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LAPAROSCOPIC MANAGEMENT OF DISTAL URETERIC STONE IN BILHARZIAL URETER: RESULTS OF A SINGLE CENTER PROSPECTIVE STUDY

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Abstract

No doubt, Bilharzial ureters are complicated by distal stricture due to precipitation of Bilharzial ova in distal ureter. These cases are associated with poorly functioning and grossly hydronephroic kidneys that hinder endoscopic manipulation of the coexistent distal, high burden, long standing impacted stones. Thus, laparoscopic uretrolithotomy was performed in 51 bilharzial patients with distal ureteric stones 4 trocars were used. The ureter was opened directly over the stone and the stone was extracted. A double-J stent was inserted into the ureter which was closed by 4-0 polyglactin running suture.

The results showed that among 51 cases 33 males and 18 females; the mean age was 40.13 years. the mean stone size was 2.73 cm. Conversion to open surgery was in only one case; the mean operative time 92.05 (range 75-120 minutes); postoperative pain score ranged from 20 to 60 , the mean number of PO analgesic request was 1.72 (range 1-3); it was once in 21, twice in 23 and thrice in 7 cases. Hospital stay ranged from 2 to 5 with a mean of 2.74 days; total duration of follow up ranged from 7 to 12 with a mean of 9.68. Stone recurrence reported in 4 cases; ureteric stricture reported in 2 cases. Stone free rate was reported to be 100%.

Keywords: Egyptian bilharzial ureter, laparoscopy, transperitoneal, stone

Introduction

Perhaps, the first description by Theodor Bilharz in 1851, of *Schistosoma haematobium*, the worm responsible for urinary schistosomiasis, was a major health problem along the Egyptian Nile Valley existed until the present days. Haematuria, the main symptom of this parasitic disease, was known and treated in Egyptian Medical Papyri since 1550 B.C. (Ziskind, 2009).

Schistosomiasis is the second most important parasitic infection after malaria and affects more than 200 million people in 74 countries (WHO, 2002). It is endemic, with high prevalence and morbidity rates in many countries, especially those in Africa, such as Egypt, and Kenya and in South America, mainly Brazil, with prevalence ranged from 15 to 45% in Egypt and Brazil (El-Khoby *et al*, 2000; Blanton *et al*, 2002; Palmeira *et al,* 2010), with the urinary one causing severe complications (Hammam *et al*, 2014). In general, schistosomiasis is still a public health problem not only in Egypt but more of less worldwide, despite the tendency of being overlooked (Othman and Soliman, 2015). Besides, the lack of genome and transcriptome information for the *S. haemtobium* directly hindered further targeted research and must be quickly rectified (Rollinson, 2009).

On the other hand, the commonly the ureteric lesions are limited to the lower half, at the level of the third lumbar vertebra, which is due to anastomotic channels between the inferior mesenteric and the periureteric and perivesical veins. These communications are believed to be the main route through which *Schistosoma haematobium* worms migrate to the urinary system causing major risks (Wang *et al*, 2014). The lower ureteric lesions in schistosomiasis include early tubercles and ulcers, and subsequently the sandy patches and cysts, known here as ureteritis cystica (Poturalski *et al*, 2015).

Fibrosis of the lower ureteric musculosa may lead to partial obstruction; the upper ureter compensates by dilatation hypertro-

phy that generates enough bolus pressure to overcome the distal obstruction, thereby protecting the kidneys from back pressure (Barsoum, 2013).

Laparoscopic ureterolithotomy (LU) is a safe well-established treatment option for management of ureteric stones, replacing conventional surgery (Anagnostou and Tolley, 2004; Wolf, 2007). LU offers less pain, minimal analgesic requirement, short hospital stay, shorter recovery phase and better cosmesis (Knoll *et al*, 2005; Leonardo *et al*, 2011). LU was done by one of two basic approaches: transperitoneal and retroperitoneal approaches, and each have its own advantages and disadvantages (Gau *et al*, 2002; Gettman and Segura, 2005; Farooq *et al*, 2011). Bilharzial ureters are complicated mainly by distal stricture due to precipitation of ova in ureterovesial junction and distal ureter. This is associated with poorly functioning and grossly hydronephroic kidneys that hinder endoscopic manipulation of the coexistent distal, high burden, long standing impacted stones technically unfeasible (Riad *et al*, 2009).

The present study aimed to define the efficacy and safety of laparoscopic management of impacted distal ureteric bilharzial stone in Egyptian patients.

Patients, Materials and Methods

This prospective study follows the tenets of the declaration of Helsinki. Transperitonial laparoscopic uretrolithotomy was performed in 51 bilharzial patients (33 men and 18 women) with distal ureteric stones; during the period from June 2010 through June 2013. Intravenous urography was done for all cases and showed grossly hydronephrosis in 45 renal units. Twenty two patients had previous endoscopic dilation of their distal ureteric bilharzial strictures.

The surgical technique usually begins with cystoscopy and insertion of an open tip 6F ureteric catheter, and then the stone side is laterally tilted 45 degree. The procedure is performed through 4 ports, Two 10 mm and two 5mm trocars were used. After reflection of the colon, the ureter is identified and stone is located and extracted through a vertical ureterotomy. The stone was identified by obvious bulge or pinching by Maryland forceps. Their upward migration was prevented by applying a laparoscopic Babcock forceps on the ureter above stone bulge, followed by ureterotomy and stone extraction.

Results

The present study included 51 cases with bilharzial ureteral stone; 33 males (64.7%) and 18 females (35.3%); age ranged from 22-54 years with a mean age of 40.13±6.90; hydronephrosis was discovered in 45 cases (88.2%); All stones were single on right side in 29 cases (56.9%) or on left side in 22 cases (43.1%); stone size ranged from 2.3-3.10cm with a mean of 2.73±0.18cm; previous endoscopic dilatation was done in 22 cases (43.1). Details are shown in tables (1 & 2) and figures (1 & 2)

Table 1: Frequency statistics of studied cases

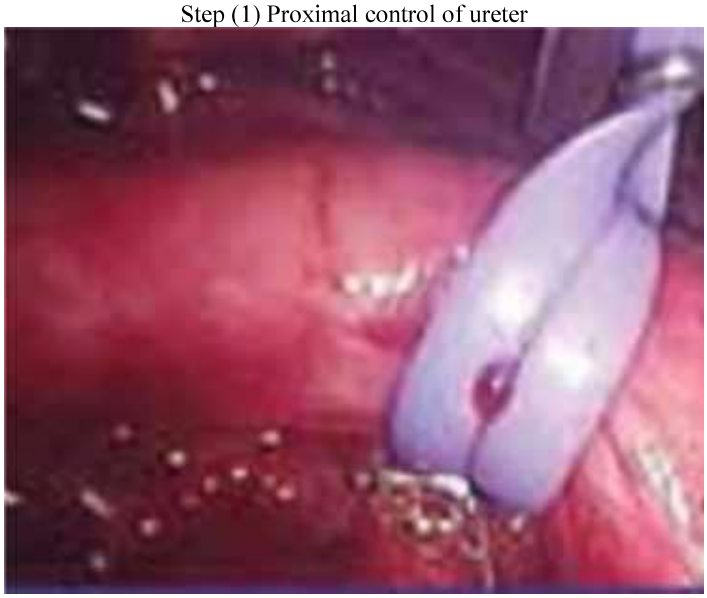
Variables	No. of Patients	Percentage
Sex (male-female)	33/ 18	64.7 / 35.3
Hydronephrosis	45	88.2
Laterality (right/left)	29/ 22	56.9 / 43.1
Previous endoscopic dilatation	22	43.1
Conversion to open surgery	1	2.0
Number of PO analgesic requests: - Once -Twice -Thrice	 21 23 7	 41.2 45.1 13.7
Stone recurrence	4	7.8
Ureteric stricture	2	3.9

Table 2: Descriptive statistics of studied cases

Variables	Mean	SD	Minimum	Maximum
Age	40.13	6.90	22.00	54.00
Stone size	2.73	0.18	2.30	3.10
OP time	92.05	10.60	75.00	120.00
IOP blood loss	70.88	17.16	30.00	100.00
PO Pain score	41.07	9.96	20.00	60.00
Time To First Request Analgesia	100.29	43.15	30.00	195.00
Number Requests	1.72	0.69	1.00	3.00
First mobilization	2.09	0.34	1.50	3.00
Resume oral intake hours	6.03	1.44	4.00	9.00
Hospital stay Days	2.74	0.91	2.00	5.00
Total follow Up months	9.68	1.63	7.00	12.00

Fig.1: Important surgical steps in transperitoneal laparoscopic ureterolithotomy

Step (1) Proximal control of ureter



Step (2) Ureteral pinching

A 6F DJ stent is then inserted and the ureterotomy is closed with 4/0 polygalactin sutures. Using a 5 mm scope, the stone is extracted in a sac through the 10 mm port and then a small drain is inserted via the other 5 mm port.

The collected data included the patient's age, sex, stone (size, number, and laterality) and past history of stone surgeries or extracorporeal shock wave lithotripsy (ESWL). The operative data included type of anesthesia applied, operative time, mean amount of intraoperative blood loss, and the frequency of conversion to open surgery. Postoperative data included postoperative pain severity judged using 100-point pain visual analogue scale (VAS) with 0 = no pain and 100 = the worst intolerable pain, duration till first request and number of requests of post-operative analgesia, time till resumption of oral intake, time till first mobilization, and duration of hospital stay. Follow-up data included duration of follow-up, stone recurrence, ureteral stricture formation, and other complications.

Conversion to open surgery was reported in one case (2.0%), operative time ranged from 75 to 120 minutes with a mean of 92.05±10.60 minutes; intraoperative blood loss ranged from 30 to 100 ml with a mean of 70.88±17.16 ml; postoperative pain score ranged from 20 to 60 with a mean of 41.07±9.96; time for first requested analgesia ranged from 30 to 195 minutes postoperatively with a mean of 100.29±43.15 minutes; the number of request ranged from 1 to 3 with a mean of 1.72±0.69; postoperative analgesic requests were once in 21 cases (41.2%), twice in 23 cases (45.1%) and thrice in 7 cases (13.7%); the first mobilization postoperatively was reported at 1.5 to 3.0 hours with a mean of 2.09±0.34; resume oral intake was done at 4 to 9 hours postoperatively with a mean of 6.03±1.44 hours; the duration of hospital stay ranged from 2 to 5 days with a mean of 2.74±0.91 days; the total duration of follow up ranged from 7 to 12 months with a mean of 9.68±1.63 months. Stone recurrence reported in 4 cases (7.8%) during follow up period; all were small and passed spontaneously with medical treatment; ureteric stricture was reported in 2 cases (3.9%) that needed further surgical intervention. Finally stone free rate was reported to be 100%.

Discussion

The laparoscopic or open ureterolithotomy may be used as primary treatment of large, impacted ureteral stones of more than 1.5 cm or as a salvage procedure in failed cases of ESWL and attempted URS/PNL (Almeida *et al*, 2009; Singh *et al*, 2013). As it can access all locations in the ureter, laparoscopic ureterolithotomy by transperitoneal route is a preferred technique for the ureteric stones (Basiri *et al*, 2008; Mandhani and Kapoor 2009). Its advantages of transperitoneal route included large peritoneal space for instrument handling and intracorporal suturing making procedure comparatively easy (Henkel, 1995). In addition, transperitoneal approach gives better understanding of the anatomical landmarks particularly for the lower ureteric stone (Gaur *et al*, 2002). Thus, this technique adopted in the present study.

In the present study stone free rate was reported in 100% (100% clearance). These results are comparable to previous studies, where it was reported that, high success rate depends upon proper patient selection and surgical experience of laparoscopic technique. Success rates of transperitoneal uretro-lithotomy range from 86 to 100% (Turk *et al*, 1998; Feyaerts *et al*, 2001; Simforoosh *et al*, 2007; Basiri *et al*, 2008). Further studies showed that with increase in experience, overall success rate is above 90% (El-Moula *et al*, 2008).

In the present study, operative time ranged from 75 to 120 minutes with a mean of 92.05±10.60 minutes. El-Feel *et al*. (2007) reported the mean operative time of 145 minutes (range 55-180 minutes). Operative time in the present study seems to be longer than previous reports and this can be at-

tributed to the fact that we act only on lower ureter stones, while previous reports included stones in all segments in the ureter; and it was reported that, in lower ureter stone, dissection of the ureter was done with extra caution where the space was less and as the ureter was crossing the iliac vessels, there were more chances of vascular injury. As compared to other locations, the overall procedure time was more for stones which were located in the lower ureter (Garg *et al*, 2013). Abolyosr (2007) reported that upper and mid ureteric stones can be safely approached retroperitoneally but for lower ureteric stones transperitoneal approach is a much better option as it gives a better understanding of the anatomical landmarks particularly in the lower part of the ureter.

The overall complications in the present study were 11.7% (7.8% recurrence and 3.9% ureteric stricture). This is in line with previous reports, where it was reported that, overall reported mean complications of laparoscopic transperitoneal urological surgeries range from 14.1 to 19% (Vallancien *et al,* 2002; Lin *et al,* 2007) and for transperitoneal ureterolithotomy, complications varies from 4-18% in different series (Simforoosh *et al,* 2007; El-Feel *et al,* 2007; Preminger, 2007). The overall 8.3% complications of TPLU were reported (Feyaerts *et al,* 2001). El-Feel *et al*. (2007) reported 4% and Simforoosh *et al*. (2007) reported 12.2% of complications. Basiri *et al.* (2008) reported 18% complications in the form of leakage of urine for more than 3 days

In the present study, the duration of hospital stay, ranged from 2 to 5 days with a mean of 2.74±0.91 days. Feyaerts *et al*. (2001) reported an average hospital stay of 3.8 days; El-Feel *et al.* (2007) reported 4.1 days and Basiri *et al.* (2008) reported a mean hospital stay of 5.8±2.3 days.

Fang *et al*. (2012) found that laparoscopic ureterolithotomy gave higher stone clearance rate and shorter operating time compared with urete-roscopic lithotripsy. But, it didn't include patients with previous ureteric surgeries or presence of multiple stones. The cases were performed by several surgeons with different experiences.

Conclusion

In general, chronic kidney disease (CKD) is a major global public health problem. The renal complications of tropical parasites particularly schistosomiasis are heterogeneous.

The present study proved that, laparoscopy is safe and effective minimally invasive procedure for distal ureteric stones in bilharzial ureter not amenable to endoscopic extraction.

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