a safe and potentially effective intervention for improving urgency and bladder storage capacity in MS patients with OAB. These findings support further investigation in larger, controlled studieswith longer follow-up and functional neuroimaging to better understand therapeutic mechanisms and long-term outcomes.

Keywords: Multiple Sclerosis/complications; Patient Reported Outcome Measures; Peroneal Nerve; Transcutaneous Electric Nerve Stimulation; Urinary Bladder, Overactive/etiology; Urinary Bladder, Overactive/therapy.

1 – Physical Medicine and Rehabilitation Service, Hospital de Braga,Braga, Portugal

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Introduction

Overactive bladder (OAB) is characterized by urinary urgency, usually accompanied by increased frequency and nocturia, with or without urgency urinary incontinence, in the absence of urinary tract infection or other obvious pathology. Symptoms of OAB arepresent in a significant proportion of MS patients, with prevalence rates ranging between 50% and 97%.[1-3] Frequency and urgencyare the most frequent symptoms, manifested in 31%–86% ofpatients and lower urinary tract symptoms (LUTS) are one of thecomplications that most concern patients with multiple sclerosis, alongside fatigue and muscle weakness.[3,4] These symptoms notonly interfere with the physiological function of the bladder but also substantially impact patients quality of life, adversely affecting daily activities, social relationships, and psychological well-being.[5,6] Consequently, bladder dysfunction in MS is associated with increasing morbidity and potentially affects disease progression, an increased risk of complications, such as urinary tract infections and social isolation, highlighting the need for therapeutic interventions that can improve both symptoms and qualityof life in these patients.[7,8]

Treatment options include behavioral measures, pharmaco therapy, and, in refractory cases, detrusor botulinum toxin injections and neuromodulation approaches. Posterior tibial nerve stimulation (PTNS) is well-established for OAB in different populations.[9-13]

More recently, emerging evidence suggests that peroneal nerve neuromodulation (PNM) might also be effective, possibly involving distinct cerebral areas.[14,15] This nerve contains motor and sensory fibers that influence pelvic floor and bladder function through central and peripheral mechanisms. Studies by Krhut and colleagues demonstrated that transcutaneous stimulation of peroneal afferents recruits distinct supraspinal networks compared with tibial stimulation on functional imaging, providing amechanistic rationale to test targeted PNM in MS-related OAB.[15,16] Based on the available literature, this is among the first prospec-

tive pilot study to evaluate targeted peroneal nerve neuromodulation specifically in MS-related OAB. The objective of this study is to evaluate the clinical and urodynamic impact of peronealnerve neuromodulation in patients with OAB and MS, using symptom and quality- of-life questionnaires, as well as urodynamic studies.

Methods

Study Design

Prospective single-center open-label pilot studyincluded 18 patients with multiple sclerosis (MS) and neurogenic OAB. All participants underwent peroneal nerve neuromodulation once per week for 12 consecutive weeks, and clinical as well as urodynamic evaluations were performed before and after the intervention. The study was conducted between October 2024 and January 2025 at the Department of Physical and Rehabilitation Medicine of Braga Hospital.

Inclusion Criteria

Age over 18 years; a confirmed diagnosis of MS; the presence of OAB symptoms (urgency, increased frequency nocturia, and/or urgency incontinence) that were refractory or intolerant to first-line treatments; a urodynamic study withinthe last two years with no therapeutic modifications since then; and the ability to provide signed informed consent.

Exclusion Criteria

Diagnosis of urinary tract infection during the study period, MS relapse, pregnancy, cognitive impairment, implanted pacemaker or neurostimulator, cutaneous lesions at theelectrode application site, any therapeutic changes targeting OAB or MS during the study period, tibial neuromodulation within the previous 6 months, detrusor botulinum toxin injection within theprevious year, pelvic floor rehabilitation during the study, intermittent catheter use or significant post-void residual.

Screening eligibility, enrollment and patients included in analysis are summarized in Fig. 1.

Intervention

The PNM technique involved placing the active electrode approximately 2–3 cm distal to the fibular head, in thearea where the peroneal nerve is most susceptible to transcutaneous stimulation, and positioning the ground electrode about 5 cm below.[17] Circular electrodes of 2.5 cm in diameter were used. Stimulation was delivered with biphasic symmetrical current at 20 Hz and a pulse width of 200 microseconds, with intensity adjusted until a visible contraction (dorsiflexion/eversion of the ankle) wasachieved and tolerated by the patient. PNM was delivered using Soleo Galva electrostimulator (Zimmer Medizin Systeme, Germany). At each session, stimulation intensity was titrated to the minimum level that produced a visible ankle dorsiflexion/eversionand was well tolerated, for each participant, the required intensity remained broadly similar across sessions. Adverse events were systematically queried at every visit.

Primary Outcome: Change in the number of urgency episodes, based on the ICIQ-OAB questionnaire, comparing baseline and 12 weeks after treatment.

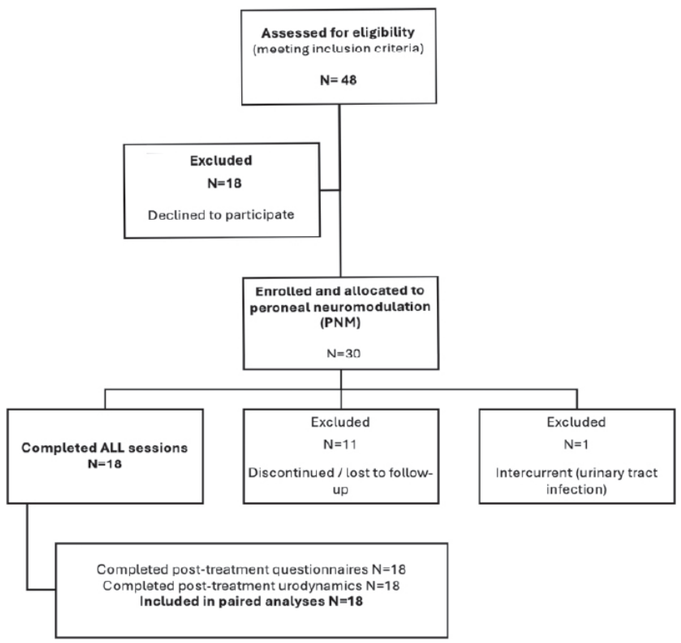


Figura 1 - Patient recruitment flowchart.

Secondary Outcomes

Comparison between baseline and 12 weeks of treatment on ICIQ-OAB questionnaire scores and urodynamic parameters, and on the incidence of adverse events.

Data Collection and Monitoring

Outcome measures included the results of International Consultation on Incontinence Questionnaire Overactive Bladder (ICIQ-OAB), validated for Brazilian Portuguese[18] (Appendix 1) - in addition to urodynamic parameters such as presence of detrusor overactivity (DO), bladdervolume at the onset of detrusor overactivity (DOVol), sphincter dyssynergia (SD), obstructive flow (OF), maximum cystometric capacity (MCC), volume at first desire to void (V1stD), volume aturge (Vurg), bladder compliance (BC), and maximum free flow rate(Qmax) and post-void residual volume (PVR) measured on uroflowmetry. The Portuguese version of the ICIQ-OAB scale is freely available for use. The authors are identified in the translation article, which is accessible at URL: https://doi.org/10.1590/S0100-72032010000600004. The applied scale can be accessed at URL: https://escalasdefuncionalidade.com/iciq-oab and is detailed in Appendix 1. Appendix 2 also presents the English translation of the same scale for reference purposes only; it was not used in the study.

Statistical Analysis

Conducted using software such as JASP, applying paired Wilcoxon or paired Student's t-tests according to data normality, and adopting a significance level of 5% ($p < 0.05$). Continuous variables were summarized as mean ± SD and categorical variables as n (%).

This was an open-label study, the staff who collected questionnaires and performed urodynamics were not blinded. Tomitigate assessment bias, all records were pseudonymized andfiled under unique study codes, patient names were not availableto assessors. Urodynamic studies were acquired and reportedusing a prespecified protocol, and post-treatment tracings were interpreted without side-by-side access to the corresponding baseline tracings. Data linkage to pre/post time points was performed only at the analysis stage.

This study was conceived as an exploratory feasibility studywith a pre-specified target of n=18, determined by the expected recruitment capacity and the methodological need to estimatevariance and preliminary effect sizes to inform a subsequent, adequately powered trial. Accordingly, the present analyses arehypothesis-generating and the study was not powered for definitive efficacy conclusions.

The study protocol was reviewed and approved by the Hospital Ethics Committee and the Data Protection Department. All procedures were conducted in accordance with ethical standards, including the principles outlined in the Declaration of Helsinki.

Written informed consent was obtained from all participants before enrollment, ensuring that their rights and well-being werefully protected.

The authors declare no relevant conflicts of interest.

Results

Study Population and Baseline Characteristics: A descriptive analysis of the study population is detailed in Table 1**.** A total of 18 patients with MS were included, predominantly with relapsing-remitting MS (RRMS), except for one participant with a secondary progressive form (EMSP). Among these 18 participants, 14 (78%) were women and four (22%) were men. Ages ranged from 20 to 74 years, and the majority (83%) presen-ted with urgency urinary incontinence (IUU), and a smaller subset (17%) reported mixed incontinence (IUM) and voiding symptoms. All participants were under disease-modifying therapies for MS, including natalizumab, ocrelizumab, teriflunomide, rituximab and glatiramer acetate. A portion of the sample was also receiving pharmacological treatment targeting lower urinary tract symtoms, such as alpha-blockers (alfuzosin, tamsulosin), antimuscarinics (solifenacin, trospium

Tabela 1 - Study Population and Baseline Characteristics. Meanage was 44 years (range: 20–74 years)

		%(n)
Gender	Male Famel	4 (22%) 14 (78%)
MS subtype	RRMS SPMS	17 (94%) 1 (6%)
Bladder symptom	Urgency incontinence Mixed incontinence Difficulty emptying	15 (83%) 2 (11%) 1 (6%)
Bladder medication	Alfuzosin Tamsulosin Solifenacin Trospium chloride Oxybutynin Mirabegron Baclofen	7 (39%) 4 (22%) 4 (22%) 1 (6%) 0 (0%) 4 (22%) 4 (22%)
MS medication	Natalizumab Ocrelizumab Teriflunomide Rituximab Glatiramer acetate	5 (28%) 4 (22%) 6 (33%) 1 (6%) 2 (11%)

RRMS - relapsing-remitting multiple sclerosis;
SPMS - secondary progressive; MS - multiple sclerosis

Tabela 2 - ICIQ-OAB Questionnaire Analysis.

(Values represent mean scores at baseline (ICIQ-OAB_i) and after the intervention (ICIQ-OAB_f). Statistical comparisons performed using theWilcoxon signed-rank test or Student's t-test as appropriate).

Quest	ICIQ-OAB_i mean(SD)	ICIQ-OAB_f mean(SD)	Test	Statistic	z	Df	*p*
1	2.06 (1.09)	1.78 (0.94)	Student	0.846	-	16	0.410
1a	5.17 (3.26)	3.00 (2.59)	Wilcoxon	111.500	2.925	-	0.003
2	2.72 (1.32)	2.44 (1.42)	Wilcoxon	28.000	1.400	-	0.152
2a	3.94 (3.59)	2.89 (3.14)	Wilcoxon	60.000	1.647	-	0.103
3	3.00 (0.97)	2.44 (0.86)	Wilcoxon	50.500	2.344	-	0.015
3a	5.44 (3.13)	3.89 (2.68)	Student	2.544	-	17	0.021
4	2.50 (0.99)	1.78 (0.73)	Wilcoxon	73.000	2.667	-	0.006
4a	5.56 (3.60)	3.61 (3.53)	Student	3.201	-	17	0.005

ICIQ-OAB_f - Final International Consultation on Incontinence Questionnaire Overactive Bladder); ICIQ-OAB_i - Initial International Consultation onIncontinence Questionnaire Overactive Bladder).
Questions: 1. How often do you pass urine during the day; 2. During the night, how many times do you have to get up to urinate, on average?; 3. Do youhave to rush to the toilet to urinate?; 4. Does urine leak before you can get to the toilet?. The sub-item evaluates the degree of bother using a 0 to 10 scale.

chloride, oxybutynin), beta-adrenergic agonists (mirabegron) and GABA-ergic agonist (baclofen). No patients were receiving onabotulinumtoxina (BTX-A) detrusor injections, tibial or sacral neuromodulation at baseline

ICIQ-OAB Questionnaire

This questionnaire contains four main questions (1 – 4) focusing on day time frequency, nocturia, urgency, and urgency incontinence, each followed by a sub-question (1a – 4a) that assesses the degree of bother. The results of the statistical analysis of the ICIQ-OAB questionnaire responses are detailed in **Table 2**. Statistically significant improvements emerged in question 1a (p = 0.003),which evaluates the level of bother related to daytime frequency; question 3 (p=0.015), which addresses the need to rush to the bathroom; question 3a (p = 0.021), the associated bother; question 4 (p = 0.006), concerning urinary leakage before reaching the bathroom; and question 4a (p = 0.005), the bother associated with that leakage. There were no significant differences in question 1, question 2, or question 2a (p = 0.05), questions related to urinary frequency and nocturia. These results show an improvement in urgency symptoms and accidental leakage, and the associated bother, as well as certain aspects of daytime frequency.

Urodynamic Data

A comparison of urodynamic parameters before and after the intervention revealed a significant increase in MCC (p = 0.041), from 260 to 313 mL, corresponding to an average improvement of 35 mL of storage and indicates a clinically meaningful gain instorage function. VUrg showed a concordant near-significant increase, from 224 to 272 mL, corresponding to an improvement of 48 mL, suggesting a trend toward improved sensory thresholds that warrants confirmation in a larger powered study. No significant changes were observed in DO, V1stD, BC, PVR, SD or Qmax (p > 0.05). The results obtained for the urodynamic study parameters before and after the intervention are detailed in **Table3**. In summary, these findings demonstrate enhanced storage capacity, in line with the clinical improvements reported in the questionnaires.

Adverse Events

Adverse events related to peroneal nerve stimulation were systematically monitored throughout the study. We specifically assessed for skin irritation, pain or discomfort at the electrode site, muscle spasms, and any neurological or systemic symptoms. Among the 18 patients included, only one experienced a mild skin burn at the site of electrode placement. This resolved sponta-neously within 48 hours without requiring medical intervention. No other adverse events were reported.

Tabela 3 - Urodynamic Studies Analysis.

Urodynamic parameter	Pre-intervention Mean (SD) / N(%)	Post-intervention Mean (SD) / N(%)	Test	Statistic	z	Df	*p*
DO	16 (89%)	12 (67%)	Wilcoxon	17.500	1.468	-	0.129
DOVol (mL)	191.88 (56.12)	162.73 (74.17)	Wilcoxon	32.500	1.185	-	0.260
V1stD (mL)	161.11 (70.62)	143.89 (80.89)	Wilcoxon	84.500	0.853	-	0.407
Vurg (mL)	224.44 (59.63)	272.22 (103.67)	Student	-2.077	-	17	0.053
MCC (mL)	260.0 (88.85)	313.33 (107.54)	Student	-2.218	-	17	0.041
BC (mL/cmH2O)	78.12 (28.19)	85.88 (24.69)	Wilcoxon	14.500	-0.948	-	0.370
PVR (mL)	43.33 (67.39)	24.71 (47.71)	Wilcoxon	12.000	1.214	-	0.281
SD	11 (61%)	9 (75%)	Wilcoxon	22.500	0.630	-	0.530
Qmax (mL/s)	15.65 (8.78)	15.83 (8.47)	Student	-0.182	-	16	0.858

DO - detrusor overactivity; DO_Vol - bladder volume at the onset of detrusor overactivity; V1stD -volume at first desire to void; Vurg - volume at urge; MCC - maximum cystometric capacity; BC - bladder compliance; PVR - post-void residual; SD - sphincter dyssynergia; Qmax - maximum flow rate.

Discussion

Management of OAB in patients with neurological disease, such as MS, typically follows a stepwise pathway. First-line conservative measures include behavioral therapy, bladder training/timed voiding, and pelvic-floor muscle training. In MS cohorts, theses trategies are recommended early but often provide only partial control, prompting escalation to pharmacotherapy.[19] Second-line treatment includes antimuscarinics, which can reduce urgency and incontinence, although their use and adherence are frequently limited by adverse effects. An alternative is the β3-adrenergic agonists, which are generally better tolerated; combination therapy may enhance efficacy at the cost of additive sideeffects. Third-line interventions include onabotulinumtoxinA detrusor injections, sacral neuromodulation (SNM), and peripheral neuromodulation such as tibial nerve stimulation. Among third-line options, onabotulinumtoxinA consistently improves OAB symptoms but carries a meaningful risk of transient urinary retention requiring clean intermittent catheterization. NM provides durable symptom control for many patients but is invasive, with device and revision-related complications that must be weighed against benefit. Posterior tibial nerve stimulation offers a non-invasive alternative with short-term response rates commonly around 50%–80% across mixed OAB populations, minimal adverse effects, and a need for maintenance sessions to sustain benefit.[19,20]

Against this backdrop, PNM, as used in the present study, retains the non-invasive advantages of PTNS, while emerging neuroimaging data indicate partly distinct supraspinal engagement.[15] In this pilot cohort, PNM was associated with significant improvements across several OAB questionnaire items, as well as an increase in MCC on urodynamic testing. These findings support the hypothesis that peroneal nerve stimulation may serve as a viable third-line option for lower urinary tract symptoms (LUTS) in people with MS, mirroring the benefits previously reported for posterior tibial nerve stimulation in OAB.[9,11,12,21]

Recent work published by Khurt *et al* showed that trans cutaneous electrical stimulation of the peroneal nerve can reduce OAB symptoms and modulate brain circuits differently from tibial nerve stimulation.[15,16] These studies provide evidence that pero neal PNM activates brain structures previously implicated in the neural control of bladder filling and in mechanisms involved in coping with urgency. Our current research aligns with that line of investigation, suggesting that peroneal neuromodulation is well-tolerated and may produce promising clinical results. The observed increase in MCC is clinically meaningful and suggests storage-phase facilitation under peroneal neuromodulation. Several mechanisms may account for this finding: PNM could enhance descending inhibitory control, modulate afferent signaling from the bladder-outlet complex, or promote detrusor adaptation during the filling phase.

From a mechanistic standpoint, PNM likely delivers somatic afferent input that gates pelvic afferent traffic at the spinal level and augments descending inhibitory control over the pontine–periaqueductal gray micturition network. Functional magnetic resonance imaging (MRI) studies with peroneal stimulation have shown distinct modulation of the insula, anterior cingulate, premotor and supplementary motor, and prefrontal regions, consistent with an upregulation of cortical inhibitory circuits that favor bladder storage.[15,16] In parallel, altered afferent signaling from the bladder-outlet complex may raise sensory thresholds (first desire and urgency), allowing filling to progress further before the emergence of urgency. The nearsignifican increase in urgency volume in our cohort (p = 0.053) supports this interpretation and implies that a larger sample or extended follow-up might confirm additional changes. PNM may rebalance storage reflexes, via spinal gating and supraspinal inhibitory influences, which could underlie the clinically meaningful capacity gain observed.

This study has inherent limitations: the small pilot sample and single-center design limit generalizability. An active control group (e.g., PTNS or pharmacotherapy) was not included, which prevents direct comparison of efficacy. The absence of a sham control precludes quantifying placebo contribution. The short/ / medium-term follow-up (12 weeks) does not allow conclusions about the long-term durability of the effect. Patient-reported measures such as ICIQ-OAB are subject to expectation bias. Outcome assessors were not blinded, which may introduce assessment bias despite standardized protocols. Additionally, there are no standardized parameters for peroneal nerve neuromodulation, which limits reproducibility and comparison across studies.

Conclusion

Peroneal nerve neuromodulation shows promising efficacy inimproving several OAB symptom domains, as measured by standardized questionnaires, and in increasing MCC in patients with MS and overactive bladder. These results, in line with previous studies investigating peroneal neuromodulation, supportthe feasibility of exploring this technique as an alternative to other FDA (Food and Drugs Administration) approved neuromodulation methods (podendal, tibial or sacral), being a nerve with greateraccessibility to electrical stimulation and possibly associated with the activation of brain structures likely involved in the neural control of bladder storage and urinary urgency.

Larger controlled studies are needed on this population to evaluate the efficacy of peroneal neuromodulation relative to other modalities (eg, PTNS) and associate the functional outcomes withbrain structures activation, using brain functional MRI. Longer follow-up studies are needed to assess the long-term persistence of therapeutic benefits.

Ethical Disclosures

Conflicts of Interest: The authors have no conflicts of interest to declare.

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Confidentiality of Data: The authors declare that they havefollowed the protocols of their work center on the publication of patient data.

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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PP, JES and CBM: Acquisiton, analysis and interpretation of data.

MMC: Concept and design, manuscript drafting and critical review.

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Corresponding Author

Sara Freixo

Rua Professor Doutor João Carvalho, 34 - 4700-289 Braga

E-mail: sara_freixo@hotmail.com

ORCID: https://orcid.org/0000-0003-4490-344X

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Appendix 1.

International Consultation on Incontinence Questionnaire Overactive Bladder ICIQ-OAB - Portuguese Version

Questionário de Bexiga Hiperativa da AssociaçãoInternacional de Incontinênica ICIQ-OAB
(validado para português do Brasil)

Agradecemos a sua participação ao responder a estas perguntas para sabermos como tem sido o seu incomodo durante as últimas 4 semanas.

1. Quantas vezes você urina durante o dia?

- ☐ 1 a 6 vezes
- ☐ 7 a 8 vezes
- ☐ 9 a 10 vezes
- ☐ 11 a 12 vezes
- ☐ 3 vezes ou mais

1a. O quanto isso incomoda você?

Circule um número de 0 (não incomoda) a 10 (incomoda muito).

0 1 2 3 4 5 6 7 8 9 10

2. Durante a noite, quantas vezes, em média, você têm que selevantar para urinar?

- ☐ nenhuma vez
- ☐ 1 vez
- ☐ 2 vezes
- ☐ 3 vezes
- ☐ 4 vezes ou mais

2a. O quanto isso incomoda você?

Circule um número de 0 (não incomoda) a 10 (incomoda muito).

0 1 2 3 4 5 6 7 8 9 10

3. Você precisa se apressar para chegar ao banheiro para urinar?

- ☐ nunca
- ☐ poucas vezes
- ☐ às vezes
- ☐ na maioria das vezes
- ☐ sempre

3a. O quanto isso incomoda você?

Circule um número de 0 (não incomoda) a 10 (incomoda muito).

0 1 2 3 4 5 6 7 8 9 10

4. Você perde urina antes de chegar ao banheiro?

- ☐ nunca
- ☐ poucas vezes
- ☐ às vezes
- ☐ na maioria das vezes
- ☐ sempre

4a. O quanto isso incomoda você?

Circule um número de 0 (não incomoda) a 10 (incomoda muito).

0 1 2 3 4 5 6 7 8 9 10

Appendix 2.

International Consultation on Incontinence Questionnaire Overactive Bladder ICIQ-OAB - English Version

"International Consultation on Incontinence Questionnaire Overactive Bladder"

(ICIQ-OAB)

We would be grateful if you could answer the following questions, thinking about how you have been, on average, over the past four weeks.

1. How often do you pass urine during the day?

- ☐ 1 a 6 times
- ☐ 7 a 8 times
- ☐ 9 a 10 times
- ☐ 11 a 12 times
- ☐ 13 or more times

1a. How much does this bother you?

Please ring a number between 0 (not at all) and 10 (a great deal).

0 1 2 3 4 5 6 7 8 9 10

2. During the night, how many times do you have to get up tourinate, on average?

- ☐ none
- ☐ one
- ☐ two
- ☐ three
- ☐ four or more

2a. How much does this bother you?

Please ring a number between 0 (not at all) and 10 (a great deal).

0 1 2 3 4 5 6 7 8 9 10

3. Do you have to rush to the toilet to urinate?

- ☐ never
- ☐ occasionally
- ☐ sometimes
- ☐ most of the time
- ☐ all of the time

3a. How much does this bother you?

Please ring a number between 0 (not at all) and 10 (a great deal).

0 1 2 3 4 5 6 7 8 9 10

4. Does urine leak before you can get to the toilet?

- ☐ never
- ☐ occasionally
- ☐ sometimes
- ☐ most of the time
- ☐ all of the time

4a. How much does this bother you?

Please ring a number between 0 (not at all) and 10 (a great deal).

0 1 2 3 4 5 6 7 8 9 10

Laparoscopic Bilateral Retroperitoneal Lymoh Node Dissection

Sara Anacleto[1], Catarina Tinoco[1], Andreia Cardoso[1], Ricardo Rodrigues[1], Sofia Araújo[1], Ricardo Leão[1], Miguel Mendes[1], Mário Alves[1], Emanuel Carvalho-Dias[1].

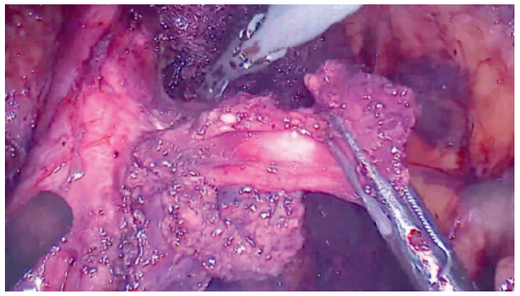
Retroperitoneal lymph node dissection is a complex surgery indicated in some cases of testicular cancer, namely in patients with non-seminomatous germ cell tumours who have residual retroperitoneal masses after chemotherapy. The laparoscopic technique, initially described in 1992, is particularly challenging. However, it offers advantages compared to the open approach, since it is less invasive and is associated with reduced overall complication rates and shorter length of hospital stay with equal cancer control results.

In this video, we report a case of a laparoscopic bilateral retroperitoneal lymph node dissection performed in a 21-year-old male with residual retroperitoneal masses after chemotherapy for mixed germ cell tumour. The patient was placed in supine position with moderate Trendelenburg and a urethral catheter and a nasogastric tube were placed. The first infra-umbilical 11 mm port was introduced under direct visualization. Thereafter, two 5 mm ports were placed in each side of the abdomen.

Firstly, the ceacum was identified and the right colon, small intestine and duodenum were mobilized. Sutures were used to tack the incised peritoneal edge of the intestine to the abdominal wall. The retroperitoneum was then exposed and the lymph node dissection initiated. The bilateral lymph node dissection template was bordered by the ureters laterally, the renal vessels superiorly and the common iliac arteries inferiorly. Initially, the paracaval space was dissected, followed by the paraaortic and interaortocaval spaces. The left colon was also mobilized. After that, the lymph nodes were removed in the same sequence, with ligation of the left gonadal vein with hem-o-lok.

Patient was discharged on postoperative day 14. Histology report showed 31 lymph nodes without metastases and with alterations compatible with previous chemotherapy. Laparoscopy is an effective approach for retroperitoneal lymph node dissection, with similar oncological outcomes and inferior patient burden compared to the open approach.

Keywords: *Laparoscopy; Lymph Node Excision; Lymph Nodes; Testicular Neoplasms/surgery.*



Aceda ao vídeo: https://drive.google.com/file/d/1ZSDrERMv9GETcaxUJWPUYk0A5lrO3okC/view

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Corresponding Author

Sara Anacleto

ULS Braga Sete Fontes, São Victor, 4710-243 Braga

E-mail: sara.anacleto241@gmail.com

ORCID: https://orcid.org/0000-0002-6776-1950

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1 - Unidade Local de Saúde Braga, Portugal

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Reconstrução Virtual 3D na Nefrectomia Parcial Assistida por Robot deRim em Ferradura: Caso Clínico

Three-Dimensional Virtual Reconstruction for Robot-Assisted PartialNephrectomy in a Horseshoe Kidney: Case Report

Sofia Mesquita[1], Paulo Príncipe[1], Avelino Fraga[1], Miguel Silva-Ramos[1].

Resumo

O rim em ferradura (HSK) é uma das anomalias de fusão mais comuns. Os rins em ferradura apresentam alterações anatómicas únicas que tornam o tratamento de lesões tumorais nestes casos complexo e desafiante.

A caracterização detalhada da anatomia nos casos de HSK através da reconstrução virtual tridimensional permite um planeamento cirúrgico mais eficaz.

Palavras-chave: Procedimentos Cirúrgicos Robóticos; Rim em Ferradura/cirurgia.

Abstract

The horseshoe kidney (HSK) is one of the most common fusion anomalies. Horseshoe kidneys present distinctive anatomical abnormalities, making the treatment of tumor lesions complex and challenging. Detailed anatomical characterization in HSK cases through three-dimensional virtual reconstruction enables more effective surgical planning.

Keywords: *Fused Kidney/surgery; Robotic Surgical Procedures*

Introdução

O rim em ferradura (*horseshoe* kidney HSK) é uma malformação congénita de fusão renal presente em 0,15%-0,25% da população. Até 12% dos doentes com HSK desenvolvem tumores renais, dos quais cerca de 50% são carcinomas de células renais.[1]

As características anatómicas do HSK, tais como a marcada variabilidade da vascularização renal, a mobilidade limitada do rim e a presença de alterações do sistema excretor, tornam o tratamento de tumores renais um verdadeiro desafio.

O planeamento cirúrgico da nefrectomia parcial assistida por robot (RAPN) é convencionalmente realizado com tomografia computorizada (TC). No entanto, a vascularização renal e tumoral, bem como o envolvimento do sistema excretor, podem ser muitas vezes de difícil avaliação nos doentes com HSK. Comparativamente com a TC de alta resolução, a reconstrução virtual tridimensional (3D) representa de forma mais detalhada a anatomia do HSK.[2] A reconstrução 3D identifica o trajeto preciso dos vasos renais, a relação destes com o tumor e a relação do tumor com o sistema excretor.[2,3]

No presente artigo, descrevemos o caso de uma RAPN por uma lesão renal numa doente com HSK, realçando o papel do planeamento cirúrgico com recurso à reconstrução 3D.

Caso Clínico

Doente do sexo feminino com 47 anos, com antecedentes médicos de diabetes *mellitus* tipo 2 não insulinotratada e obesidade grau I, foi enviada à consulta de Urologia por achado incidens tal de lesão renal com 3 cm em TC abdominopélvica realizada em contexto de dor abdominal. Apresentava como antecedentes cirúrgicos tiroidectomia total há 21 anos e salpingectomia há 10 anos. TC mostrava: "rim em ferradura com lesão expansiva suspeita com cerca de 32 mm de diâmetro axial no polo inferior do hemi-rim esquerdo" (Fig.1).

A reconstrução virtual 3D do HSK foi criada a partir das imagens de TC. A reconstrução 3D proporciona uma visualização de 360º do HSK, a localização e dimensões

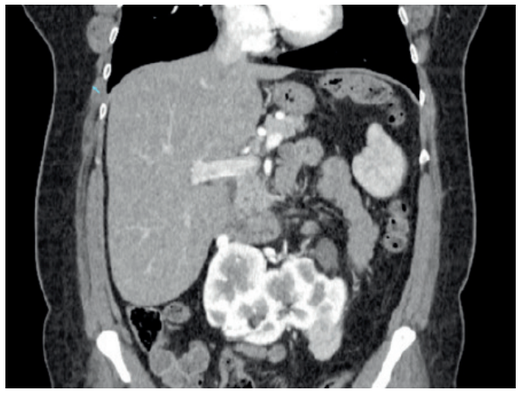


Figura 1 - Tumor renal no polo inferior hemi-rim esquerdo (seta azul).

1 - Unidade de Cirurgia Renal e Transplante, Serviço de Urologia, Unidade Local de Saúde de Santo António, Porto, Portugal
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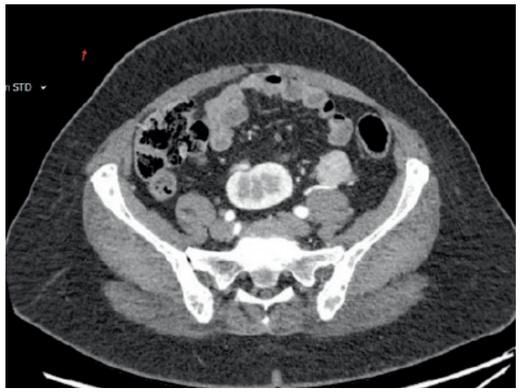


Figura 2 - Vascularização arterial de tumor renal - ramo a emergir da artéria ilíaca comum esquerda (seta vermelha).

detalhadas do tumor, bem como a anatomia vascular e a relação com o sistema excretor e estruturas adjacentes. Tal como expectável num HSK, verificou-se vascularização atípica. Tanto a TC (Fig. 3) como a reconstrução 3D (Fig. 4) mostraram a presença de uma artéria e uma veia renais principais e um ramo da artéria ilíaca comum em estreita relação com o tumor.

Foi submetida a nefrectomia parcial transperitoneal assistida por robot com o sistema HugoTM RAS. A doente foi posicionada em decúbito lateral direito em semiflexão do tronco. Atendendo à anatomia do rim e localização do tumor, optou-se pela colocação de 3 trocares em posição mais inferior e medial relativamente à distribuição clássica da RAPN, mantendo-se a posição e angulação dos braços (Fig. 4).

Inicialmente, procedeu-se a mobilização do cólon descendente medialmente com identificação do polo inferior do hemi-rim esquerdo. Optou-se por disseção do hilo renal com identificação e referenciação da artéria renal principal e, posteriormente, do ramo da artéria ilíaca comum. Após identificação do tumor no polo inferior do hemi-rim esquerdo, procedeu-se à incisão da fáscia de Gerota próxima do tumor e delimitação do mesmo (Fig. 5A). Optou-se por clampar com *bulldog* apenas o ramo da artéria ilíaca comum, atendendo à sua estreita relação com o tumor (Fig. 5B).

Posteriormente, procedeu-se a enucleorresseção do tumor (Fig. 5C) e, por fim, a sutura do leito tumoral com V-Loc 3/0 e da cápsula com V-Loc 2/0.

O tempo de isquemia quente (WIT) foi de 13 minutos.

O procedimento decorreu sem intercorrências. Os tempos totais de cirurgia e de consola foram de 138 e 55 minutos, respetivamente. As perdas sanguíneas estimadas foram de 100 mL.

No pós-operatório, destacou-se apenas pico febril isolado, tendo tido alta ao 4º dia. A anatomia patológica revelou uma neoplasia oncocítica de baixo potencial maligno.

A TC aos 6 meses de seguimento não mostrou evidência de recidiva.

Discussão

A nefrectomia parcial em doentes com HSK representa um desafio único devido à complexidade anatómica e cirúrgica associadas. Destacam-se três características anatómicas importantes nestes casos: (i) enorme variabilidade da vascularização renal, (ii) presença de um istmo responsável pela mobilidade limitada do rim e (iii) alterações do sistema excretor.[4]

Tsivian *et al*[5] descreveram o primeiro caso de nefrectomia parcial transperitoneal laparoscópica em HSK, recomendando diferentes abordagens de acordo

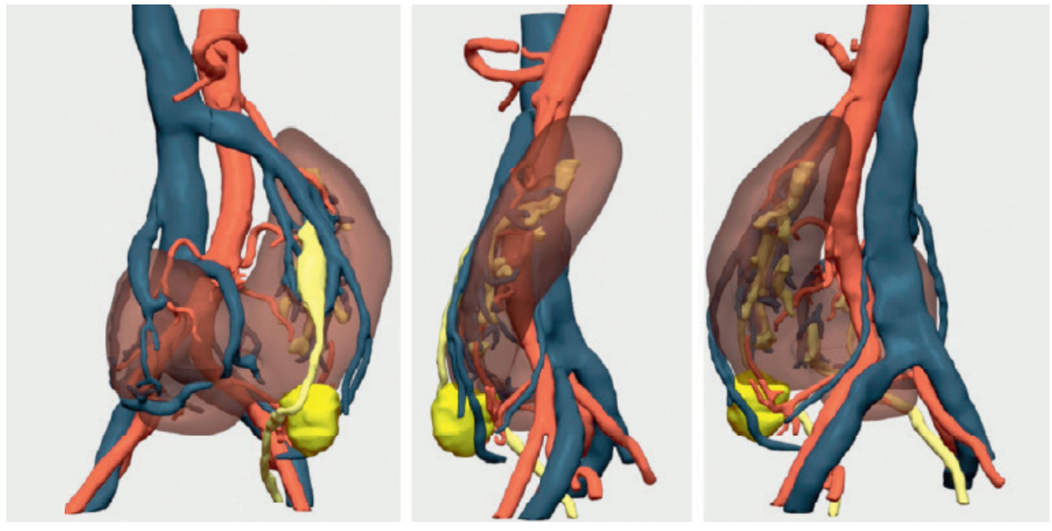


Figura 3 - Reconstruçãovirtual 3D de HSK.

com a localização do tumor-transperitoneal para lesões anteriores, anterolaterais e no istmo e retroperitoneal para lesões posteriores e posterolaterais. Raman *et al*[6] relataram, em 2017, o primeiro caso de RAPN em doente com HSK e lesão no polo inferior com 3 cm. O WIT foi de 13 minutos e a perda sanguínea estimada de 150 mL. No caso apresentado, verificou-se igual WIT e menor perda sanguínea.

O planeamento pré-operatório em doentes com HSK é essencial para o sucesso da intervenção. A reconstrução virtual 3D identifica com precisão o trajeto dos vasos renais, a sua relação com o tumor e a proximidade do tumor com o sistema excretor. A reconstrução 3D tem impacto na diminuição das perdas sanguíneas e do tempo de isquemia quente, bem como na preservação de massa de parênquima renal[7] Porpiglia *et al*[6] mostraram que a reconstrução 3D apresenta vantagem na clampagem seletiva dos ramos da artéria renal durante a RAPN para massas renais complexas, diminuindo as lesões causadas pela isquemia. Por um lado, a definição mais precisa do volume tumoral permite uma maior preservação de massa de parênquima renal. Adicionalmente, podem ocorrer lesões de pequenos vasos periféricos durante a disseção, exérese tumoral ou renorrafia, causando hemorragia que pode limitar a visão do campo cirúrgico, prolongando assim o WIT. Com a reconstrução 3D, é possível antecipar a presença de pequenos vasos em relação com a lesão tumoral. Por outro lado, a maior preservação de pequenos vasos durante o procedimento pode reduzir também a massa de nefrónios desvascularizada, fator determinante para a recuperação funcional.[9] Neste caso, o modelo 3D permitiu orientar a estratégia de clampagem vascular seletiva, de modo a reduzir o tempo de isquemia quente, bem como realizar uma reconstrução renal eficaz após a enucleação do tumor.

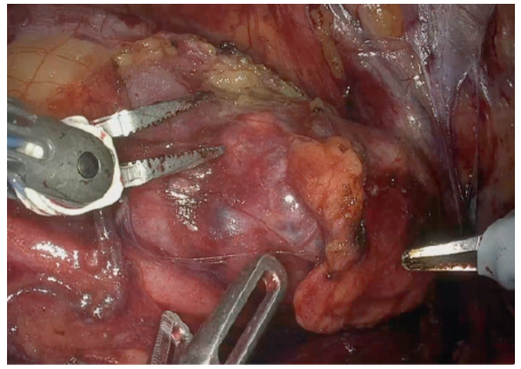


Figura 5A - Identificação do tumor no polo inferior do hemi-rim esquerdo.

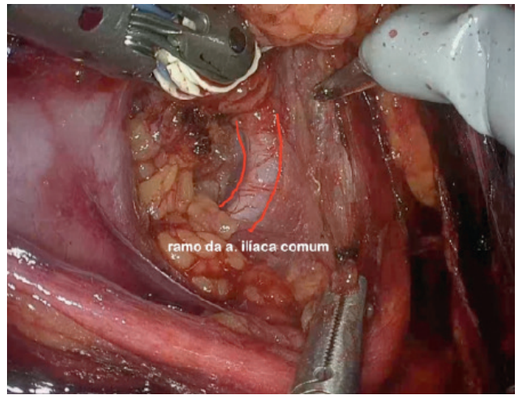


Figura 5B - Identificação de ramo da artéria ilíaca comum.

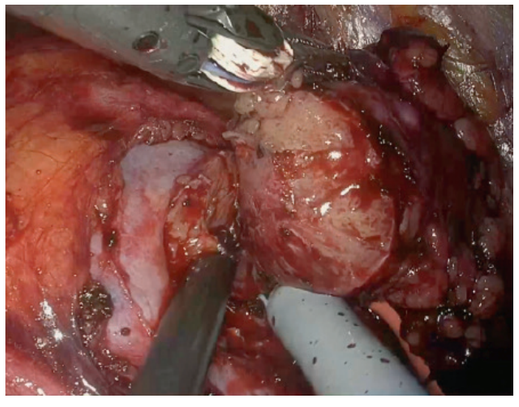


Figura 5C - Enucleorresseção do tumor.



Figura 4 - Localização das portas.

Conclusão

O tratamento de lesões tumorais em doentes com HSK permanece um desafio atendendo às alterações anatómicas inerentes. O planeamento cirúrgico com reconstrução virtual tridimensional em rins com alterações anatómicas de fusão é essencial para o sucesso da intervenção. A RAPN é uma abordagem segura e exequível no tratamento de tumores em doentes com HSK.

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All authors participated significantly in the conception, writing critical revision, and final approval of the article.

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Autor Correspondente / Corresponding Author

Sara Anacleto

ULS Braga Sete Fontes, São Victor, 4710-243 Braga

E-mail: sara.anacleto241@gmail.com

ORCID: https://orcid.org/0000-0002-6776-1950

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Encerramento Endoscópico de Perfuração Cólica Após Nefrolitotomia Percutânea

Endoscopic Closure of Colon Perforation After Percutaneous Nephrolithotomy

Andreia Cardoso[1] , Mariana Dias Capinha[1] , Luís Pinto[1] , Nuno Morais[1,2].

Resumo

A perfuração do cólon é uma complicação rara da nefrolitotomia percutânea (NLPC). O tratamento clássico é conservador, com antibiótico de largo espectro, jejum e drenagem separada (urinária e intestinal).

Neste cenário, reportamos a utilização de um dispositivo de sutura endoscópica de espessura total, *over-the-scope clip* (OTSC). Os OTSC foram aplicados por gastrenterologista experiente, após identificação das perfurações cólicas durante colonoscopia.

Os doentes apresentaram febre, enfisema subcutâneo e drenagem entérica percutânea. Um doente foi diagnosticado no 1º dia pós-operatório, após remoção da sonda de nefrostomia percutânea (NPC), tendo sido realizado tratamento conservador 5 dias, sem melhoria. O segundo doente foi diagnosticado ao 4º dia, com a NPC ainda colocada, trespassando o cólon, e dois OTSC foram imediatamente colocados durante a remoção da NPC sob visualização direta.

A dieta foi iniciada em 2 dias e os doentes tiveram alta em 4 dias.

Assim, o tratamento endoscópico da perfuração do cólon com OTSC parece ser uma alternativa minimamente invasiva ao tratamento conservador clássico, ou uma opção quando este falha, em doentes estáveis com perfurações retroperitoneais.

Palavras-chave: Endoscopia; Nefrolitotomia Percutânea/efeitos adversos; Perfuração Intestinal/etiologia; Perfuração Intestinal/tratamento.

Abstract

Colon perforation is a rare complication of percutaneous nephrolithotomy (PCNL). It is classically treated conservatively, with broad-spectrum parenteral antibiotics, fasting, and the use of two separate drains (one for the urinary system and one for the bowel). In this setting, we report the use of the endoscopic full-thickness suturing device over-the-scope clip (OTSC). An experienced gastroenterologist applied the OTSC after identifying the colon perforations during colonoscopy.

Patients presented with fever, subcutaneous emphysema, and percutaneous enteric drainage. One patient presented at the 1st post-operative day, after percutaneous nephrostomy tube (PCNT) removal, and conservative management was attempted for 5 days, without improvement. The second patient presented at the 4th day, with PCNT still in place, trespassing the colon, and two OTSC were immediately placed, during PCNT removal under direct visualization.

Afterwards, the diet was started in 2 days, and patients were discharged in 4 days.

Thus, endoscopic management of colon perforation with the full-thickness suture device OTSC seems a minimally invasive alternative to the classic conservative treatment, or an option for when it fails, in stable patients with retroperitoneal perforations.

Keywords: *Endoscopy; Intestinal Perforation/etiology; Intestinal Perforation/therapy; Nephrolithotomy, Percutaneous/adverse effects.*

Introdução

A nefrolitotomia percutânea (NLPC) continua a ser um tratamento de primeira linha para o tratamento eletivo cirúrgico da litíase renal, sobretudo para cálculos com mais de 2 cm.[1]

A perfuração iatrogénica do cólon é uma complicação rara deste procedimento, com incidência descrita inferior a 1%, contudo está associada à morbilidade considerável e até à mortalidade.[2-4]

Classicamente, estas lesões iatrogénicas são tratadas conservadoramente. O tratamento clássico inclui: antibioterapia parentérica de largo espetro, dieta pobre em resíduos ou pausa alimentar associada a nutrição parentérica, e drenagem individualizada para o sistema urinário e intestinal.[2-4]

Contudo, várias técnicas endoscópicas minimamente invasivas têm sido testadas no âmbito das fístulas entéricas de diversas etiologias, sendo o sistema *over-the-scope clip* OTSC) um dos mais recentes e de utilização difundida.[5]

As fistulas uro-entéricas, ou seja, comunicações anormais entre o sistema urinário e intestinal, são uma complicação frequentemente descrita, tanto de etiologia iatrogénica, seja após procedimentos cirúrgicos, técnicas de radioterapia, ou mesmo naturais, por doenças inflamatórias intestinais ou urinárias, sequelas de infeções, ou condicionadas por neoplasias malignas.[6-8]

As fistulas uro-entéricas mais descritas no pós-operatório de cirurgias urológicas envolvem a bexiga e/ou uretra e o reto ou cólon sigmoide e ocorrem sobretudo após cirurgias pélvicas, como a prostatectomia ou a cistectomia radical.[6-8]

O tratamento endoscópico destas fístulas encontra-se mais frequentemente descrito na literatura, e é facilitado pela sua localização anatómica envolvendo o trato urinário e intestinal baixos, de mais fácil acesso endoscópico, tanto a urologistas como a gastroenterologistas.[9,10]

Por outro lado, as fístulas reno-cólicas ou uretero-pielo-cólicas, nomeadamente as que se desenvolvem após cirurgia percutânea renal, para além de mais raras, o que leva a uma inerente menor experiência na sua abordagem e tratamento, apresentam ainda o acréscimo de dificuldade para manejamento endoscópico intestinal, pela sua localização mais proximal, sobretudo à direita, no cólon ascendente.[2-4]

Atendendo à crescente experiência endoscópica de gastroenterologistas e à melhoria continuada dos seus instrumentos, o tratamento endoscópico das fístulas cólicas envolvendo o trato urinário alto tem-se tornado cada vez mais frequente e com bons resultados descritos,[5,9,9,10] pelo que pretendemos avaliar retrospetivamente os casos ocorridos no nosso hospital, relativamente ao sucesso do procedimento e eventuais complicações associadas.

Caso Clínico

Realizámos uma revisão retrospetiva dos casos de perfuração cólica durante NLPC no nosso hospital durante um período de 6 anos, entre 01/01/2018 e 31/12/2023.

Por rotina, as NLPC são sempre realizadas sob controlo fluoroscópico e ecográfico, é usada uma técnica de dilatação sequencial do trajeto nefrocutâneo, e dilatação do trajeto com um balão dilatador e colocação de bainha de 32 Fr, através da qual é usado um nefroscópio rígido de 26 Fr, e litotritor combinado ultrassónico e pneumático para alcançar a litofragmentação. Constatámos a ocorrência de 2 perfurações iatrogénicas do colón descendente durante NLPC esquerdas. Ambos os doentes eram do sexo masculino, e tinham idades compreendidas entre 67 e 69 anos.

Em ambos os doentes o posicionamento durante a NLPC foi o de Valdivia-Galdakao modificado,[11,12] como é prática de rotina no nosso hospital. Em ambos foram também colocados cateter ureteral duplo J e sonda de Foley 18 Fr em posição de nefrostomia percutânea (NPC) pós-operatória.

Nenhuma das lesões cólicas foi detetada intraoperatoriamente.

Ambos os doentes apresentaram febre, enfisema subcutâneo e drenagem entérica percutânea no período pós-operatório, sem sinais de irritação peritoneal. Analiticamente ambos demonstravam elevação dos parâmetros inflamatórios (leucocitose e aumento da proteína C-reativa). A tomografia computorizada (TC) foi o exame de imagem utilizado para confirmar ambos os diagnósticos.

Num dos doentes (A) este quadro clínico foi detetado no primeiro dia de pós-operatório, após remoção do cateter de NPC (Fig. 1); enquanto que o diagnóstico do segundo doente (B) só foi realizado ao quarto dia de pós-operatório, ainda com sonda de NPC in situ, a trespassar o cólon (Fig. 2).

No doente A, foi inicialmente tentada uma abordagem conservadora. Durante 5 dias o doente permaneceu em pausa alimentar, com nutrição parentérica e antibioterapia de largo espectro (piperacilina-tazobactam e metronidazol). Contudo, por ausência de melhoria, com drenagem entérica percutânea persistente optou-se por tentativa de abordagem endoscópica. A colonoscopia flexível foi realizada sob sedação, por uma gastroenterologista experiente do nosso hospital, que, após identificação do local de perfuração no colon, com um orifício com cerca de 3,5 mm aos 42 cm da margem anal, o encerrou com



Figura 1 - Tomografia computorizada do doente A, revelando cateter ureteral duplo J corretamente posicionado, com presença de ar no retroperitoneu, bacinete renal, tecido subcutâneo e intermuscular na parede abdominal do flanco esquerdo, no trajeto percutâneo de sonda de nefrostomia já removida.

1 - Serviço de Urologia, Unidade Local de Saúde de Braga, Braga, Portugal
2 - Serviço de Urologia, Unidade Local de Saúde do Tâmega e Sousa, Penafiel, Portugal

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aplicação de OTSC (Fig. 3).

No doente B, após a realização da TC que demonstrou o trespasse cólico pelo cateter de NPC, a colonoscopia flexível sob sedação foi realizada de imediato, após preparação intestinal. Durante a colonoscopia, a sonda de NPC foi visualizada endos-copicamente (Fig. 4) aos 30 cm da margem anal. Após a suaremoção sob visão direta endoscópica, os 2 orifícios de perfuração cólicos foram imediatamente encerrados com aplicação deOTSC, mantendo a patência luminal.

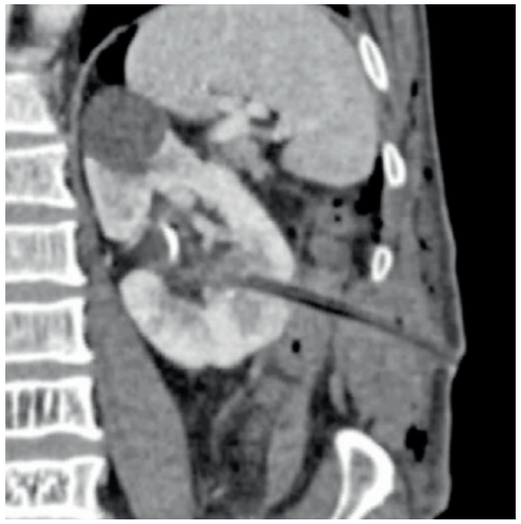


Figura 2 - Tomografia computorizada do doente B, revelando trajeto percutâneo de sonda de nefrostomia a trespassar o colon descendente.

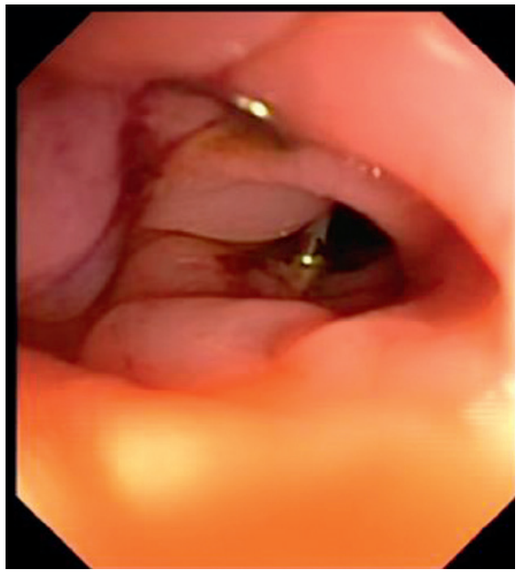


Figura 3 - Endoscopia digestiva baixa com OSTC aplicado no orifício de lesão cólica.

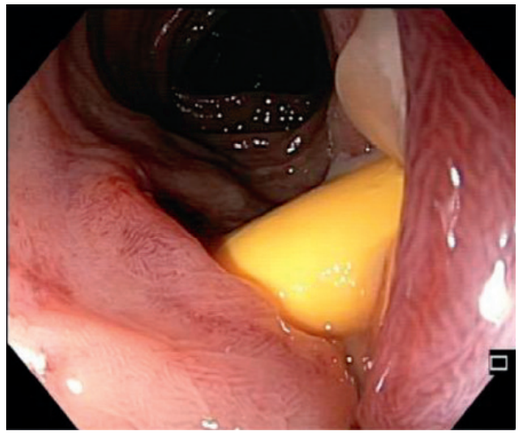


Figura 4 - Visão endoscópica cólica da sonda de nefrostomia percutânea a trespassar o colon descendente.

Em ambos os casos, após o procedimento endoscópico, os doentes apresentaram melhoria clínica progressiva, diminuição da drenagem entérica percutânea, da dor e sinais inflamatórios locais, e diminuição progressiva dos parâmetros inflamatórios analíticos.

Ambos os doentes realizaram TC de reavaliação entre 24 e 48 horas após o encerramento endoscópico, com confirmação da diminuição do ar retroperitoneal e do sistema excretor, ausência de fugas ativas de contraste, coleções abecedadas ou evidência de outras complicações.

Em ambos os casos foi iniciada dieta líquida 48 horas depois do encerramento endoscópico, com progressão para dieta geral às 72 horas, e alta clínica ao 4º dia após procedimento.

O doente A realizou uma colonoscopia total 45 dias depois, sem complicações associadas, e confirmando correto posicionamento do OTSC (Fig. 5). Após 5 e 2 anos de seguimento (doentes A e B, respetivamente), não há evidência de complicações. O doente A apresentou recidiva da litíase urinária, e foi submetido a cirurgia infrarrenal retrograda para a litofragmentação, que decorreu sem intercorrências.

Discussão

A perfuração intestinal é uma complicação rara da NLPC, descrita na literatura como ocorrendo em menos de 1% dos casos (incidência estimada de 0,5%-0,6%). Os fatores de risco para lesão do cólon parecem ser: idade avançada, sexo feminino, anomalias renais congénitas, punção do polo inferior, procedimento do lado esquerdo e dilatação do cólon.[2-4]

A TC pré-operatória é de extrema importância para o planeamento do acesso percutâneo. O cólon retrorrenal é uma condição presente em aproximadamente 1%-2% dos doentes, mas pode ser mais comum (incidência de 16,2%) se os doentes forem posicionados em decúbito ventral durante a TC, o que pode ser útil para o planeamento de procedimentos de NLPC em decúbito ventral.[2] A posição supina durante o procedimento não parece aumentar as perfurações do cólon.[2,12-14]

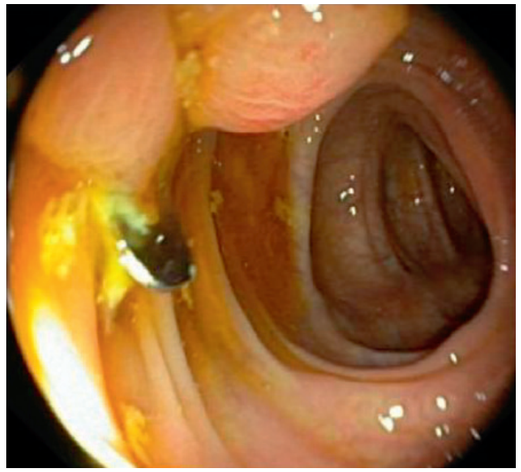


Figura 5 - Endoscopia digestiva baixa de controlo, 45 dias após aplicação do OTSC do doente A, confirmando o seu correto posicionamento, e ausência de complicações associadas.

Estacomplicaçãopodeserdetetadaintraoperatoriamente com a opacificação do cólon pelo produto de contraste ou pode ser detetada após o procedimento.[3,4] A identificação precoce é essencial porque um atraso no diagnóstico pode levar a complicações catastróficas. Os sinais de perfuração do cólon incluem a passagem de fezes ou gases através ou em redor do cateter de nefrostomia percutânea, diarreia, hematoquezia, dor lombar, febre ou peritonite (se houver perfuração intraperitoneal).[2,3] Perante suspeita, deve ser realizada uma pielografia anterógrada no final do procedimento para despistar lesão do cólon.

As lesões do cólon podem ocorrer de duas formas: o cólon pode ser atravessado pelo trajeto de acesso renal, resultando em 2 orifícios cólicos; ou pode ser perfurado apenas num único local, o que ocorre após uma punção tangencial do cólon que é rompido durante a dilatação do trajeto de acesso renal percutâneo.

Na maioria dos casos, a perfuração do cólon pode ser tratada de forma conservadora, especialmente se a lesão for retroperitoneal e houver estabilidade clínica mantida.[2,13] O princípio básico do tratamento conservador é separar a comunicação reno-cólica para evitar a formação de fístula. A abordagem clássica consiste na colocação de 2 drenos diferentes, um para o sistema urinário (cateter ureteral) e outro para o intestino (sonda de nefrostomia percutânea reposicionada no cólon).[2-4] A sonda do cólon deve ser removida gradualmente (1 cm/dia) até ao encerramento do cólon.[3,4] Devem ser implementados antibióticos parentéricos de largo espectro e dieta com baixo teor de resíduos ou jejum com nutrição parentérica.[2-4,13] Após a remoção da sonda, a integridade do cólon deve ser confirmada com um enema de bário ou uma TC com contraste oral. Em casos de formação de fístula, peritonite, sépsis ou falha do tratamento conservador, a exploração cirúrgica é classicamente indicada e a colostomia temporária é geralmente inevitável.[2,4]

Os dois casos clínicos descritos reportam as duas formas clássicas de lesão cólica (tangencial e trespasse), e de apresentação clínica.

No caso A, o diagnóstico foi feito logo após a remoção do cateter de nefrostomia percutânea, com um quadro clínico típico de perfuração intestinal retroperitoneal: drenagem entérica (fezes e gases) pelo trajeto de acesso, febre, sinais inflamatórios locais, e integridade peritoneal. Como a nefrostomia já tinha sido removida, não podia ser utilizada como dreno de acordo com a técnica descrita anteriormente. O doente manteve-se estável com medidas conservadoras, mas a drenagem era ainda substancial (provavelmente uma mistura de conteúdo intestinal e urina), o que poderia resultar na formação de uma fístula renocólica se não fosse tratada.

A utilização do dispositivo de sutura endoscópica de espessura total, *over-the-scope clip* (OTSC)), para o encerramento de perfurações do cólon é uma técnica bem descrita na literatura com taxas de sucesso globais satisfatórias (84,6%).[5] O dispositivo de sutura de espessura total, quando comparado com os clips hemostáticos endoscópicos, tem a vantagem de permitir o tratamento de defeitos maiores, com apreensão mais profunda do tecido do cólon, resultando provavelmente em maiores taxas de sucesso.[5,10] A principal aplicação destes OTSC é no tratamento de perfurações iatrogénicas, ocorridas principalmente durante procedimentos endoscópicos e polipectomias intestinais. O dispositivo OTSC tem algumas limitações, nomeadamente a dificuldade de navegação pelo cólon até ao local da lesão com o OTSC ligado, e a incapacidade de encerrar defeitos muito grandes. As complicações associadas descritas estão relacionadas com inflamação da mucosa do cólon, com isquemia ou necrose e fibrose da região de perfuração. Dada a dificuldade de navegação endoscópica com o OTSC aplicado, esta técnica será mais difícil em caso de perfurações mais proximais, nomeadamente do cólon direito após NLPC direita.

Conclusão

O tratamento endoscópico de perfuração do cólon após NLPC com o dispositivo de sutura de espessura total OTSC pode ser uma opção minimamente invasiva para doentes estáveis e não sépticos com perfurações

retroperitoneais. Esta pode ser uma alternativa ao tratamento conservador clássico com drenagem dupla, ou pode ser utilizada em casos em que o tratamento conservador falhou.

A exploração cirúrgica permanecerá a abordagem padrão em caso de perfurações intraperitoneais com peritonite.

O planeamento cirúrgico com estudo anatómico adequado com TC contrastada é essencial para prevenir as lesões do colon e respetiva morbilidade.

Embora sejam necessários mais estudos para averiguar a eficácia e segurança do tratamento endoscópico com OTSC das perfurações do cólon após NLPC, da nossa experiência, à qual para além dos dois casos descritos, se associam também raros casos de fístulas reto-uretrais/vesicais após cistectomias e prostatectomias radicais, esta parece ser uma técnica viável para tratamento minimamente invasivo destas raras complicações, mas altamente mórbidas.

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Prémios e Apresentações / Awards Previous Presentations

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AC: Recolha e análise de dados e redação do primeiro rascunho.

MDC, LP: Análise e revisão dos dados.

NM: Revisão e edição.

Todos os autores aprovaram a versão final a ser publicada.

AC: *Data collection and analysis and writing the first draft.*

MDC, LP: *Data analysis and review.*

NM: *Review and editing.*

All authors approved the final version to be published.

Autor Correspondente / Corresponding Author

Andreia Cardoso

Serviço de Urologia, Unidade Local de Saúde de Braga, Sete Fontes – São Victor 4710-243 BRAGA

E-mail: andreia.filipa.cardoso@ulsb.min-saude.pt

ORCID: https://orcid.org/0000-0002-3654-5657

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Bladder Metastasis of Type 2 Papillary Renal Cell Carcinoma: A Case Report

Margarida Henriques[1] , Margarida Manso[1] , João Silva[1,2].

Abstract

Rare cases of renal cell carcinoma bladder metastases have been reported, with clear-cell renal cell carcinoma subtype accounting for the majority of them. Bladder metastases of papillary renal cell carcinoma are limited to only a few case reports. We present the case of an 81-year-old woman who came to the emergency department complaining of hematuria and ultrasound evidence of a bladder mass. Two years earlier, she underwent a right nephrectomy due to papillary renal cell carcinoma. Histopathology revealed a metastatic bladder tumor of papillary renal cell carcinoma. Bladder metastases of papillary renal cell carcinoma are very rare. Metastasectomy can provide palliation of symptoms and improve survival in selected patients. Although there is scant information regarding systemic therapy in non-clear renal cell carcinoma, pazopanib may have a role.

Keywords: Carcinoma, Renal Cell/surgery; Metastasectomy; Neoplasm Metastasis; Urinary Bladder Neoplasms/secondary.

Introduction

With 431 288 new cases and 179 368 reported fatalities each year, kidney cancer is the 14th most common cancer in the world.[1] Renal cell carcinoma (RCC) is the most frequent solid lesion, and its usual metastatic sites include the lung, lymph nodes, bone, and liver. Bladder metastases from RCC are rare, with only around 70 cases described, and clear-cell RCC is the most documented subtype.[2] Bladder metastases from papillary RCC are even rarer, and to our knowledge, only three cases have been described.[2,3] Hereby, we present the case of a patient with bladder metastasis of type 2 papillary RCC.

Case Report

An 81-year-old, non-smoker, obese and hypertensive woman presented to the emergency department (ED) with macroscopic hematuria and right flank pain. She denied having any more urological symptoms, and the laboratory workup was only relevant for anemia, with normal kidney function. Contrast-enhanced computed tomography (CT) showed a 62 mm mass in the right kidney. Cystoscopy did not show any lesions. She underwent an open right radical nephrectomy, and pathological analysis showed a type 2 papillary renal cell carcinoma (pRCC), Fuhrman grade 3 - stage pT3aN0M0R0. After the procedure, she kept skipping her appointments, losing follow-up. Two years later, she returned to the ED with a three-month history of macroscopic hematuria and ultrasonographic evidence of a bladder mass. She had no other complaints. CT scan showed two bladder lesions of 45 mm on the posterolateral right wall and a 31 mm lesion near the left meatus (Figs. A.1 and A.2). An apparently complete transurethral resection of the bladder (TURB) was performed, and histopathology revealed a muscle-invasive bladder metastasis of the pRCC. The case was discussed in a multidisciplinary tumor board, and the patient started systemic therapy with pazopanib, considering the patient's age, comorbidities and available evidence in non–clear cell RCC, which she discontinued on her own several times, due to reported intolerance. After three months of follow-up, CT showed a new lesion of 27 mm on the posterolateral wall of the bladder. It was decided to perform an anterior pelvic exenteration with ureterostomies as urinary diversion. After that, she was kept under surveillance. Five months after cystectomy, thoracic CT revealed lung metastases and the patient was restarted on pazopanib. Over time, the lung metastases kept progressing, and, a few months later, the patient passed away.

Discussion

RCC comprises around 90% of all kidney malignancies and remains one of the most lethal urological cancers. Metastatic sites usually include the lung, lymph nodes, bone, and liver. Bladder metastases are rare, corresponding to only 2% of the cases.[4] Clear-cell RCC subtype accounts for the majority of situations, with isolated reports of metastases of papillary, chromophobe, and collecting duct carcinoma. Tobacco exposure is the most accepted environmental risk factor for RCC, and although our patient was a non-smoker, she suffered from obesity and hypertension, which are other major risk factors for the disease.[5] Around a quarter of the patients are metastatized at the time of diagnosis and nearly 20% will develop metastases during follow-up. 6 As described in the literature, our patient's complaint at the time of diagnosis was gross hematuria. This metachronous lesion was found two years later after the diagnosis of RCC, which is in accordance with the reported median time of 33 months.[2] There isno consensus regarding the metastatic pathways in these patients, but four theories have been proposed: drop metastases, hematogenous spread, lymphatic and retrograde venous embolization. In this particular case, the presence of deep metastatic lesions located near the meatus could suggest lymphatic spread or retrograde venous embolization of the tumor.[7] Metastatic RCC has a poor prognosis, with a ten-year survival of less than 5%. The disease-free interval following nephrectomy appears to be an important prognostic factor and synchronous metastases seem to correlate negatively with surviva.[8] Metastasectomy can provide palliation of symptoms and improve survival in selective patients, especially those with lung-only metastasis, clear-cell type RCC, asynchronous metastasis, fewer metastases sites and patients who had a nephrectomy.[9] In our case and in contrast to the majority of report,[2] the metastases were muscle-invasive and follow-up CT showed a new lesion after TURB, so the patient ended up performing an anterior pelvic exenteration. Although target therapy is an option for advanced RCC, a recent meta-analysis found no benefit in overall survival and disease-free survival.[10] There is still scant information regarding the use of target therapy in non-clear cell RCC, however, a recent systematic review suggests that pazopanib could be an option in this setting.[11]

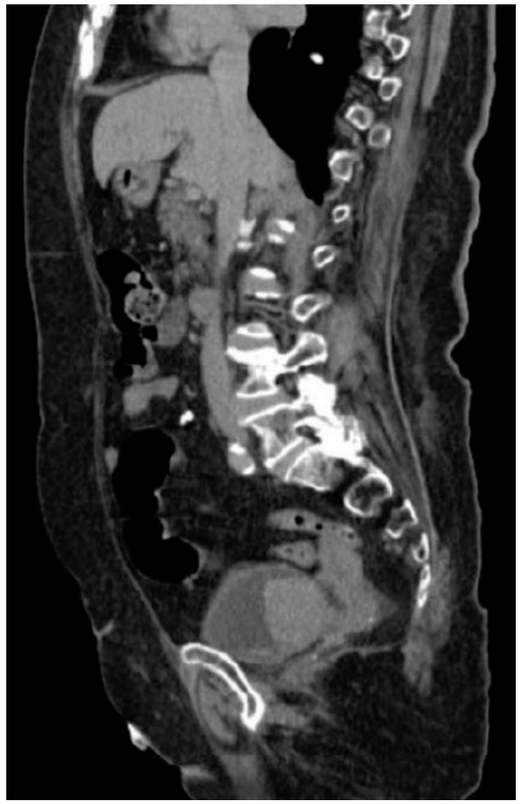


Figure A.1 - Sagittal view of CT scan showing the bladder metastasis.



Figure A.2 - Coronal view of CT scan showing the bladder metastasis.

Conclusion

Bladder metastases of papillary renal cell carcinoma are very rare and prognosis is poor. Metastasectomy can provide palliation of symptoms and improve survival in selected patients. Although there is scant information regarding systemic therapy in non-clear RCC, pazopanib may have a role.

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1 - Unidade Local de Saúde São João, Porto, Portugal.
2 - Faculdade de Medicina da Universidade do Porto, Porto, Portugal.

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Contributorship Statement

All authors contributed substantially to the conception, drafting, and revision of this case report.

MH: Was responsible for patient management and clinical data collection, conducted the literature review and drafted the initial manuscript.

MM and JS: Contributed to the interpretation of clinical findings and critically revised the manuscript.

All authors reviewed and approved the final version of the manuscript and agree to be accountable for all aspects of thework.

Corresponding Author

Margarida Henriques

Alameda Prof. Hernâni Monteiro, 4200-319 Porto, Portugal.

E-mail: anamargaridach@hotmail.com

ORCID: https://orcid.org/0009-0006-7226-5069

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Correção da Fístula Retouretral: Cirurgia de York-Mason, Princípios e Técnica Cirúrgica

Correction of Rectourethral Fistula: York-Mason Surgery, Principles and Surgical Technique

Marcos Francisco Dall'Oglio[1], Cassius Martins e Silva[1], Hermano Covre Argolo[1], Rodrigo Beserra Sousa[1], Bruno Hurtado[2], Fabiano Matsumoto[1], Luis Dubid[1].

Resumo

O nosso objetivo foi escrever, classificar, sistematizar e padronizar a técnica de York-Mason em pacientes que apresentam fístula após trauma por arma de fogo e, em casos mais comuns, que ocorrem feridas como complicações após uma prostatectomia radical retropúbica.

Três pacientes que apresentaram fístula retouretral. Um deles apresentou fístula retouretral após ferimento por arma de fogo. Dois casos após prostatectomia radical e um com radioterapia associada. Todos os pacientes foram submetidos a procedimentos cirúrgicos e avaliados prospectivamente, entre 2016 e 2018. A fístula retouretral foi avaliada pela classificação proposta por Rivera, e foi submetida à correção transesfincteriana de fístula retouretral pela técnica de York-Mason.

Podemos concluir que a resolução das fístulas retouretrais é factível, de fácil reprodução e evolui com poucas e leves complicações.

Palavras-chave: Fístula Retal/cirurgia; Fístula Urinária/cirurgia; Procedimentos Cirúrgicos Urológicos; Resultado do Tratamento

Abstract

We aimed to describe, classify, systematize and standardize the performance of the York-Mason technique in patients who present a fistula after trauma due to a gunshot wound and more common cases that occur, such as complications after a retropubic radical prostatectomy.

Three patients presented with rectourethral fistula. One of them presented rectourethral fistula after a gunshot wound. Two cases after radical prostatectomy, but one was associated with radiotherapy. All patients underwent surgical procedures and were prospectively evaluated between 2016 and 2018. The rectourethral fistula was assessed using the classification proposed by Rivera, who underwent transsphincteric repair of rectourethral fistula using the York-Mason technique.

We can conclude that the resolution of rectourethral fistulas is feasible, easily reproduced and evolves with few and mild complications.

Keywords: Rectal Fistula/surgery; Treatment Outcome; Urinary Fistula/surgery; Urologic Surgical Procedures.

1 - Urology Department, Santa Marcelina Hospital, São Paulo, Brazil
2 - Hospital das Clínicas Luzia de Pinho Melo, Mogi das Cruzes, Brazil

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Introduction

The rectourethral fistula (RUF) is a rare complication after a radical prostatectomy due to malignancy and is considered a devastating complication for the patient.[1] Around 60% of the cases are caused by iatrogenic lesions during surgical procedures (such as surgery, cryosurgery, radiotherapy and brachytherapy), unusual in cases of genitourinary trauma, infections or inflammations.[2] Its correction is a complex procedure with a high level of difficulty and depends on the choice and experience of the surgeon as well as the surgical techniques to obtain a satisfactory resolution of the case.[3]

Considering the different surgical techniques proposed for the treatment, the York-Mason surgery can be well applied and shows good outcomes. It is indicated in the correction of fistulas and benign stenosis and benign and malign tumors in the lower 2/3 of the rectum.

This article proposes to describe, classify, systematize and standardize the performance of this surgery, using cases from our service, which present a fistula after trauma due to a gunshot wound and more common cases that occur such as complications after a retropubic radical prostatectomy and radiotherapy. In three cases the surgery can be easily reproduced, regardless of the causes.

In 1960, the British surgeon Aubrey York Mason, from the St. Helier University Hospital in London, showed proof of the possibility of a surgical approach to the rectum with transsphincteric exposure. In 1969, York Mason and Kilpatrick introduced the transsphincteric parasacral coccygeal approach to repair rectourinary fistulas, and

the York Mason surgery was officially published obeying the following principle: "The complete separation of the anal sphincters provides excellent access to the inside of the rectum [...] If the separated sphincters are sutured with precision restoring the anatomical layers, they cure and allow the patient to have normal defecation and complete anal continence".[4]

The median section of the sphincter is completely safe during the surgical incision regarding injury of the striated anal sphincter innervation, as the innervation occurs through the sphincteric somatic complex, supplied mainly by the fourth sacral nerve (S4 root) that runs laterally through the incision. The precise re-engagement of the anatomic layers is essential to guarantee good functional outcomes, and the technique we propose is described in this article, where the layers are repaired separately and distinguished by surgical fields, which considerably helps to identify and separate the layers, guaranteeing good surgical outcomes.

Rivera et al[5] proposed a classification to make the treatment of recto-urinary urethral fistulas easier (Table 1).

Table 1 - Classification to make the treatment of recto-urinary urethral fistulas easie.

Staging	Classification
Stage I	Non-irradiated fistula ≤ 4 cm from anal border
Stage II	Non-irradiated fistula > 4 cm from anal border
Stage III	Irradiated fistula located ≤ 2 cm from anal border
Stage IV	Irradiated fistula located > 2 cm from anal border
Stage V	Giant fistula usually related to pressure ulcers

According to this classification, endoanal correction is feasible in stage I, and the York-Mason surgery is indicated for stages II and III, possibly being performed in stage IV. Stage V fistulas undergo multimodal treatment, usually with the need to perform intestinal diversions.[3]

Case Reports

Case 1

A male Caucasian patient, 48 years old, was shot with a firearm. The shot entered the base of the penis on the right and to the right of the thorax in August 1999. He underwent emergency surgery in a trauma hospital, developing fecaluria, pneumaturia and recurrent infections in the lower urinary tract after being discharged from the service where he was treated. A colostomy became necessary effectively in April 2003 due to pyelonephritis associated to urinary sepsis. An internal urethrotomy was also carried out due to urethral stenosis in 2005, and the patient complained of difficulty urinating and a larger amount of urine coming out of the anus compared to the urethra.

He came to our service complaining of pneumaturia and was eliminating urine through the anus and using antibiotics occasionally due to lower urinary tract infections.

His physical examination showed a good general state of health, he was ruddy and hydrated, with no alterations in the cardiopulmonary system, presented a discreetly globular innocent abdomen, no pain or palpable masses and had a loop colostomy on the right side.

The digital rectal exam presented a rectum free of polyps, with urine coming out during the test. The prostate had approximately 30 g, was smooth, without palpable nodules, fibroelastic, with free lateral recesses and without palpable perception of the rectourethral fistula.

A retrograde and voiding cystourethrography was performed, showing the presence of urethral contrast associated with rectal, sigmoid and ascending colon contrast, without a clear view of the urethroprostatic fistula, however showing the probable location of the fistula. A rectourethral fistula was diagnosed 5 cm from the anal border (Fig. 1). Rivera Classification, stage II.

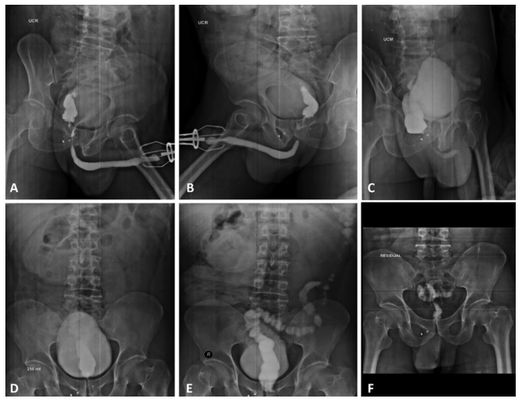


Figure 1 - Cystourethrography with evidence of a rectourethral fistula with contrast of urethra and rectum, showing permeability of bladder to rectum, without signs of urethral stenosis. Post-traumatic fistula.

Case 2

The second case involves a male Caucasian patient, 63 years of age, diagnosed with a prostate Gleason 7 (3+4) adenocarcinoma in 6/12 fragments, in the left base, mid left and left apex regions. A biopsy was made due to the increased PSA value of 6.3. The physical examination presented good general health conditions. The patient was ruddy, hydrated, showed no changes in the cardiopulmonary system, had an innocent abdomen, not too globular, without pain or palpable masses. The digital rectal exam of the prostate showed an organ of around 30 grams of fibroelastic consistency, without nodules or stiffness, characterizing clinical stage T1c.

A radical prostatectomy was indicated together with a bilateral retropubic obturator lymphadenectomy. The surgery was performed without complications and lasted around 2 hours, with a hemorrhage volume of 400 mL and sparing of the neurovascular bundles. The possibility of intraoperative rectal injury was not observed, however, after about 2 weeks, following the removal of the urinary catheter, the patient suffered urinary loss through the anus and complained of fecaluria and pneumaturia, associated with urine with a strong smell and a urinary infection was diagnosed through a urine culture test. Colostomy was not performed in this patient.

After being diagnosed with a rectourethral fistula, a retrograde and voiding cystourethrography was performed showing the fistula, with rectal, sigmoid and ascending colon contrast, and a view of the probable fistulous region - about 4cm from the anal border (Fig. 2). Rivera Classification, stage II.

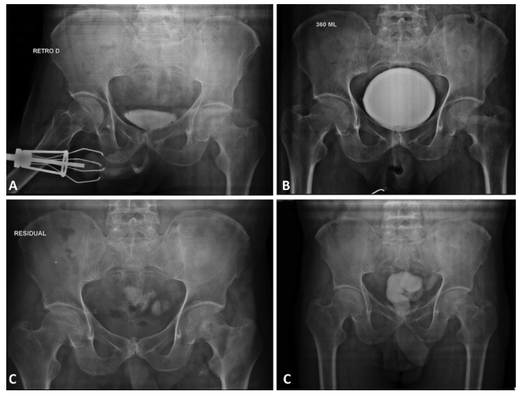


Figure 2 - Cystourethrography showing bladder-filling phase and full bladder without the perception of contrast overflow into the rectum (A and B), rectal contrast through the fistula (C), and residual with emptying close to that of complete bladder and rectum (D), which can cause fecaluria and pneumaturia as well as recurrent UTI. Post radical prostatectomy fistula.

Case 3

The third case involves an African-American patient, 57 years old, diagnosed with prostate cancer Gleason 7 (4+3) adenocarcinoma in 8/12 fragments, in both lobes. A biopsy after a suspicious digital rectal exam with an apparently extra-prostatic involvement (cT3), and an initial PSA of 17.2. He was submitted to a retropubic prostatectomy plus extended lymphadenectomy. During surgery, there was a small rectal lesion of 0.5 cm, closed with interrupted double-layer 3-0 polyglactin suture. He was discharged after 4 days and returned after 2 weeks for urinary catheter removal, evolving with pneumaturia and urinary loss from the anus. Postoperative pathology indicated a Gleason 5+4 with extraprostatic and seminal vesicle invasion, and lymph node involvement (pT3bN1). Radiation therapy was indicated because of a biochemical recurrence after 4 months. In this period, he evolved with urethral stenosis and cystostomy by an emergency general surgeon and colostomy. A cystography was performed and confirmed a fistula, about 3 cm from the anal border, classified as Rivera stage IV.

The York-Mason rectourethral fistula correction surgery was indicated in all patients.



Figure 3 - Cystourethrography with evidence of a rectourethral fistula with contrast of urethra and rectum, showing permeability of bladder to rectum.

Discussion

Described by Kilpatrick and Mason in 1969, with a transsphincteric parasacral-coccygeal opening and modified in 1970 by York-Mason.[3]

It basically consists of preoperative preparation with antibiotic prophylaxis, urinary catheterization with an 18 Fr Foley catheter, with the patient in the prone jack-knife position (Fig. 4) where buttocks are retracted with heavy tape to expose the anal cleft and the anus (Fig. 5). A median incision is made in the skin of the intergluteal cleft, from the anal margin to the level of the coccyx (small variation in the York-Mason surgery, which makes the incision laterally to this vertebra, and was done on the patient with a post-prostatectomy fistula).[2] The wall posterior to the rectum is sectioned using

electrocautery, the layers are identified and repaired with Catgut threads per plane during the sectioning. It could have been necessary to resect the last coccygeal vertebra, as done in the first patient, however, it was not necessary in the second case, without further complications or increase in patient morbidity.[2]



Figure 4 - Jack-knife position.

The posterior wall of the rectum is then opened and repaired with wires in the cranial and caudal portions and sectioning of the sphincter complex (external and internal sphincter and anus levator muscle).[2-4] The wires that repair each of the layers up to the rectal opening have the objective of increasing the ease of synthesis per plane for surgical closure.



Figure 5 - Retraction of buttocks for exposure.

After reaching the rectum through an opening in its posterior wall, which provides excellent exposure to the anterior wall of the rectum and anus as well as the rectourethral fistula, the latter is then identified and catheterized with a 10 Fr. urethral probe, and completely resected with the help of a cold blade and scissors. The resection of the rectal and urethral walls and the underlying tissues is also performed, and the Foley catheter becomes visible in the urethra.[2]

After resecting the fistula, the resected borders are brought close together in 4 planes, with absorbable polyethylene glycol thread (Vicryl) 3.0 and separate sutures, where 3 of the planes are longitudinal and the fourth in the direction of the rectal wall, transversal to the rectum. There is no need to place the tissue between the urethra and the rectum (Fig. 6),[2] like transsphincteric modified for Dafnis.[6]

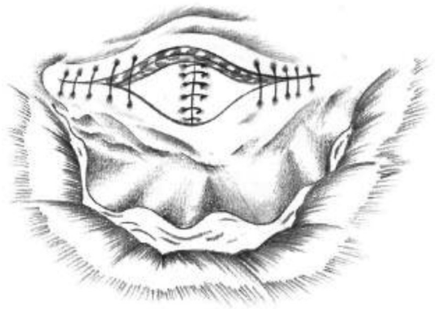


Figure 6 - Suture per plane in perpendicular direction.

The synthesis of the posterior rectum wall is performed with absorbable polyethylene glycol thread (Vicryl) 3.0 with a continuous suture and from the posterior wall to the rectum in planes, with polyethylene glycol thread using continuous sutures in 5 distinct planes, with approximation of the external anal sphincter already previously repaired (Fig. 7).

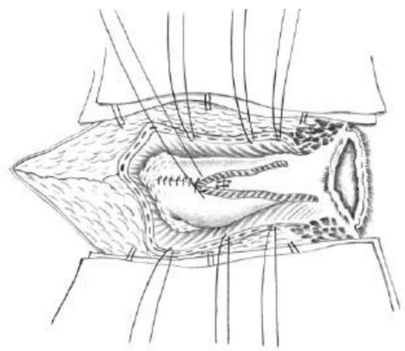


Figure 7 - Repairing per planes of layers posterior to rectum wall.

Synthesis of the anal mucosa with absorbable poliglecaprone (mono-cryl) 4.0 occurs with simple stitches using nylon thread 4.0 and Donatti stitches in the skin of incision. An occlusive dressing is placed without the need to maintain the catheter in the coccygeal vertebra that was removed or other additional measures.

All patients evolved in a similar manner. Immediately after the surgery, neither of the patients complained of local pain, bleeding or anything else. They were discharged on the 2nd day after surgery with a delaying vesical catheter through the urethra, using antibiotics for gram-negative and anaerobic bacteria for 15 days and they were asked to return in 1, 2 and 3 weeks after surgery.

In the 1st week after surgery, the first patient was fine, with mild discomfort in the surgical wound, however without any further complaints, with urine output through the delaying vesical catheter and without urine output through the rectum. The second and third patient had absolutely no complaints, evolving in this manner during the follow-up period.

After another week, the first patient appeared at the outpatient clinic with mild pain in the region of the incision and a small amount of serous secretion from the surgical wound that did not present phlogistic signs. Local pain improved expression of seroma. The nylon stitches were then removed from the skin and the patient was directed to return after one week.

When the patient came back after three weeks, he was fine, with significant improvement of the pain and no other associated complaints.

After the third week, a voiding cystourethrography was performed, with contrast injection through the vesical catheter the patient had been using since the surgery and removal of the catheter for micturition, without performing the retrograde phase, to evaluate urethral permeability and leakage of extraurethral contrast or maintenance of the fistula (Fig. 7).

All tests from patients showed a bladder with good capacity, without diverticula or stones, the urethra showed no signs of stenosis, leakage of contrast, maintenance of the retrourethral fistula or contrasting of colon/rectum and absence of the final residue.

After removal of the delaying urinary catheter, 21º postoperative day the patient stated he was satisfied with the urinary stream, without voiding effort, and without urine being eliminated through the rectum.

All patients evolved similarly. Immediately after the surgery, neither of the patients complained of local pain, bleeding or anything else. They were discharged on the 2nd day after surgery with a delayed vesical catheter through the urethra, using antibiotics for gram-negative and anaerobic bacteria for 15 days and they were asked to return in 1, 2 and 3 weeks after surgery.

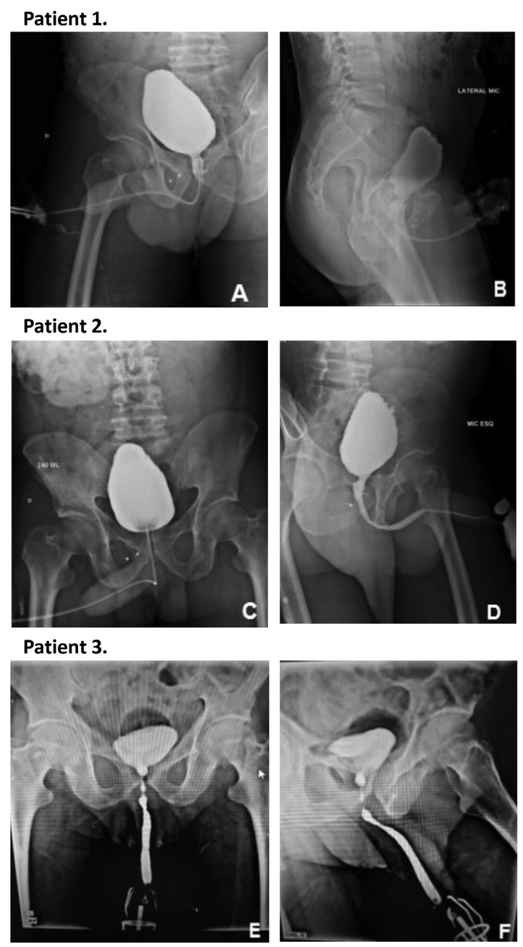


Figure 8 - Voiding cystourethrography with contrast injected through delaying vesical catheter, removal of catheter for micturition. Note the absence of contrast leakage in the rectum. Absence of fistulas, as well as stenosis or urethral narrowing in the micturition phases (**D** and **E**).

The first patient was followed up in the outpatient clinic, returning every 4 months in the first year, and evolving without new episodes of urine output through the anus or of pneumaturia. Reconstruction of the intestinal transit by the proctology team progressed well, without any new complaints of fecaluria or urinary infection.

The second patient progressed satisfactorily without complaints of fecaluria or pneumaturia, showing that there is no need for intestinal transit diversion for the surgery to be successful.

The third patient was submitted to an internal urethrotomy (anastomosis stricture) after 2 months, then the cystostomy was removed, with no fecaluria or urine loss from the anus, just mild incontinence, with the use of 1 pad/day.

The satisfaction of the patients as to the voiding and defecation standards is high, being considered within the normal range of what they had before surgery or the trauma that occurred.

Repairing each sectioned layer after the incision and performing the synthesis guided by these layers, makes the surgery simple and without complications such as fecal incontinence, anal stenosis or rectocutaneous fistulas.

Conclusion

Using the York-Mason surgery, the modified technique as well as the one described by Kilpatrick and Mason in 1969, we can conclude that the resolution of rectourethral fistulas is feasible, easily reproduced and evolves with few and mild complications.

Responsabilidades Éticas / Ethical Disclosure

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

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Confidencialidade dos Dados: Os autores declaram ter seguido os protocolos da sua instituição acerca da publicação dos dados de doentes.

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Declaração de Contribuição / Contributorship Statement

Todos os autores aprovaram a versão final do manuscrito para publicação e assumem responsabilidade por todos os aspetos do trabalho, garantindo a exatidão e a integridade dos dados apresentados.

All authors approved the final version of the manuscript for publication and assume responsibility for all aspects of the work, ensuring the accuracy and integrity of the data presented.

Autor Correspondente / Corresponding Author

Marcos Francisco Dall'Oglio
Rua Barata Ribeiro, 398 – 5º andar
01308-000 – São Paulo – SP – Brazil
E-mail: marcosdallogliouro@terra.com.br
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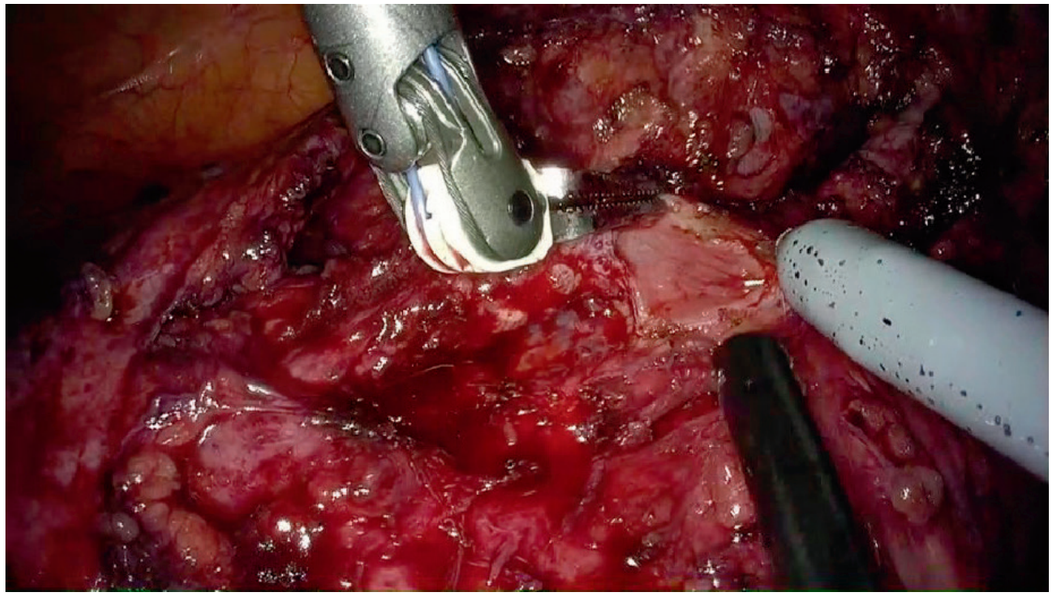
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Robotic Buccal Ureteroplasty Using HUGO-Ras: A Challenging Case

Maria Alexandra Rocha*[1], Diogo Gil Sousa[1], Paulo Príncipe[1], Miguel Silva-Ramos[1]

Keywords: Robotic Surgical Procedures; UreteralDiseases/surgery; Urologic Surgical Procedures

Ureteral strictures are a very challenging problem for urologists. Inthe developed countries, the most common causes include lithia-sis and iatrogenic. Since the early 2010s', robotic buccal uretero-plasty has been used successfully in mostly complex cases bymultiple authors.



Aceda ao vídeo no link: https://drive.google.com/file/d/1CCABN8zBGY5tKRhXfCAuwrWNmO9osBTc/view

In this video, the authors present a challenging case of robotic buccal ureteroplasty using the robotic-assisted system HUGO™.

We present a case of a 44-year-old male with an iatrogenic stricture of the ureter. The stricture was made during an anterior rectal resection in 2021, with an iatrogenic lesion of the ureter, and the first attempt of correction was a ureteral reimplantation with a Boari flap. After removal of the ureteral catheter, there was a re-stenosis, with no possibility of ureteral catheterization. A ne phrostomy tube was placed. The patient was referred to our centre at this point and proposed to do a ureteroplasty with buccal mucosa graf.

The patient was positioned in dorsal decubitus with a slight Trendelenburg tilt. Placement of ports in a W configuration. The surgery started with lysis of adhesions to free up the area. Exposure of the area with marked induration corresponding to ureteral stricture and adhesions to the previous Boari flap. Instillation of saline (SF) through the nephrostomy tube (NPC) to confirm ureter position. Identification of marked fibrosis involving the entire pelvic course of the ureter up to the insertion of the neo-ureteral meatus in the Boari flap. Release of the ureter and resection of its anterior plate involving the entire stenotic area (approximately 5 cm) up to near the bladder insertion. Meanwhile, a second surgical team was harvesting the patient's oral mucosa. Then we proceed to the introduction of JJ stent under direct vision with a cystoscope and confirmation of its correct positioning. Anastomosis of the oral mucosa graft onlay to the anterior surface of the ureteral defect using 4/0 monocryl sutures. Confirmation of watertightness through instillation of saline through the nephrostomy tube. Mobilization of the peritoneal flap

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

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over the intervened area.

Procedure completed without complications. To date, no report of stenosis.

We show that robotic buccal ureteroplasty is a safe and feasable surgery in complex cases of ureteral stricture. The authors aim to expand their experience in this procedure.

Ethical Disclosures

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Contributorship Statement

MAR: Conceptualization; Investigation (surgical participation); Data curation (video editing); Writing – original draft.

DGS, PP and MSR: Investigation (surgical participation); Data curation (video correction and editing); Writing – review & editing.

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Corresponding Author

Maria Alexandra Rocha

Serviço de Urologia - Unidade Local de Saúde de Santo António

E-mail: marialexandrarocha@gmail.com

ORCID: https://orcid.org/0000-0002-5841-8966

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