Early experience of retroperitoneoscopic surgery in paediatric population

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Abstract. Objective: To present our early experience with retroperitoneoscopic surgery in paediatric population suffering from various urologic conditions. Methods: Patients undergone retroperitoneoscopic urological procedures from January 2012 to May 2013 were included in the study. Retroperitoneoscopy was performed in lateral position using standard three port technique (5mm including camera port). Parameters like intraoperative complications, operating time, difficulty in surgery, conversion to open, postoperative complications, analgesic requirement and final outcome were analysed. Results: From January 2012 to May 2013, eight patients underwent retroperitoneoscopic urological procedures. There were two females and six males; median age at procedure was 5 years (3-12 years). Surgeries performed were nephroureterectomy (NFU) in non-functioning kidney (four) and nephrectomy in multicystic dysplastic kidney (four). Two patients were converted to open because of pyonephrotic kidney with severe adhesions due to previous PCN. Average duration of surgery was 80 minutes for NFU and 63 minutes for nephrectomy. There was minimal blood loss and no intraoperative complications. The two patients who were converted to open had superficial wound infection managed by intravenous antibiotics and dressing. Patients were started orally within 24 hrs. All returned to normal daily activity within 2-4 days of surgery. Six patients were discharged on day three after the drain removal. All of the patients were asymptomatic in follow up. Conclusion: The retroperitoneoscopic procedure is easy and feasible in paediatric population. It can be performed safely, with minimal postoperative pain, excellent cosmetic results and early ambulation. Patient selection is of paramount importance to avoid conversion to open.

Keywords: Retroperitoneoscopy, nephroureterectomy, dysplastic kidneys, transperitoneal, laparoscopy

Introduction

Dysplastic kidney with ectopic ureter is a rare disease in children. Nephrectomy is the most common procedure for this anomaly. Up to now, nephrectomy has been performed by open surgery or laparoscopic operation with three trocars. There are now many available published series showing the importance of retroperitoneoscopic approach over the traditional transperitoneal approach.

We are reporting our early experience with the retroperitoneoscopic approach in paediatric population suffering from various urologic conditions.

Material and Methods

This was a prospective study in which patients undergoing retroperitoneoscopic urological procedures from January 2012 to May 2013 were included. Institute's ethical committee approval was taken for the study. Those patients where parents/ guardians refused consent for the procedure of retroperitoneoscopy were excluded. Retroperitoneoscopy was performed in lateral position with cotton roll below the flank after proper written and informed consent. The position was given according to side of involvement. Standard three port technique was used and all the ports used were 5mm, including camera port [Fig. 1].

![Fig. 1. Port positions used in retroperitoneoscopy (all ports are 5mm) (AAL: Anterior axillary line, MAL: Mid axillary line, PAL: Posterior axillary line)](image_url)
Space for retroperitoneoscopy was created by inflating the middle finger of no 8 surgical gloves tied with cut end of 14 Fr Malecot catheter with 300 to 400 ml of air. First Malecot catheter with collapsed middle finger of gloves was introduced through the incision (for camera port) in to desired space. Then 300 to 400 ml of air was pushed slowly through the catheter using three way stopcock and inflated gloves finger was kept for 15 minutes. In all patients suction drain was put at renal bed after surgery. Parameters like intraoperative complications, operating time, difficulty in surgery, conversion to open, postoperative complications, analgesic requirement and final outcome were analysed.

Results

This was a prospective study in which patients undergoing retroperitoneoscopic urological procedures from January 2012 to May 2013 were included in the study. Total eight patients underwent retroperitoneoscopic urological procedures in mentioned period. There were two females and six males (M:F::3:1); median age at procedure was 5 years (3-12 years). The surgeries performed were nephroureterectomy (NFU) in non-functioning kidney (four) and nephrectomy in multicystic dysplastic kidney (four) [Fig. 2]. Two patients were converted to open because of pyonephrotic kidney with severe adhesions due to previous PCN. Average duration of surgery was 80 minutes for NFU and 63 minutes for nephrectomy (Table 1). There was minimal blood loss and no intraoperative complications. None of the cases had significant postoperative pain and were managed with routine doses of paracetamol. Two patients who were converted to open had superficial wound infection managed by intravenous antibiotics and dressing. Patients were started orally within 24 hrs. All returned to normal daily activity within 2-4 days of surgery. Six patients were discharged on day three after the drain removal. All of the patients were asymptomatic in follow up.

Discussion

Surgeries involving the retroperitoneal structures like kidney are quite common in paediatric age group. Traditionally these cases have been approached using retroperitoneal exploration via flank approach. With the advent of better laparoscopic instruments and increase in the expertise of the surgeons many of these cases are now been managed using laparoscopy. The two traditional routes for the management of these cases are using a traditional laparoscopy via a transperitoneal approach and secondly using a retroperitoneoscopic approach. In the transperitoneal approach the retroperitoneum is approached either by colonic reflection or by the transmesentric route. This technique has long being popular due to its simplicity and requirement of less of technical expertise. This is however associated with the obvious disadvantage of peritoneal breach and associated complications which in any case is not justifiable. In the

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number</th>
<th>Operating time</th>
<th>Wound infection</th>
<th>Conversion to open approach</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Nephrectomy</td>
<td>Nephroureterectomy</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>6</td>
<td>62± 12 min (range: 56- 89 min)</td>
<td>81 ±8 min (range: 63-108)</td>
<td>1</td>
</tr>
<tr>
<td>Female</td>
<td>2</td>
<td>61 ± 9 min (range: 54 -92 min)</td>
<td>78 ± 9 min (range: 62- 98 min)</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>63 ± 7 min (range: 52- 91 min)</td>
<td>80± 9 min (range: 62- 99 min)</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 1. Outcomes with respect to the various parameters in the cases (n=8)
retroperitoneoscopic technique the above disadvantage is overcome. This technique is very demanding in its approach and performance. A lot of experience and expertise is required in performing this approach.

Laparoscopic nephrectomy was performed for the first time by Clayman et al in 1991. They did it using a transperitoneal approach. Figenshau et al reported the first paediatric laparoscopic nephroureterectomy in 1994. Retroperitoneoscopic nephrectomy in adults was first reported by Gauer et al and Kerbl et al in 1993. Since then it has been introduced at multiple institutions for treating paediatric patients. However, retroperitoneoscopic nephrectomy (RN) is still not generally favored by paediatric surgeons. There are various reasons for this. Most important reason is the lack of experience. Besides this there are concerns about the long operative times and related complications, and litigation. One of the important causes is also the dearth of urologic cases that general paediatric surgeons can manage; this keeps them with little opportunity to master retroperitoneoscopy.

The main advantage of the retroperitoneoscopic approach is that it avoids opening the peritoneum, which better simulates the open approach, and if any complication arises, it is restricted to this space. However, the retroperitoneal space is small, thus a RN is technically difficult and challenging for beginners, thus there is a learning curve that has to be overcome. In 1999, Borer et al were the first to describe paediatric RN in the prone position, and in 2002, Urbanowicz et al reported their initial experience with retroperitoneoscopic access using three ports in 12 children including complete nephrectomy, nephroureterectomy, and upper pole heminephrectomy. Their mean operating time (MOT) was 110 minutes, and length of hospital stay was 3 days. In 2003, El-Ghoneimi et al also reported using a three-trocar technique for retroperitoneoscopic nephroureterectomy and partial nephrectomy in 15 patients. Their MOT was 150 minutes, with minimal blood loss, and mean hospital stay was 1.4 days. They reported no intraoperative complications except for one conversion to open surgery because of a large peritoneal tear, which can be a complication of the retroperitoneal approach especially in infants, because of difficulty in establishing adequate retropneumoperitoneum. This is actually the most common complication of RN, and the main cause of conversion to open surgery.

We also used the traditional three port technique but lateral position instead of prone because we found it technically more comfortable. Our mean operating time 80 minutes for NFU and 63 minutes for nephrectomy and this could be attributed to the lateral position which gives an ease in the port placement. Szymanski KM et al reported 11 consecutive retroperitoneoscopic nephrectomies. In their series a total of 14 kidneys were removed from 10 children with a mean age of 12 years. Mean operative time was 174 minutes for unilateral and 458 minutes for bilateral nephrectomy, including 1 simultaneous peritoneal dialysis insertion and 1 umbilical hernia repair. With the ongoing enthusiasm on retroperitoneoscopy there are now two published case reports of laparoscopic partial nephrectomy in a horseshoe kidney. Retroperitoneoscopic approach has also been used in the excision in a horseshoe kidney. With the advent of technical expertise and single trocar surgeries single trocar laparoscopic surgeries are also becoming popular for renal cases. One trocar laparoscopic surgery was first introduced to perform appendectomy. In urology, Lima used a single trocar to perform pyeloplasty in 2005. This approach has also been used successfully by some other surgeons for pyeloplasty or nephrectomy for unilateral multicystic dysplastic kidney in children. We however do not have used single trocar technique.

Conclusion

The retroperitoneoscopic procedure is easy and feasible in paediatric population. It can be performed safely, with minimal postoperative pain, excellent cosmetic results and early ambulation. Patient selection is of paramount importance to avoid conversion to open.

References

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