



ISSN NO. 2320-5407

Journal homepage: <http://www.journalijar.com>

INTERNATIONAL JOURNAL
OF ADVANCED RESEARCH

RESEARCH ARTICLE

PERCUTANEOUS ANTEGRADE ENDOPYELOTOMY IN THE MANAGEMENT OF PELVIURETERIC JUNCTION OBSTRUCTION - INITIAL OUTCOME

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Manuscript Info

Manuscript History:

Received: 14 November 2015
Final Accepted: 22 December 2015
Published Online: January 2016

Key words:

PUJO- pelviureteric junction
obstruction

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Abstract

Objective: The aims and objectives of our study were to evaluate the role of percutaneous antegrade endopyelotomy in the management of PUJ obstruction, in terms of success rate, operative time, postoperative parameters like hospital stay, postoperative complications (if any).

Patients and Methods: From 1st June 2013 to October 2015, a total of 15 patients {9/ M; 6/F} of PUJO were enrolled in the study. The selection criteria included: Mild – Moderate hydronephrosis, Differential function > 30%, Stricture length < 2cm and absence of crossing vessel at PUJ. 9 patients with primary and 6 patients with secondary pelviureteric junction obstruction (following failed pyeloplasty) underwent percutaneous antegrade endopyelotomy using a Bugbee electrode/ Hot Knife and the results were analysed.

Results: Total of 15 renal units were operated upon, 9 patients having primary PUJO, and 6 having secondary PUJO (failed pyeloplasty). Mean age of patients was 33 years. There was moderate hydronephrosis in 66% of cases and mild hydronephrosis in 34% of cases. Percutaneous antegrade endopyelotomy was done in all 15 cases. Endopyelotomy with simultaneous stone extraction was done in 3 patients. Mean operative time was 90 minutes. Mean hospital stay was 3.5 days. The success rate after one year in terms of symptomatic relief was in 81% (9/11). The success rate after one year in terms of DTPA improvement was 80% (12/15). There were no significant complications.

Conclusion: Endopyelotomy remains a viable therapeutic option in a selected group of patients of ureteropelvic junction obstruction.

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Introduction:-

Obstruction of the urinary tract can occur during fetal development, childhood, or adulthood.

The point of obstruction can be as proximal as the calyces and as distal as the urethral meatus. The obstructive processes may be intrinsic, extrinsic, congenital, or iatrogenic, and in many cases the cause of obstruction may not be immediately evident¹. The diagnosis of “ureteropelvic junction (UPJ) obstruction” results in a functionally significant impairment of urinary transport from the renal pelvis to the ureter. Although most cases are probably congenital, the problem may not become clinically apparent until much later in life.² The identification of ICCs in the human urinary tract was possible due to the discovery that the tyrosine receptor c-kit was expressed on the surface of cells. In addition, the cytokine produced in the urothelium has also been proposed to exacerbate UPJ

obstruction.³ In some patients, these lower pole vessels cross the ureter posteriorly and truly have an aberrant course. Regardless, it is unlikely that the associated vessel alone is causing the primary obstruction.⁴

Renal ultrasonography is usually the first radiographic study performed. Ultrasonography should be able to visualize dilatation of the collecting system, to help differentiate UPJ obstruction from multicystic kidney.⁵ Diuretic renography allows quantification of the degree of obstruction and can help differentiate the level of obstruction.

Objective:-

The aims and objectives of our study were to evaluate the role of percutaneous antegrade endopyelotomy in the management of PUJ obstruction, in terms of success rate, operative time, postoperative parameters like hospital stay, postoperative complications (if any).

Material and methods:-

This observational study was conducted in the Department of Surgery of the Government Medical College Srinagar on 15 patients over a period of 18 months. The selection criteria included: Mild – Moderate hydronephrosis, Differential function > 30%, Stricture length < 2cm and absence of crossing vessel at PUJ. 9 patients with primary and 6 patients with secondary pelviureteric junction obstruction (following failed pyeloplasty) underwent percutaneous antegrade endopyelotomy using a Bugbee electrode/ Hot Knife and the results were analysed. Patients were discharged on second / third postoperative day. They were called for first follow up at 6 week later to look for any complications. The stent was removed at 6 weeks of surgery. The patients were then followed at 6 months and 12 months for assessment of early surgical outcome by IVP and TC⁹⁹ DTPA scan.

Procedure:-

After induction of anesthesia the patient was positioned in low dorsal lithotomy position for cystoscopy. Ureteric catheter (5fr) was introduced into the concerned ureter and advanced into the pelvicalyceal system under fluoroscopic guidance. Foley catheter was placed into the bladder and both were secured. The patient was turned to prone position and Cushions placed under the flanks to stabilize the kidneys. The patient's arms were brought up at right angles to the body with the elbows bent to remove the arms from the path of the fluoroscopic beam and to allow the anesthesiologist to access the arms. The thighs, knees, legs, ankles and feet were appropriately padded; supported and secured. The concerned renal area was focused on C-Arm. Retrograde access was used to opacify the collecting system with contrast (76% Urografin).

With the C-arm in vertical position (0 degree), the collecting system was inspected and appropriate calyx identified (preferably superior calyx due to its straight course to the PUJ). An 18-gauge puncture needle (two part) was advanced in the plane of the fluoroscopic beam with the C-arm in the 30-degree position and appropriately aligned using a **Bull's Eye Technique**. The depth of needle penetration was monitored by rotating the C-arm back to the vertical position (0 degree). Once the selected calyx was punctured, the stylet was removed and the correct position of the needle was confirmed by aspiration of urine. A 0.035-inch floppy- tip hydrophilic radiopaque guide wire (Terumo) were negotiated through the needle and advanced either across the uretero-pelvic junction or coiled within the renal pelvis. With the needle left in place, a 5mm skin incision was made at the point of entry. The needle was removed and the tract dilated over the guide wire. The tract was initially be dilated with 15 F fascial screw dilator. A 16F Amplatz sheath mounted over the metallic obturator is navigated on the guidewire and appropriately positioned in the concerned calyx using C-arm fluoroscopy. Following withdrawal of the metallic obturator, A 12F miniature nephroscope (Wolf) was introduced through the 16f Amplatz sheath. A posterolateral incision was made across the PUJ using a bug-bee electrode. The incision was extended 2cm in the pelvis and 1cm in the ureter across PUJ and deep into the periureteric fat which was confirmed by extravasation of contrast at the site of incision during per-operative contrast study. An endopyelotomy stent was then mounted on the guide wire placed across the PUJ into the ureter and its position monitored on fluoroscopy. The stent was left in situ for a period of 6 weeks. Nephrostomy tube was placed in the tract, to serve the triple function of hemostasis, drainage and provision for dye study. It was clamped for 24hrs then removed after 48-72hrs.

Results:-

The mean age was 33.9±9.75 years and ranges from 15-47 years. 13.3% patients were in the age group of 15-25 years, 46.7% patients were in the age group of 25-35 years, 26.7% patients were in the age group of 35-45 years

and 13.3% patients were in the age group of >45 years of age. Out of a total of 15 patients, 9 (60%) were males and 6 (40 %) females. Most of patients presents with symptoms of flank pain (73.3%), followed by, Dysuria (20.0%), asymptomatic (26.7%), and haematuria (6.7%). 10 (66.7%) patients had mild hydronephrosis, and 5 (33.3%) had moderate hydronephrosis. 6 (40.0%) patients had GFR of 25-35 (ml/min) followed by 5 (33.33%) patients with GFR of 46-55 ml/min and 3 (20.1%) patients with GFR of 56-65 ml/min. Preoperative renal drainage was poor in 9 (60%) of patients and slow in 6 (40%) patients. Mean operative time was 94.3 ± 17.2 minutes, which ranges from 62-115 minutes. 3 (20%) patients took <80minutes, 7 (46.7%) patients took 80-100 minutes and 5 (33.3%) patients took > 100 minutes. The average hospital stay was 3.5 ± 0.74 days, ranges from 3-5 days. 9 (60%) patients had 3days hospital stay, 4 (26.7%) patients had 4 days and 2 (13.3%) patients had 2 days hospital stay. the average was score during day 1 was 4.07, day 2 was 2.73 and day 3 was 1.67. post operative renal drainage across PUJ was improved in 11 (73.3%) patients and remains unchanged in 4 (26.7%) patients. The subjective outcome of symptoms at 3 months was improved in 9 (81.8%) of patients, unchanged in 2 (18.2%) while as all the 4 (100.0%) were unchanged in asymptomatic patients. The subject outcome of symptoms at six months was improved in 9 (81.1%) patients, unchanged in 2 (19.9%) patients. In asymptomatic patients, all the 4 were unchanged. The post operative complications were, blood transfusion in 2 (13.3%) patients, urinary leak 1 (6.7%) patients and fever/sepsis in 1 (26.7%). 11 patients which were preoperatively symptomatic, 9 (81.81%) showed remission in symptoms. Against a total of 15 patients which showed inadequate PCS drainage on DTPA preoperatively, 11 (73.33%) showed adequate drainage across PUJ postoperatively.

Discussion:-

In our study, out of 15 patients, 9 (60%) were males and 6 (40%) were females. Age and sex distribution shows close resemblance with reports of various authors. The study conducted by Keeley FX Jr et al⁶ (2000) includes 19 patients (8 females and 11 males). The mean operative time was 94.3 ± 17.2 minutes and range (62-115minutes). Desai MM, Gill IS et al⁷ (2002) shows similar results with mean operative time of 81.4 minutes (range 51-117 minutes). Another study lam JS et al⁸ (2003) showed similar results with mean operative time 93.9 minutes. Pratipal Singh et al⁹ (2009) similar in their study with mean operative time was 100 minutes. The mean duration of days of Hospital stay was 3.5 ± 0.74 days, range (3-5 Days). Gill Is et al¹⁰ (2002) showed similar results with average hospital stay was 2.2 days (range 2 to 3 days). The mean visual analogue score for pain at day 1 was 4.07 with S.D 1.03 (range 3-6), day 2 was 2.73 with S.D 1.10 (range 1-5), and day 3 was 1.67 with S.D 1.50 (range 0-4). NJ Rukin et al (2007)¹¹ in their study, 13 out of 14 (93%) patients reported significant reduction or resolution of pain, compared with their preoperative state. post operative DTPA scan and IVP was done at 6 month follow up which showed improved in pelvic calyceal drainage across PUJ. Dr. Seiji Naito et al (2002)¹² in their study of 14 patients, showed improvement of renal function in 11, while remaining 3 were stable. The main post operative complications in our subjects were 26.7% (4 patients) and included; (i) post operative blood transfusion 2 (13.3 %) patients. (ii) Urinary leak 1 (6.7%) patients. (iii) Fever / sepsis 1 (6.7%) patients, which were close to those reported in literature. Dr. Seiji Naito et al (2002)¹² reported in their study, that there was 1 patient with an intraoperative complication (extravasation) and a late complication related to the stent. NJ Rukin et al (2007)¹¹ reported in their study, there were no major postoperative complications for this series with mean follow-up of 31.8 months (range, 12–52 months).

Conclusion:-

We conclude that percutaneous antegrade endopyelotomy, represents a safe and effective minimally invasive procedure for treatment of pelviureteric junction obstruction in selective patient population.

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