

DIURETIC RADIONUCLIDE RENOGRAPHY IN ASSESSING ANDERSON-HYNES PYELOPLASTY IN UNILATERAL PELVI-URETERIC JUNCTION OBSTRUCTION

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ABSTRACT

Objective: To analyze the functional outcome of unilateral Anderson Hynes (AH) Pyeloplasty using DTPA renography in patients with symptomatic pelvi- ureteric junction (PUJ) obstruction.

Material and Methods: This study included 48 patients with PUJ-obstruction who underwent stentless AH pyeloplasty. Their record was analyzed for age, clinical presentation, pre and postoperative IVU and preoperative and postoperative DTPA renography finding. The out come of the pyeloplasty was evaluated by comparing preoperative and postoperative symptomatic improvement and DTPA renography split function result.

Result: The age range from 3yrs to 25yrs with mean age 19.68 yrs. There were 35 (72.9%) male and 13(27.1%) female. The left side was involved in 31(64.58%), right side in 10(20.83%) and 7 (14.58%) patients had bilateral PUJ -obstruction. The predominant clinical presentation was pain in 36(75%), urinary tract infection in 4(8.33%), haematuria in 2(4.16%), while in 8(16.66%) patients it was an incidental finding. The patients were divided into 3 groups based on the renography split function. Group A: 20-30% function, 16 (33.33%) patients; Group B: 31-40% function, 12(25%) patients and Group C: >40% function, 20 (41.66%) patients. Post pyeloplasty scan revealed stable renal function in 19(39.58%) patients, while improvement was noticed in 21(43.75%) patients. The remaining 8(16.66%) had deterioration in renal function.

Conclusion: Anderson-Hynes Pyeloplasty is an effective treatment for PUJ-obstruction. 99mTc-DTPA renal scan is an important investigation in diagnosing PUJ-obstruction and evaluating the outcome of surgical intervention.

Key Words: Pelvi-ureteric Junction Obstruction, Anderson Hynes Pyeloplasty, DTPA- Renogram .

INTRODUCTION

Pelvi-ureteric Junction (PUJ) obstruction is the most common congenital abnormality of urinary tract and account for 80% of cases. The frequency of birth to unilateral PUJ obstruction is 1 case per 5000-8000 live births.^{1,2} It is more common on left than the right side and is more common in male than in female.³

The etiology of PUJ-obstruction is primary or secondary. Primary PUJ -obstruction is due to developmental anomalies of PUJ and is the commonest cause of hydronephrosis in infant and children. This is either due to aperistaltic section of smooth muscles, or mucosal fold forming valve

or polyps. Secondary PUJ-obstruction results from injuries or distortion of PUJ as a result of iatrogenic trauma, inflammation, urolithiasis and even vesico ureteric (VU)-reflux or compression from aberrant lower pole vessel. PUJ-obstruction is often associated with a number of other congenital anomalies including contralateral PUJ-obstruction, VU reflux, megaureter, ureteral valves, ectopic kidney and horse shoe kidney etc.⁸⁻¹²

The choice of treatment is between watchful waiting or surgical intervention.¹³ The indication for surgery is the severity of symptoms or evidence of complication. The most popular open procedure is the Anderson Hynes dismembered pyeloplasty¹⁴ which can be done with

PRESENTING SYMPTOMS OF PATIENTS

Symptoms	Frequency	%Age
Pain	34	70.83
UTI	4	8.33
Haematuria	2	4.16
Incidental	8	16.66

Table 1

or without stent. ¹⁵ Now a days this can be done via laparoscopy. ¹⁶⁻²⁰ The other minimally invasive options are antigrade or retrograde endopyelotomy, ^{21,22} retrograde approach using balloon cutting catheter(acucise) ²³ under fluroscopy guidance and by the use of ureteroscopy. ²⁴ To assess the function of the kidney and the outcome of various available treatments, the commonly used and comparatively cheap investigation tool is radionucleoid ^{99mT-DTPA} renal scan. ²⁵⁻²⁷ The efficiency of ^{99m T-DTPA} scan can be enhanced by keeping the patient well hydrated and bladder empty by so called well tampered renogram (WTR). ²⁸ Also by measuring the clearance half life of injected radio isotope after diuretic (T ½) ²⁹ and the GFR estimation, all provides a good indication of function and extent of obstruction. This study was conducted to analyze the functional outcome of unilateral Anderson Hynes (AH) Pyeloplasty using DTPA renography.

MATERIAL AND METHODS

The study was done in Surgical C unit of Khyber Teaching Hospital from January 2001 to December 2006. Total of 48 patients who completed the follow up criteria of at least 6-months were included in the study.

Inclusion Criteria

- Patients with symptomatic PUJ-obstruction.
- Patients with evidence of deteriorated renal function.
- PUJ-obstruction with split renal function of more than 20%.

Exclusion criteria

- PUJ-obstruction in association with vesico ureteric reflux.
- Patients not able to come for follow-up.
- Secondary PUJ-obstruction due to urolithiasis or iatrogenic trauma.

A complete history, through physical examination, and relevant investigation, including ultrasonography, intravenous urography and ^{99m T-DTPA} renography were done. In all patients

ASSOCIATED ABNORMALITIES

Associated Abnormalities	Frequency (n=48)	%Age
Aberrant vessel	9	18.75
Duplex system	5	10.41
Stone	6	12.5
Horse shoe	2	4.10
Classic	26	51.16

Table 2

Anderson Hynes pyeloplasty was done. The cause of PUJ-obstruction was noted. After excision of redundant pelvis and about 1cm of proximal ureter, the spatulated ureter was anastomosed to dependent portion of pelvis by 4/0 vicryl suture. No stent or nephrostomy tube was used. A perinephric drain was left in all cases. After removal of drain the patients were discharged and asked to come for follow-up on 10th day for removal of stitch. ^{99mT-DTPA}-renal scan was booked for 3rd and 6th month and IVU on 6th month. The pre and post surgery results were recorded and compared.

RESULTS

A total of 48 patients were included in study. The age ranged from 3- 25 years with the mean age of 19.68 years. There were 35 (72.91%) males and 13 (27.08%) females. The left side was involved in 31(64.58%), right side in 10(20.83%) and in 7 (14.58%) patients bilateral UPJ-obstruction was present. The predominant clinical presentation was pain in 34 (70.83%) cases, UTI in 4 (8.33%) cases, haematuria with pain in 2(4.10%) cases, while in 8(16.66%) patients the diagnosis was incidental (Table 1). Associated abnormalities found during operation were aberrant lower pole vessel causing compression at UPJ in 9 (18.75%) patients, duplex system in 5(10.41%) patients, renal stone in 6(12.5%) patients, and horseshoe kidney in 2 (4.16%) patients (Table 2). Postoperative complication included wound infection in 5(10.11%) patients, haematuria in 3(6.25%) patients and clot retention in 1(2.08%) patient (Table 3). Urine leak for > 6days was noted in 7 (14.58%) patients; of these 2 patients needed JJ-stenting when the leak persisted for more then 2

POSTOPERATIVE COMPLICATION

Complication	Frequency (n=48)	%Age
Urine Leak (>6days)	7	14.58
Wound Infection	5	10.11
Haematuria	3	6.25
Urinoma	2	4.1
Clot retention	1	2.08

Table 3

POSTOPERATIVE RENAL FUNCTION

Group	Improvement	Stable	Deterioration
A = 16 (33.33%)	7 (43.75%)	6 (37.5%)	3 (18.75%)
B = 12 (25%)	6 (50%)	4 (33.44%)	2 (16.66%)
C = 20 (41.66%)	8 (40%)	9 (45%)	3 (15%)
Total = 48 (100%)	21 (43.75%)	19 (39.58%)	8 (16.66%)

Table 4

weeks. Two (4.1%) patients presented with urinoma, which was treated by percutaneous needle aspiration. One patient with >200ml urine collection also had JJ-stenting. All these stents were removed after 2 months.

The patients were divided into 3 groups (Table 4) depending on 99mTc-DTPA split function renography. I.e.

- Group A “20-30% renal function” included 16(33.33%) patient,
- Group B “31-40% renal function” included 12(25%) patients and
- Group C “>40% renal function” included 20(41.67%).

To account for an accepted error of measurement, an absolute difference in differential renal function of > 5% was considered significant. Post Pyeloplasty renal scan at 3 months revealed stable renal function in 19 (39.58%) patients, while improvement in renal function was noticed in 21(43.75%) patients. The remaining 8(16.66%) patients had deterioration in renal function. One patient needed revision pyeloplasty (from Group A), as his renal function further deteriorated below 20% at 6 month follow up and JJ-stent couldn't be passed. None of the patient needed nephrectomy.

DISCUSSION

The pathophysiology, presentation and diagnosis of congenital PUJ-obstruction have been a challenge to urologist.³⁰ To differential between dilated and obstructed renal pelvicalyceal system is still a dilemma.^{31,32} The decision of surgical intervention and whether or not to expect any functional improvement post operatively continues to generate debate.³³⁻³⁵ In general patients with PUJ-obstruction having significant pelvic dilatation on ultrasound (>20mm AP diameter)³⁶ and those who show deterioration of >10% in renal function are candidates for intervention.³⁷ Also patients with symptomatic PUJ-obstruction need surgery.³⁸ It is well realized that Anderson-Hynes pyeloplasty fails to improve drainage pattern and renal function parameter in few cases.³⁹ This may be due to the reason that abnormal ureteral segment being longer

then the visible constricted segment below the PUJ. It is recommended that ureter should be excised at least 8mm or more beyond the visible lower limit of constricted segment.⁴⁰ For follow up, IVU is an alternate study. Ultrasound is probably not a good procedure because residual hydronephrosis often persist without obstruction. Follow up is usually at 2-3 months, but sooner if symptoms appear or if there is evidence of UTI. In order to detect silent obstruction from stricture formation, patients generally require lifetime follow up.

In this study majority of patients have persistent hydronephrosis after surgery and the improvement in the renal function and T½ was noted in <50% of cases. This correlates well with the study of MacNeily⁴¹ and Dell'Agnola,⁴² who suggested that operation done before two years of age shows better outcome.

Hence it can be concluded that Anderson-Hynes Pyeloplasty is an effective treatment for most of patient with PUJ-obstruction. The earlier the operation is performed the better is the result. In later life when scarring settles in, then significant improvement in renal function does not occurs. 99mTc-DTPA renal scan is a reliable investigation in detecting the presence of obstruction and the outcome of surgical intervention. Even after surgery in small but significant number of cases the renal function deteriorates, therefore it is very important to keep patients under surveillance for long time.

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