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Büyük Mesane Taşlarının Transüretral Nefroskop ile Tedavisi

The treatment of Larger Bladder Stones Using of Nephroscope Via Transurethrally

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ÖZ

GİRİŞ ve AMAÇ: *Mesane taşlarının tedavisinde minimum travma oldukça önemlidir. Bu çalışmada da, transüretral yolla nefroskop kullanılarak mesane taşlarının endoskopik tedavisi hakkında deneyimlerimizi sunduk ve bu yöntemi sistoskop kullanılarak yapılan yöntemle karşılaştırdık.*

YÖNTEM ve GEREÇLER: *Mesane taşı olan 26 erkek hasta transüretral nefroskop kullanılarak ve 24 hasta sistoskop kullanılarak endoskopik tedavi edildi. Taş boyutu ve prostat hacmi, direk grafi veya suprapubik ultrasonografi ile ölçüldü. Operasyon süreleri de her iki grupta ölçüldü.*

BULGULAR: *26 hastada ortalama taş boyutu ve toplam taş sayısı sırasıyla 36.48±16.7 mm ve 31 taş olarak belirlendi. 26 hastanın yaş ortalaması 59.3±17.6 idi. İntravenöz sedoanaljezi başlangıcından üretral foley kateter yerleştirilmesine kadar geçen ortalama ameliyat süresi 33.2±18.9 dakika ve ortalama prostat hacmi 50.7±20.4 ml olarak ölçüldü. İki grup arasında operasyon süreleri açısından istatistiksel anlamlı fark saptanmadı.Hastaların hiçbirinde erken (postoperatif üçüncü ay) dönemde üretral striktür gelişmedi.*

TARTIŞMA ve SONUÇ: *Nefroskopun, taş parçalarının kolayca çıkarılmasını kolaylaştıran daha geniş bir lümene sahip olması sistoskop kullanımına göre belirgin bir avantaj sağlamkatadır. Nefroskop kullanarak transüretral yoldan taş tedavisi, hastaların morbiditesini arttırmadan güvenli ve etkili bir yöntemdir.*

Anahtar Kelimeler: *nefroskop, mesane taşı, kalkül, transüretral*

ABSTRACT

INTRODUCTION: *It is essential that the bladder stone be removed with a minimum of trauma and damage applied to the bladder. In this context, we present our experience removal of bladder stone endoscopically with using nephroscope via transurethrally and compared this method with using cystoscope.*

METHODS: *Twenty six male patients who had bladder stones treated with endoscopically with using nephroscope via transurethrally and 24 patients were treated with using cystoscope. The maximum diameter of stones in milimeters and prostate volume were measured on plain KUB Xray or suprapubic ultrasonography. Also, operation time was measured.*

RESULTS: *The mean stone diameter and total number of stones in the 26 patients was 36.48±16.7 mm and 31 stones, respectively. The average age of the 26 patients was 59.3±17.6 years. Mean operative time from begining of intravenous sedoanalgesia until urethral foley catheter insertion was 33.2±18.9 minutes and mean prostate volume was measured to be 50.7±20.4 ml. No statistical difference was found for operation time between groups. None of the patients developed urethral stricture disease in the early (postoperative third month) follow-up.*

DISCUSSION and CONCLUSION: *Nephroscope has distinct advantage over the cystoscope as it has a wider lumen, which facilitates easy removal of the stone fragments. Transurethral stone removal using a nephroscope is safe and efficacious method of stone removal without increasing the morbidity of the patients.*

Keywords: *nephroscope, bladder stone, calculi, transurethral*

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INTRODUCTION

Bladder calculi are one of the most common entities of stones occurring in the urinary tract, and, unlike kidney or ureter stones, most occur because of conditions unrelated to calculi (1). Reported risk factors for developing bladder stones include patient age, type of augmented diversion, immobilization contributing to hypercalciuria and oxalate calcium stone formation, and infected urine (2). Massive or giant bladder calculus is a rare entity in the recent urological practice. Males are more affected than females. Bladder calculi are usually observed secondary to bladder outlet obstruction. These patients generally present with recurrent urinary tract infection, hematuria or urinary retention. Regarding the clinical presentation, bladder stones may be asymptomatic. However, symptoms such as suprapubic pain, dysuria, hematuria, weak and choppy urine stream, hesitancy, frequency, urgency and pain in the glans may occur in over 50% of patients (3,4).

The size and composition of the stone, the size of the enlarged prostate, the patient's conditions, a history of surgery on the lower urinary tract, the cost of the surgery, and the instruments that can be used during surgery are important factors that need to be considered in the treatment of bladder calculi (5). It is essential that the bladder stone be removed with a minimum of trauma and damage applied to the bladder. The management of bladder calculi has been developed in the recent decade, with the result that multiple management modalities are available. Transurethral approaches for bladder calculi or cystolitholapaxy is probably the most common way to manage cystolithiasis, and especially appropriate if there are associated bladder outlet pathologies (6-10). The surgical difficulty will be increased when the stones are >2 cm. Although open cystolithotomy is widely used for the removal of larger bladder calculi, current treatment trends are moving toward minimally invasive procedures, such as extracorporeal shock wave lithotripsy (ESWL), transurethral cystolithotripsy (TUCL), and percutaneous suprapubic cystolithotripsy (PCNL) (11). Nephroscope has distinct advantage over other current endoscopes in transurethral cystolithotripsy as it has a wider lumen, which facilitates easy removal of the Stone fragments. In present study, we present our experience removal of bladder stone endoscopically with using nephroscope via transurethrally. Also, we compared this procedure with transurethral cystolithotripsy using cystoscope.

METHODS

There were twenty six male patients who had bladder stones treated with endoscopically with using nephroscope via transurethrally. For control group, 24 patients who treated with transurethral cystocope were included in the study. The pre-operative evaluation included medical history, physical examination, blood tests, urine culture, plain kidney, ureter and bladder (KUB) X-ray, and ultrasonography of the urinary tract. The maximum diameter of stones in milimeters and prostate volume were measured on plain KUB X-ray or suprapubic ultrasonography. All patients had sterile urine cultures before the operation.Options of management were explained to the patient and the possibility of intraoperative conversion to other modality of management from endourology procedure to open surgery was also explained.

26 Fr rigid nephroscope (Karl Storz) was introduced after adequate lubrication into the urethra. After entering the bladder and visualizing the stone, pneumatic or ultrasonic lithotriptor is passed and stone fragmented into smaller pieces. After adequate fragmentation is achieved, fragments are retrieved using an ellick evacuator. Also, forceps was used for remving the s tone fragments. At the end of procedure, 16 F foleys was placed which was removed on first postoperative day (if there was no hematuria) and patient was discharged the same day. In the other group, the same procedure was used with 21 Fr rigid cystoscope (Karl Storz).

The baseline characteristics of the controls and the subjects were compared using a twosample t-test or Mann–Whitney U-test for the continuous variables. All statistical tests were two-tailed, and statistical significance was defined as $P < 0.05$. All analysis were conducted using SPSS version 15.0 (SPSS Inc., Chicago, Illinois, USA).

RESULTS

50 patients of bladder stone treated in the urological department. 26 of these were treated by

nephroscope. 24 patients were treated using cystoscope. The mean age of the 26 patients was 59.3±17.6 years. The mean stone diameter and total number of stones in the 26 patients was 46.48±16.7 mm and 31 stones, respectively. The mean age was 51,6±12,36 years in control group. Also, the mean stone diameter was 19,2±5,54. Mean age was lower in control group than the patients who treated with nephroscope ($p<0,05$). Comparing the stone diameter, the patients who treated with cystoscope have lower values ($p<0,05$). Complete clearance was achieved in all patients confirmed intra-operatively using the nephroscope or cystoscope and follow up KUB with Ultrasound 4-6 weeks later. Mean operative time from begining of intravenous sedoanalgesia until urethral foley catheter insertion was 33.2±18.9 minutes in study group and 35,62±14.4 in control goup. No statistical difference was found for mean operation time between groups. Also, mean prostate volume was measured to be 50.7±20.4 ml in study group. Mean prostate volume was 44,3 ±12,8 in control group. The control group had lower prostate volumes ($p<0,05$). None of the patients developed urethral stricture disease in the early (postoperative third month) follow-up. One patients with previously known urethral stricture disease have shown to have the same disease in the follow-up period in study group. No perop or postop complications were determined in all cases. In all cases, the transurethral catheter was removed on first postoperative day . No recurrence was observed during the follow-up period. Characteristics of all patients were shown in Table 1.

Table 1. Characteristics of all men with bladder calculi

	Study group	Control group	P value
Number of patients (n)	26	24	
Age (years) (mean±std)	59.3±17.6	51,6±12,36	**<0,05**
Stone diameter (mm) (mean±std))	46.48±16.7	19,2±5,54	**<0,05**
Prostate volüme (ml) (mean±std)	50.7±20.4	44,3 ±12,8	**<0,05**
Operation time (min) (mean±std)	33.2±18.9	35,62±14.4	**0,52**

DISCUSSION

Vesical calculus means “urolith in bladder” and accounts for nearly 5% of urinary system calculus (12). Calculus disease affects all parts of urinary system; kidneys, ureter, urinary bladder, and urethra. The size and composition of the stone, the size of the enlarged prostate, the patient’s conditions, a history of surgery on the lower urinary tract, the cost of the surgery, and the instruments that can be used during surgery are important factors that need to be considered in the treatment of bladder calculi (5). It is essential that the bladder stone be removed with a minimum of trauma and damage applied to the bladder. Bladder stones are managed by transurethral route, suprapubic endoscopic route, open surgery or ESWL. Transurethral stone disintegration can be achieved using the mechanical stone crusher, ultrasound, pneumatic and electrohydraulic lithotriptors, the combined ultrasonic/pneumatic lithotripsy device (Swiss Lithoclast, EMS Electro Medical Systems, Nyon, Switzerland), and laser energy sources. All endoscopic procedures aim to achieve complete stone-free state in shortest possible time, with short hospital stay and minimal complications associated with it (13). Open surgery is undoubtedly still the most appropriate treatment for large, hard bladder stone, concomitant open prostatectomy or diverticulectomy, failed endoscopic surgery and remains the main treatment of bladder stones in children long hospital stay and long duration of urethral catheterization are the main disadvantages of this procedure (14-16).

The shortcomings of transurethral stone fragmentation include increased operative time, bleeding, loss of vision, and potential urethral injury. Alternative minimally invasive approaches may address some of these shortcomings, but the relevant studies are scanty. Percutaneous cystolithotomy avoids urethral injuries and achieves high rates of clearance for large or multiple Stones (17). It can be safely and effectively performed under local anesthesia (18) or in combination with a simultaneous transurethral approach, thus making fragment removal less time-consuming (19). The suprapubic percutaneous approach, however, is associated with some risks (incision-related morbidity, bowel and vascular injury) and contraindications (urothelial carcinoma, previous

abdominal or pelvic surgery). Bacause of disadvantages of these methods, in present study we aimed to analyze our experience removal of bladder stone endoscopically with using nephroscope via transurethrally. Also, we compared this method with using cystoscope. In a previous study, Ener et al concluded that large bladder stones treated by transurethrally placed nephroscope are a fast and effective treatment modality compared to endoscopic treatment via cystoscope (20). They used combined pneumatic/ultrasonic lithotripsy device, with its aspiration for the stone fragmentation and retrieval. In this study 26F nephroscope (without sheath) was used to fragment the stone. But, in our study we used 26F nephroscope with sheath. Larger bladder stones were treated with nephroscope via transurethrally in our study. So, we found higher stone diameter in study group. Because of the larger stone diameter, the patients in study gruop were older. Also, mean operation time was similar between groups in our study. We think that larger stone diameter may be the cause of this result. If the stone sizes were similar, mean operastion time might be lower in study group.

The advantage of nephroscope is better vision and the probe is stronger and sturdier. To avoid overdistension of the urinary bladder during the procedure, we kept the inflow of the saline slow and many times the flow of the fluid was completely stopped. If the bladder got distended during the procedure, then the rubber cap over the port inlet of the nephroscope was removed to empty the bladder. Nephroscope has distinct advantage over other current endoscopes in transurethral cystolithotripsy as it has a wider lumen, which facilitates easy removal of the stone fragments. On other hand, Ellik evacuator can be connected with sheath to wash out smaller fragments. As the experience grew, the number of entries in the urethra decreased, as the stone was fragmented to smaller pieces at first instance before nephroscope was withdrawn.

Transurethral lithotripsy can be safely combined with TURP, with one study showing slightly higher complication rate from hematuria when compared with TURP alone. Combined TURP and percutaneous cystolithotripsy is safer, more effective, and much faster alternative to combined TURP and transurethral cystolithotripsy in patients with large bladder stones and BPH (21-23). On the other hand, nephroscope has distinct advantage over the cystoscope as it has a wider lumen, which facilitates easy removal of the stone fragments. Also cystoscopic fragmentation requires longer operating time and there is a decrease in vision quality, which parallels the degree of stone fragmentation.

The study have some limitations. First of these, number of patiens was lower. Larger series with this method may add some advantages for bladder calculi removal. This study is retrospective study. Because of that the patients' ages and stone sizes were not similar. It is the disadvantage for comparing the methods. We think this metdod can use suitable patients with large urethral lümen. In conclusion, transurethral stone removal using a nephroscope is safe and efficacious method of stone removal without increasing the morbidity of the patients. To confirm our results, prospective studies with larger numbers are needed.

We have no coflict of interest.

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