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# Transurethral Resection of the Bladder Tumour as a Treatment Method in Children with Transitional Cell Carcinoma of the Bladder – Analysis of Our Material and Literature Review

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**A** – research concept and design; **B** – collection and/or assembly of data; **C** – data analysis and interpretation; **D** – writing the article; **E** – critical revision of the article; **F** – final approval of article; **G** – other

## Abstract

**Background.** Bladder cancer occurs mainly in adults. In children, younger than 10 years in particular, it is very rare.
**Objectives.** The aim of the study is to retrospectively evaluate the efficacy of transurethral resection of the bladder tumour (TUR-BT) of transitional cell carcinoma (TCC) of the bladder in children.
**Material and Methods.** Transurethral resection of the bladder tumour was performed in 7 boys aged 4 to 17 years (median 12.1 years). In all cases laboratory tests, ultrasound, and cystoscopic tumour biopsy were carried out prior to the resection. Doxorubicin was additionally instilled intravesically as one dose in two patients. The Foley catheter was left in the bladder for 1 to 4 days (median 1.85 days). The follow-up period ranged from 10 months to 10 years (median 4 years).
**Results.** Papillary urothelial neoplasm of low malignant potential (PUNLMP) was diagnosed in 5 patients and urothelial papilloma in 2. Local recurrence was observed in one case two years after the resection. In all other cases complete remission was achieved.
**Conclusions.** Transitional cell carcinoma of the bladder in children is usually benign and endoscopic treatment (TUR-BT) seems to be the treatment of choice. To determine a follow-up schedule a more substantial group of children with bladder cancer should be analysed (**Adv Clin Exp Med 2015, 24, 3, 505–509**).

**Key words:** children, TCC, bladder tumor, transitional cell carcinoma, haematuria.

The most common bladder tumour in children is rhabdomyosarcoma [1]. TCC of the bladder is typically diagnosed in adults between 60 and 70 years of age, predominantly in males [2]. The incidence of that tumour type in children is extremely rare. Only few cases, concerning mainly teenagers, have been reported so far [3–5]. In these cases no risk factors typical of adults such as smoking, pelvic irradiation, cyclophosfamide treatment, chronic exposure to selected chemical substances (aniline, naftylamine, benziline), or sweetener abuse were involved [3–7]. Bladder cancer in children has not been found to be genetically conditioned [2, 5]. The most common symptom of transitional

cell carcinoma (TCC) both in children and adults is haematuria [3–5].

The aim of the study is to retrospectively evaluate the efficacy of endoscopic treatment of TCC of the bladder in children.

## Material and Methods

Seven boys with bladder tumour were treated in two centres from 1999 to 2011. The symptoms of the disease as well as the diagnostic and therapeutic procedures were retrospectively analysed. The patients' age ranged from 4 to 17 years (median 12.1). Three of them were below 10. The most common symptom was haematuria (6 cases). Two patients additionally reported intermittent pain in the lower part of the abdomen. One patient complained of dysuria. In one case bladder tumour was incidentally found on ultrasounds (US) performed for other reasons. Family medical history was negative in each case. No exposure to risk factors was noted either. US revealed an exophytic mass in the bladder in all cases. All patients had cystoscopy with tumour biopsy performed.

TUR-BT was carried out after the histological evaluation of tumour biopsy specimens in all cases. The Foley catheter was left in the bladder for 1 to 4 days (median 1.85 days). Intravesical instillation of 30 mg of doxorubicin was administered to 2 17-year-old boys. The hospital stay ranged from 3 to 6 days (median 3.85). The post-operative observation was based on imaging tests (US) and urinalysis. Control cystoscopy was carried out in all patients 6 months after the surgery. The patients' data is presented in Table 1.

## Results

The tumour was localized near the ureteral orifice on the right side in 5 cases and on the left side in 2. Its diameter was smaller than 3 cm in 4 cases and exactly 3 cm or bigger in 3 (Table 1). The histology of the biopsy specimens revealed papillary urothelial neoplasm of low malignant potential (PUNLMP) in 5 patients and urothelial papilloma in 2 cases (according to the WHO 2004 grading). The follow-up after the procedure ranged from 10 months to 10 years. In one case local recurrence was observed 2 years after the operation. The patient underwent re-TUR-BT. No signs of local recurrence have been observed so far (8 years of follow-up). In other patients no local recurrence after the first TUR-BT was noted.

**Table 1.** Patients' data

| Patient (initials) | Age (years) | Sex | | Symptoms | | | Ultrasound | Cystoscopy | Cystoscopic biopsy | Urine cytology | Tumour diameter | | TUR-BT | re-TUR-BT | Doxorubicine instilation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | male, n (%) | female, n (%) | hematuria | dysuria | pain | | | | | < 3 cm | ≥ 3 cm | | | |
| P1 (WK) | 17 | • | | • | | | • | • | • | | • | | • | • | |
| P2 (SN) | 7 | • | | • | | • | • | • | • | | • | | • | | |
| P3 (PS) | 17 | • | | • | • | | • | • | • | | • | | • | | |
| P4 (SP) | 7 | • | | • | | | • | • | • | | • | | • | | |
| P5 (MG) | 16 | • | | • | | • | • | • | • | | | • | • | | • |
| P6 (KK) | 4.5 | • | | | | | • | • | • | | | • | • | | |
| P7 (KD) | 17 | • | | • | | | • | • | • | | | • | • | | • |
| Generally n (%) | | 7 (100) | 0 (0) | 6 (85.7) | 1 (14.3) | 2 (28.6) | 7 (100) | 7 (100) | 7 (100) | 0 (0) | 4 (57.1) | 3 (42.9) | 7 (100) | 1 (14.3) | 2 (28.6) |
| Generally median | 16 | | | | | | | | | | | | | | |
| Generally mean (SD) | 12.21 (5.30) | | | | | | | | | | | | | | |

**Table 2.** Tumour classification

| | Generally n | | P1 (WK) | P2 (SN) | P3 (PS) | P4 (SP) | P5 (MG) | P6 (KK) | P7 (KD) |
|---|---|---|---|---|---|---|---|---|---|
| **2004 WHO grading** | | | | | | | | | |
| Urothelial papilloma | 2 | | | | | • | | • | |
| Papillary urothelial neoplasm of low malignant potential (PUNLMP) | 5 | | • | • | • | | • | | • |
| Low-grade papillary urothelial carcinoma *(G1, G2)* | 0 | | | | | | | | |
| High-grade papillary urothelial carcinoma (carcinoma *in situ, G3)* | 0 | | | | | | | | |
| **Stage of tumour**<br>**2002 TNM classification of urinary bladder cancer** | | | | | | | | | |
| T – Primary tumour | | | | | | | | | |
| TX Primary tumour cannot be assessed | 0 | | | | | | | | |
| T0 No evidence of primary tumour | 0 | | | | | | | | |
| Ta Non-invasive papillary carcinoma | superficial | 7 | • | • | • | • | • | • | • |
| Tis Carcinoma *in situ*: 'flat tumour | | 0 | | | | | | | |
| T1 Tumour invades subepithelial connective tissue | | 0 | | | | | | | |
| T2 Tumour invades muscle | deeply invasive | | | | | | | | |
| T2a Tumour invades superficial muscle (inner half) | | 0 | | | | | | | |
| T2b Tumour invades deep muscle (outer half) | | 0 | | | | | | | |
| T3 Tumour invades perivesical tissue: | | | | | | | | | |
| T3a Microscopically | | 0 | | | | | | | |
| T3b Macroscopically (extravesical mass) | | 0 | | | | | | | |
| T4 Tumour invades any of the following: prostate, uterus, vagina, pelvic wall, abdominal wall | | | | | | | | | |
| T4a Tumour invades prostate, uterus, or vagina | | 0 | | | | | | | |
| T4b Tumour invades pelvic wall or abdominal wall | | 0 | | | | | | | |

The grade and the stage of each tumour were analysed according to classification systems used in adults (Table 2).

## Discussion

TCC of the bladder in children is very uncommon and its aetiology is unknown. No risk factors typically observed in adults were found to have affected children in few studies reporting TCC in children [4, 8, 9]. In our analysis, based on the medical interview, no risk factor was found to be decisive either. Reporting a case of a 7-year-old girl, Thomas et al. suggest that TCC may develop from chronic cystitis [9]. The past history of one our patient included episodes of upper urinary tract infections. It cannot be resolved, however, whether the infections were primary or secondary to the developing tumour. Some authors suggested the role of sex and reported a male to female ratio of 3 : 1 to 9 : 1 [10]. In our study we diagnosed bladder tumours only in boys.

The main symptom of TCC of the bladder is haematuria, which was observed in all our patients but the youngest one [3, 4, 11, 12]. Haematuria in children is an indication for further thorough investigation of the urinary tract. Polycystic kidney disease and other congenital kidney diseases and urinary tract malformations, kidney inflammation, urolithiasis, urinary tract infection, injury, and bladder tumour should be considered in differential diagnosis of the haematuria causes.

Abdominal ultrasound (US) and urinary tract examination was performed in all our patients and it revealed an exophytic mass on the lateral wall of the bladder. Numerous studies treat US as the first, most basic screening examination in children with haematuria [3, 7, 11, 12]. Cystoscopies as well as cytology, which are demanding in terms of the doctor's experience, are of lesser importance [3, 11, 13]. Many urologists claim that the conclusive examination in diagnostic process of bladder tumour in children is cystoscopic biopsy followed by histopathology evaluation [5, 11, 12].

TUR-BT was performed after cystoscopy with tumour biopsy in all our patients. Most authors agree that subsequent chemotherapy is not necessary because of the benign course of the disease in children [3, 11, 13]. Local chemotherapy, that is intravesical instillation of 30 mg of doxorubicin, was administered to 2 of our patients – 17-year-old boys as a similar treatment was reported to have been used for adults. It should be stressed that there are no recommendation for treatment procedures in children with TCC. In all our patients low risk tumours were diagnosed. Other authors also confirmed that bladder tumours in children are non-invasive and this fact is well known in the literature. However, the numbers of presented series are very small [8, 14–16]. According to these facts, in our opinion there is no need to perform cystoscopy in paediatric patient with bladder tumour found on US, and TUR-BT should be a first-line procedure.

There are no established guidelines as to the follow-up in children who underwent TUR-B, either. Even though a bladder tumour in children has been recognized as benign by many authors and the rate of recurrence is reported to be low, the patients must be monitored after the treatment [3, 5, 11, 13]. Bujons et al. suggested the 2-year follow-up with cystoscopy performed every 6 months [15]. It should be emphasised that the only recurrence of the tumour we observed in our patients was seen 2 years after the operation, which suggests the need of even longer follow-ups. In the series of Hoenig et al. 25 patients were treated and the duration of follow-up was up to 72 months [8].

The authors have concluded that TCC of the bladder is rare in children. Haematuria, the most important symptom, is the indication for thorough diagnosis. That type of tumour in children is usually benign and endoscopic treatment (TUR-B) seems to be the treatment of choice. To determine a follow-up schedule a more substantial group of children with bladder cancer should be analysed.

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