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OPEN TRANSPERITONEAL PYELOPLASTY IN CHILDREN: A SINGLE CENTRE EXPERIENCE

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ABSTRACT

Background: Open pyeloplasty for PUJ obstruction is routinely performed through retro peritoneal route. There are little data to show the significance of trans peritoneal approach for open pyeloplasty.

Objectives: To evaluate the results and complications of open Anderson hynes pyeloplasty done via trans peritoneal approach.

Methods: We retrospectively reviewed the medical records of 38 children operated via transperitoneal open pyeloplasty (TOP) between 2019 to 2023. Patients demographic characteristics, operative time,estimated blood loss(EBL), post operative complications, success rate assessed by change in degree of hydronephrosis based on measurement of antero-posterior (AP)diameter of renal pelvis and increase in parenchymal thicknes were recorded.

Results: Mean operative time was 90 minutes(80-110 min), mean EBL (Estimated blood loss) was 15ml(10-30ml). The mean hospital stay was 5days(4-7days) days. Post operative ultrasound examination showed a diminished grade of hydronephrosis and improvement in renal function in diuretic scintigraphy. Over all success rate was 93%.

Conclusion: Our result confirms that operation through transperitoneal route is within an acceptable range with a short learning curve. The advantage of a good exposure and operating over pelvi ureteric junction in a normal anatomical position is really helpful for beginers and operating in small infants.

Keywords: Transperitoneal open pyeloplasty, Estimated blood loss, Antero posterior diameter, Hydronephrosis, Uretero pelvic junction obstruction, Parenchymal thicknes.

INTRODUCTION

Uretero pelvic junctio obstruction(UPJO) is one of the most common congenital anomaly occurs in 1:750-1500 live births. It is considered the third most common cause of antenatal hydronephrosis (HN) after transient and physiologic hydronephrosis.[1-3] The wide spread avalability and use of prenatal ultrasound has caused an increased in incidence of hydronephrosis in newborns.[4,5]

Although the mjority of cases resolve, a significant no of UPJO ramain and thus require urologic evaluation.[6]

Open pyeloplasty has long been gold standard for operative management of UPJO (Uretero pelvic junction obstruction) in children since it was first described by Anderson and Hynes in 1949.[7,8] It has been shown to have high success rates(80-97.5%) in several studies.[9]

With the further development of laparoscopic procedures and lately robotic assisted procedures in pediatric pyeloplasty, they have gained popularity. The advantages of laparoscopic and rhobotic pyeloplasty are lower pain scales,shorter hospital stay and less scaring.[10,11] However in pediatric patients there are certain disadvantages like smaller working space, longer operating time,limited fine surgical instruments.[12,13]

Although minimaly invasive techniques have significant advantages over open approach it is costly, performed by few surgeons limiting its use in high volume centers.[14]
Althugh pyeloplasty is an effective surgical treatment to improve urinary drainage but not all kidneys improve aftre surgical treatment.[15,16] Upto 5% of children need a reoperation after pyeloplasty. [17] There is stil a lack of knowledge regarding the natural course of resolution of hydronephrosis after pyeloplasty. Post operative dilatation may resolve early or persist for long time.[18,19]

Open pyeloplasty is still performed in very good nommber of centers with a good outcome. Traditionaly it is performed through retroperitoneal approach. Here in this study we reviewed patients operated for childhood UPJO via transperitoneal route in department of pediatric surgery SVPPGIP, SCB Medical college, Cuttack, Odisha and evaluate the results and complications.

MATERIALS AND METHODS

This is a retrospective study. Data collected from medical records of 38 children operated between 2019 to 2023 in the department of pediatric surgery SVPPGIP, SCB Medical College Cuttack.

Inclusion ans exclusion criteria

All patients younger than 14 years of age who underwent transperitoneal pyeloplasty for UPJO were included in this study and Patients with single kidney or bilateral UPJO ; with preoperative APD (Antero posterior diameter) < 10mm on regular ultrasound, reoperation cases, cases who had lost for follow up were excluded.

Pyeloplasty; procedure and follow up

Indication for pyeloplasty were UPJO with a progressive impairment of differential renal function(>10% function loss during active follow up) on Tc99 DTPA scan or DRF < 35% on affected kidney or sympomatic UPJO(pain or recurrent UTI)

A standard open dismembered pyeloplasty was performed by the same surgeon in all patients via trans peritoneal approach with a supra umbilical travsverse incision(fig 1). Uretero-pelvic anastomosis was done with 5-0 polyglactin sutures(fig 2). Double J stent of size varies from 3 to 5 fr according to age of patient was placed across the anastomosis(fig 3). A perinephric drain was kept for 48 hours. DJ stent was removed after 6-8 weeks.

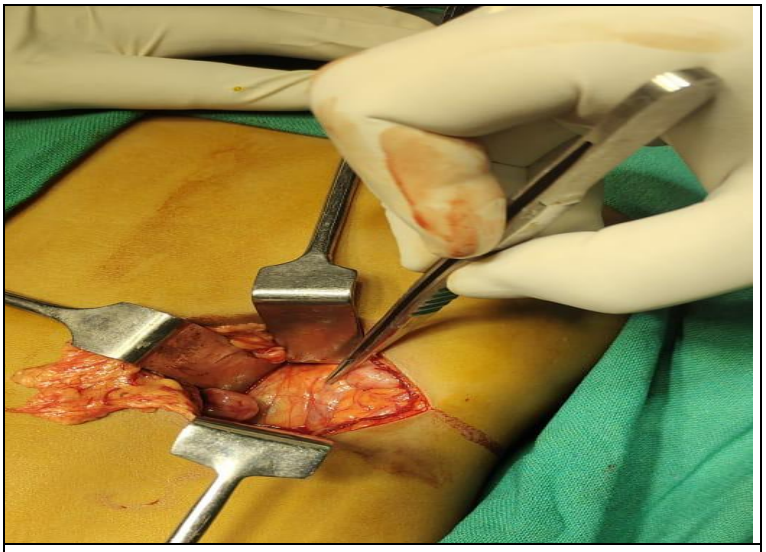

Figure 1

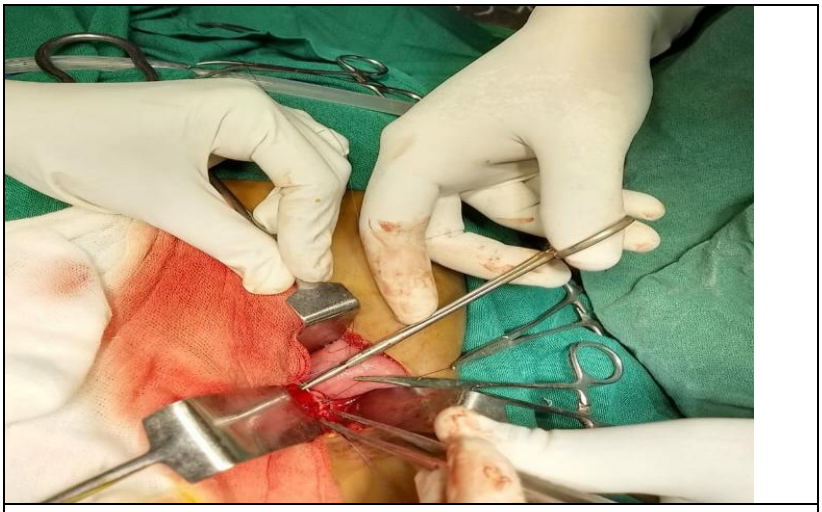

Figure 2

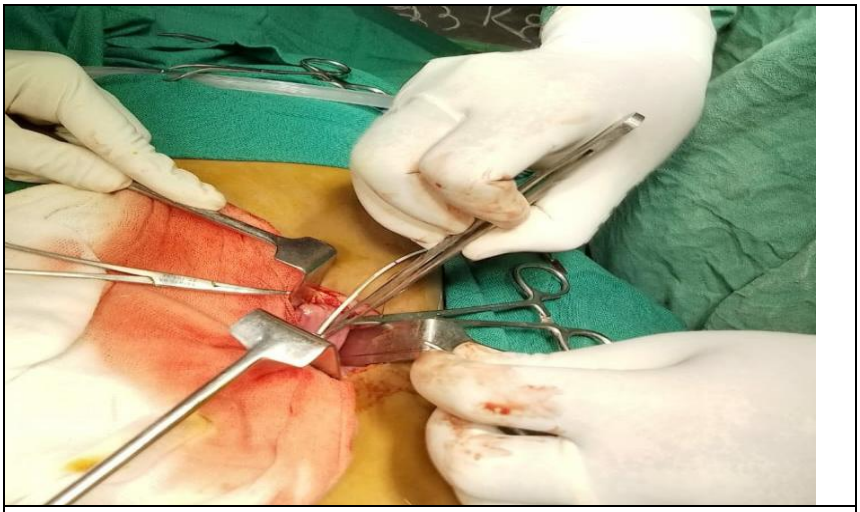

Figure 3

In follow up renal ultrasound were performed 1,3,6 and 12 months after surgery to evaluate APD, PT (Parenchymal thicknes). The radioneuclide scan Tc 99 DTPA was repeated in 1 year to assess final SRF and drainage. PT, APD measured by USG and SRF measured by Tc 99 DTPA scan were compaired before and after surgery.

Patients demographic characteristic, operative time, length of hospital stay, estimated blood loss, complications, success rate assessed by improvemrent in degree of hydronephrosis and parenchymal thickness were recorded.

RESULTS

Our study comprised of 38 patients, out of which 29 males(76.31%) and 9 females (23.68%). The mean age at pyeloplasty was 1.8 year with number of patients < 1year was 10 (26.31%) and number of patients > 1 year was 28 (73.68%). Patients with right sided hydronephrosis was 14 (36.84%) and with left sided hydronephrosis was 24(63.15%). Patient demographic characteristics are summerized in table 1.

characteristics	**Number(n)**	**Percentage(%)**
Age		
<1yr	10	26.31%
>1yr	28	73.68%
Mean(min-max)	1.8yr	3m-11yr
Sex		
Male	**29**	**76.31%**
Female	**9**	**23.68%**
Laterality		
Right	**14**	**36.84%**
left	**24**	**63.15%**

Table 1. general characteristics of patients

The mean operative time was 90 minutes. The mean EBL was 15 ml. The mean hospital stay was 5 days. Post op 2 patients had leak for which drain was kept for another 3 days more. 4 patients had febrile UTI improved on conservative management. Hematuria seen in 7 patients. Two patients had anastomotic stricture needed redo pyeloplasty. 3 patients had persistent moderate to severe degree of hydronephrosis even after 1 year follow up but Tc99 DTPA scan showed SRF improvement . 2 patients had features of intestinal obstruction , improved on conservative management.

Operation time mean(min-max)	**90 min (80 min-110 min)**
Estimated blood loss mean (min-max)	15 ml (10 ml- 30ml)
Duration of hospital stay mean(min-max)	5 days (4-7 days)
Short term complications	
UTI	4 (10.52%)
leak	2 (5.26%)
hematuria	7 (18.42%)
Long term complications	
anastomotic stricture	2 (5.26%)
Persistent hydronephrosis	3 (7.89%)
Intestinal obstruction	2 (5.26%)

Table 2. surgical data and complications

A significant improvement of mean renal pelvic diameter from 28mm before operation to 9mm 1 year after surgery ($p<0.001$). Parenchymal thickness improved from a mean value 5 mm pre operation to 9 mm1 year post operation ($p< 0.001$). Despite significant improvement in mean, 3 patients had persistent hydronephrosis required CT IVP and MAG3 renal scan. Two patients had stricture required redo pyeloplasty.

Parameters	Pre op	Post op 12month	P value
Renal pelvis diameter(APD)	28mm N=36	9mm N=24	<0.001
Parenchymal thickness(PT)	5mm N=36	9mm N=24	<0.001

Table 3 :preoperative ultrasound finding and follow up

*paired t test

DISCUSSION

Open pyeloplasty was the standard treatment for UPJO since 1949 , its description by Anderson-Hynes. Indeed pure laparoscopic and robotic approaches can be more technically complex in younger and smaller pediatric patients. More over avilable data seems to demonstrate no significant benefit to infants and children from a laparoscopic or robotic approach over an open procedure performed through a small skin incision.

Open pyeloplasty most commonly done via extra peritoneal and extra pleural approach. In this study we have tried pyelopasty through transperitoneal approach. It has advantage of combining a good exposure on pelvi ureteric junction to allow an excellent section of the pelvis and to realize on impervious anastomosis.

The mean operative time in our study is 30 minutes. Rogue et al reported an operating time of 165 minutes for open pyeloplasty. Lee et al in 2006 showed an operating time of 181 minutes for open pyeloplasty. Kafka et al showed a lower mean operating time of 66.5 minutes for open pyeloplasty.[14] Our study shows we are rather in the lower range of operating time despite of being a surgical traning center.

The mean length of hospital stay in our study is 5 days which is much longer than the reported ones for open pyeloplasty(2-3.5days).[11,13] This might be due to pre operative stay for arranging stent and investigating the patient. Therefore our finding would be similar to the previously reported hospital stay in the literature.

During active post operative follow up it confirms high success rate in terms of normalisation of renal pelvic diameter and increase in PT in most cases within 12months of surgery. This result indicates that resolution of hydronephrosis in children may take time, however it should be expected in majority of cases within 24 months post operatively. Freilich et al reported a success rate of 96% in groups wth open pyeloplasty. In our study we achieved a success rate of 94.74%.

The most significnt major complication was redopyeloplasty for stricture in 2 cases (5.26%) which is simillar to the reported reoperation rate (4.8%-5.1%) in a meta analysis reported by Cundy et al.

LIMITATIONS

Our monometric study was limited by lack of a control group and the retrospective design. The other limiting factor is, this study is analysed in a small population of patients. Further studies should be randomised control trials in order to compare the different types of surgery for correction of UPJO.

CONCLUSION

Our result confirms that operation through transperitoneal route is within an acceptable range with a short learning curve. The advantage of a good exposure and operating over pelvi ureteric junction in a normal anatomical position is really helpful for beginers and operating in small infants.

Conflicts of interest: the author declare no conflict of interest.

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