Non-functional bladder paraganglioma - case presentation and literature review of a rare urological pathology

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ABSTRACT

Pheocromocytomas and paragangliomas are rare tumors consisting of cromaffin cells. When such tumors are located in the adrenal gland they are called pheocromocytomas, while those of extra-adrenal localisation are called paragangliomas. We present the case of a 42 years old white male admitted with an intravesical mass. At presentation the patient was asymptomatic and bladder cytology showed no suspicion for malignancy. Cystoscopic evaluation described a 12/10 mm solid mass, just behind the posterior part of the bladder neck, in the proximity of the right ureteral orifice. Transurethral resection of bladder tumor (TURBT) was performed. Despite its position, complete removal was achieved with ease. Pathological exam and immunohistochemical stainings described a bladder paraganglioma. Nu recurrence occurred during the 24 months follow up.

Key-words: bladder paraganglioma, non-functioning, transurethral resection

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INTRODUCTION AND OBJECTIVES

Pheocromocytomas and paragangliomas are rare tumors consisting of cromaffin cells. When such tumors are located in the adrenal gland they are called pheocromocytomas, while those of extra-adrenal localisation are called paragangliomas.
Cromaffin cells tumors are frequently but not exclusively benign. About 10% of pheocromocytomas and about 20% of paragangliomas are malignant [1]. The paragangliomas within the genitourinary tract are even rarer tumors, the bladder localisation being probably the most frequent one of this subtype. They account for less than 0.05% of all bladder tumors and for less than 1% of all cromaffin cells tumors, both adrenal or extra-adrenal.

Based on cathecolamine activity paragangliomas may be functional (cromaffin) or non-functional (non-cromafin) tumors.

The first case of paraganglioma of the urinary bladder was described in 1953 by Zimmerman et al. [2].

In this paper we describe a clinical case of non-functional urinary bladder paraganglioma, treated by transurethral resection of the bladder. We also discuss cases with this pathology published in the literature.

CASE PRESENTATION

C.D., a 42 years old white male was admitted with an intravesical mass. The tumor was incidentally discovered during a routine ultrasonographic evaluation and the patient was referred to the radiology department for a CT scan with contrast. It described a 12/10 mm intravesical mass located just behind the posterior part of the bladder neck.
In the patients history there are a few episodes of acute prostatitis. At presentation the patient was asymptomatic and bladder cytology showed no suspicion for malignancy.
Under regional anaesthesia, cystoscopic evaluation was performed and a 12/10 mm solid mass was visualised just behind the posterior part of the bladder neck, in a paramedian right position, in the proximity of the right ureteral orifice. Transurethral resection of bladder tumor (TURBT) was performed, the tissue fragments displaying a white-gray homogenous aspect. Despite its position, complete removal was achieved with ease.
Pathological exam described tumoral proliferation mainly in the interstitial space of musculara propria, creating nests of various dimensions ("zellballen" aspect), anastomotic cords and angioma-like structures, with delicate fibro-vascular septs, tumoral contingents with large poligonal septs and small cells, without evident mitosis activity.

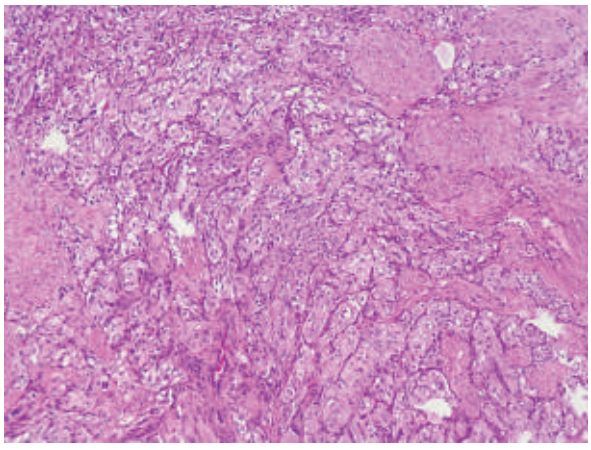


Fig. 1 Pathological exam suggestive for paraganglioma; hematoxylin and eosin staining (magnification, x20)

The aspect was suggested for bladder paraganglioma and supplementary immunohistochemical stainings were performed in order to confirm the diagnosis. This analysis also confirmed aspects suggestive for paraganglioma

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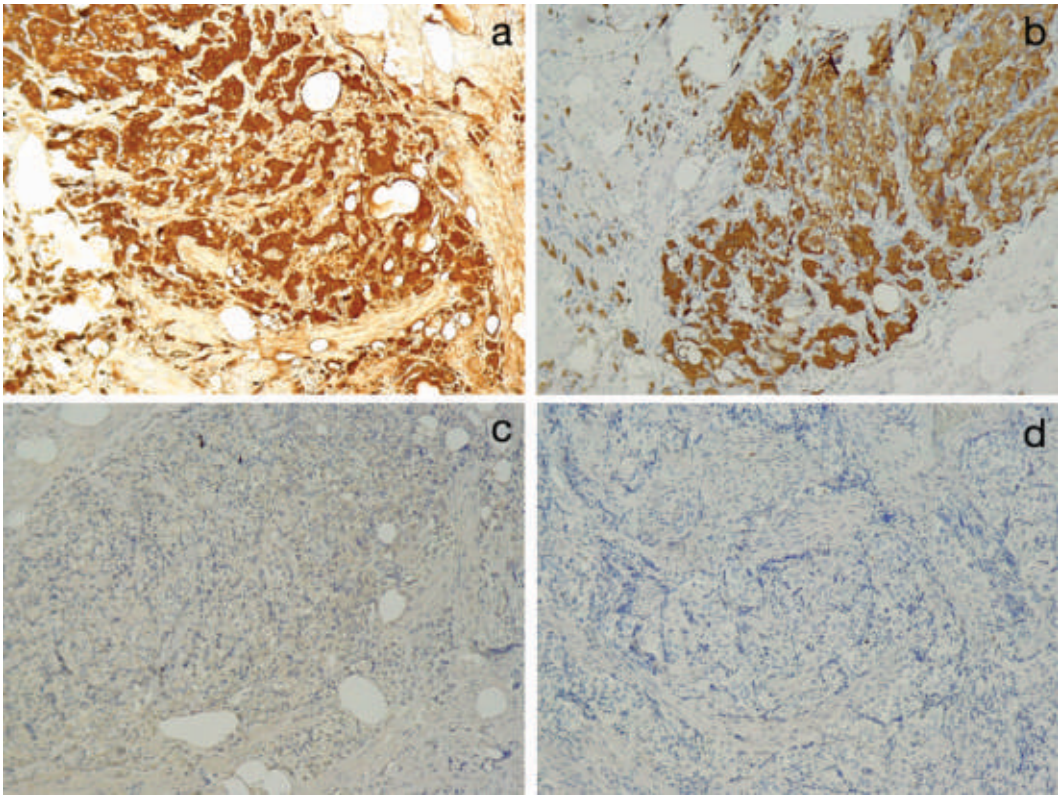


Fig. 2 Immunohistochemical staining suggestive for paraganglioma: Chromogranine A (a), Synaptophyzine (b), CK7 (c) and Ki-67 (d)

Follow-up consisted on cystoscopic evaluation which described a postoperative scar and no recurrence at 24 months.

DISCUSSIONS

Since the first report of such pathology in the 50's by Zimmerman and al [2], a number of articles reporting this relatively rare pathology were published, describing around 200 cases.

Reporting an impressive serie of 22 such cases operated during a decade, Zhai et al. reported a mean age at diagnosis of 49.8+/-14.6 years and an equal gender distribution. About 47% of the cases were non-functional paragangliomas [3]. Other authors report an increased incidence in women rather than in men.

The functional subtype is characterised by catecholamine-related symptoms such as arterial hypertension, headache, palpitations, syncopes, diaphoresis, dizziness or abdominal pain [4]. When the paraganglioma is located in the bladder wall, the catecholamine release (and consequently the related symptoms) may be transient during or immediately after micturition [5].

While in functional paragangliomas the quite characteristic symptoms may create a preoperative suspicion, the non-functional tumors are more difficult to identify This subtype associates no such characteristic symptoms but may create compression if their size becomes large. Frequently,

the non-functional paragangliomas are only incidentally identified on imagistic exams [6]. This was also the case in our patient, in which the bladder mass was incidentally found during a routine ultrasonography. Following the transurethral resection and the anatomo-pathological exam, a thorough anamnesis was repeated identifying no suggestive preoperative symptoms.

Regarding the localisation of the tumor in the urinary bladder, the published data are controversial. While some of the authors report its most common localisation on the dome or the trigone [7], others cite most of the cases located on the posterior bladder wall [8].

Various surgical approaches were cited in the treatment of such bladder tumors. A systematic review of the literature published by Beilan JA et al in 2013 describe as surgical treatment one of the following options: transurethral resection of the bladder (approximately 20% of the patients), partial cystectomy (most of the cases, about 70% of the patients) or radical cystectomy (about 10% of the cases) [9].

Zhu et al report the cases of a young female patient treated using transurethral laser ablation followed by morcellation of the tumor. In this case, the tumor had 37/31 mm and was located on the anterolateral wall of the bladder [8].

Song et al describe transurethral enucleation of a bladder paraganglioma [10] while Sonmez et al report a combined approach, in which transurethral incision of the mucosa and the detrusor and injection of methylene blue to define the safe surgical margins were followed by open surgical partial cystectomy through a suprapubic transverse incision [11].

When the tumor is localised in the bladder trigone, proximity of the ureteral orifices may create supplementary surgical difficulties. Ravichandran-Chandra A et al describe a complex surgical procedure in such a case, in which resection of the tumor involved bilateral resection of the uretero-vesical junctions followed by bilateral uretero-vesical reimplantation [12].

In our case, despite the position of the tumor in the proximity of the right ureteral orifice, the resection was performed without any significant challenges and the paraganglioma was completely removed (confirmed during long-term follow up).

Especially in functional paragangliomas, the surgical and anaesthesia team must expect and be prepared for intraoperative symptoms generated by catecholamine release, with severe hypertension and tachycardia [11].

CONCLUSIONS

Non functioning paraganglioma of the urinary bladder is a rare pathology, with no specific symptoms.

The diagnosis is often incidental, during imagistic evaluations.

Transurethral resection of the paraganglioma may be the only necessary therapeutic method in selected cases.

REFERENCES

1. Andersen KF, Altaf R, Krarup-Hansen A, Kromann-Andersen B, Horn T, Christensen NJ, Hendel HW. Malignant pheochromocytomas and paragangliomas - the importance of a multidisciplinary approach. Cancer Treat Rev. 2011 Apr;37(2):111-9. doi: 10.1016/j.ctrv.2010.07.002. Epub 2010 Aug 2. PMID: 20675056

2. Zimmerman IJ, Biron RE, Macmahon HE. Pheochromocytoma of the urinary bladder. N Engl J Med. 1953 Jul 2;249(1):25-6. doi: 10.1056/NEJM195307022490106. PMID: 13063676.

3. Zhai H, Ma X, Nie W, Li H, Peng C, Li X, Zhang Y, Zhang X. Paraganglioma of the Urinary Bladder: A Series of 22 Cases in a Single Center. Clin Genitourin Cancer. 2017 Oct;15(5):e765-e771. doi: 10.1016/j.clgc.2017.03.010. Epub 2017 Mar 28. PMID: 28688872

4. Bishnoi K, Bora GS, Mavuduru RS, Devana SK, Singh SK, Mandal AK. Bladder paraganglioma: safe and feasible management with robot assisted surgery. J Robot Surg. 2016 Sep;10(3):275-8. doi: 10.1007/s11701-016-0573-0. Epub 2016 Mar 23.

PMID: 27007467
5. Bagchi A, Dushaj K, Shrestha A, Leytin AL, Bhuiyan SA, Radparvar F, Topchik S, Tuli SS, Kim P, Bakshi S. Urinary bladder paraganglioma presenting as micturition-induced palpitations, dyspnea, and angina. Am J Case Rep. 2015 May 12;16:283-6. doi: 10.12659/AJCR.891388. PMID: 25965060; PMCID: PMC4444169
6. Zhang B, Fu Z, Liu L, Qiao B, Liu C. Non-functional paraganglioma of urinary bladder managed by transurethral resection. Int Braz J Urol. 2019 Sep-Oct;45(5):910-915. doi: 10.1590/S1677-5538.IBJU.2018.0604. PMID: 31038858; PMCID: PMC6844347
7. Hermi A, Ichaoui H, Kacem A, Hedhli H, Gargouri F, Khiari R, Ghozzi S. Functional Bladder Paraganglioma Treated by Partial Cystectomy. Case Rep Urol. 2019 Nov 12;2019:4549790. doi: 10.1155/2019/4549790. PMID: 31886013; PMCID: PMC6925741
8. Zhu X, Zhou M, Yu H, Kuang Y, Chen Y, Li H, Gou X. Bladder paraganglioma managed with transurethral holmium laser resection: A case report. Medicine (Baltimore). 2021 Aug 27;100(34):e26909. doi: 10.1097/MD.0000000000026909. PMID: 34449457; PMCID: PMC8389942
9. Beilan JA, Lawton A, Hajdenberg J, Rosser CJ. Pheochromocytoma of the urinary bladder: a systematic review of the contemporary literature. BMC Urol. 2013 Apr 29;13:22. doi: 10.1186/1471-2490-13-22. PMID: 23627260; PMCID: PMC3654956
10. Song HC, Liu JX, Song J, Li XH. Transurethral enucleation of bladder tumor containing non-functional paraganglioma: A case report. Asian J Surg. 2024 Sep;47(9):4222-4223. doi: 10.1016/j.asjsur.2024.05.083. Epub 2024 May 25. PMID: 38797593
11. Sonmez G, Tombul ST, Golbasi A, Demirtas T, Akgun H, Demirtas A. Symptomatic paraganglioma of the urinary bladder: A rare case treated with a combined surgical approach. Urol Case Rep. 2020 May 29;33:101290. doi: 10.1016/j.eucr.2020.101290. PMID: 32514405; PMCID: PMC7267705
12. Ravichandran-Chandra A, Arthanareeswaran VK, Do HM, Dietel A, Franz T, Kyriazis I, Liatsikos E, Rassler J, Horn LC, Stolzenburg JU. Minimally invasive partial cystectomy with bilateral vesico-ureteric junction resection and reimplantation for a large paraganglioma involving urinary bladder trigone. Cent European J Urol. 2017;70(4):378-381. doi: 10.5173/ceju.2017.1351. Epub 2017 Sep 19. PMID: 29410889; PMCID: PMC5791395