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Original Research Article

A study to evaluate the outcome following Anderson Hynes pyeloplasty in hydronephrosis patients with cummings stent and D-J stent

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ABSTRACT

Background: Uretero-Pelvic Junction Obstruction (UPJO) is an important cause of hydronephrosis in pediatric age group. The choice of treatment could be conservative or surgical. Commonly Anderson-Hynes pyeloplasty is practiced with internal, external or partly internal partly external stent.
Methods: This was a prospective study of 40 patients with UPJO, divided into 2 groups consecutively, each consisting of 20 patients. All patients underwent open Anderson-Hynes pyeloplasty. Cummings stent were given in one group for drainage and conventional DJ stent were used for another group.
Results: The mean hospital stay was lesser in DJ stent group (8.4±2.13) compared to Cummings stent group (11.4±0.68), not only in respect to primary admission, but also including readmission for cystoscopic stent removal. The incidence of complications was also fewer in Cumming stent group. Stent migration and urinary tract infection (UTI) were more associated with DJ stent (2 each) than Cumming stent (0 each). However, dysuria was more in case of cumming stent (2 patients) than DJ stent (1 patient).
Conclusions: The mean hospital stay in DJ stent insertion is less even if duration for cystoscopic removal is considered. The complication of stent removal and UTI are more with DJ stent though dysuria is more in case of Cummings stent.

Keywords: Anderson-Hynes pyeloplasty, Cumming stent, DJ stent, Hydronephrosis, Uretero-pelvic junction obstruction

INTRODUCTION

Hydronephrosis is defined as aseptic dilatation of pelvi-calyceal system secondary to any distal obstruction.[1] Infants with neonatal hydronephrosis have a range of abnormalities including ureteropelvic junction obstruction (UPJO), ureterovesical junction obstruction and vesicoureteral reflux (VUR). As second and third entities are fairly uncommon, pediatric patients having hydronephrosis and normal voiding cystourethrogram (VCUG) are presumed to have UPJO.[2] Incidence is approximately 1 in 2000 live births and half of the total prenatal hydronephrosis.[3,4] Society for Fetal Urology (SFU) grade of hydronephrosis and the likelihood of spontaneous resolution are as following Grade I resolves in approximately 50% of patients, and grades II, III, IV hydronephrosis resolve in 36%, 16%, and 3% of cases, respectively.[4]

The indication of surgery is controversial both because of a lack of reliable investigation options and well-documented rate of spontaneous resolutions.[5,6] The

decision for a surgical intervention is indeed important and is based on serial, not single, imaging and documentation of failure to improve and deteriorating renal function.[7]

Embryological explanation of UPJO is that it is the last area to be recanalized though extrinsic obstruction by bands, kinking, aberrant vessels are also encountered.[8] Murnagham suggests, the cause to be the abnormality in the lamina muscularis of UPJ, whereas Notley and Hanna proposed increase in collagen between the muscle bundles and elastin in the adventitia plays the role.[9-12]

Whatever may be the cause, the recommended investigation for UPJO is serial USG. The initial renal USG is recommended at day 2 of life and decision of renal scintigraphy is individualised.[7] In grade 4 Hydronephrosis a repeat USG and a renogram should be performed at 1 months of age.[7] In most patient intervention can be delayed and a repeat USG is needed at 3 months of age which, if indicates, deterioration or dilatation, a repeat renogram should be done.[7]

Surgical intervention is indicated for an obstructive drainage curve with a deteriorating renal function (<40%) and incidence is approximately 20% patients, majority being grade 3 and grade 4 hydronephrosis.[7]

The surgery of choice, in the meta of Laparoscopy is changing from an open pyeloplasty to minimally invasive one.[13] The conventional laparoscopic approach demands more expertise and dedicated training. The advantage of conventional Anderson-Hynes pyeloplasty over laparoscopy is that, in children laparoscopy is technically challenging and in best hands laparoscopy offers ≤95%.[14] Dismembered Anderson-Hynes Pyeloplasty on the other hand provides ≥95% success rate and allows to deal with long strictures, presence of severe hydronephrosis or crossing vessel.[15,16]

METHODS

The study was conducted at Department of Paediatric Surgery, Medical College and Hospital, Kolkata**,** India. All patients (Age 2-12 years) admitted in paediatric surgery ward for Anderson Hynes pyeloplasty for Hydronephrosis due to pelvi-ureteric obstruction in Medical College Hospital, Kolkata, India.

The study was conducted between period of April 2014 to August 2015. 20 patients in each group, Cummings Stent group and DJ stent group consecutively selected with inclusion criterion of all patients with UPJO without any syndromic association

Inclusion criteria

Patients with hydronephrosis due to pelviureteric junction obstruction in paediatric age group (2 to 12 years of age).

Exclusion criteria

Patients with Vesico-ureteric reflux, Redo-pyeloplasty, Hydroureteronephrosis or associated any other cause of distal obstruction or renal pathology.

This was the interventional study. Study group was assessed clinically, radiologically and microbiologically. Serum levels of urea, creatinine, USG abdomen, IVU, VCUG, renal isotope scan, urine for routine and microscopical examination and urine for culture and sensitivity, RE of blood, temperature measurement was done in all cases in order to assess the morbidity. Moreover, hospital stay, cost of treatment of each patient was noted. Appropriate statistical technique was applied using available statistical software

Study tools

- Clinical examination.
- Routine blood investigation, renal function test and coagulation profile and urine examination.
- Radiological investigation-USG KUB.
- SFU USG Grading- Grade I- slight splitting of central renal complex, normal renal parenchyma, Grade II- evident splitting of central renal complex and pelvis dilatation confined within renal border, normal renal parenchyma, Grade III- wide splitting of central renal complex, pelvis dilated outside renal border with dilated calices, normal renal parenchyma, Grade IV- wide splitting with pelvis dilated outside renal border with dilated calices which may appear convex, renal parenchymal atrophy.

Study technique

This was a prospective study of 40 patients with UPJO, divided into 2 groups consecutively, each consisting of 20 patients. All patients underwent open Anderson-Hynes pyeloplasty. Cummings stent were given in one group for drainage and conventional DJ stent were used for another group. Written Informed consent and Approval from ethical committee was obtained.

Children aged 2 to 12 years of either sex; having obstructed drainage pattern on renal dynamic scan (DTPA) and intravenous urogram with unilateral obstruction were included. Patients were admitted a day prior to surgery and informed consent taken including discussion about both methods of diversion. Rough estimate of the required length of DJ stent was determined by measuring the distance from the tip of the 11th rib to ipsilateral pubic tubercle in centimetres.

Anderson-Hynes pyeloplasty was performed through an anterolateral extra peritoneal flank incision. After dissecting out the pelviureteric junction the dismembered pyeloplasty was done. Conventional DJ stent was passed distally to the bladder and placed at transanastomotic site as a stent in one group of patients. On the other hand, the

distal curly portion of the Cummings stent was placed in the bladder as the same process like DJ, the middle fenestrated Malecot like portion, which acted as nephrostomy tube, was kept in the dilated pelvis and the wide bore proximal tube was kept outside the parities after piercing it through the renal parenchyma. Perinephric tube drain was placed in all the patients before closure of the abdomen.

Post-operative analgesia and antibiotics were provided as required. Patients with DJ stent were discharged after adequacy of oral food tolerance and removal of perinephric drain, usually by 5 days with oral antibiotics.

In first few postoperative days, urine collected in nephrostomy tube bag in patients with Cummings stent. But with time it dried up in 6th-7th post-operative day. The stent was removed after the drain dried up usually on 8th post-operative day and was discharged after removal of perinephric drain usually on 10th post-operative day. In case of persistent nephrostomy tube drainage, tube was clamped periodically, if the patients had no pain or discomfort and no increase in perinephric drainage volume, the stent was removed usually after 2 days of clamping.

Patients were followed up in OPD one week after discharge. Uro-prophylaxis was stopped one week after discharge in Cummings stent group. Antibiotic prophylaxis was continued in DJ stent group till they re-admitted for cystoscopic DJ stent removal usually after 4 to 6 weeks. And that time average hospital stay of DJ stent group was 2 to 3 days. Again, prophylactic antibiotics were given to DJ group after stent removal for at least 7 days.

RESULTS

Age group wise distribution of Cummings and DJ stent: Mean age group for Cumming Stent was 7±2.86 years and that for DJ stent was 5.45±2.91 years (Figure 1).

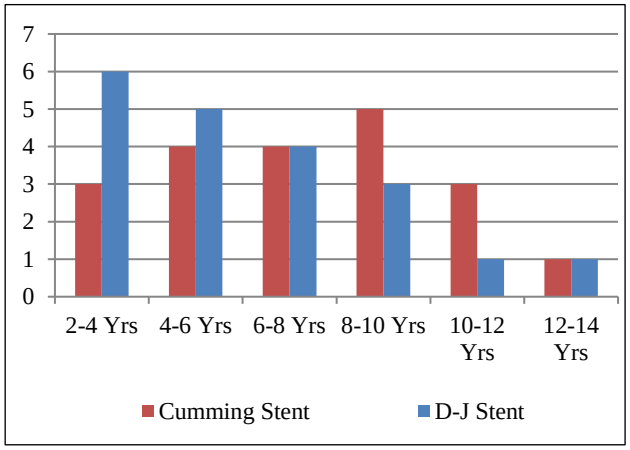

Figure 1: Distribution of Cumming stent and D-J stent age group wise.

Sex wise distribution of Cummings and DJ stent: 9 male patients were given Cumming stent and 11 male patients was given DJ stent. 11 female patients were given Cumming stent and 9 female patients were given DJ stent.

Distribution of mean hospital stay with Cummings and DJ stent: Mean hospital stay was lesser for DJ stent (8.4 ± 2.13) than Cummings stent (11.4±0.68) and it was more for Cummings stent than DJ stent. It was statistically significant (p<0.0001) (Figure 2).

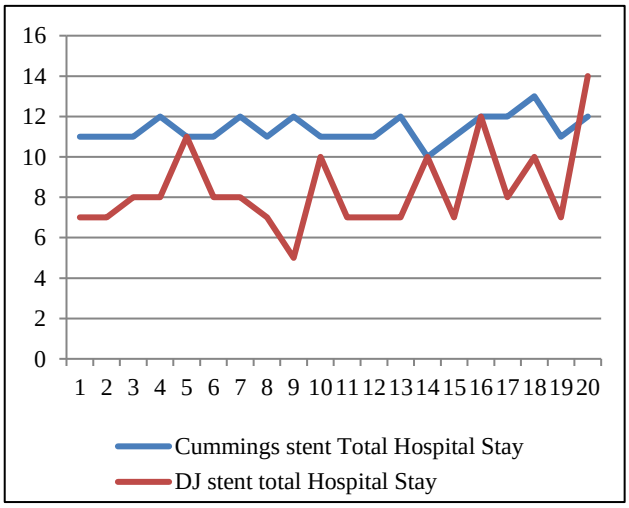

Figure 2: Distribution of Cummings stent and D-J stent with mean hospital stay (days).

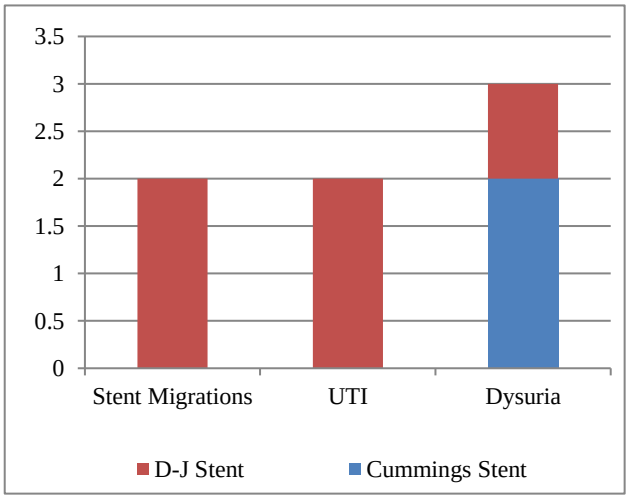

Figure 3: Distribution of different complications with Cummings Stent and D-J stent.

Distribution of different complications with Cummings and DJ stent: The complications are more associated with DJ stent than with Cummings Stent. In our study, stent migration, UTI and dysuria were considered as complication. Complication of stent migration and UTI are more with DJ stent and dysuria is more in case of Cummings stent (Figure 3).

DISCUSSION

The Anderson-Hynes dismembered pyeloplasty, the most commonly used type of repair for UPJO hydronephrosis was first described as a Stentless procedure[19]. Over the years, drainage techniques were added as perianastomotic leakage of urine and infection were thought to be the cause of stenosis or stricture formation requiring re-operation. Drainage tubes may be external, e.g. nephrostomy tube; completely internal, e.g. DJ stent; or partly external and partly internal, e.g. Salle stent and Cummings stent.

Problems are associated with all types of drainage procedures. This can occur during insertion, especially in small children.[18,20] We were unable to negotiate the UVJ while inserting the DJ stent in a 2 yrs. old patient for whom we did no stent technique (this patient was excluded from the study). A gentle traction of the ureter from above to straighten the UVJ has been found to be helpful.

DJ stent can cause mechanical irritation of the bladder of the bladder trigone. McMullin et al, noticed urinary urgency in 11.1% patients.[21] Braga et al, noted bladder spasm symptoms in 2.9% patients requiring early stent removal in some because of severity of symptoms.[17] Though in our study, we did not encounter this problem in both the groups.

DJ stents have been known to migrate in 2.5% to 16.6% cases.[18,21,22] Stents with full coils are less prone to migrate than those with a J-shape which can occur due to inadequate length. We encountered proximal migration of DJ stent into dilated pelvis in one case and in one case DJ stent migrated outside the renal system. In both the cases we had to perform exploratory laparotomy to remove the stents and thereby causing more hospital stay and more morbidity. In one patient in our study we could not negotiate cystoscope to remove DJ stent and had to perform suprapubic cystostomy to remove the stent and thereby causing more hospital stay and morbidity. On the other hand, in Cummings stent group no serious complication encountered. In one case there was persistent urine drainage through the nephrostomy tube till 6th post-operative day. We clamped the tube for two days, patient neither complained any heaviness or abdominal discomfort, nor any increase in perinephric drainage volume. So, we removed the Cummings stent on 9th post-operative day.

Choosing a correct stent length can therefore avoid several post-operative problems. Pre-operatively we measured the distance in cm from the tip of the 11th rib to the ipsilateral pubic tubercle for an approximate length of DJ stent. The DJ stents (in addition to the labelled length) also have 5cm length tails on each side as a coil. To avoid excess length of stent in the bladder, Ravi Kumar Garg et al.[18] proposed the formula:

Length of DJ stent (cm) = length of retained ureter (cm)-2

In our study, the mean hospital stay was lesser in DJ stent group compared to Cummings stent group, not only in respect to primary admission, but also including readmission for cystoscopic stent removal.

CONCLUSION

Morphometric features of transverse and sigmoid sinus with other superficial landmarks is essential during posterlateral approaches to the posterior cranial fossa. The measurements of asterion with other bony landmarks provide database for the clinical-surgical practice and also for forensic and anthropological application.

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