

Intradiverticular Bladder Tumours Challenges and Outcomes: About 28 Cases

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ABSTRACT

Introduction: Bladder diverticula are urothelium herniations that pass through the bladder muscle. The perivesical fat is in direct contact with the urotheliumdiverticularis. As a result, tumours developing from the urotheliumdiverticularis have a distinct evolutionary history from classical bladder tumours and are rarely linked with a bad prognosis. Objective: to assess the management of intraverticular bladder tumours. Material and methods: This is a retrospective study on intradiverticular bladder tumours from January 2012 to December 2023. The study included all patients with an intradiverticular bladder tumour and a complete file. Results: The mean age was 63.75 years and the delay between the onset of symptoms and the consultation was 12.83 months. In all cases, hematuria was the most common symptom for consultation. Smoking (66.66 percent) and recurrent urethritis were identified as two risk factors. In 50% of patients, ultrasound revealed a diverticulum with tumour material, and CT scans revealed a tumorous diverticulum. Urothelial carcinoma was the most frequent histological type (83.33 percent), followed by squamous cell carcinoma. After surgery, the pT3 grade was the most prevalent. In three and nine cases, surgery was conservative and radical, respectively. After three years of follow-up, the majority of patients had a favourable outcome with no recurrence. Conclusion: Intraverticular bladder tumours exhibit differences from typical bladder tumors, notably presenting a higher frequency of T3a tumors and non-urothelial carcinomas. Additionally, there is a risk of misdiagnosed extension and tumor multifocality in IDBT cases. Unfortunately, the prognosis for the majority of these cases is poor.

Keywords: Diverticula, Cancer, Cystectomy, Urothelial Carcinoma, Prognosis, Survival

INTRODUCTION

Bladder diverticula are urothelium herniations through the bladder muscle. The perivesical fat is in coordinate contact with the urotheliumdiverticular. Intradiverticular bladder tumors are uncommon, with a predominance of

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0.8-13.5 percent and prevalence in males over the age of 50 [1-5]. In most occasions, they show as obtained diverticula, regularly inferable to subvesical obstacle, whereas congenital diverticula are watched only rarely [3-4].

Early extravescal invasion and poor survival are watched in diverticula due to the absence of a muscular layer [6-9]. In addition, the slim nature of the diverticulum postures expanded difficulty during transurethral resection, raising the risk of bladder perforation. Consequently, the recommended course of action ordinarily includes diverticulectomy or partial cystectomy, with or without early postoperative intravesical chemotherapy.

MATERIAL AND METHODS

This study is characterized by retrospective data collection focusing on intradiverticular bladder tumors (IDBT) spanning from January 2012 to October 2023, covering a period of six years. The study included all patients with intradiverticular bladder tumors possessing complete medical records, while those with incomplete files were excluded. Various epidemiological, clinical, paraclinical, therapeutic, and prognostic factors were considered. Asterile CBEU (Cystoscopy, Bladder Examination, and Urine culture) was conducted for all endoscopic and surgical procedures involving the urinary

tract. The Clavien-Dindo intermittent classification of 2009 was employed to evaluate short- and medium-term post-cystectomy complications, thereby assessing postoperative outcomes. Data analysis was performed using Epi Info.7, and graphical representation was done using Excel version 2007. Quantitative variables were presented as mean with standard deviation, while qualitative variables were expressed as number and percentage. The Pearson Chi-square (χ^2) test was utilized for percentage comparisons, with a p-value ≤ 0.05 considered statistically significant. The reporting of this study adheres to the PROCESS criteria, ensuring reliability and standardization in clinical procedure reporting.

This work has research registry number: 10009.

RESULTS

Epidemiology and Clinic

We had 28 cases in 12 years or 2 cases each year. 26 patients were male and 2 female with a sex ratio of 1/13, with a mean age of 63 years and extremes ranging from 44 to 88 years, and the most common symptom for consultation was haematuria (Table 1). The delay between the onset of symptoms and the consultation was 12.83 months (extremes from 6 to 24 months).

Table 1. Patient distribution based on clinical data

		n(%)
Antecedent	Smoking	20(71,42)
	Urethritis	2(7,14)
	None	2(7,14)
Symptom	Hematuria	15(53,57)
	Hematuria and lower urinary tract symptoms	11(39,28)
Clinical Examination	Alteration of the general condition, infiltrated bladder base and prostate enlargement	2(7,14)
	Normal	10(35,71)

Paraclinic

Urinary tract ultrasonography

On ultrasonography of the urinary tract, 14 patients had a diverticular bladder, and 8 patients had a diverticulum with tumour content. In two cases, we found a multidiverticular bladder, and in four cases, we found 2 diverticulum positioned latero-vesically. In 16 cases, benign prostatic hypertrophy was

identified as an obstacle.

Computed tomography urogram (CTU)

Prior to endoscopic resection, 23 patients had a CTU; in all cases, the diverticulum was tumorous and mostly in the lateral wall (18 cases), with 2 cases trigonal and 3 case in the bladder dome.

Endoscopy

Endoscopy revealed that 19 cases had a peridiverticular bladder tumour, with the diverticulum in 9 cases being positioned at the level of the dome (figure 1).

The majority of intradiverticular tumour resections were biopsy (75 percent of cases) and complete (25 percent of instances).

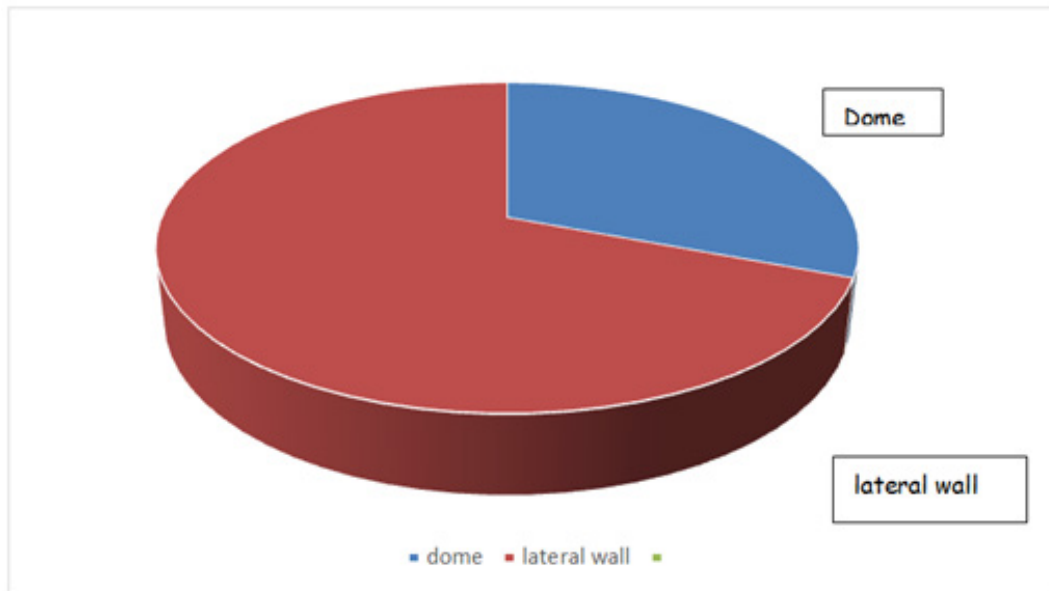


Figure 1. Distribution of patients according to the location of the tumour diverticulum.

Histology

Urothelial carcinoma (26 cases) was the most common

histological type, followed by squamous cell carcinoma in two cases (Table 2).

Table 2. Distribution of patients according to histology after endoscopic resection

		n	%
Urothelial carcinoma pT1	Low grade	2	7.14
	High grade	9	32.14
Urothelial carcinoma pT2		13	46.42
Urothelial carcinoma pT3		2	7.14
squamous cell carcinoma		2	7.14
Total		28	100

Treatment**Medical**

Two patients had been treated with radio chemotherapy and three with BCG immunotherapy combined with partial cystectomy. Four patients were treated with BCG therapy after an electrocoagulation of intra-diverticular lesions with a normal control cystoscopy. Eight patients underwent neoadjuvant chemotherapy prior to cystectomy.

Surgical

In three cases, a partial cystectomy was performed (Figure 2). There was one case of paralytic ileus, one case of parietal suppuration, and one case of urinary retention after orthotopic neobladder. Cystectomy was performed in 19 patients including 2 anterior pelvicotomy.

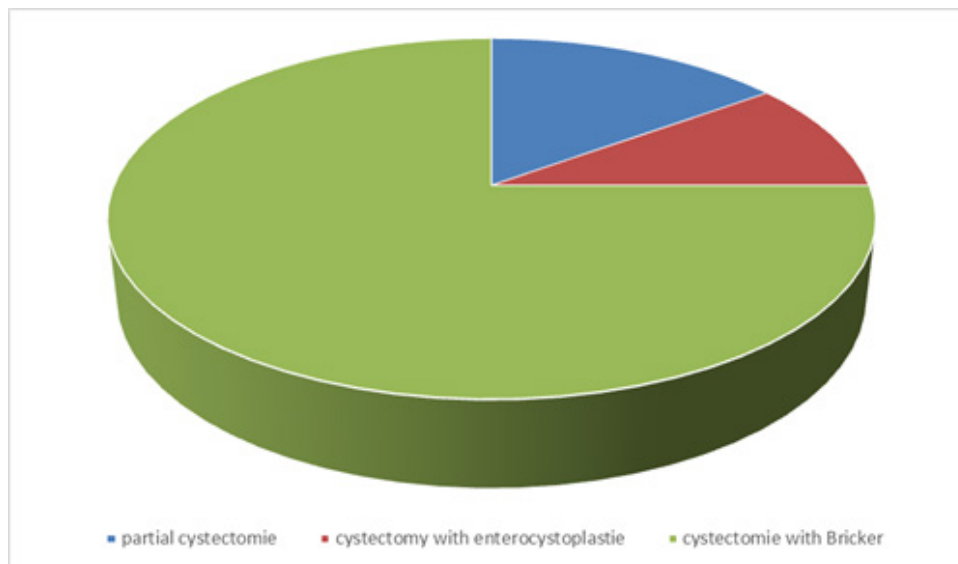


Figure 2. Distribution of patients according to type of surgery.

Evolution

We had two Lost cases to follow-up (Table 3).

Table 3. Distribution of patients according to follow-up

	n	%
Normal cystoscopy at 3 and 6 months and every 3 months for 3 years	1	3,57
Normal cystoscopy at 3 and 6 months and every 3 months for 3 years and normal TAP scan	2	7,14
Lost to follow-up	5	17,85
Normal TAP scan and biological assessment at 3, 6 and 12 months	7	25
Normal TAP scan at 3 and 6 months	5	17,85
Normal TAP scan at 3 months	6	21,42
TOTAL	28	100

DISCUSSION

Bladder diverticula refer to herniations of the urothelium through the bladder muscle. This positioning means that the perivesical fat comes into direct contact with the urothelium in the diverticulum. Consequently, tumors originating from this urothelial diverticulum exhibit a distinct evolutionary profile when compared to typical bladder tumors [1].

Bladder diverticula lack muscularis by definition, thus lacking contractile function. As a result, their filling and emptying processes are passive. The effectiveness of diverticular emptying hinges on factors such as the diameter of the neck and the gradient of its implantation.

The occurrence of intradiverticular bladder tumors is estimated to range between 1% and 10% in the general

population, with an average prevalence of 4% [2-4]. In our study, spread over a period of 12 years, we found 28 cases, i.e. 2 cases/year.

Diverticula were primarily a result of increased pressure during urination, often stemming from chronic urethral obstruction, most commonly due to prostatic issues [5-7].

More rarely, diverticula were of congenital origin. Our study agrees with the results of the literature in finding a prostatic obstacle in 61.53% of cases.

Eighty percent of diverticula demonstrate structural alterations in the bladder wall, such as dysplasia, leukoplakia, or squamous metaplasia, with the remaining two to thirteen percent being sites for malignant tumor development [8-10]. In our series, tumoral diverticula are predominantly found in

the bladder's lateral wall.

In addition to the traditional etiological factors associated with bladder tumors, the risk of tumor occurrence within a bladder diverticulum is heightened by urinary stasis and chronic inflammation. These factors contribute to chronic mucosal irritation, which can lead to dysplasia and eventual malignant transformation.

The diagnostic circumstances are unspecific, with haematuria being the most common symptom. The other symptoms are frequently linked to the cervicoprostatic obstruction. Conventional radiological investigations (intravenous urogram and retrograde cystography) are ineffective; the intradiverticular lacuna is seldom seen and can be misinterpreted as lithiasis or a blood clot; the tumour can also obstruct the diverticulum's neck, rendering it mute [11,12].

The effectiveness of conventional bladder ultrasonography in diagnosing IDBT has been reported as poor [13,14], although it can identify a tumor within a large diverticulum or a lateral vesical mass. Conversely, in our study, we identified a diverticular bladder in 84.61 percent of cases using urinary tract ultrasound, with the diverticulum being tumorous in 8 cases.

Computed tomography and, specifically, magnetic resonance imaging stand out as the optimal diagnostic techniques [11,12]. Their effectiveness lies in multidirectional slices and exceptional resolution, especially after contrast medium injection. These imaging methods aid in assessing the tumor's extent, with a focus on detecting potential extension into the perivesical fat.

Before undergoing endoscopic resection, ten patients in our study received a CT scan. In each case, the diverticulum was found to be tumorous, predominantly located in the lateral wall of the bladder, without any clear explanation for this observation

Examining the interior of diverticula during endoscopic diagnosis of Intraluminal Diverticular Bladder Tumors (IDBT) posed challenges, often due to their orientation concerning the bladder neck or the narrowness of the diverticular neck. Because of these difficulties, fibroscopy with a flexible endoscope has demonstrated greater effectiveness compared to a rigid cystoscope in the diagnosis of IDBT [15-17].

The objectives of endoscopic resection for IDBT are akin to those for any bladder tumor: complete removal of the tumor

without bladder perforation. However, resection within a diverticulum presents unique challenges due to the restricted angle of view resulting from the rigidity of the material and the narrowness of the diverticular neck.

The absence of bladder muscle heightens the risk of bladder perforation during the resection of Intraluminal Diverticular Bladder Tumors (IDBTs).

Some recommendations include employing cold forceps biopsy to mitigate the risk of perforation, especially when dealing with the removal of the base of IDBTs [16,18].

In our study, we encountered 18 cases of peridiverticular bladder tumors and 8 cases of dome diverticulum. The resection of intradiverticular tumors predominantly involved biopsy procedures in the majority of cases (77%), while complete resection was achieved in 23% of cases.

The diverticular mucosa, by definition, does not rest on the bladder muscle, but rather has a direct contact with the perivesical fat. As a result, IDBT cannot be classed as T2 (muscle invasion tumour), but will instead advance from Ta-T1 to T3 (muscle invasion tumour) (tumour invading the perivesical fat or adjacent organs by contiguity). This IDBT feature is thought to be responsible for the estimated 55-60% of tumours detected at stage T3 [18,19]. Many authors have suggested that all IDBTs be treated as invasive tumours from the beginning [1,19-23].

The histological diagnosis of Intra Diverticular Bladder Tumors (IDBT) is occasionally challenging due to two phenomena:

-Peridiverticular fibrosis, identified by the thickening and fibrous densification of the lamina propria. This may create a margin of progression for the tumor before reaching the perivesical fat [2].

-Hypertrophy of the mucosal muscle, which can be mistaken for the bladder muscle [24].

The predominant histological type was urothelial carcinoma in 92.31% and in two cases we noted squamous cell carcinoma.

The Cancer Committee of the French Association of Urology provides the following recommendations [25] based on literature findings:

Transurethral resection alone is typically recommended for Ta-T1 low-grade, unifocal IDBT without concomitant carcinoma in situ, assuming complete resection without

bladder perforation.

BCG therapy may be considered for treating T1 tumors.

Diverticulectomy or partial cystectomy is an option for T1 low-grade, unifocal IDBT without concomitant carcinoma in situ, provided good margins are maintained. Extemporaneous examination and node dissection are advised.

Total cystectomy with pelvic lymph node dissection is the recommended approach for IDBT > 1 or high grade, multifocal tumors, or those accompanied by carcinoma in situ.

In our study, 22 cystectomy cases were observed, comprising 19 complete and 3 partial cystectomies. Additionally, one patient underwent radiochemotherapy, and the overall one-year survival rate was favorable.

The prognosis for IDBT is poor, with less than 10% survival at five years due to the delay in diagnosis, the thinness of the diverticular wall, which favours rapid progression of the tumour from a superficial to an infiltrative stage, and a recurrence rate of 62 percent between three and 36 months, according to the literature [26].

Although the one-year survival rate was satisfactory in our study, it is essential to acknowledge several limitations that prevent the extrapolation of our results. Firstly, our sample size was small, and the survival time was limited to one year. Additionally, the presence of patients lost to follow-up introduces uncertainty. Moreover, the retrospective nature of the study introduces various biases that may affect the validity of our findings. Therefore, caution should be exercised when interpreting and generalizing the results of our study.

CONCLUSION

Intraventricular bladder tumours exhibit differences from typical bladder tumors, notably presenting a higher frequency of T3a tumors and non-urothelial carcinomas. Additionally, there is a risk of misdiagnosed extension and tumor multifocality in IDBT cases. Unfortunately, the prognosis for the majority of these cases is poor.

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None.

CONFLICT OF INTEREST

The authors have nothing to declare.

REFERENCES

1. Bouchot O, Zerbib M. (2002). Tumeurs urothéliales intra-diverticulaires de vessie [Intra-diverticular urothelial tumors of the bladder]. *Prog Urol.* 12(5):1109-1111.
2. Golijanin D, Yossepowitch O, Beck SD, Sogani P, Dalbagni G. (2003). Carcinoma in a bladder diverticulum: presentation and treatment outcome. *J Urol.* 170(5):1761-1764.
3. Melekos MD, Asbach HW, Barbalias GA. (1987). Vesical diverticula: etiology, diagnosis, tumorigenesis, and treatment. Analysis of 74 cases. *Urology.* 30(5):453-457.
4. Lowe FC, Goldman SM, Oesterling JE. (1989). Computerized tomography in evaluation of transitional cell carcinoma in bladder diverticula. *Urology.* 34(6):390-395.
5. Kelalis PP, McLean P. (1967). The treatment of diverticulum of the bladder. *J Urol.* 98(3):349-352.
6. Boylan RN, Greene LF, McDonald JR. (1951). Epithelial neoplasms arising in diverticula of the urinary bladder. *J Urol.* 65(6):1041-1049.
7. Montague DK, Boltuch RL. (1976). Primary neoplasms in vesical diverticula: report of 10 cases. *J Urol.* 116(1):41-42.
8. Peterson LJ, Paulson DF, Glenn JF. (1973). The histopathology of vesical diverticula. *J Urol.* 110(1):62-64.
9. Mičić S, Ilić V. (1983). Incidence of neoplasm in vesical diverticula. *J Urol.* 129(4):734-735.
10. Fellows FJ. (1978). The association between vesical carcinoma and diverticulum of the bladder. *Eur Urol.* 4(3):185-186.
11. Dondalski M, White EM, Ghahremani GG, Patel SK. (1993). Carcinoma arising in urinary bladder diverticula: imaging findings in six patients. *AJR Am J Roentgenol.* 161(4):817-820.
12. Durfee SM, Schwartz LH, Panicek DM, Russo P. (1997). MR imaging of carcinoma within urinary bladder diverticulum. *Clin Imaging.* 21(4):290-292.
13. Fekak H, Rabu R, Joual A, Bennani S, Moufid K, Sarf S, et al. (2002). Les tumeurs de vessie intradiverticulaires. A propos de trois cas [Intradiverticular bladder tumors. Three case reports]. *Ann Urol (Paris).* 36(1):53-57.

14. Stamatiou K, Moschouris H, Papadaki M, Perlepes G, Skolarikos A. (2011). Accuracy of modern ultrasonographic techniques in the follow up of patients with superficial bladder carcinoma. *Med Ultrason*. 13(2):114-119.
15. Rozet F, Pfister C, Planet M, Sibert L, Grise P. (1997). Tumeur de vessie intra-diverticulaire. A propos de 5 cas [Intradiverticular bladder tumors. Five case reports]. *Prog Urol*. 7(2):225-228.
16. Aubert J, Dombroz M, Dore B. (1982). Tumeur vésicale intradiverticulaire. A propos de 3 observations [Intradiverticular bladder tumor. A propos of 3 cases]. *J Urol (Paris)*. 88(8):537-540.
17. Montague DK, Boltuch RL. (1976). Primary neoplasms in vesical diverticula: report of 10 cases. *J Urol*. 116(1):41-42.
18. Tamas EF, Stephenson AJ, Campbell SC, Montague DK, Trusty DC, Hansel DE. (2009). Histopathologic features and clinical outcomes in 71 cases of bladder diverticula. *Arch Pathol Lab Med*. 133(5):791-796.
19. Gattegno B, Chopin D. (2001). Diverticule vésical et tumeurs superficielles de la vessie [Bladder diverticulum and superficial bladder tumors]. *Prog Urol*. 11(5):1145-1148.
20. Faysal MH, Freiha FS. (1981). Primary neoplasm in vesical diverticula. A report of 12 cases. *Br J Urol*. 53(2):141-143.
21. Abeshouse BS. (1943). Primary carcinoma in a diverticulum of the bladder: a report of four cases and a review of the literature. *J Urol*. 49:534-547.
22. Redman JF, McGinnis TB, Bissada NK. (1976). Management of neoplasms in vesical diverticula. *Urology*. 7(5):492-494.
23. Rozet F, Pfister C, Planet M, Sibert L, Grise P. (1997). Tumeur de vessie intra-diverticulaire. A propos de 5 cas [Intradiverticular bladder tumors. Five case reports]. *Prog Urol*. 7(2):225-228.
24. Hansel DE, Paner GP, Nese N, Amin MB. (2011). Limited smoothelin expression within the muscularis mucosae: validation in bladder diverticula. *Hum Pathol*. 42(11):1770-1776.
25. Neuzillet Y, Comperat E, Rouprêt M, Larre S, Roy C, Quintens H, et al. (2012). Tumeurs de vessie intradiverticulaires: revue du Comité de cancérologie de l'Association française d'urologie [Intradiverticular bladder tumors: review of the Cancer Committee of the French Association of Urology]. *Prog Urol*. 22(9):495-502.
26. Dibingue TAC, Alafifi M, Nedjim MS, Gallouo M, Hagguir H, Hannaoui A, et al. (2022). What about the Intradiverticular Bladder Tumours at Ibn Rochd University Hospital? *J Urol Nephrol*. 7(1):000199.