Long term results of pyeloplasty in adults

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ABSTRACT

Objective: To determine the presenting symptoms, complications, stone coincidence in the adult patients with primary ureteropelvic junction (UPJ) obstruction seen at King Abdul-Aziz University Hospital, (KAUH) Jeddah, Kingdom of Saudi Arabia, we are also reporting the success rate and long term results of adult pyeloplasty.

Methods: We reviewed the records of 34 patients who underwent 37 pyeloplasty operations during the period January 1992 through to June 2002. The preoperative radiological diagnosis made by intravenous urogram (IVU) or renal isotopes scan. We excluded from our study patients with previous history of passage of stones, renal or ureteral surgeries, large renal pelvis stone that may cause UPJ obstruction, or abnormalities that may lead to secondary UPJ obstruction such as vesicoureteral reflux.

Results: There were 26 male patients and 8 females, their age varied between 16 and 51-years, the mean age was 36.1-years, and 18 (52.9%) patients had concomitant renal stones. Ipsilateral split renal function improved by 3-7% post pyeloplasty in 23 patients, while in one patient the function stayed the same, and in another patient the split function reduced by 4%. T1/2 renal isotopes washout time became less than 15 minutes in 19 patients and less than 20 minutes in 6 patients. Intravenous urogram revealed disappearance of the obstruction at UPJ in 7 patients, while in 2 patients it became poorly functioning.

Conclusion: Anderson Hynes pyeloplasty is an excellent procedure for treating UPJ obstruction in adults. Our success rate is comparable to the international reported rates, while our study revealed a higher incidence of concomitant renal stones than the international studies.

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Ureteropelvic junction (UPJ) is the most common site of obstruction in the upper urinary tract. Although the malformation is believed to be congenital, its actual dysfunction may manifest at any time from intrauterine life to old age.[1] The UPJ obstruction does not represent a single anatomic entity but rather a set of obstructive processes that result from multiple etiologic factors.[2] Ureteropelvic junction obstruction can be congenital or acquired as a result of some diseases such as stone, urethelial tumors, or previous surgery. Neonates and infants usually present with palpable flank mass while older children and adults commonly present with intermittent flank or abdominal pain.[3] Stones may coexist with UPJ obstruction and indeed may be caused by UPJ stenosis, also stone in itself may generate edema that may appear as UPJ obstruction that should be ruled out.[4]

The phenomenon of UPJ obstruction and simultaneous calculi is not rare; there seem to be primarily metabolic basis, although the obstruction may be certainly a contributing factor,[5,6] Clark et al[1] reported 20% coincidence of stones in adults with UPJ obstruction, while Snyder et al[7] reported a rate of 5% coincidence of stones in their pediatric series in patients with UPJ obstruction, and Rickwood[8] reported lower coincidence rate of stones 1.2% in their pediatric series. Literature review revealed that the results of laparoscopic pyeloplasty are promising, and the short term results are comparable to open surgery, serious complications such as vascular and visceral injuries are possible but can be

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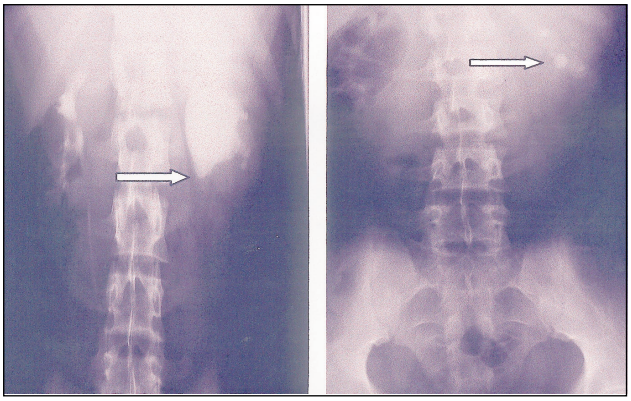

Figure 1 - Intravenous pyelogram shows ureteropelvic junction obstruction, renal pelvis and caliceal stones.

Table 1 - Clinical presentation.

Clinical presentation	Patients n (%)
Flank pain	All (100)
Gross or microscopic hematuria	8 (23.5)
Concomitant stones	18 (52.9)
Swelling or flank mass	3 (8.8)
Recurrent urinary tract infections	6 (17.6)
Abnormal serum creatinine	1 (2.9)

prevented with better mastery of the different steps of procedures.[9-12] Endopyelotomy, balloon dilatation, and newer endoscopic procedures currently used must be carefully assessed against the gold standard Anderson-Hynes procedure.[13-16] Long term follow up of patients with UPJ obstruction treated by Anderson-Hynes pyeloplasty proved the most effective and permanent treatment for UPJ obstruction.[17-19]

Methods. We reviewed the records of 34 patients who underwent 37 pyeloplasty for UPJ stenosis at KAUH in the period between January 1992 and June 2002. All the patients entered our study were above 12-years-old. We reviewed the records regarding gender, side, clinical presentation, concomitant renal stones, and the results of surgery. We excluded from our study all patients with previous history of renal or ureteral stones, surgeries, or abnormalities that may cause secondary UPJ obstruction such as vesicoureteral reflux. Preoperative evaluation included urinalysis, renal function profile and the diagnosis of UPJ stenosis made by IVU, diuretic renal isotopes scan or both, in the early years of the study diagnosis made by IVU as the renal isotope was not available in the institute. **(Figure 1)**

The postoperative follow up made by analysis of the postoperative symptoms, renal ultrasonography, and renal isotope scan or intravenous pyelogram. Isotope scan studies made by using 99mTc-DTPA or 99mnTc-MAG3 with computer generated analysis of differential renal function and drainage half time. All patients underwent Anderson-Hynes pyeloplasty through median or flank incision, except 2 patients who underwent Culp procedure and 3 patients who underwent Y-V Pyeloplasty. Drainage made by internal stent (double J stent 6 Fr) or by external stent (nephrostomy and feeding tube size 5Fr) as stent, and only 2 cases were without stents. Nephrostogram performed on the 7-10 Postoperative day and the tubes were removed at that time if the anastomosis proved to be patent, while double J stents removed on the14-20th post operative day. Leakage through drain recorded daily and evaluated regarding length and amount of the drainage.

Results. Thirty-four patients were included in our study during the period January 1992 through to June 2002 and underwent 37 pyeloplasty, 2 patients had bilateral UPJ obstruction, 25 patients had left UPJ obstruction, 7 patients had right UPJ obstruction, and one patient who had left UPJ obstruction had repeated pyeloplasty, follow up period varies between 29th month and 63rd month with an average of 32 months. Twenty-six of the patients were males and 8 were females, the male to female ratio was 26:8 approximately equal to 3:1. The age of the patients ranged between 16 and 51-years-old, and means age was 36.1-years. All patients presented with unilateral flank pain, 8 (23.5%) patients with hematuria, 6 (17.6%) with recurrent urinary tract infections, 3 (8.8%) patients presented with swelling in the flank, and 18 (52.9%) patients had concomitant renal stones **(Table 1)**. Thirteen patients had caliceal stones only, and 5 patients had both caliceal and renal pelvis stones of less than 2cm in diameter, stone analysis revealed struvite stones in 2 (11.1%) while 11 (61.1%) patients had oxalate stones, cystine stone in 1 (5.5%) patient and 4 (22.2%) patients had mixed stones such as oxalate and uric acid stones.

All patients had normal serum creatinine. The diagnosis of UPJ obstruction was based solely on diuretic IVU in 9 cases while in 25 patients on diuretic renal isotopes scan. Preoperative renal isotope in 25 patients revealed relative differential function varied between 23-42% with mean split function of 35%, and mean T1/2 washout of

isotopes more than 20 minutes. Preoperative renal ultrasound made in all cases revealed dilated calyces and huge renal pelvis. Thirty-two cases underwent Anderson-Hynes pyeloplasty while 2 cases underwent Culp procedure and 3 underwent Y-V Pyeloplasty. D-J stents were removed on the 15th -21st postoperative day, and feeding tube removed after radiological confirmation of patency of the UPJ at the 10th postoperative day. Two cases were unstented pyeloplasty required postoperative stenting for persistent large amount of urinary leakage.

Histopathology results of the resected UPJ segment revealed submucosal fibrosis, muscle hypertrophy, and nonspecific chronic inflammation. Postoperatively, 85% of the patients were a symptomatic, 2 patients had episodes of symptomatic infections and deterioration of renal function, while the rest of the patients had significant improvement of their symptoms. The ipsilateral split renal function evaluated postoperatively by renal isotope scan that revealed improved function by 3-7% in 25 cases (67.5%), while in one patient the function showed no improvement and in another patient the split function reduced by 4%, T1/2 drainage time became less than 15 minutes in 19 patients and less than 20 minutes in 4 patients.

Intravenous pyelography confirmed the patency of the ureteropelvic junction in 7 (18.8%) cases, while revealed poorly functioning kidneys in 2 patients. Only one patient required repeated surgery by Culp procedure, 2 patients had nephrectomy for recurrent attacks of pyelonephritis and poor renal function, there was no significant difference in the outcome of the different types of procedures and the overall success rate was 94.5%.

Discussion. Ureteropelvic junction is the most common site of congenital ureteral obstruction, none of the currently available information on ureteral development explains it.[20] Congenital UPJ obstruction with calculi should be distinguished from obstruction due to edema from an impacted UPJ stone. We evaluated only the cases that are most probably due to congenital UPJ obstruction, the ureteropelvic junction excised during the corrective pyeloplasty and submitted for histopathological evaluation. The histopathological results in our patients showed submucosal fibrosis and thickening, and muscle hypertrophy, these histological findings are similar to those found in congenital ureteropelvic obstruction as described by Starr et al,[21] Allen.[22] The etiology of the concomitant stone disease is controversy, whether patients with simultaneous ureteropelvic junction obstruction has a stone due to the anatomical obstruction, or a metabolic problem exists as the cause of the stone. Douglas et al[5] found metabolic abnormalities in 76% with UPJ obstruction and simultaneous non-struvite renal calculi.

In our study 18 (52.9%) patients had concomitant renal stones, this incidence rate is higher by more than 2 1/2 the previously mentioned international reported studies, while the stone analysis of our patients resulted in an incidence of (88.9%) of non struvite stones. The higher incidence of stone formation in the Kingdom of Saudi Arabia (KSA) and urinary stasis could explain the higher incidence of coexisting stone with UPJ obstruction; more multicenter national studies in this area is needed. Ramello et al[23] reported 20% incidence of stone formation in KSA, which is higher than Europe 5-9%, and North America 13%. All of our patients presented with flank pain which is the most frequent presentation in most of the reported studies[24,25] and all of the patients had 2 or more symptoms on presentation while none of the patients were a symptomatic. Pub-med literature search resulted in limited number of articles published concerning primary UPJ obstruction in adults. Many articles discussed the controversy in managing these patients conservatively or surgically, in reviewing 83 patients with UPJ obstruction Kinn[26] stated that the surgical treatment of UPJ obstruction in adult may be limited to those with recurrent episodes of pain or infection and possibly with concomitant stones.[27]

In our study the success rate achieved with the Anderson-Hynes technique is comparable to those reported worldwide.[28-31]

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