Original Article

The Effectiveness Of Open Anderson-Hynes Pyeloplasty For Congenital Unilateral Uretero-Pelvic Junction Obstruction In School Going Children

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Abstract

Background: Ureteropelvic junction obstruction (UPJO) is defined as a condition whereby there is obstruction at the level of outlet where the ureter starts branching from the renal pelvis and this hinders the free flow of urine. Horseshoe kidney and ureteropelvic junction obstruction: congenital UPJ obstruction take place when there is an aperistaltic segment in the ureter.
Objective: To identify the hypothesis of whether unilateral congenital UPJO can be effectively managed with open Anderson Hynes Pyeloplasty in children aged 5 to 16 years and examine the impact of the following on the rate of kidney function improvement: GFR, SRF, APD of renal pelvis, and changes in parenchymal thickness.
Study design : A cross sectional retrospective study
Place and duration of study. from June 2021 to December 2021 the Pediatric Urology Department, Institute of kidney diseases Peshawar.
Methodology: The study design was a cross-sectional retrospective consecutive case series of an identifiable population of patients aged from 5-16 years with primary unilateral UPJO who underwent Anderson-Hynes dismembered pyeloplasty from June 2021 to December 2021 the Pediatric Urology Department, Institute of kidney diseases Peshawar. Pre- and post-operative records were matched and analyzed to determine the impacts it made on the alterations to GFR, SRF, APD of the renal pelvis and changes in the parenchymal thickness.
Results: The follow-up investigations revealed that postoperative GFR and SFR measurement detected on DTPA renal scan three months after the operation was significantly higher than pre-surgery score. By the end of the third month follow up, the comparative analysis showed appreciable changes in the APD and parenchymal thickness, evaluated on ultrasound KUB. From a review of the literature, therefore, it is deduced that Anderson Hynes dutch dismembered pyeloplasty is a standard and efficient method in managing UPJO in children.

Keywords: Uretero-Pelvic Junction Obstruction, Anderson-Hynes pyeloplasty, hydronephrosis, GFR**,** Open Surgery.

Introduction

Ureteropelvic Junction Obstruction (UPJO) is acknowledged as a notable clinical indication in the sub-specialty of Pediatric Urology. Lithotripsy for UPJ obstruction in live born children is currently performed at an incidence of 1 in 5000 [1]. Congenital hydronephrosis which originates from intrinsic UPJ obstruction is statistically significant and frequent in children. In its worst-case scenario, if left untreated, hydronephrosis can occur and result in renal failure

or chronic kidney disease. UPJO has been known to mainly affect males and least affected females and is commonly located on the left side of the abdomen; it causes symptoms including flank pain and haematuria [2]. Up until now it is possible to diagnose UPJ obstruction during pregnancy via maternal ultrasound. In children and adolescents, diagnosis is usually based on a scan that uses ultrasound or intravenous pyelography or DTPA/MAG3 scan. Also, a kidney-bladder X-ray test called a Voiding Cystourethrogram (VCUG) may be taken to test for vesicoureteral reflux that occurs in as much as 10% of children affected with UTIs [3]. UPJO blocks the flow of urine from the renal pelvis and causes hydrostatic elongation of the peIvic and intrarenal calICEal system. Based on this evidence it can be concluded that, with prolonged urine retention, there is increased intrapelvic pressure which suggests kidney damage [4]. Hypoxia and ischemia can also promoted cyclooxygenase activity and thromboxane synthetase in obstructed kidneys [5]. Also, activation of the renin-angiotensin system in the obstructed kidneys increases the sclerosis and this process can be reversed by use of ACE inhibitors [6]. It also initates spasms in the renal vasculature bringing down the GFR to normal levels [7]. It is also important to acknowledge that chronic obstruction results in collagen accumulation and renal fibrosis [8]. Since, renal obstruction is threatening to the kidney function and hydronephrosis least likely to resolve itself without some interventional measure, early management is counselled [9].

In the nineteenth century, to be exact in 1891, Kuster went down in history as the first to perform urinary tract reconstruction and specifically the successful repair of ureteropelvic junction obstruction [10]. As a result of this, improvements have been made to the many types of surgery that are performed on patients. In 1949, Anderson and Hynes further developed Kuster's dismembered pyeloplasty and standardized in its current form as dismembered pyeloplasty – Anderson Hynes pyeloplasty our standard approach in the management of UPJO [11]. Employed via open, laparoscopic or robotics, this procedure has been done for over the last seventy years and is considered to be the gold standard with above 90% efficacy.Therefore, the purpose of this investigation is to evaluate the effectiveness of open Anderson-Hynes pyeloplasty. Efficacy will be measured by changes in G-F and S-R functional scores following treatment in addition to slowing down of functional/morphological progression of the affected kidney.

Methodology

This retrospective observational study included 125 pediatric patients and was conducted at from June 2021 to December 2021 the Pediatric Urology Department, Institute of kidney diseases Peshawar Electrical, Mechanical and Computer engineers: It takes longer time to complete this specialization because it balances the executive MBA program's analytical emphasis with technical content, says the report. Before the collection of data and the analysis was conducted, the research proposal was approved by the institutional Research and Ethical Review Board.

Inclusion and Exclusion Criteria:

The present study comprised of patients of UTBED; age group between 5 to 16 years with primary unilateral UPJO and split renal function of more than 15% undergoing AH dismembered pyeloplasty in the Department of Urology, Khyber Teaching Hospital, Peshawar. The life history, complete medical history, and clinical evaluation where well recorded. This diagnosis was made by sonogram and then backed up by IVU/CTU and finalized with the help of DTPA renal scan. Patients with PUJO in solitary or ectopic kidney, bilateral PUJO, recurrent PUJO, secondary PUJO and the one with split renal function less than 15% were not included in the study.These diagnostic assessments were done through taking comprehensive history of the patient, assessment of all systems, and numerous tests. These investigations included urine microscopy and analysis, cumulative blood counts, fasting blood sugar, blood urea and serum creatinine and various electrolyte levels, sonography, intravenous urogram (IVU) and Ditheto Tetrofosmin Acid IV (DTPA renal scan). Surgical approaches consisted of flank incisions, in which all the lower pole vessels were assessed for any abnormality. The dismembered pyeloplasty was undertaken using either 4/0 polyglycol running sutures or the first two initial interrupted sutures. During the operation, the placement of J J stent in the antegrade position was done. A drain was put beside the repair and Foley catheter inserted into the bladder.Postoperative complications were documented. The Foley catheter was generally managed for 24 hours, while the drain was removed when the amount and characteristics of drainage were low. They both got operated and a JJ stent was inserted in them The JJ stent was then taken out after six weeks. Patients of study had follow up by ultrasound to determine APD and parenchymal thickness meaning. APD is said to be the distance that starts objectively in the midline of the cross sectional view of the renal parenchymal and ends at the other side of the parenchymal at the hilum. Three months after the surgery, the DTPA nuclear scan was conducted to assess the functional aspect of the surgery, including the enhancement of GFR and SRF and the clearance of contrast in the pelvis into the ureter.

Results

Out of 56 patients, 44. 8% were in age category 5-10 years, while 69 patients, 55. 2% were in age category 11-15 years. The tests showed that the overall mean age for all the children was 10. 5 and usually there is a variation of 1. 39.The tests also revealed that the total overall age of all the children was calculated to be a mean of about 10. 5 with a standard deviation of 1. 39. Regarding the gender distribution of the patients, 86 (68. 8%) of the total patients were male whereas the number of females was 39 (31. 2%). Among them left side was affected in 88(70. 4%) cases and right side was seen in 37 (29. 6) case.

Table 1: Age in years (n=125, Range= 5-16)

	Mean	**SDs**
Age (Years)	10.5	1.395

"Table 2: Age frequency distribution of respondents (n = 125)"

Group Age	**Number of Cases**	**%**
5-10 (years)	56	44.8%
11-16 (years)	69	55.2%
Total	125	100%

Table 3: number of cases and % for Gender (n=125)

Gender	**Number of Cases**	**%**
Male	86	68.8%
Female	39	31.2%
Total	125	100%

Table 4: number of cses and % for Side (n=125)

	Number of Cases	**%**
Left side	88	70.4%
Right side	37	29.6%
Total	125	100%

There was a statistically significant increase in postoperative Glomerular Filtration Rate (GFR) and Split Renal Function (SRF) recorded on DTPA renal scan 3 months postoperatively. The mean preoperative GFR was 36.50mL/min with SD 11.36, and the mean postoperative GFR was 40.35 mL/min with SD 12.23. The efficacy in terms of GFR improvement was recorded in 113 (90.4%) patients while 12(9.6%) showed no efficacy. Similarly, the mean preoperative SRF was 38.50 % with SD 4.97, and the mean postoperative SRF was 43.70 % with SD 5.46. The results revealed that out of 125, 109 (87.2%) patients had improvement in SFR while 16 (12.8%) did not show any improvement.

Table 5: finding of Glomerular Filtration Rate (GRF) ,n=125

	Mean	**SDs**
Pre-op GFR (mL/min)	36.50	11.36
Postop GFR(mL/min)	40.35	12.23

GFR Improvement	Number of Cases	%
Yes	113	90.4%
No	12	9.6%
Total	125	100%

Table 6: finding of Split Renal Function (SRF),n=125

	Mean	SDs
Pre-op SRF (%)	38.50	4.97
Post-op SRF (%)	43.70	5.46
SRF Improvement	**Number of Cases**	**%**
Yes	109	87.2%
No	16	12.8%
Total	125	100%

Postoperatively the APD and PT were recorded on Ultrasound KUB done 3 months after the surgery. The mean preoperative APD was 30.35cm ± 4.85 and the mean postoperative APD was 21.10cm± 4.856. It was noted that there was a statistically significant decrease in postoperative APD. 110 out of 125 (88%) cases, APD decreased postoperatively. Likewise, the PT improved in 45 (36%) patients, was maintained in 72 (57.6%) patients, and deteriorated in 8 (6.4%) patients.

Table 7: bases on finding the changes in Anterio-posterior Diameter (APD) of renal pelvis (n=125)

	Mean	SDs
Pre-op APD (cm)	30.35	4.850
Post-op APD (cm)	21.10	4.856
APD Decreased	**Number of Cases**	**%**
Yes	110	88%
No	15	12%
Total	125	100%

Table 8:finding of Parenchymal Thickness (n=125)

Parenchymal Thickness	Number of Cases	%
Improved	45	36%
Maintained	72	57.6%
Deteriorated	8	6.4%
Total	125	100%

DISCUSSION

The aim of UPJO surgery if to establish free flow of urine from renal pelvis to the ureter while at the same time, maintaining or even enhancing the kidney function. Dismembered pyeloplasty has been well proven as the most effective management of Upjo [13]. This procedure entails the excision of the affected part and reconstruction of the normal urine transporting pathway [14]. Eventually, major changes in surgical approaches, remaining improvement in utilization of materials and sutures for closure have assured strong or almost ‘‘intrinsically sealed’’ anastomoses [15].

Although minimal invasive surgical techniques have gained increasing popularity in various urological surgeries, open Anderson-Hynes dismembered pyeloplasty is still considered the first line approach to treat UPJO in many centres. This has been attributed to the fact that, most of the developed countries, conducting these surgeries do not have adequate supplies of laparoscopic instruments and human resource [16].UPJO can present during any age;

Nevertheless, the point here being that it can present in a patient at any age. Altogether, 55. 2% of participated patients were in the age group of 11-16 years, while Mughal and Soomro observed that 60% of their participants were of 1-5 years old [17]. Male patients outnumbered female patients, with 68. 8% males and 31. 2% females, resulting in a male-to-female ratio of 2:1, which is also consistent with previous observations in the form of literature [18]. Concerning the affected kidney, the left kidney was more affected than the right kidney, with an incidence of 60%; this is in concordance with previous studies such as; PUJO affects the left kidney in 52 – 73. 52% of patients. Likewise, present investigation identified that the left renal fascia was involved in 70. 4 percent of the cases. Several studies have shown that advancement in renal pelvic APD and renal PT after pyeloplasty is associated with better prognostic indications [20] Some of them are shown in the following tables. Similarly, changes in functional parameters including GFR, SRF, and the drainage pattern seen on post surgical renogram have otherwise been used in many studies reported as indicators of good outcomes following pyeloplasty [21]. Here, as in previous work published by other researchers, there was a positive association between the enhanced morphological outcomes and functional results of pyeloplasty.

CONCLUSION

Since then Anderson-Hynes open pyeloplasty still holds the standard for the treatment of congenital unilateral ureteropelvic junction obstruction (UPJO) in school-aged children in our setting, not only exhibiting good prognosis continually. This approach is helpful in relieving a blockage and enhancing kidney function, especially when one compares this study's patients with those NS-NS patients who did not undergo surgery; their GFR progressively declined.

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Authors Contribution

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