Outcome of Anderson Hynes Dismembered Pyeloplasty in Paediatric Pelvic Ureteric Junction Obstruction

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ABSTRACT

Background

Anderson Hynes dismembered pyeloplasty is the gold standard procedure for management of Pelvic Ureteric Junction Obstruction (PUJO) in children with success rate of 90-95%. The aim of the current study is to evaluate safety, efficacy and outcomes of Anderson Hynes Pyeloplasty in our part of the world.

Method

A retrospective study was conducted involving 69 children who underwent Open Anderson Hyne'S dismembered Pyeoplasty over a period of 2 years from March 2022 to April 2024. Patient were evaluated with respect to age, sex, ultrasonographic grading of hydronephrosis, affected side, operation time, postoperative complications and follow-up outcomes and analyzed.

Result

This study consisted of 69 patients with moderate to severe hydronpehrosis secondary to PUJO underwent open pyeloplasty. Male-female ratio was 2:1. Average mean age was 41.67 months (1 month to 156 months) where 28 patients (40.57%) were infants. 45 patients (65.2%) had grade 3 hydronephrosis whereas 24 patients (34.8%) had grade 4 hydronephrosis in ultrasound abdomen. Right sided pyeloplasty was performed in 48 children (69.6%) and left sided was performed in 21 children (30.4%). Mean operative time period was 92.5 minutes with mean hospital stay of 3.53 days (3 days to 5 days). Post-pyeloplasty, 63 patients(91.3%) showed improvement in ipsilateral kidney function on DTPA scan and three patient developed anastomotic stricture which required Re-do Pyeloplasty.

Conclusion

Anderson Hyne's dismembered pyeloplasty has shown better outcome amongst pediatric patient with PUJO. It has a high success rate with significant improvement in kidney drainage function.

Keywords: Anderson Hyne's dismembered pyeloplasty, Clavien Dindo, Pelvic ureteric junction obstruction

Introduction

Pelvic ureteric junction obstruction (PUJO) is defined as blockage or obstruction of urine flow from the kidney into the proximal ureter, with incidence of 1 in 1000 to 1500 live birth.[1,2] It has a ratio of 2:1 in boys compared with girls and left side is more common than right.[3] It is leading cause of kidney injury in paediatric age group. Majority of PUJO are asymptomatic and will manage with watchful follow up.[4] PUJO with severe hydronephrosis, recurrent flank pain, associated renal stones and deteriorating split renal function require surgical intervention.[5]

Minimal invasive technique aids in better cosmetic, easy and short hospital stay. Because of lack of minimal invasive instruments and expertise in Nepal, patient with paediatric PUJO is managed with open procedure. Anderson Hynes dismembered pyeloplasty is the gold standard procedure for PUJO with success rate of 90-95%.[6] The aim of the current study is to evaluate safety, efficacy and

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outcomes of Anderson Hynes Pyeloplasty in our part of the world.

Materials and Methods

This was a retrospective study done in the single unit of department of Paediatric Surgery, Kanti Children Hospital over a period of 2 years from March 2022 to April 2024 AD**.** All patient who underwent Anderson Hyne's dismembered Pyeoplasty with DJ stenting were studied with respect to age, sex, affected side, operation time, postoperative complications and postoperative follow up. All children initially underwent an Ultrasound of the abdomen and pelvis to evaluate the side and extent of hydronephrosis. Onen grading system of hydronephrosis was used.[7] Patient with moderate to severe hydronephrosis along with impaired ipsilateral function kidney on DTPA of any age group between 1 month to 14 years were included. PUJO secondary to stone, mild hydronephrosis, moderate hydronephrosis with normal renal function were excluded. Neonate age group were also excluded. All surgery were performed by single surgeon. DJ stent was removed after 4 weeks of pyeloplasty. Early complications were evaluated using Clavien-Dindo complication grading, whereas late complications were assessed in follow up.

Follow up: In all children with pyeloplasty, USG abdomen and pelvis and DTPA was also done at 6-12 months post-surgery to evaluate kidney function and drainage pattern across the PUJ.

Results

This study consisted of 69 consecutive patients with hydronephrosis secondary to PUJJO who underwent Open Anderson-Hynes Dismembered Pyeloplasty from March 2022 to April 2024 AD. Majority were male (69.6%). Mean age was 41.67 months (1 month to 156 months). Right sided pyeloplasty was performed almost double than left sided. Mean operative time period was 92.5 minutes. Mean hospital stay was 3.53 days (3 days to 5 days) (Table 1).

Pyeloplasty was performed more in infant age group (40.57%) followed by school going and toddler. (Figure 1)

45 patients (65.2%) had grade 3 hydronephrosis (moderate) whereas 24 patients (34.8%) had grade 4 hydronpehrosis (severe) in ultrasound abdomen (Onen classification grading)[10]. (Figure 2)

Table 1. Patient Characteristics

Age at surgery (months)	Mean 41.67 (Range: 1-156)
Sex Male: Female	48 (69.6%): 21 (30.4%)
Site of surgery (left:right)	21:48 (1:2.3)
Mean operative time (minutes)	92.5 (71-112)
Hospital stay (days)	Mean 3.53 (3-5)
Follow up (months)	Mean 8 (6-12)

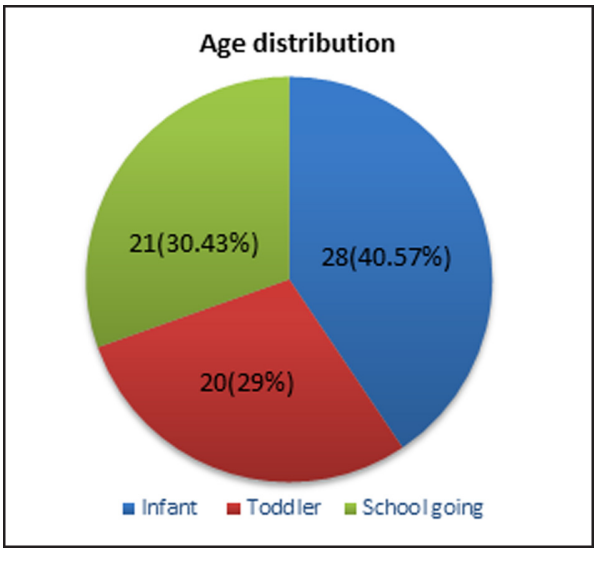

Figure 1: Age distribution of children with PUJO (N= 69)

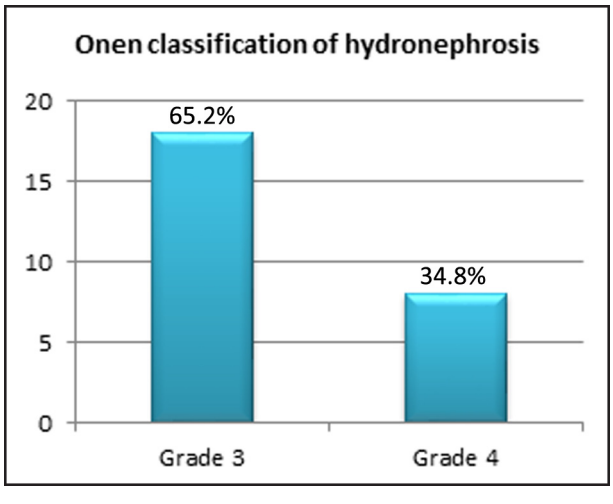

Figure 2: Onen grading of hydronephrosis (Ultrasound guided) (N=69)

Postoperative complications

Clavien-Dindo (CD) complications were observed in 25 (36.2%) patients (Table 2). One patient had two CD complication. In one infant, DJ Stent could not be negotiated at uretero-vesical junction,

so classical 3 tube technique A-H Pyeloplasty (Trans-anastomotic stent, intra-pelvic drain and perinephric drain) was done. Intrapelvic drain was kept for 4 weeks and antegrade pyelogram showed anastomotic stricture which was managed by Re-do pyeloplasty. Other 2 patients also developed anastomotic stricture in 6 month follow up with deteriorating renal function in DTPA. These 3 patients underwent Re-do pyeloplasty. Thrombophlebitis and UTI were common complications.

During follow up (mean 8 months), five patients (7.2%) suffered febrile UTI. These patients were kept under chemoprophylaxis for 3 months. Later, they didn't have any recurrent febrile issues. One patient had proximal migration of DJ Stent which was removed with ureteroscope. This could be due to inadequate length of distal coil of DJ stent. Three patient developed ipsilateral flank bulge which was resolved spontaneously after 7 months of operation. performed.

Mean DTPA Scan in postoperative period was found to be 33.5 ± 7.67 in compare with preoperative 29.26 ± 8.24 with improvement in 63 patients (91.3%). It was found statistically significant (Table 3).

Discussion

Pelviureteric junction obstruction (PUJO) can manifest at any age, from the neonatal period to late adulthood. Anderson Hynes pyeloplasty is the gold standard procedure in any age group, no matter which surgical mode is used, open or laparoscopy or robotic technique.[8-11] Right sided Pyeloplasty was performed more compared to left. This finding is contrary to other studies.[3] More numbers of male were affected compared to female just like other study.[3]

The success rate for dismembered pyeloplasty in children consistently remains high i.e 90-95%, with studies showing long-term improvement in renal function and resolution of symptoms.[6] Postoperative complications were stratified according to the Clavien-Dindo classification system. Grade I complications were predominantly present which could be present in any urological procedure irrespective of Anderson-Hynes dismembered pyeloplasty technique. However, anastomotic stricture, proximal migration of DJ Stent into ureter were major issues. Vascular compromise, improper surgical technique and tight anastomosis were the common cause of anastomotic stricture.[9,10,11] Use of short DJ stent length, redundant coiling of stent in

Table 2: Post operative Complications

Claviendindo Score	Diagnosis/ treatment	Number of patients	Total (percentage)
I	Thrombophlebitis	12	12 (17.3%)
II	Febrile UTI	5	5 (7.2%)
	Flank bulge/ Spontaneous resolution	3	3 (4.3%)
IIIa	Abdominal distention/ NG tube insertion and Nil per oral for 24 hours	1	1 (1.4%)
IIIb	DJ stent migration, use of URS for removal	1	1 (1.4%)
	Redo Pyeloplasty	3	3 (4.3%)
IV	None		
			25 (36.2%)

Table 3: Comparison of DTPA Scan

	Range (Min-Max)	DTPA value (%) of ipsilateral kidney with standard deviation	p-value
Preoperative mean DTPA value	9-42	29.26 ± 8.24	0.029*
Postoperative mean DTPA value	10-44	33.5 ± 7.67	

*chi square test is used to see level of significance

renal pelvis are leading cause of proximal migration of stent.[12]

This could be due to impairment of vascular supply around pelvi-ureteric junction area. This complications occurred at initial phase of research. Better outlining the vessels and preserving it before anastomosis is ideal to prevent such catastrophic complications. Some patients developed ipsilateral flank bulge which could be due to transient neurapraxia to intercostal nerves or muscle weakness.[11]

Of the 69 patients who underwent dismembered pyeloplasy, the overall improvement in ipsilateral kidney function on DTPA scan was found in 91.3%, which is comparable to the outcomes reported in recent studies by Smith et al and Patel et al.12,13 In the present study, mean operative time was 92.5 and duration of hospital was 3.53 which in almost similar finding with Polak et al.[14]

This is single center retrospective study with limited cases. Multi institutional study seems more conclusive rather than this single center study. Minimal invasive procedure should be started in near future to improve healthcare of demanding general population.

Conclusion

Anderson hynes dismembered pyeloplasty is the gold standard procedure for management of pelvicureteric junction obstruction in any age group. It provides excellent outcomes with high success rates and significant improvement in renal drainage function in paedaitric age group.

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