

# Laparoscopic Pyeloplasty

## Abstract

We report our results and short term follow up of transperitoneal laparoscopic pyeloplasty for pelvi-ureteric junction (PUJ) obstruction. We have prospectively maintained a database to document our initial experience of 54 laparoscopic pyeloplasty. All procedures were carried out by one surgeon through a transperitoneal approach. The data extends from April 2005 to September 2008 and reports operative time, blood loss, complications, hospital stay, short term follow-up on symptomatic and radiological outcome. Fifty-four procedures were performed during the study period. Mean patient age was 29 years. Mean operating time was 133 minutes (range 65-300 minutes), and mean blood loss was 45ml (range 20-300ml). No intra operative complication occurred. Neither blood transfusion nor conversion to open surgery was required. Postoperative mean hospital stay was 3.4 days (range 3-14 days). There were 3 anastomotic leakages; 2 in the immediate postoperative period and 1 following removal of stent. They all required percutaneous drainage and prolonged stenting. Overall 47 (87%) patients have symptomatic relief and resolution of obstruction on renogram. Four (7%) patients developed recurrence. Three (5.5%) patients had symptomatic relief but have a persistent obstructive renogram. Laparoscopic pyeloplasty is an effective alternative treatment for symptomatic pelvi-ureteric junction obstruction. The results appear comparable to open pyeloplasty with decreased postoperative morbidity.

## Introduction

PUJ obstruction is the most common disease of the ureter, and can lead to progressive hydronephrosis and renal dysfunction. Most cases are congenital and are not clinically apparent until later in life. Traditionally it has been treated with open surgical reconstruction for symptomatic relief and preservation of renal function. Although the procedure has stood the test of time with published success rate of >90%, several less invasive alternatives to standard operative reconstruction are available. Endopyelotomy is an alternative minimally invasive technique; however the success rate is less than that of open pyeloplasty. Laparoscopic pyeloplasty was initially introduced by Schuessler et al in 1993. It gives the advantage of surgical reconstruction under direct vision while eliminating the morbidity of a flank incision. Potential advantages include shorter hospital stay, less post operative pain, improved cosmesis, excellent functional outcome and has become the standard of care in the management of PUJ obstruction. The aim of this study was to review and report our initial experience with laparoscopic pyeloplasty.

## Methods

We performed a retrospective review of prospectively maintained data of 54 consecutive laparoscopic pyeloplasty (LP) carried out between April 2005 and September 2008. All patients had radiographic evidence of PUJ obstruction on diuresis renography in conjunction with symptoms and/or deterioration of renal function. All patients had cystoscopy and a double pig-tailed catheter placed retrogradely in the operating room before surgery. The patient was positioned in the lateral position. Pneumoperitoneum was achieved using a Hassan Port (10mm) and two 5 mm ports were placed under vision. Peritoneum overlying the kidney was incised and the colon mobilized medially. The PUJ was freed from the surrounding tissues and dismembered Anderson-Hynes pyeloplasty was performed. The anastomosis was completed using 3-0 vicryl running suture over the ureteric stent. A drain was positioned close to the anastomosis and a Foley catheter left in place. The urethral catheter was removed on the first post operative day. If drain output was less than 50ml in the following 24 hours following removal of catheter, it was removed. The ureteric stent was usually removed after 4 weeks with a flexible cystoscopy under local anaesthesia. Patients were assessed symptomatically and radiologically with diuretic renogram at 2-3 months and one year. Both subjective relief and renogram results were examined in defining the success of procedure. Patients who remained asymptomatic and whose renogram confirmed relief of obstruction were discharged after 1 year. Patients with evidence of PUJ obstruction recurrence were either monitored or offered a secondary procedure.

## Results

During the study period 54 pyeloplasties were performed. The mean age of patients was 29 (range 16-52) years. Pain and recurrent infection were the commonest indications for treatment. Four patients were operated for deteriorating renal function secondary to obstruction. The mean operating time excluding the time taken for cystoscopy and stent placement, was 133 minutes (range 65-300) and mean estimated blood loss was 45ml (20-400). Crossing vessels were found in 17 (31%) patients. There were no major intra operative complications and no conversions to open surgery were required. Median post operative hospital stay was 3 days (range 2-14days) (Table 1) with 76% of our patients discharged on or before 3rd post operative day.

Three patients developed anastomotic leakage, 1 on the 2nd post operative day, 1 in the 3rd week and 1 on the day following removal of the stent i.e. 4 weeks post operatively. All three required percutaneous drainage and prolonged stenting. One required laparoscopic abdominal exploration for persistent pain but no pathology was found. Of these 3 patients, 2 had a successful outcome and 1 showed recurrence of PUJ obstruction. Overall 4 (7.4%) patients developed recurrence within one year requiring further intervention or follow up. Three patients showed prolonged half times on DTPA scans but had symptom relief and are being followed up conservatively. Forty-seven (87%) patients were discharged after 1 year of follow up, being cured symptomatically with a post operative renogram showing no obstruction. Of the 4 patients who developed recurrence, 3 of them underwent secondary procedures and the 4th declined further intervention. Two had balloon dilatation and 1 underwent Accucise endopyelotomy which was further complicated with retroperitoneal bleeding requiring embolization of the kidney (Table 2).

## Discussion

Open pyeloplasty has been the gold standard treatment for PUJ obstruction with reported success rate of >90%. It requires a morbid flank incision which may cause prolonged pain and results in poor cosmesis. Various minimal invasive techniques, including antegrade or retrograde endopyelotomy and laparoscopic pyeloplasty have been developed to decrease the morbidity and improve the cosmetic appearance. The initial acceptance of laparoscopic pyeloplasty was limited because of excessive operative time and the requirement of advanced laparoscopic skills namely laparoscopic suturing. More recently however it has gained acceptance in centres with advanced laparoscopic expertise. High success rates (>90%) have been reported in most of the published series and laparoscopic pyeloplasty is now viewed as the gold standard for the treatment of PUJ obstruction. Although both transperitoneal and retroperitoneal approaches have been described, the former is often preferred as it provides a larger working space and in particular allows easier displacement of the ureter in the presence of anterior crossing vessel. The retroperitoneal approach provides a more limited space which may make suturing and knot-tying difficult especially in obese patients. In all reported series, complications during surgery were minimal and those afterward were usually related to urinary leak and persistent drainage which can usually be managed conservatively.

Our study is the first Irish series of laparoscopic pyeloplasty which reflects the experience of a single Laparoscopic Urologist who has carefully introduced this technique to his practice. We have shown that it is safe minimally invasive procedure as there was no major intraoperative complication. It reduces hospital stay as median hospital stay in our study is 3 days and 41 of our patients were discharged within 3 days after the procedure. The overall success rate of 87% is lower than that reported in other series. However 92% of our patients had symptomatic relief. We have seen that 3 out of 4 patients who had recurrence were among first 25 cases and there was only 1 failure in last 29 cases, and success rate in last 29 cases is certainly above 90%. We feel with further increase in numbers the outcome will further improve. With regards to operative time, blood loss, hospital stay and complications our results are comparable to other major series<sup>11,12</sup>. Our initial experience is encouraging and we have demonstrated that a laparoscopic approach to PUJ obstruction repair can be introduced to an Irish urology practice with acceptable short term results and potential patient benefits.

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