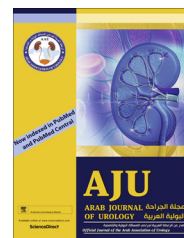




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ONCOLOGY/RECONSTRUCTION

ORIGINAL ARTICLE

**Bipolar vs monopolar resection of bladder tumours
of > 3 cm in patients maintained on low-dose
aspirin: A randomised clinical trial**



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KEYWORDS

Bipolar;
Bladder tumours;
Low-dose aspirin

ABBREVIATIONS

Hb, haemoglobin;
(B-)(M-)TURBT, (bipolar)(monopolar)transurethral resection of bladder tumour

Abstract Objective: To compare the safety and efficacy of bipolar vs monopolar transurethral resection of bladder tumour (TURBT) in patients maintained on low-dose aspirin with tumours > 3 cm.

Patients and methods: A prospective randomised single-centre study was performed including 200 patients with bladder tumours of > 3 cm, as measured by ultrasonography. All patients were using low-dose aspirin (81 mg/day), which was not stopped in the perioperative period. Patients were randomised into two groups: Group A, monopolar TURBT (M-TURBT); Group B, bipolar TURBT (B-TURBT). The primary endpoint of the study was the decrease in postoperative haemoglobin (Hb) concentration measured using an automated cell counter. The secondary endpoints of the study were intraoperative blood transfusion or the occurrence of urethral trauma during cystoscopy and the need for re-coagulation.

Results: The postoperative reduction in Hb concentration, was significantly lower in the B-TURBT group [mean (SD) 0.55 (0.26) g/dL] compared with the M-TURBT group [mean (SD) 1.24 (0.61) g/dL] ($P < 0.001$). There was also a significant difference (in favour of B-TURBT) between the groups in the mean postoperative reduction in haematocrit and the mean postoperative hospital stay. There was no significant difference between the groups for the occurrence of obturator jerk, bladder perforation, and the need for blood transfusion.

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Conclusion: B-TURBT in patients maintained on low-dose aspirin is better than M-TURBT for minimising postoperative drop in Hb concentration.

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Introduction

Transurethral resection of bladder tumour (TURBT) using monopolar current (M-TURBT) as the source of energy for the cutting loop is the standard of care for the treatment of non-muscle-invasive bladder tumours [1,2]. Recently, bipolar resection has proven to be an effective and safe alternative to monopolar resection, especially in prostate resection [2,3]. Several studies have reported on transurethral resection of bladder tumour (B-TURBT) vs M-TURBT, but they had the limitation of not focusing on large tumours [1–3].

Urologists worldwide are increasingly confronted by patients with multiple comorbidities, such as coronary arterial disease, cardiac dysrhythmias, valvular heart disease, and deep venous thrombosis [4]. Patients with such comorbidities are usually maintained on oral antiplatelets and anticoagulants that increase the risk of bleeding complications during urological interventions [4].

The idea behind the present study arose from the clinical observation that many patients presenting with bladder tumours for the first time at our institute were using low-dose aspirin as antithrombotic therapy.

Patients and methods

This prospective study was performed over an 18-month period and comprised 200 patients presenting with bladder tumours of > 3 cm in maximum diameter, as measured by ultrasonography, for the first time. In patients with multiple tumours, the diameter of the largest was measured. All patients were receiving low-dose aspirin (81 mg/day) as antiplatelet therapy, which was not stopped before surgery. Patients with recurrent tumours and patients with CT or MRI evidence of muscle-invasive tumours were excluded from the study. The protocol of the study was approved by the Local Ethics Committee of the Faculty of Medicine and it was registered in Alexandria University. An informed consent explaining the procedure and the possible complications was signed by all patients.

Patients were randomly divided into two equal groups; Group A, M-TURBT was performed using a Storz 24-F resectoscope (Karl Storz GmbH & Co. KG, Tuttlingen, Germany) and the Martin ME 400 generator (KLS Martin GmbH & Co. KG, Umkirch, Germany) settings were 90 W for cutting and 70 W for

coagulation, 1.5% glycine was used for irrigation; and Group B, B-TURBT was performed using Olympus 26-F resectoscope and Olympus ESG-400 generator (Olympus Surgical Technologies Europe, Hamburg, Germany), settings were 100 W for cutting and 80 W for coagulation, normal saline was used for irrigation.

Simple randomisation was performed based on computer generated serial numbers and all procedures were performed under spinal anaesthesia, obturator block was not used. A single experienced urologist performed all cases.

The primary endpoint of the study was the decrease in postoperative haemoglobin (Hb) concentration measured 24-h postoperatively using an automated cell counter. Secondary endpoints of the study were intraoperative blood transfusion or the occurrence of urethral trauma during cystoscopy and the need for re-coagulation.

Our hypothesis was set to be: B-TURBT is associated with less bleeding complications than M-TURBT in patients maintained on low-dose aspirin.

The Clavien–Dindo classification of surgical complications was used to assess complications.

Power analysis

A total of 200 patients were entered in this two-treatment parallel-design study. The probability (power) was 94% that the study would detect a treatment difference at a two-sided 0.05 significance level.

Plan for data analysis

Data analysis was carried out using the Statistical Package for Social Science (SPSS® version 20; IBM Corp., Armonk, NY, USA). Percentages, means and standard deviations (SDs) were used to describe demographic, as well as tumour characteristics amongst the studied patients. The Fisher's exact test was used to compare the incidence of complications amongst both groups, namely bladder perforation and obturator spasm. Analysis was done at the 5% level of significance.

Results

The results (Table 1) show no significant difference between the groups for patients' demographic characteristics. For tumour characteristics, there were signifi-

Table 1 Demographic characteristics and tumour characteristics amongst both groups.

Variable	M-TURBT (<i>n</i> = 100)	B-TURBT (<i>n</i> = 100)	<i>P</i>
Sex, <i>n</i>			0.269
Males	79	85	($\chi^2 = 0.220$)
Females	21	15	
Age, years			0.904
Min–max	45–80	46–81	(<i>t</i> = 0.121)
Mean (SD)	59.25 (6.86)	59.37 (7.14)	
Tumour number, <i>n</i>			0.843
1	68	70	($\chi^2 = 0.829$)
2	21	21	
3	9	6	
4	2	3	
Tumour site, <i>n</i>			0.454
Lateral wall	31	36	($\chi^2 = 0.561$)
Other	69	64	
Tumour grade, <i>n</i>			0.007*
Low grade	48	67	($\chi^2 = 7.38$)
High grade	52	33	
Tumour size, cm			0.545
Min–max	3–5.30	3–6.10	(<i>t</i> = 0.606)
Mean (SD)	3.50 (0.56)	3.46 (0.51)	

* Statistically significant.

cantly more high-grade tumours in the M-TURBT group.

Complete resection of the tumours was achieved in all cases, in both groups. Postoperative continuous irrigation was not used in any of the cases. The urethral catheter was removed after 24–48 h, when urine was clear except in cases with bladder perforation. None of the patients in either group developed postoperative clot retention requiring re-coagulation.

Comparing the outcome variables amongst both groups (Table 2), there was no significant difference in the mean preoperative Hb, the need for blood transfusion, and the operative time, but the mean postoperative reduction in Hb concentration, haematocrit, and the postoperative hospital stay were significantly lower in the B-TURBT group compared to the M-TURBT group.

Extraperitoneal bladder perforation occurred in five cases and was treated by prolonged catheter drainage for 3 days (Clavien–Dindo grade I complication). In all five cases, complete tumour resection was achieved before discovering the perforation, which occurred during resection of the tumour base. Obturator jerk occurred in 27 patients (13.5%), with no significant difference between the groups.

Multivariate linear regression analysis showed that significant predictors for postoperative reduction of Hb concentration were age of the patient ($B = 0.175$, $P = 0.001$), tumour size ($B = 0.117$, $P = 0.018$) and tumour pathological grade ($B = 0.337$, $P = 0.001$), as well as the type of the operation ($B = -0.523$, $P = 0.001$).

Table 2 Outcome variables amongst both groups.

Variable	M-TURBT (<i>n</i> = 100)	B-TURBT (<i>n</i> = 100)	<i>P</i>
Mean preoperative Hb, g/dL			0.944
Min–max	10–14	11–14	(<i>t</i> = 0.070)
Mean (SD)	12.39 (0.90)	12.38 (0.71)	
Mean postoperative Hb, g/dL			< 0.001*
Min–max	8–13.6	10–13.6	(<i>t</i> = -5.647)
Mean (SD)	11.15 (0.96)	11.83 (0.74)	
Mean reduction in Hb concentration			< 0.001*
Min–max	0–3.5	0.1–1.4	(<i>t</i> = 10.453)
Mean (SD)	1.24 (0.61)	0.55 (0.26)	
Hb reduction > 1.5 g/dL, <i>n</i>	34	0	< 0.001*
Hb reduction > 2 g/dL, <i>n</i>	12	0	< 0.001*
Mean reduction in haematocrit value, %			< 0.001*
Min–max	0.3–10.5	0.3–5.2	(<i>t</i> = 10.152)
Mean (SD)	3.74 (1.84)	1.69 (0.84)	
Need for blood transfusion, <i>n</i>	2	0	0.497
Mean operative time, min			0.001*
Min–max	25–50	25–55	(<i>t</i> = 3.26)
Mean (SD)	36.42 (6.21)	33.74 (5.39)	
Bladder perforation, <i>n</i>	4	1	0.369
Obturator spasm, <i>n</i>	15	12	0.654
Mean duration of hospital stay, h			< 0.001*
Min–max	24–96	24–72	(<i>t</i> = 5.667)
Mean (SD)	42.24 (15.67)	31.20 (11.57)	

* Statistically significant.

Discussion

The use of a bipolar resectoscope is associated with many advantages over the ordinary monopolar resectoscope; saline used for irrigation has reduced the morbidity from TUR syndrome, especially in long duration procedures (> 90 min) [5]. Moreover, in the monopolar resectoscope, the active electrode is the resecting loop and the return electrode is the diathermic pad placed on the patient's body surface, so that energy travels through the patient's body to complete the circuit. In the bipolar resectoscope, both the active and the return electrode are close to each other at the level of the target tissue, thus reducing the distance crossed by the energy and decreasing risks for patients, especially those with a cardioverter defibrillator or an implanted pacemaker [6].

The present study, to our knowledge, is the first to compare between B-TURBT and M-TURBT of large bladder tumours (> 3 cm) in patients maintained on low-dose aspirin without preoperative cessation of low-dose aspirin therapy.

The most important finding of the present study is that B-TURBT in patients using low-dose aspirin is associated with a significantly lower mean Hb decrease and shorter hospital stay than M-TURBT.

In the present study, we assessed the factors affecting postoperative drop in Hb and not haematocrit because with modern laboratory equipment haematocrit is calculated by automated analysers and not directly measured, and it is related to the level of Hb.

Aspirin is a critical therapy for patients with cardiovascular disease. Stopping aspirin may lead to platelet rebound phenomenon and prothrombotic state predisposing to major adverse cardiovascular events [7]. The fear of excessive bleeding has led to the common practice of stopping aspirin therapy 7 days before elective surgery [8]. However, for many operative procedures, thromboembolic risks associated with aspirin withdrawal are much higher than the risk of perioperative bleeding whilst continuing aspirin [9,10]. Today, the consensus is that for patients with cardiac risk factors, low-dose aspirin can be continued in the perioperative period of many surgical procedures without a higher risk of major bleeding [4].

Contrary to the results of the present study, Venkatramani et al. [11] in their parallel arm randomised comparison between B-TURBT and M-TURBT reported that there was no significant difference in change in haematocrit between the two arms in their study. However, these authors did not mention whether their patients were using low-dose aspirin or not [11]. Del Rosso et al. [12] in their randomised controlled comparison between B-TURBT and M-TURBT found no significant differences in the mean change in Hb between the two modalities.

The incidence of the occurrence of obturator jerk during TURBT is widely variable in different studies with an average of 10–25% [11,13], whilst others have reported an incidence of 0.5–5% in B-TURBT [14,15]. In the present study, there was no significant difference between B-TURBT and M-TURBT for the occurrence of obturator jerk. This concurs with Venkatramani et al. [11] and Del Rosso et al. [12], who reported no significant differences in the incidence of obturator jerk and bladder perforation.

Sugihara et al. [16] performed a large retrospective comparison between B-TURBT and M-TURBT in Japan; these authors reported a lower incidence of severe bladder injury associated with B-TURBT than with M-TURBT. In the present study, there was no significant difference between the groups in the occurrence of bladder injury. Sugihara et al. [16] also reported no difference between the two modalities in postoperative haemostasis procedures, the need for blood transfusion, and the duration of anaesthesia. These reports are in agreement with the results of the present study.

The difference in the Hb drop between the two groups in the present study was statistically significant but it may be of no clinical significance in young patients. This is not true in elderly patients; the WHO defined anaemia in the elderly as Hb thresholds of

< 13 g/dL for men and < 12 g/dL for women [17]. Multiple epidemiological studies have shown an association between a slight drop in Hb below the WHO threshold and a worse outcome in elderly patients including increased hospitalisation, increased difficulty with mobility, and falls [18–20]. Also, it was found that the presence of cardiovascular disease appears to increase the negative prognostic impact on survival [21]. The present study found that increased age of patients is associated with more significant postoperative drop in Hb concentration, so using B-TURBT could decrease that risk.

Potential limitations of the present study include the imbalance between the two groups regarding tumour grade despite the randomisation process; no assessment of the difference in serum sodium between the two groups; no assessment of cautery artefacts in pathological specimens; the small number of female patients included, which is probably because of low incidence of smoking amongst this population; and finally being a single-centre study.

It is the recommendation of the present study that B-TURBT would be the method of choice for resection of bladder tumours in patients maintained on low-dose aspirin. However, a population-based study including multiple centres is also recommended to overcome the limitations of sample size in randomised trials and to confirm the findings of the present study.

Conclusion

B-TURBT in patients maintained on low-dose aspirin is superior to M-TURBT for minimising postoperative drop in Hb concentration.

Conflicts of interest

None.

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