










Bimanual palpation for staging of bladder cancer—clinical use and its predictors

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ABSTRACT

Objective: To analyze the frequency of performing bimanual palpation (BP) during transurethral resection of the bladder tumor (TURBT) and to identify its predictors.

Material and methods: This retrospective analysis enrolled 568 consecutive patients, who underwent TURBT due to primary bladder cancer. There were thirty surgeons involved in the analysis, each performed a mean of 18.9 TURBTs (range 1-43). Univariate and multivariate logistic regression analyses were performed to identify factors predicting the BP use. This was a retrospective non-interventional study; the Ethical Board approval was waived according to institutional regulations.

Results: Two hundred and sixty-five patients (46.7%) underwent BP. BP was performed in 36.1% of Ta tumors, 49.1% of T1 tumors and 76.6% of \geq T2 tumors ($p<0.001$); in 60.2% of tumors >3 cm and in 33.3% of tumors <3 cm ($p<0.001$). Female, and male doctors performed BP in 38.3%, and 48.8% of the cases, respectively ($p=0.01$). Senior residents performed BP more often than junior residents and certified junior and senior urologists (64.6% vs. 39.2% vs. 48.2% vs. 31.1%, respectively; $p=0.03$). In multivariate logistic regression analysis higher tumor stage, larger tumor size, as well as senior residents and male surgeons performing TURBT were independent predictors of BP.

Conclusion: Though BP is recommended for each patient at the time of TURBT, it is performed only in the minority of patients undergoing TURBT, mainly those with advanced or larger tumors, operated by senior residents and male surgeons.

Keywords: Bladder cancer; cancer staging; patterns of care; physical examination.

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Introduction

Bladder cancer is the most common urinary tract malignancy, affecting 430,000 people yearly all over the world.^[1] At the time of the diagnosis, about 78% of the patients have non-muscle-invasive bladder cancer (NMIBC), while a muscle-invasive bladder cancer (MIBC) is diagnosed in the remaining percentage of patients.^[2] Accurate staging before treatment is essential for appropriate patient management. Standard staging methods comprise bimanual palpation (BP) at the time of transurethral resection of the bladder tumor (TURBT), microscopic examination of TURBT surgical specimen and

use of computed tomography (CT) or magnetic resonance imaging (MRI).^[3-6] BP is an old and traditional clinical staging tool with limited and inconsistent evidence concerning its diagnostic accuracy. According to clinical guidelines released by the European Association of Urology (EAU), BP remains a standard part of TURBT protocol.^[7] However, clinical observations suggest that in the era of imaging studies—surgeons often do not perform BP. However, this phenomenon has not been accurately studied yet.

The aim of the study was to analyze the frequency of performing BP during TURBT and to identify its predictors.

Table 1. Univariate and multivariate analysis for performing BP during TURBT

	Total	BP performed	%	Relative risk	p-value univariate	p-value multivariate
Total	568	265	46.7			
Patient sex						
F	161	73	45.3	1	0.27	
M	407	192	47.2	1.04		
Age	69.6	68.4			0.03	0.2
Stage						
Ta	332	120	36.1	1	<0.001	<0.001
T1	116	57	49.1	1.36		
T2	107	82	76.6	2.12		
Grade						
PUNLUMP	11	4	36.4	1	<0.001	0.09
Low Grade	370	139	37.6	1.03		
High Grade	179	116	64.8	1.78		
Number of tumors						
Single	396	186	47.0	1	0.64	
Multifocal	154	68	47.2	1		
Tumor size						
<3 cm	228	76	33.3	1	<0.001	<0.001
>3 cm	274	165	60.2	1.81		
Surgeon's gender						
F	115	44	38.3	1	0.01	0.002
M	453	221	48.8	1.27		
Surgical experience						
JR	79	31	39.2	1.26	0.03	0.004
SR	158	102	64.6	2.08		
JS	170	82	48.2	1.55		
SS	161	50	31.1	1		

BP: bimanual palpation; F: female; M: male; PUNLUMP: papillary urothelial neoplasm of low malignant potential; JR: junior resident; SR: senior resident; JS: junior specialist; SS: senior specialist

Material and methods

Patients

Medical records of 568 consecutive patients who underwent TURBT in a single department in the period of January 2011-December 2016 due to primary bladder cancer were reviewed retrospectively. Demographic (sex and age), surgical (number, size and location of tumors) and pathological (stage and grade) parameters were analyzed. Tumors were staged according to the 2009 TNM classification and graded according to the 2004 WHO/ISUP grading system. BP was defined as the palpation of the bladder with left hand placed on the lower abdominal wall and right index finger introduced into a vagina in the female or the rectum in the male patients. BPs were performed in the operative room directly before TURBT, when patients were already anesthetized. Patients were considered to undergo BP based on their surgical reports.

Surgeons

Six female and 24 male surgeons who individually performed the average number of 18.9 (range 1-43) primary TURBTs were enrolled into the study. Surgeons were divided into four groups based on their professional experiences: JR (Junior Residents)-residents of urology in the first three years of their training, SR (Senior Residents)-residents of urology in the second three years of their training, JS (Junior Specialists)-certified urologists up to 10 years after finishing the residency program, SS (Senior Specialists)-certified urologists for more than 10 years.

Statistical analysis

Percentages were calculated by dividing the number of records by the number of all available records. Continuous variables were presented as means. To evaluate factors that can be associated with performing BP univariate and multivariate stepwise forward logistic regression analyzes were used and a 2-sided p-value <0.05 was considered statistically significant. Statistical

Table 2. Results of pathological examination in patients who underwent BP

Result of pathological examination	All		Impalpable mass		Palpable mass, mobile bladder		Immobile bladder	
	All	%	Impalpable mass	%	Palpable mass, mobile bladder	%	Immobile bladder	%
Total	254		183		46		25	
Tx	5	2.0	5	2.7	0	0	0	0
Ta	115	45.3	104	56.8	8	17.4	3	12.0
T1	56	22.0	42	23.0	10	21.7	4	16.0
MIBC	77	30.3	32	17.5	28	58.3	17	68.0

analyses were performed using STATISTICA 12 (StatSoft, USA).

This was a retrospective non-interventional study, so the informed consent and the Ethical Board approval were waived according to institutional regulations.

Results

There were 407 men and 161 women in the study cohort, with the male to female ratio of 2.5. The age of the patients ranged widely from 36 to 93 years, with a median value of 69.6 years. Pathological staging revealed stage Ta in 332 (59.8%), stage T1 in 116 (20.9%) and MIBC in 107 patients (19.3%).

Only 265 patients (46.7%) underwent BP according to surgical reports. Patients with MIBC underwent BP 2.1 times more often than patients with stage Ta cancer and 1.6 times more often than those with stage T1 cancer. Also gender and experience of the surgeons were positive predictive factors of performing BP. Table 1 presents characteristics of the patients, tumors and surgeons in univariate and multivariate analysis for performing BP during TURBT. In multivariate analysis, independent predictors for performing BP were tumor size and stage, as well as gender, and experience of the surgeon.

Clinical interpretations of 254 out of 265 patients who underwent BP were available. The patients had an impalpable tumor (n=183: 72%), a palpable and mobile mass (n=46: 18.1%), and an immobile mass (n=25: 9.8%). Detailed results of pathological examination regarding BPs are shown in Table 2.

Discussion

Accurate staging plays an indispensable role in the decision-making and management in patients with bladder cancer. We performed a retrospective analysis of BP performance in patients with bladder cancer, finding, that BP was often omitted, especially in cases of small, low stage tumors.

Study by Gray et al.^[8] showed that early and accurate clinical staging decreases 5-year mortality rates in patients treated with radical cystectomy. Many authors have proven that diagnostic imaging such as CT, MRI or ultrasound may be efficient and accurate in clinical staging of bladder cancer.^[9,10] However, clinical staging includes also BP which remains basic, but an important staging tool.^[3,4,11] Our study shows that more than half of the patients with primary bladder cancer do not undergo BP during TURBT, despite the clinical guideline statements. Kellett et al.^[6] first noticed in 1980 that CT may be as good as BP. It seems that it is more and more common to rely only on radiographic findings rather than physical examination which may be related to poor sensitivity (43-46%) and moderate specificity (75-82%) of BP.^[3,5] However, Rozanski et al.^[5] proved that performing BP independently improves staging accuracy, while combined with radiographic imaging it improves its specificity, positive and negative predictive values. Moreover, study by Wijkström et al.^[12] showed that BP findings have a significant prognostic value for patient survival and thus are crucially important in clinical staging. On the other hand our study corresponds with other available data^[3,4,13] showing lack of satisfactory concordance between results of BP with pathological results.

We also noticed that the percentage of patients who undergo BP differs significantly in certain subgroups. Firstly, stage of bladder cancer influenced the rate of performing BP. It was performed in as many as 76.6% of MIBC patients and only 39.5% of NMIBC patients. In a historical cohort, Ploeg et al.^[13] noticed that 52.4% of their MIBC patients underwent BP, which was significantly lower relative to our cohort. This discrepancy may be partially explained by the fact that our department is a university teaching hospital, while Ploeg et al.^[13] reported that BP is performed much more often in teaching than in non-teaching hospitals (62 vs. 30%). Grzegorzórkowski et al.^[14] observed high accuracy of endoscopic visual staging in MIBC patients which explains why patients with MIBC undergo BP significantly more often than those with NMIBC. Moreover, in multivariate logistic regression analysis, we revealed that stage of the disease is an independent predictive factor for BP.

Second, we noticed that surgeon's experience impacts the frequency of performing BP. Many authors suggest that surgeon-related factors (especially professional experience) influence the recurrence risk after TURBT.^[15,16] In our study, senior residents did perform BP much more frequently than both junior residents and certified urologists. De Vries et al.^[17] observed that senior residents show higher degree of completeness of the TURBT procedure with lower incidence of unintended events as compared to junior residents. However, surgical complications are more common with senior than junior residents.^[18] Finally, when interpreting the phenomenon of higher BP rates among senior residents than certified urologists, one should remember that the overall quality of TURBT may be higher when performed by certified urologists.^[19] We also observed that male urologists significantly more often perform BP than female urologists. The underlying cause is difficult to identify, however, the fact that female urologists may have less experience overall and less experience in oncological procedures in male patients could be of importance.^[20,21]

Though the aim of the study was not to assess the accuracy of BP it seems to be important to notice that even among patients with NMIBC, some cases had palpable tumor and immobile bladder as detected with BP. This fact however does not prove, that BP should not be performed, because, as it was discussed before, performing BP improves staging accuracy.^[5]

Main limitation of our study is its local character of analysis which may show some department-specific observations, especially as it is a tertiary center and a university hospital. The number of patients with MIBC, which are of the greatest importance in the context of BP, was limited. We have not analyzed available pathological data of cases who underwent radical cystectomy, thus value of BP was not evaluated. However, such studies have been previously performed and their results are available in the literature.^[4,13] It is also a retrospective analysis which is based on medical documentation, so incomplete medical files may be a source of bias.

In conclusion, only minority of patients with primary bladder tumors submitted to TURBT undergo BP. Tumors of >3 cm, MIBC, senior resident surgeon and male surgeon are independent predictive factors for BP. Though it has been proved that bimanual palpation is beneficial for accurate tumor staging in patients with bladder cancer, it is very often omitted during TURBT.

Ethics Committee Approval: According to local regulations, the Review Board approval was waived for this retrospective non-interventional analysis.

Informed Consent: Due to the retrospective design of the study, informed consent was not taken.

Peer-review: Externally peer-reviewed.

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