

Comparative Study Between Two Different Laparoscopic Ureterolithotomies at IGMC Shimla H.P

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ABSTRACT- This study was carried out to evaluate two different Laparoscopic Ureterolithotomies, Laparoscopic Transperitoneal ureterolithotomy (TPUL) and Retroperitoneal ureterolithotomy (RPUL). This study was conducted on 45 [25 cases for TPUL and 20 cases for RPUL] selected patients of single large impacted calculus of size more than 8mm in upper and middle ureter. It was observed that conversion to open ureterolithotomy was observed in 4 cases and excessive bleeding in one case for Transperitoneal ureterolithotomy. On the other hand excessive bleeding was present in one patient while need for conversion to open ureterolithotomy was seen in 8 cases in case of Retroperitoneal ureterolithotomy. No major perioperative complications were seen in either study. Both the procedures have definitely shown decreased post-operative discomfort, decreased requirement of post-operative analgesia, better cosmesis, early return to work, and less morbidity with acceptable variations in these parameters between two studies.

Key-words- Retroperitoneal ureterolithotomy [RPUL], Transperitoneal ureterolithotomy [TPUL], Extracorporeal shockwave lithotripsy [ESWL]

INTRODUCTION

Stones of human urinary tract are the most common afflictions of the present time. This disease has been described since antiquity. Earlier the urinary stones were more common in men, but now afflict male and female equally. The site of stone formation has changed over time from lower to upper urinary tract. This can be attributed to changes in lifestyle and global acculturation. Earlier open surgical ureterolithotomy or endoscopic basket extraction were the most common procedures performed for the management of ureteric calculi. Recent advances in the minimally invasive and noninvasive management of stone disease has revolutionised the ease with which stones can be removed. The preceding 3 decades were full of research over minimally invasive and noninvasive procedures for ureteric calculi. Open surgical ureterolithotomy has become as salvage procedure with the advent of the extracorporeal

shockwave lithotripsy (ESWL), per cutaneous renal surgery and ureteroscopic lithotripsy. However open surgical ureterolithotomy is still required in hard, large, long standing and impacted calculi especially in upper and middle ureter with its disadvantage of invasive trauma, major incision, postoperative pain and significant hospital stay. The term celioscopy^[1] was given by George Kelling of Dresden. He performed the first laparoscopy in a dog, in 1901, in which air was used to insufflate the peritoneal cavity. During the last decade laparoscopic surgery has added a further endoscopic minimally invasive option in urology. With the description of laparoscopic nephrectomy^[2] and laparoscopic lymphadenectomy^[3] the role of laparoscopy in urology has tremendous expansion. Different kinds of ureteric procedures have been performed like ureterolysis^[4], nephro-ureterectomy^[5], ureteric resection and repair^[6].

This study was carried out to evaluate laparoscopic transperitoneal ureterolithotomy and retroperitoneal ureterolithotomy as a viable option to open surgical ureterolithotomy & endoscopic urology and to assess both laparoscopic ureterolithotomies in terms of various parameters like hospital stay and postoperative complications.

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MATERIALS AND METHODS

Source of Data

These studies were conducted in the Department of General Surgery, Indira Gandhi Medical College, Shimla, India on 45 selected patients of large upper and middle ureteric calculi for the duration of two years. During the first year 25 cases were evaluated for transperitoneal ureterolithotomy and 20 cases for retroperitoneal ureterolithotomy in the subsequent year. The objective of this study was to evaluate the efficacy and safety of laparoscopic transperitoneal and retroperitoneal ureterolithotomy for management of large upper and middle ureteric calculi.

Techniques (RPUL and TPUL)

For both procedures patients were placed in full flank position with the operating side up. For proximal ureteral calculi 3 trocars were used, while approaching mid ureteral calculi 4 trocars were used. Number of trocars used for both procedures (RPUL and TPUL) was same with some variation in the site of placement. In both the procedures CO₂ pneumoperitoneum was created with the help of Veress needle. After dissection iliac vessels and ureter were identified. Ureter was then freed from adjacent structures via sharp and blunt dissection till the stone site was reached. Once the stone was localized by 'ureteral pinching', cold knife was used to incise the ureter over the stone. Maryland dissector was used to fish out the stone with closed forceps tip. Following this the stone was held by a gall bladder extractor & removed through 10 mm port. Decision regarding the placement of DJ stent was taken intraoperatively. Once the stent was in place 4-0 vicryl was used to close the ureterotomy site with interrupted sutures and a tube drain was placed through one of the ports.

RESULTS

The mean age of the patients was 37.80 years in TPUL and 38.30 years in RPUL. Out of 25 cases, 19 were male and 6 were female in TPUL whereas out of 20 cases 14 were male and 6 female in RPUL. All the patients in either study were suffering from pain. Mean time taken for TPUL (79.64 minutes) was more as compared to RPUL (76.60 minutes). An average of 53 litre of CO₂ was used in TPUL as compared to 44.51 litres in RPUL. In case of TPUL 4 cases were converted to open surgery as compared to 8 in RPUL. Intraoperatively periureteric adhesions and minor bleeding was observed in both the studies, whereas spillage of stone and lump formation was observed only in TPUL.

Table 1: Mean Time (Minutes) for Each Five Cases in TPUL^[7]

No. of Cases	Mean Time (Minutes)	Mean of all
1 st Five	120.6	79.64
2 nd Five	98.6	

3 rd Five	82.6	
4 th Five	57	
5 th Five	39	

Table 2: Mean Time (Minutes) For Each Four Cases in RPUL^[8]

No. of Cases	Mean Time (Minutes)	Mean of all
1 st Four	71.25	78.20
2 nd Four	76.25	
3 rd Four	89	
4 th Four	76.5	
5 th Four	78	

DISCUSSION

Symptomatology

Pain, Number of Attack and Adhesions

In both the studies 100% of patients complained of pain prior to admission in the hospital. Patients selected for TPUL have suffered 3.76 attacks of ureteric colic on an average prior to surgery whereas those selected for RPUL suffered 3.83 attacks.

Time Taken for Surgery

The mean time taken for completion of the procedure in TPUL was 79.64 minutes (range 30 to 135 min.). On the other hand mean time taken for RPUL was 76.60 minutes (range 35 to 125 min). Simforoosh^[9], El-Feel^[10] and Feyaerts^[11] were reported varying range of time in TPUL. On the other hand Kwon *et al.*^[12], Shah *et al.*^[13], Gaur^[14] and Goel^[15] were also reported wide variation in time in RPUL.

CO₂ Consumed

On an average 53 litres of gas (CO₂) per case was used in TPUL. On the other hand an average of 44.51 litres of gas (CO₂) per case was used in RPUL.

Conversion

In TPUL 4(16%) of our cases were converted into open ureterolithotomy. The reasons for open conversion were adhesions, inadvertent bleeding, lump formation and spillage of stone. In case of RPUL 8(40%) of the cases were converted into open ureterolithotomy. The reason for open conversion in RPUL was periureteric adhesions, periureteritis and intraoperative bleeding.

Intra-Operative Complications

Adhesions

Only four of the patients (16%) undergoing TPUL had multiple adhesions around ureter. Two (8%) of them were converted to open surgery. On the other hand six of the

patients (30%) undergoing RPUL had adhesions around the ureter. All the cases with adhesions were converted to open ureterolithotomy in the later study. The possible reason for adhesions probably is seeking late medical advice as they came from far flung areas.

Lump Formation

In spite of screening, one of the patients (4%) undergoing TPUL had lump formed around the ureter. This particular patient had adhesions around the surrounding structures with formation of a large lump at the site of the impacted stone and the dilated ureter was bent upon itself posing difficulty in identifying ureter, decision to convert to open surgery was taken. No such observation was reported in the cases undergoing RPUL.

Spillage of Stone

This complication occurred in 2 (8%) of the patients undergoing TPUL during extraction of stone. Basiri *et al.* [16] also reported spillage of stone in TPUL. This complication was not observed in the patients undergoing RPUL.

Bleeding

We encountered minor bleeding during both the procedures in a few cases. We encountered major bleeding in one of the cases in each study the case was completed by converting to open surgery. The bleeding was not from any major vessel but probably from increased vascularity due to periureteritis.

Major Vessel and Visceral Injuries

None of our patients sustained these injuries in either study.

Urinary Injuries

None of our cases encountered bladder or ureteric injuries in either study as reported in the literature.

Post-Operative Complications

In our series none of the patients had wound infection, abscess formation, prolonged ileus or deep vein thrombosis in either study. These post-op complications reported in various case series by Feyaerts, EL Feel and Basiri.

Hospital Stay

In TPUL mean hospital stay was 5.77 days whereas in case of RPUL it was 6.65 days.

Postoperative Pain

The mean days of analgesic (diclofenac) requirement for TPUL were 3.64 days whereas for RPUL it was 2.55 days.

Post- Operative IVP

All cases in the present series, both TPUL and RPUL underwent post-operative IVP after a period of four to six week. None of the patients had post operative stricture in case of TPUL. Only one patient undergoing RPUL developed postoperative stricture and was managed by

open pyeloplasty with DJ stenting.

DJ Stenting and its Removal

DJ Stenting was done laparoscopically in 7 cases undergoing TPUL. DJ Stent was removed after 4 to 6 week endoscopically. In case of RPUL, DJ stenting was done in only one case laparoscopically and was removed after six weeks endoscopically.

General Benefits of the Procedure

From our initial experience of this small series, it can be safely deduced that greatest benefit of Laparoscopic TPUL as well as RPUL comes from rapid return of activity that it permits. Most of the patients were discharged from the hospital without activity restrictions and could return to work as soon as they felt normal. This should result in to an overall cost effective & cosmetic procedure for the patient.

CONCLUSIONS

The increased skills of the surgeons & advances in endoscopic equipment have made laparoscopy the technique of future. In our experience of laparoscopic TPUL as well as RPUL in Indira Gandhi Medical College, Shimla, India the procedure can be done without any major complication. Good knowledge of the open ureterolithotomy is required for timely conversion, if any complication is encountered during either TPUL or RPUL. Time taken for surgery should be no criteria for academic groups. Both the procedures have definitely shown decreased post-operative discomfort, decreased requirement of post-operative analgesia, better cosmesis, early return to work and less morbidity with minor variations in all the observed parameters. Both TPUL as well as RPUL can be considered as another well- established armamentarium in the armour of general surgeons and is recommended as an effective minimally invasive primary treatment in large, impacted difficult stones in the upper and mid ureter otherwise indicated for open ureterolithotomy.

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