

Comparisons of obturator jerk using monopolar versus bipolar diathermy following transurethral resection of urinary bladder tumor

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Objective: To compare obturator jerk using monopolar with bipolar diathermy for transurethral resection of urinary bladder tumor.

Methodology: This is randomized control trial was conducted at urology ward of CMC, Larkana from January 1, to June 30, 2019. Total of 80 patients irrespective of age, both genders with history of hematuria and clinically or ultrasound of KUB showing mass in urinary bladder were included. All patients were distributed in 2 groups by lottery method. In Group 1, TUR-BT was done using bipolar diathermy and in Group 2,

monopolar diathermy was used.

Results: In bipolar diathermy out of 40 patients, obturator jerk was noticed in 3 patients and 7 patients with monopolar, respectively.

Conclusion: Bipolar resection lead to decrease in complications rate with shorter catheterization time than monopolar study. (Rawal Med J 202;45:622-625).

Key words Monopolar diathermy, bipolar diathermy, TUR-BT and non-muscle invasive bladder cancer.

INTRODUCTION

Worldwide in male population, cancer of bladder (BC) is 7th most common cancer, but if we will consider in both genders then its incidence decreases to 11th, that indicates the male predominance in carcinoma of bladder.¹ Incidence highest in Belgium and lowest in Finland and cause of that difference is not yet known.² According to its depth of invasion, bladder cancer is divided in non-muscle invasive bladder cancer (NMIBC) and muscle invasive bladder cancer (MIBC). Among them, 75% patients with BC present with a disease confined to the mucosa (stage Ta, CIS) or submucosa (stage T1) and as depth of invasion increases its mortality rate also rises.^{1,2}

Initial recommended treatment for the most NMIBC and MIBC is transurethral resection of tumor. It can be done cystourethroscopically and electric current of diathermy is used to resect or fulgurate the tumor. Histology confirms bladder tumor and its type. Diathermy that is used for resection of tumor is of 2 types, monopolar and bipolar diathermy.³ Following resection of tumor either with monopolar or bipolar diathermy many complications occurs like bleeding, perforation, incomplete resection, obturator jerk and urethral stricture.⁴ Purpose of our

study was to compare frequency of obturator jerk using monopolar versus bipolar diathermy following transurethral resection of urinary bladder tumor.

METHODOLOGY

This randomized control trial was conducted at urology ward of CMC Larkana for period of six months from January 1, to June 30, 2019. Total of 80 patients irrespective of age, both genders with history of hematuria and clinically or ultrasound of KUB showing mass in urinary bladder were included after approval of ethical review committee. Patients not willing for surgery, deranged clotting profile confirmed by prothrombin time (PT) and activated partial thromboplastin time (APTT) or having active urinary tract infection and deranged renal function tests were excluded from study.

All patients were distributed in 2 groups by lottery method, slips were prepared and kept back in box and patients were requested to take slip. In Group 1, TUR-BT was done using bipolar diathermy. In Group 2, monopolar diathermy was used. In both groups surgical intervention was performed by consultant urologist having at least 3 years of post-fellowship experience. Following TUR in both

groups obturator jerk was noted by seen flexion of hip with naked eye and data was composed on study proforma.

Statistical Analysis: Data were analyzed with SPSS version 20.0. Continuous and categorical variables were calculated for descriptive statistic while mean and standard deviation for age of patient and BMI. Diabetes mellitus and raised blood pressure were calculated for Frequency and percentage. In both study groups obturator jerk was compared using t-test. Stratification was done further to control effect modifiers like age, diabetes mellitus and raised blood pressure. $p \leq 0.05$ was considered as significant.

RESULTS

A total of 80 patients were randomly allocated into two groups, 40 patients in each group. Group 1 was treated with bipolar diathermy and Group 2 with Monopolar diathermy.

Table. Comparison of both groups.

	No Obturator Jerk	Obturator Jerk noted	Total	P-value
Group A (Bi-polar diathermy)	37 (92.5%)	03	40	0.176
Group B (Monopolar Diathermy)	33 (82.5%)	07	40	0.176
Total	70 (87.5%)	10	80	

Chi-square=1.828

In bipolar diathermy, out of 40 patients, obturator jerk was noticed in 3 patients and 7 patients with monopolar respectively (Table). Out of 3 patients in bipolar group in 2 patients transient hematuria was noticed at the time of surgery due to obturator jerk and in 1 patient clot retention was seen on 1st post-operative day, all were managed successfully. While in monopolar group, obturator jerk was noticed in 7 patients, out of which in 4 patients hematuria was noticed that was transient in 2 cases, while in 2 patients case was abandoned due to loss of vision, then redo-TURBT done after few days. In one patient, due to obturator jerk bladder perforation was noticed, procedure was completed as perforation was extra-peritoneal, so Foley's catheter were left for 2 weeks and in discharged after performing cystogram.

In bipolar TUR-BT mean time of catheter removal was 19.33 ± 4.64 hours and 35.90 ± 6.86 hours in monopolar group. It was significantly low in group 1 than 2. It was observed that obturator jerk was significantly low in group 1 than group 2.

DISCUSSION

TUR-BT was 1st of all introduced in year 1910, since than it was done using monopolar diathermy for both diagnostic and therapeutic purpose.³ Around more than 30 years ago experiments were performed using bipolar current for transurethral resection of bladder growth, at that high frequency current was used.^{4,5} After few years, studies showed that bipolar current can desiccate tumor at low power that leads to less tissue destruction but these trials were in animal models.⁶ After that it was clinically tried over human beings and was considered as safe and effective tool for resection. On other hand, it was also seen that due to its low destructive effect on tissues, it leads in adequate and less necrotic for histopathological analysis.

Recent studies showed that bipolar current was a safe and effective method with advantage of minimal effect on neurovascular bundle hence minimizing obturator nerve stimulation and tissue obtained for histopathological reporting was of same quality as that of monopolar.^{7,8} For some time, technique was limited for pregnant women and on patients with pacemakers.^{9,10}

In our study, obturator jerk was seen in 7 patients with monopolar diathermy and in 3 patients with bipolar diathermy, which is similar to Pu et al study who reported adductor contractions was seen around 5% bladder related injuries in 1.7 % and hematuria in 2.5%.¹¹ Results of our study was also comparable to Puppo et al from Italy over 1000 cases, out of which in 480 cases bipolar current was applied. Obturator nerve stimulation was reported in 2% in their study and in 3 patients in our study while no bladder wall perforation in bipolar diathermy groups in both studies. Clot retention seen in 2%, out of which <1 % needs transfusion in Puppo et al study.¹² Drawback of our study in comparison their study was difference of sample size which was much higher in Puppo et al study.¹²

Bladder injury following TUR-BT is not too much, but if occurs leads to over staging of tumor due to seedling outside the urinary bladder.¹³ Real reporting of this drastic sequel is undermined because it is less reported and literature proven prevalence of 2 to 6%.^{14,15} But nowadays, due to advancement in imaging studies its prevalence has reached near to 60%. It's also seen in recent past that due to bipolar diathermy again number cases reported is declining and this decrease is due to decrease in obturator jerk.¹⁶

In another study Gupta et al that was also a comparative study but in between high and low power setting using in bipolar diathermy, there results suggested that bladder related injuries and frequency of obturator jerk is much higher when high frequency current of 150+ watts is used in comparison to low voltage only 50 Watts respectively.¹⁸ This suggested that many of complications can be avoided by only minimizing and making power setting of 50 and 40 W.^{18,19} Thus, using bipolar current and reducing the power setting not only reduces the frequency of obturator jerk but also bladder perforation, but being an endourologist we should be familiar with latest gadgets, having adequate knowledge of bladder anatomy before going for TUR-BT. Standardized anesthesia, proper location of tumor size, site and burden has also positive impact over good outcome of surgery along with good surgical skills.

It is also noted that catheterization, hospital stay and cost is also decreased in bipolar arm then monopolar.¹⁹ Del Rosso showed significant reduction of the catheterization time when bipolar current was applied then monopolar, reducing upto 24 hours less catheterization time.²⁰ In our study, mean catheterization time was 19.33 ± 4.64 hours in bipolar diathermy group and 35.90 ± 6.86 hours in monopolar diathermy, which is also comparable to above mentioned Del Rosso study. But overall hospital stay is different in different hospitals but it was concluded generally that where ever bipolar diathermy was used there hospital stay was much lesser in comparison to monopolar possibly because of smaller irrigation¹⁹ and catheterization time.²⁰ But drawback of our study was that we have not compared hospital stay and cost.

CONCLUSION

It is concluded that bipolar resection leads to decreased in complications rate with shorter catheterization time than monopolar study. Still literature is lacking, further studies should be carried on larger scale to compare such results. If seems suitable then will be used in future as sole in comparison to monopolar group.

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