Scientific Research Publishing

Open Journal of Urology, 2022, 12, 342-356
https://www.scirp.org/journal/oju
ISSN Online: 2160-5629
ISSN Print: 2160-5440

Transurethral Resection of Bladder Tumours: Results and Outcomes

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How to cite this paper: Kamadjou, C., Kuitche, J., Wadeu, A.K., Mbassi, A. and Angwafo, F. (2022) Transurethral Resection of Bladder Tumours: Results and Outcomes. *Open Journal of Urology*, **12**, 342-356.
https://doi.org/10.4236/oju.2022.126033

Received: January 22, 2022
Accepted: June 11, 2022
Published: June 14, 2022

Abstract

Aim: This study aimed to determine the demographic, clinical, paraclinical, therapeutic, and evolutive characteristics of patients with bladder tumors who underwent transurethral resection of bladder tumors (TURBT) at a urology center in Douala, Cameroon. **Patients and Methods:** This was a retrospective study carried out from 2015 to 2019 on 32 patients with bladder tumors that were managed at the *Centre medico-chirugical d'urologie* in Douala, Cameroon. The relevant data were obtained from patients' clinical records. **Results:** A total of 32 patients (25 men and 7 women) aged 29 - 75 years were included in this study. The mean age of the study participants was 58.63 ± 11.00 years. Among our study participants, there were 10 smokers (31.25%). Eight (25%) of them had occupational exposure while 2 (6.25%) had residential exposure to bladder cancer. Thirty (93.75%) presented with hematuria, 2 (6.25%) presented with recurrent urinary tract infections, and 1 (3.13%) presented with acute urinary colic. Nineteen (59.38%) of them were anemic, with 4 (12.5%) requiring blood transfusions. Twenty-seven (84.38%) of them had pedunculated tumors while 5 (15.62%) had sessile tumors. The tumor diameters ranged from 1 cm to 5 cm, with a mean diameter of 2.75 ± 1.22 cm. Complete resection was performed in 27 (84.38%) participants while partial resection was performed in 5 (15.62%) patients. The early single instillation of intravesical chemotherapy with mitomycin was performed in 8 (25%) patients. Only one (3.13%) patient had a postoperative complication, and seven (21.88%) patients experienced tumor recurrence and underwent a second TURBT. Two (6.25%) of the 32 patients died and 30 (93.75%) survived. **Conclusion:** TURBT is the gold standard method of managing bladder tumors. This procedure is at the same time diagnostic and therapeutic for tumors that do not invade the walls of the urinary bladder.

Keywords

Macroscopic Hematuria, Bladder Tumor, Transurethral Resection, Mitomycin

1. Introduction

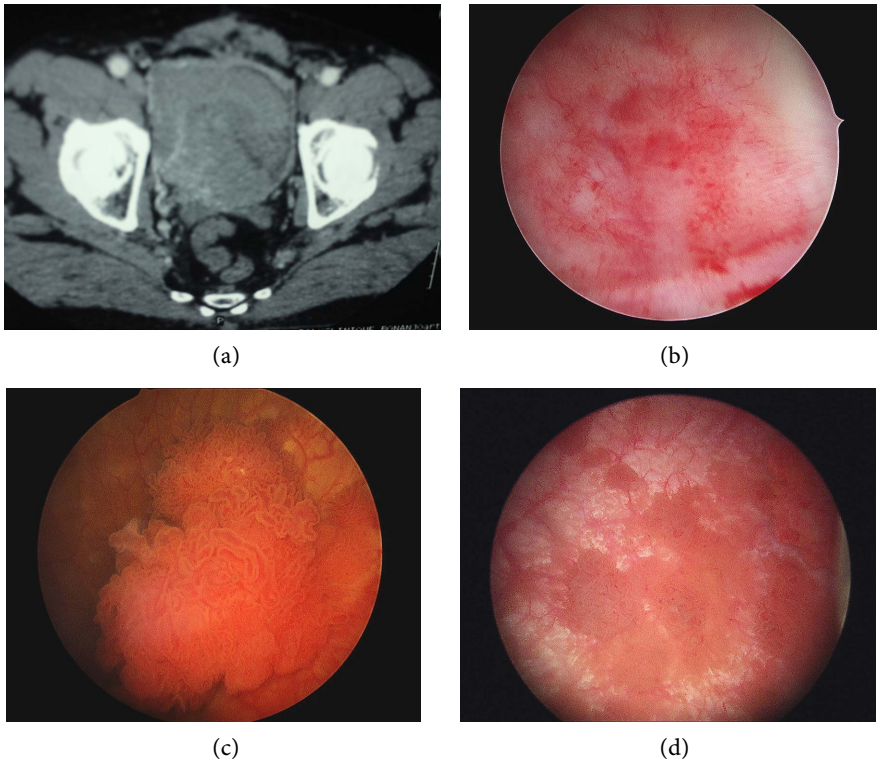
The bladder is a hollow muscular pelvic organ that stores urine briefly before its expulsion from the body. Like many organs in the body, the bladder is the seat of cancerous processes in the body. Bladder cancer is among the top ten most common cancer types in the world, with approximately 550,000 new cases annually [1]. The prevalence of this pathology in men is four times that among women [2]. Smoking (tobacco) has been identified as the main risk factor for bladder cancer [3]. Other risk factors include aromatic amines [4], polyaromatic hydrocarbons [5], and schistosomiasis (bilharziasis) [6]. In the majority of cases, painless, macroscopic hematuria is the typical initial symptom of bladder carcinoma [7]. However, patients with this condition could also present with irritative symptoms [8]. In patients with the usual signs, symptoms, and risk factors, laboratory tests such as urine cytology and imaging tests are performed [9]. Emergent technologies in the diagnostics and therapy of superficial bladder carcinoma, including fluorescence cystoscopy, can reduce recurrence and progression rates [10]. Cystoscopy is the principal means of diagnosis and surveillance of bladder tumors. It enables experts to classify bladder cancer into muscle-invasive bladder cancer (MIBC) and non-muscle-invasive bladder cancer (NMIBC) [11]. Open surgery (radical cystectomy) has been known to be the treatment of choice for bladder cancer [12]. However, with advancements in technology, laparoscopic radical cystectomy has been shown to be associated with a lower morbidity rate than cystectomy by open surgery. It has also been proven to be associated with a more rapid resumption of oral fluid and solid intake as well as a return to normal bowel function and shorter hospital stay [13]. Transurethral resection of bladder tumors (TURBT) is the standard surgical procedure for non-muscle invasive bladder cancer. This technique enables the surgeon to not only properly visualize but also resect all visible tumors, resect part of the apparently normal mucosa surrounding the tumor, resect the muscle layer at the base of the tumor till normal muscle fibers become visible, perform a biopsy of the apparently normal urothelium and prostatic urethra, and verify that there are no traces of cancerous tissue after the procedure [14]. Thus, the procedure is not only diagnostic but also therapeutic. However, in spite of the numerous advantages of this technique, it is still not a common practice in resource-limited settings such as ours. Hence, our study aims to determine the demographic, clinical, paraclinical, therapeutic, and evolutive characteristics of patients with bladder tumors managed via endoscopic resection at a urology center in Douala, Cameroon.

2. Patients and Methods

This was a retrospective study carried out from 2015 to 2019 on 32 patients with bladder tumors that were managed at the *Centre medico-chirugical d' urologie* in Douala, Cameroon. The relevant data were obtained from patients' clinical records. We included all patients who were diagnosed with bladder tumors and underwent TURBT and excluded all patients with incomplete clinical records.

The diagnosis was made in all patients via cystoscopy and abdominal computerized tomography, while the nature, grade, and degree of infiltration were determined via endoscopic biopsy and histopathology. The computed tomography images and endoscopic views of the bladder tumors are presented in **Figures 1(a)-(d)**.

Urinalysis was also performed for all the participants of this study to ensure that they had no urinary tract infection (UTI) before going in for the mini-invasive procedure. We included all patients with bladder tumors who underwent TURBT within the study period at the *Centre medico-chirugicale d' urologie* in Douala and had all the required information in their clinical records. The data collected from the patients' files included age, sex, tobacco consumption (measured in pack-years), environmental exposure to bladder cancer (residence in areas with lakes from where schistosomiasis could be contracted), occupational exposure to bladder cancer (professions such as painting, tiling, welding, and

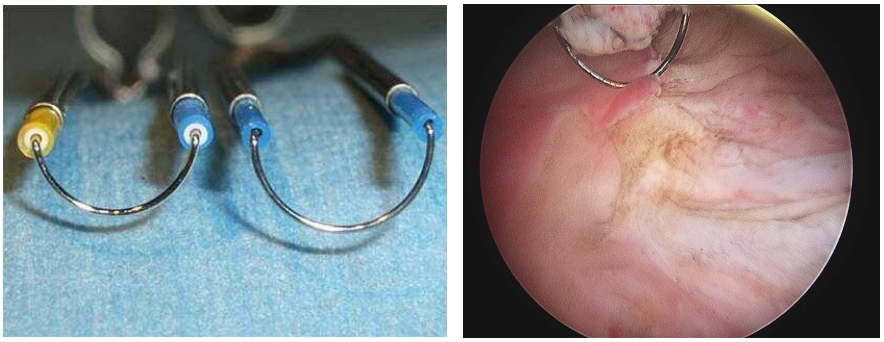


(a) (b) (c) (d)

Figure 1. Imaging of bladder tumors. (a): computed tomography image of bladder tumor; (b): Endoscopic view of carcinoma-in-situ (×50 magnification); (c): Endoscopic view of a pedunculated tumor (×50 magnification); (d): Endoscopic view of a sessile tumor (×50 magnification).

motor mechanics that come with a high exposure to aromatic amines), recurrent urinary tract infections (together with the culprit pathogens), acute nephritic colic (due to the obstruction of the renal pelvis by tumors), hemoglobin level, transfusion, the location of the tumors, the type of tumor (pedunculated or sessile), the presence of single or multiple tumors, the histological nature of the tumors, the diameters of the tumors, the type of TURBT (partial or complete resection), the type of anesthesia used (spinal anesthesia or general anesthesia), surgery duration, and the early single instillation of intravesical chemotherapy with mitomycin (SIIC, an intravesical therapy that is given to reduce the rate of relapse for intermediate tumors and the rate of progression for high-risk tumors). In some of our patients, mitomycin was started early in the postoperative period, within two hours of the end of the surgical intervention. This drug was given at the highest possible dose (40 mg) in the first 24 hours after the TURBT procedure. As required, the pH of the patients' urine was rendered alkaline before using this drug. While using this drug, we bore in mind its contraindications, including macroscopic hematuria and bladder perforation. We also collected data on tumor histology after TURBT, supplementary TURBT for those who underwent partial resection the first time, duration of postoperative hospitalization, postoperative complications, recurrence (and time-lapse from diagnosis to recurrence), and patient outcome (death or life). In this study, we defined anemia as a hemoglobin level of less than 12 g/dL in women and less than 13 g/dL in men [15] (**Figure 2**).

These data were entered into Microsoft excel 2007 and exported to Epi Info 7 for analysis. Continuous data were presented using the mean value and standard deviation for variables with normally distributed data and the median and interquartile range for variables with skewed data distributions. Categorical data were presented as frequencies and percentages. This study was approved by the institutional review board of the Faculty of Medicine and Pharmaceutical Sciences of the University of Douala and the ethics committee of the *Centre medico-chirugicale d' urologie* in Douala, Cameroon. The requirement for informed consent was waived due to the retrospective study design.



(a) (b)

Figure 2. Endoscopic bladder tumor resection. (a): Resection loops; (b): Endoscopic view during resection (×50 magnification).

3. Results

In this study, we recruited 32 participants, 25 (78.13%) males and 7 (21.87%) females aged 30 - 75 years with a mean age of 58.63 ± 11.00 years. Of the 32 patients, there were 10 smokers (31.25%) whose ages at onset of smoking ranged from 16 years to 30 years, with a mean value of 20.30 ± 4.64 years. The tobacco consumption of these smokers ranged from 7 - 58 pack-years, with a median value of 24 [10 - 30] pack-years. Eight (25%) of our participants had professional exposure while two (6.25%) had residential exposure to bladder cancer since they lived around lakes from which they contracted schistosomiasis. The demographic and social characteristics of the study participants are presented in Table 1.

Table 1. Demographic and social profiles of the study participants.

Variable	Frequency (%)
Age (years)	
30 - 40	2 (6.25)
41 - 50	6 (18.75)
51 - 60	8 (25.00)
61 - 70	12 (37.5)
>70	4 (12.5)
Sex	
Male	25 (78.13)
Female	7 (21.87)
Smoking	
Yes	10 (31.25)
No	22 (68.75)
Age at onset of smoking	
≥20	5 (50)
<20	5 (50)
Tobacco consumption (Pack-years)	
≥25	5 (50)
<25	5 (50)
Professional exposure	
Yes	8 (25.00)
No	24 (75.00)
Residential exposure	
Yes	2 (6.25)
No	30 (93.75)

Of the 32 patients we recruited, 30 (93.75%) had hematuria, two (6.25%) had recurrent urinary tract infections, and one (3.13%) had acute nephritic colic. The hemoglobin levels of our study participants ranged from 5.5 g/dL to 15 g/dL, with a mean level of 11.31 ± 3.40 g/dL. Nineteen (59.38%) of our participants were anemic while 13 (40.62%) were not anemic. Four patients (12.5%) had severe anemia and needed blood transfusions of between two and four pints of blood, depending on the severity of the anemia. Urinalysis was performed in three (9.38%) of our study participants, and the identified germ was *E. coli* in two (66.67%) patients and *Pseudomonas aeruginosa* in one (33.33%) patient. Ultrasonography was carried out in 8 (25%) of our study participants while anteroposterior computerized tomography scanning and cystoscopy were performed in all 32 patients. Two (6.25%) of our study participants had bilharziasis that occurred as a result of residential exposure. The clinical and paraclinical profiles of our study participants are presented in Table 2.

Twenty-seven (84.38%) participants had pedunculated tumors while 5 (15.62%) had sessile tumors. Twenty-four patients (75%) had single tumors while 8 (25%) had multiple tumors. The diameters of the tumors ranged from 1 cm to 5 cm with a mean diameter of 2.75 ± 1.22 cm. The tumors were urothelial carcinoma in 30 (93.75%) patients and epidermoid carcinoma in 2 (6.25%) patients. Carcinoma in-situ (CIS) was identified in 3 (9.38%) of our study participants. The tumors were located at the lateral surfaces of the bladder in 11 (34.38%) cases, between the bladder's neck and the prostatic urethra in 6 (18.75%) cases, at the anterior part of the bladder's neck in 6 (18.75%) cases, between the dome of the bladder and the left lateral surface in 4 (12.5%) cases, between the left lateral surface and the anterior part of the bladder in 3 (9.23%) cases, between the right meatus and right lateral surface in one (3.13%) case, and between the left meatus and the urinary pelvis in one (3.13%) case. The tumor characteristics are presented in Table 3.

All patients in our study underwent transurethral resection of the bladder. Twenty-seven (84.38%) patients underwent complete resection while 5 (15.62%) underwent partial resection. Spinal anesthesia was used in 26 (81.25%) participants while general anesthesia was used in 6 (18.75%) participants. Early single instillation of intravesical chemotherapy with mitomycin (SIIC) was performed in 8 (25%) patients. The duration of the surgical procedure ranged from 20 minutes to 75 minutes, with a mean value of 47.90 ± 14.80 minutes. Of the five patients who initially underwent partial TURBT, two (40%) underwent supplementary TURBT. Only one patient (3.13%) developed a postoperative complication, which was a sub-peritoneal bladder perforation. This complication was managed by placing an indwelling urinary catheter for 10 days, after which the patient returned to his normal life. The duration of hospitalization ranged from 1 day to 5 days, with a median duration of 3 [2 - 3.5] days. In 7 (21.88%) of the 32 patients, the tumors recurred. The time-lapse till recurrence ranged from 133 days to 337 days, with a median value of 272 [156 - 292] days. The procedure was repeated in all patients who experienced recurrence. Two (6.25%) of the 32

Table 2. Clinical and paraclinical profiles of our study participants.

Variable	Frequency (%)
Clinical presentation	
Hematuria	30 (93.75)
Recurrent UTI	2 (6.25)
Acute nephritic colic	1 (3.13)
Anemia	
Yes	19 (59.38)
No	13 (40.62)
Transfusion (severe anemia)	
Yes	4 (12.5)
No	28 (87.5)
Urinalysis	
Yes	3 (9.38)
No	29 (90.62)
Pathogens identified during urinalysis	
E. coli	2 (66.67)
Pseudomonas aeruginosa	1 (33.33)
Bilharziasis	
Yes	2 (6.25)
No	30 (93.75)
Ultrasonography	
Yes	8 (25.00)
No	24 (75.00)
Computed tomography	
Yes	32 (100)
Cystoscopy	
Yes	32 (100)

Table 3. Characteristics of the tumors.

Variable	Frequency (%)
Type	
Pedunculated	27 (84.38)
Recurrent UTI	5 (15.62)
Histology	
Urothelial carcinoma	30 (93.75)
Epidermoid carcinoma	2 (6.25)

Continued

Single/Multiple	
Single	24 (75.00)
Multiple	8 (25.00)
Tumor diameter (cm)	
1	4 (12.5)
2	12 (37.5)
3	8 (25.00)
4	4 (12.5)
5	4 (12.5)
Carcinoma in-situ	
Yes	3 (9.38)
No	29 (90.62)
Tumor location	
Left/Right lateral surface	11 (34.38)
Bladder neck–prostatic urethra	6 (18.75)
Anterior bladder neck	6 (18.75)
Dome–left lateral surface	4 (12.5)
Anterior bladder neck–left lateral surface	3 (9.23)
Right meatus–right lateral surface	1 (3.13)
Left meatus–urinary pelvis	1 (3.13)

patients died after surgery, one due to pulmonary embolism and the other due to peritoneal carcinomatosis. The follow-up durations of our study participants ranged from 149 days to 1422 days, with an average duration of 561.47 days. Details of the surgical interventions and outcomes of the patients are presented in Table 4.

After the first surgical intervention, a biopsy with histopathology was carried out. Of the 32 patients, two (6.25%) each had tumors of grades T1G1, T1G3, T2G3, and TaG1. Eight (25%) patients had tumors of grade TaG2, six (18.75%) had tumors of grade T1G2, four (12.5%) had tumors of grade TaG3, three (9.38%) had tumors of grade T2G2, while one (3.13%) each had tumors of grades T2G1, T1G1 + CIS, and T1G3 + CIS. Of the five patients who initially underwent partial TURBT, two (40%) underwent supplementary TURBT, after which a second biopsy with histopathology revealed that both patients had tumors of grade T2G2. The seven patients who experienced recurrence underwent a repeat TURBT procedure, which was also accompanied by biopsies with histopathology. Of these seven, two (28.57%) had tumors of grade T1G2 while each (14.29%) of the remaining five had tumors of grades T1G2 + CIS, TaG2, T2G3 + CIS, T1G3, and T2G3. The tumor grades after the first and second TURBT procedures are presented in Table 5.

Table 4. Characteristics of surgical interventions and ensuing histopathology.

Variable	Frequency (%)
Type of resection	
Complete resection	27 (84.38)
Partial resection	5 (15.62)
Supplementary resection	
Yes	2 (40.00)
No	3 (60.00)
Type of anesthesia	
Spinal	26 (81.25)
General	6 (18.75)
SIIC	
Yes	8 (25.00)
No	24 (75.00)
Duration of procedure (minutes)	
20 - 30	6 (18.75)
31 - 40	6 (18.75)
41 - 50	5 (15.62)
51 - 60	10 (31.25)
61 - 70	4 (12.50)
>70	1 (3.13)
Postoperative complication	
Yes	1 (3.13)
No	31 (96.87)
Duration of hospitalization (Days)	
1	2 (6.25)
2	11 (34.38)
3	11 (34.38)
4	6 (18.75)
5	2 (6.25)
Recurrence	
Yes	7 (21.88)
No	25 (78.12)
Time-lapse till recurrence (Days)	
≤200	3 (42.86)
>200	4 (57.14)

Continued

Survival	
Yes	30 (93.75)
No	6 (6.25)
Follow-up duration (days)	
≤500	16 (50)
501 - 1000	12 (37.50)
>1000	4 (12.50)

Table 5. Tumor grades after first, supplementary, and repeat TURBT procedures.

Grade	Frequency (%)
First TURBT	
TaG2	8 (25.00)
TaG3	4 (12.50)
T1G2	6 (18.75)
T2G2	3 (9.38)
T1G1	2 (6.25)
T1G3	2 (6.25)
T2G3	2 (6.25)
TaG1	2 (6.25)
T1G1 + CIS	1 (3.13)
T1G3 + CIS	1 (3.13)
T2G1	1 (3.13)
Supplementary TURBT	
T2G2	2 (100.00)
Repeat TURBT	
T1G2	2 (28.57)
T1G3 + CIS	1 (14.29)
T1G3	1 (14.29)
T2G3	1 (14.29)
T2G3 + CIS	1 (14.29)
TaG2	1 (14.29)

4. Discussion

In this study, we aimed to determine the demographic, clinical, paraclinical, therapeutic, and evolutive characteristics of patients with bladder tumors who underwent TURBT at a urology center in Douala, Cameroon. We included 32

patients with a mean age of 58.63 ± 11.00 years, which is similar to the 62 years reported by Uchida *et al.* [16]. This is only to be expected since bladder cancer is predominantly a disease of the elderly, with 90% of diagnoses made in those over 55 years [17]. Males constituted 78.13% of our study population, which is in line with the fact that they have a threefold to a fourfold higher risk of bladder cancer as compared to females [18]. This is logical as men are more exposed to the major risk factors for the condition, which include smoking and chemicals (occupational exposure to rubber, textiles, paint, and aromatic amines). Smokers accounted for 31.25% of our study population, which was expected since smoking is the primary risk factor for bladder cancer [19]. Twenty-five percent of our study participants had professional exposure to aromatic amines while 6.25% had residential exposure to schistosomiasis. These findings are in line with those of Pira *et al.* who found that professional exposure to aromatic amines predisposes to bladder cancer [20] and Zaghloul *et al.* who identified bilharziasis as a risk factor for bladder cancer in 2020 [21]. Hematuria was identified in 93.75% of our study participants, with 59.38% of them being anemic. These findings are in line with those of Abt *et al.* who identified hematuria as a common and severe symptom of the pathology [22] and Joynson *et al.* who reported that 52% of their study participants were anemic [23]. Bladder cancer has hematuria as its major symptom; also, like many other types of cancer, it has anemia as one of its long-term complications. In our study, pedunculated tumors accounted for 84.38% of all tumors. This finding is in line with those of a study by Ishikawa *et al.* in which pedunculated tumors outnumbered sessile tumors by a ratio of more than 2:1 [24]. Urothelial carcinoma represented 93.75% of all tumors in our study, which is in line with the findings of Tanaka and Sonpavde who reported that urothelial carcinoma accounts for more than 90% of cases of bladder cancer [25]. The mean tumor diameter in our study was 2.75 ± 1.22 cm, which is similar to the findings of Kaynar *et al.* who reported an overall mean diameter of 2.85 ± 1.30 cm (the mean diameter of the NMIBC group was 2.1 ± 1.09 cm while that of the MIBC group 3.6 ± 1.5 cm). Complete tumor resection was carried out in 84.38% of our study participants, which is higher than the 67% reported by Pak *et al.* in 2021 [26]. This difference could be accounted for by the fact that Pak *et al.* carried out complete TURBT prior to neoadjuvant chemotherapy whereas resection was the only treatment option in our study. They also had a larger study sample (93 patients) than we did. In our study, only two of the five patients who initially underwent partial resection went in for supplementary resection. This was because the histopathology results after partial resection revealed T2 tumors in three of the five patients; as such, these patients had to undergo radical cystectomy instead of a supplementary resection. Spinal anesthesia was used in 81.25% of our study participants, which is a higher proportion than the 64.04% reported by Cesur *et al.* in 2008 [27]. This difference could be explained by the fact that some patients who initially underwent epidural anesthesia in their study were converted to general anesthesia. The mean surgery time in our study was 47.90 ± 14.80 minutes, which is similar to the median time of 40 mi-

nutes reported by Fukuhara *et al.* in 2017 [28].

The rate of postoperative complications in our study was 3.13%, which is lower than the 5.8% reported by Matulewicz *et al.* in 2015 [29]. This difference is mainly due to the fact that their study included 10,599 cases of TURBT while ours included just 32, which means it was more likely for them to encounter more postoperative complications. Moreover, mini-invasive procedures such as TURBT are usually associated with such low rates of postoperative complications as are reported in the above studies. The recurrence rate after TURBT in our study was 21.88%, which is similar to the 19.5% reported by Bangash *et al.* in 2020 [30]. The high rate of recurrence in our study was probably because, in the majority of our patients, the tumors were located at more than one spot, which corroborates the findings of Fradet *et al.* who reported that recurrence is more likely to occur in patients with tumors at multiple locations [31]. In our study, two patients (6.25%) died after the intervention. This is higher than the 0.1% mortality reported by Bansal *et al.* in 2016 [32]. This difference can be explained by the fact that the patients in their study were diagnosed at an earlier stage than those in ours, which improved their prognosis. Moreover, of the two deaths we recorded, one was due to pulmonary embolism and the other due to peritoneal carcinomatosis, and both of these lethal complications could be associated with the late diagnosis of the condition in these patients. Also, Bansal *et al.* studied only the complications that occurred within a month after TURBT, whereas our average follow-up duration was 561.47 days. Given that our minimum follow-up duration was 149 days, it is possible that the postoperative mortality rate would have been 0% if our follow-up duration was 30 days. Regarding the histological classification of tumors, 71.88% of tumors in our study were of grade G1 - G2, which is similar to the 65% reported by Bousted *et al.* in 2014 [33]. This further confirms the fact that most cases of bladder cancer are NMIBC.

However, our study had certain limitations. First, the retrospective study design we used comes with recall bias. Secondly, our study sample was small compared to those of other similar studies in the literature. Third, some of our findings, such as the duration of postoperative hospitalization and the postoperative mortality rate were skewed by the behaviors and tendencies of patients in our context. Firstly, these patients are usually hesitant to return home less than three days after mini-invasive surgical procedures for fear of the unknown. Secondly, the diagnosis of bladder cancer in our context is usually done at a relatively advanced stage since patients tend to consult specialists only after exhausting all other options such as traditional medicine. More studies with larger samples and different study designs should be carried out in the future to further investigate our findings.

5. Conclusion

TURBT is the gold standard method of managing bladder tumors. It is a rapid and efficient procedure that is associated with a short postoperative hospitaliza-

tion and minimal postoperative complications. This procedure is at the same time diagnostic and therapeutic for tumors that do not invade the walls of the urinary bladder. The use of this technique should be encouraged even in resource-limited settings such as ours for optimal surgical outcomes.

Acknowledgements

The authors thank Health Search Association for critically reviewing the manuscript.

Availability of Data and Materials

The data analyzed in this study are available from the corresponding author upon reasonable request.

Ethics Statement

Ethical approval was obtained from the institutional review board of the Faculty of Medicine and Pharmaceutical Sciences and the ethics committee of the *Centre medico-chirugicale d'urologie* in Douala, Cameroon. The requirement for informed consent was waived due to the retrospective nature of the study.

Conflicts of Interest

The authors have no conflicting interests to declare.

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