Case Report

Management of bladder pheochromocytoma by transurethral resection

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Abstract Bladder pheochromocytoma is the most common extra-adrenal genitourinary tumor. Endoscopic management is feared due to the risk of intra-operative hypertensive crisis. We described a case of successful endoscopic management of a bladder pheochromocytoma and discussed its technical aspects.

1. Introduction
Bladder pheochromocytomas are rare extra-adrenal tumors and are often recognized only at the time of transurethral resection (TUR) or as a histopathological surprise. If recognized preoperatively, these patients require a complete metabolic work-up, and a thorough search for any other metabolically active lesion in the body. The standard treatment for bladder pheochromocytoma is partial/radical cystectomy, since TUR is believed to induce intraoperative hypertensive crisis. Moreover, 10% of these lesions can be malignant and hence TUR alone may not suffice. Contrary to this notion there are reports of managing patients by TUR alone in select group of patients [1]. We reported a successful endoscopic management of a solitary bladder pheochromocytoma and highlighted a few technical tips to achieve complete endoscopic resection with minimal morbidity.

2. Case report
A 40-year-old male with bladder tumor was referred to us following an abandoned TUR due to intra-operative hypertensive crisis. On evaluation he gave a peculiar history of episodes of palpitation and dizziness at the time of
micturition for 3 months. The patient also had one episode of hematuria, however there were no lower urinary tract symptoms. General physical examination and systemic examination were unremarkable. On further work-up urinary normetanephrine levels were raised (1255.2 μg/24 h; normal <659.5 μg/24 h). Computerized tomogram (CT) whole abdomen revealed a 3.8 cm × 4.3 cm polypoidal enhancing lobulated mass arising from the right posterolateral wall of urinary bladder close to ureteric orifice (Fig. 1). A DOTANOC PET scan (GE healthcare, Chicago, United States of America [USA]) was done which corroborated the findings of contrast enhanced computerized tomogram (CECT) and did not reveal any other extravesical focus.

The patient was optimized in consultation with endocrinologist on lines of extra-adrenal pheochromocytoma using sequential alpha-blockade followed by beta-blockade. In view of the lateral tumor location and proximity to ureteric orifice, the patient was planned for TUR under general anesthesia with invasive blood pressure monitoring, as it ensures better intraoperative hemodynamic management. Sodium nitroprusside and nitroglycerine infusion were prepared preoperatively for anticipated intraoperative hypertensive crisis. Cystoscopy revealed a sub-mucosally located tumor (Fig. 2A and B). Intraoperatively there was a rise in blood pressure on initial tumor manipulation which required use of parenteral antihypertensive medication only for a short duration. The bladder wall was circumferentially fulgurated at the base of tumor before starting the resection. Then the resection was done using short burst of current. To obtain a complete tumor clearance, the resection was done upto the perivesical fat (Fig. 2C and D). The entire procedure was completed uneventfully and patient’s bladder was kept on irrigation for 1 day. Postoperatively his blood pressure remained normal without further use of alpha blockers. Check cystoscopy at 6 months follow-up showed no recurrence and a scar at the surgical site (Fig. 3). Repeat DOTANOC PET at 6 months follow-up showed no residual activity (Fig. 4A and B).

![Figure 1](image1.png)  
**Figure 1** Computerized tomogram scan showing the right posterolateral wall bladder mass.

![Figure 2](image2.png)  
**Figure 2** Cystoscopic view of bladder pheochromocytoma. (A) Intact mucosa with calcific plaque; (B) Lateral view showing the pedunculated tumor; (C) Transurethral resection using 26 Fr resectoscope and monopolar electrosurgical device; (D) Completed procedure showing dissection upto the perivesical fat.
3. Discussion

Bladder pheochromocytoma was first described by Zimmer-
man et al. in 1953 [2]. They are rare tumors which comprise
less than 0.05% of all bladder tumors and less than 1.00% of
all pheochromocytomas [3]. Among genitourinary tract, the
urinary bladder is most commonly involved (79.2%) followed
by urethra (12.7%), renal pelvis (4.9%) and ureter (3.2%)
[3,4]. It involves patients in third to fifth decade and is
usually submucosal or intramural with intact vesical
epithelium. It commonly occurs in the trigonal region [5].

Ultrasonography is usually the screening modality which
shows sharply circumscribed heterogeneously hypo-echoic
lesions [6]. CT is widely available modality, providing high-
resolution images in short time. Biphasic CT shows homog-
enous or heterogeneous hyper-enhancing soft tissue masses
[5]. Calcification may be seen in about 10% of the cases as
was seen in our case (Fig. 1A). Tumors are usually hypo-
intense to iso-intense and show avid contrast enhance-
ment [7].

Beilan et al. [7] have reviewed the literature and found
the treatment modality of choice being partial cystectomy
in almost 69% of cases. Most of the literature available is in
form of case report and case series due to rarity of this entity.
Similarly, in an earlier published case series from
our centre the treatment of choice was advocated to be
partial cystectomy citing reasons of hypertensive crisis
intraoperatively [8].

Transurethral resection has been reported in handful of
cases. However, in most patients the TURBT was done
incidentally and the diagnosis was pathological and in
hindsight [1,9]. In our case, diagnosis was evident preop-
eratively. The patient was optimized and electively pre-
pared for surgery. Since it was a solitary primary lesion in
the bladder and was close to the right ureteric orifice on
the posterior bladder wall, decision was taken to manage
the tumor endoscopically. Partial cystectomy was not
feasible and would have added to the morbidity. With
availability of better monitoring and effective periopera-
tive anesthetic management, it is possible to manage the
blood pressure fluctuations in these patients. Early coag-
ulation of the feeding vessels to the tumor at its base and use
of short burst of cutting limit the intraoperative blood
pressure fluctuations. This may enable complete endo-
scopic resection of such lesions. The resection must be up-
to the perivesical fat to ensure completeness in order to
decrease the risks of recurrence.

The role of functional imaging like MIBG (Siemens, Munich
Germany) and DOTANOC PET is being defined in extra-adrenal
pheochromocytomas. Level I evidence is being mounted in
favor of DOTANOC PET over MIBG in terms of both sensitivity
and specificity [10]. In our case the DOTANOC revealed the
tumor clearly, ruled out other extra-adrenal lesions and also
helped us in postoperative follow-up.

There is lack of high quality data and lack of organiza-
tional guidelines (e.g., European Association of Urology,
National Comprehensive Cancer Network and American
Urology Association) thus a strict follow-up strategy is still
to be defined [6]. A provisional follow-up strategy for
functional tumors, regardless of stage has been formulated
by Bielan et al. [7] which comprises monitoring of VMA,
metanephrine and catecholamines levels 1 month post-
surgery, then every 6 months for 2 years. In case of
regional or metastatic disease axial imaging of the
abdomen/pelvis should be performed every 3 month for 1
year, every 6 month for 1 year and annually thereafter for
next 3 years [6]. Addition of functional imaging in form of
DOTANOC PET as in our case can help in detecting the re-
idual and recurrent disease at the earliest.

4. Conclusion

Endoscopic management of bladder pheochromocytoma is
safe and feasible with proper preoperative optimization
and use of specific endoscopic maneuvers in selected cases.

Author contributions

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Conflicts of interest
The authors declare no conflict of interest.

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