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# Pyeloplasty in children by lumbotomy approach using infant feeding tube as single stent

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## ABSTRACT

**Background:** The objective of this study was to assess the outcome in children who had undergone pyeloplasty by lumbotomy approach using infant feeding tube (IFT; 5 Fr) as a single stent. **Materials and Methods:** During January 2000 and December 2010, 134 pyeloplasty were performed by the lumbotomy approach. The procedure involves single layer anastomosis at pelvi-ureteric junction using vicryl 5-0/6-0 (reduction of pelvis if required). An IFT 5 Fr with multiple holes used as a single stent to serve as nephrostomy and as transanastomotic stent also. **Results:** There were 109 males and 25 females with M: F ratio of 4.3:1. Left-side pelvi-ureteric junction obstruction (PUJO) was seen in 117 (87.3%) while right side PUJO in 17 (12.7%). Mean age of presentation was 52.7 months (range 9-120 months). Postoperative complications included infection 2 (1.5%), urinoma formation 1 (0.7%), urine leak 3 (2.2%), non drainage 2 (1.5%), accidental removal of the stent 2 (1.5%). Follow-up scan done at 3 and 9 months showed improved drainage in 124 (92.5%), preserved renal function in 129 (96.2%) cases. Overall success rate 97.5%. **Conclusion:** Transanastomotic stent using IFT not only provide an effective drainage but also avoid the complications associated with double-J stents and nephrostomies, with the added benefit of being cheaper and availability.

**Key words:** Infant feeding tube, lumbotomy, pyeloplasty, single stent

## INTRODUCTION

The most common cause of hydronephrosis in children is a pelvi-ureteric junction obstruction (PUJO), occurring in 1 in 1000-2000. Recent advances in radiology allow prenatal diagnosis in most of the cases.[1-4] First description of reconstructive surgery was given by Trendelenburg in 1891 since then various modifications in techniques have been described by various authors. Dismembered pyeloplasty as described by Anderson Hynes in 1946 has become the gold standard in pyeloplasty.[5] Controversy still exists not only in medical versus surgical management but also regarding the use of stenting catheters and proximal diversion in pyeloplasty. Era has progressed from multiple stents to stentless pyeloplasty. Nephrostomy and stents once consider an integral part of pyeloplasty is out of favour nowadays.[6-8] However, because of the associated complications with stentless pyeloplasty, the concept of stentless pyeloplasty is not universally accepted. Multiple types of stents are available in the market some of which are especially designed for the procedure only.[9] Apart from associated complications of stents, cost and availability are two other important aspects which are a hindrance for success of such stents. We are trying to propagate the use of infant feeding tube (IFT; 5 Fr) with multiple extra holes up to 15 cm as nephrostomy and transanastomotic tube in cases of pyeloplasty for PUJO in children.

Our objective was to assess the outcome in children undergoing pyeloplasty by lumbotomy approach using IFT 5 Fr as a stent.

## MATERIALS AND METHODS

Retrospective analysis of our records of children who underwent pyeloplasty for PUJO during January 2000 and December 2010 was done. Institute's ethical committee approval was taken for the study. Inclusion criteria included all cases of unilateral Anderson-Hynes pyeloplasty by lumbotomy approach, with IFT as nephro-stent with a follow-up period of 24 months. Cases with bilateral pyeloplasty, use of DJ stents, follow-up period of less than 24 months, incomplete

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data were excluded from the study. All cases were done by a single experienced surgeon. The indications for operative intervention included all symptomatic cases and cases with findings on renal dynamic scan suggestive of an obstructive pattern. We have used lumbotomy approach in all our cases as described previously by the senior author.[10] Surgery was done under standard i.v. and inhalational anaesthesia. The prone position was achieved and soft rolls made of folded towels placed under the pelvis and shoulders to allow free movement of the chest and abdomen. The head and neck were supported in a such a way that a clear access to airway was possible. A Foley's catheter was placed only for associated vesicoureteral reflux. The following landmarks were identified: 12$^{th}$ rib, vertebral column, lateral edge of the erector spinae group of muscles and iliac crest. After painting with povidone iodine and draping, a skin incision was made in the transverse axis 1 cm below the 12$^{th}$ rib starting from the lateral edge of the erector spinae and extending for 3-4 cm laterally. Skin incision was deepened with cautery and the posterior lamella of lumbodorsal fascia was exposed and divided in vertical axis. Sacrospinalis was retracted medially and then the anterior layer of fascia was divided, retracting the quadrates lumborum medially. A curved retractor was applied laterally to retract the abdominal wall muscles and latissimus dorsi to the other side thus, providing a good exposure to renal fossa. The Gerota's fascia was opened and direct visualisation of pelvis achieved. In the case of giant hydronephrosis, aspiration was done with a 23-G needle or an i.v. canula to facilitate exposure. A standard dismembered Anderson Hynes pyeloplasty was performed using 5-0 — Vicryl. We injected saline through the proximal end of the ureter to rule out any obstruction at the ureterovesical junction. IFT 5 Fr with multiple extra holes for about 15 cm was used both as transanastomotic stent and nephro-stent [Figure 1 a, b and Figure 2]. The stent was removed on the 5$^{th}$ postoperative day after establishing the drainage pattern. During follow-up period ultasonography (USG) and renal dynamic scan (RDS) was performed after 3 months and 9 months post-surgery followed by USG yearly thereafter. Chemoprophylaxis was given for 6 months post-surgery.

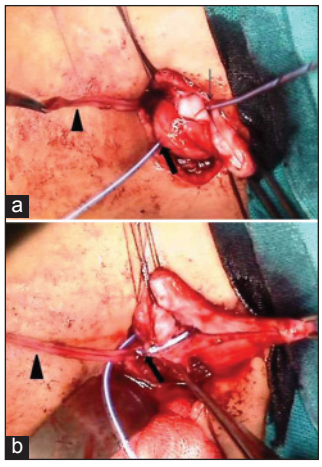



**Figure 1: [a] Intraoperative view showing the entry (thick arrow) and exit (thin arrow) point of infant feeding tube (5 Fr) used as a single stent during pyeloplasty (arrow head — spatulated ureter) [b] After posterior layer of uretero-pelvic anastomosis infant feeding tube (5 Fr) was put across the anastomosis (thick arrow) as stent (arrow head — spatulated ureter)**

## RESULTS

There were 109 males and 25 females with M: F ratio 4.3:1. Left-side PUJO was seen in 117 (87.3%) while right-side PUJO in 17 (12.7%). Mean age of presentation was 52.7 months (range 9-120 months). Postoperative complications included infection 2 (1.5%), urinoma formation 1 (0.7%), urine leak 3 (2.2%), non-drainage 2 (1.5%), accidental removal of the stent 2 (1.5%). Follow-up scan done at 3 and 9 months showed improved drainage in 124 (92.5%), preserved renal function in 129 (96.2%) cases. Overall success rate 97.5%.

## DISCUSSION

Anderson-Hynes pyeloplasty is the gold standard for surgical management of pelviuretric junction obstruction in children. Over the last few years various modifications have been done to improve the final outcome. Not only the surgical approach but also the use of stent is a point of debate. Currently, the choice of the pyeloplasty approach in children with PUJO is mostly based on the surgeon's preference and experience. Once an approach is chosen, the surgeon must then decide whether to place a ureteral stent for internal urinary drainage, to select an external stent

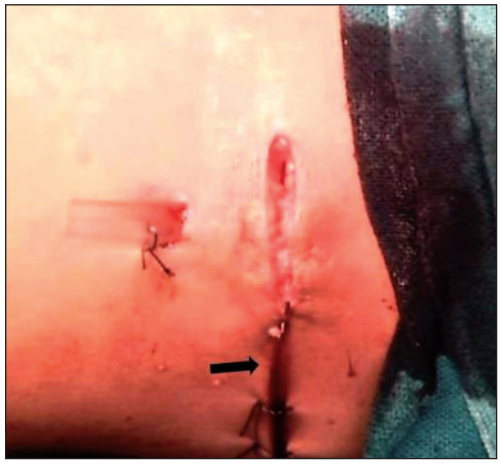


**Figure 2: Intraoperative view after pyeloplasty showing the wound and the infant feeding tube (thick arrow) used as a single stent**

such as a trans-nephrostomy tube or trans-pyelostomic stent, or to just simply leave a perinephric drain without urinary diversion. Whether a temporary urinary stent such as a nephrostomy tube or ureteric stent leads to better results than simple perinephric drainage still remains controversial due to lack of evidence-based studies.[4,11-14] Now-a-days, surgeons are inclined towards internal drainage than external drainage.[15,16] There are many ways to divert urine, and different types of drainage methods have been described in the literature, including nephrostomy tube drainage, internal ureteral stents such as the double 'J' stent, external stent, and a combination of these modalities.[17,18]

Several favourable reports on the use of internal stents have been published in recent years showing their several advantages.[11,19] The advantages of a double 'J' stent compared with a nephrostomy tube include a shorter hospital stay and a lower morbidity rate.[20,21] Furthermore, double 'J' stents prevent adhesion to the suture site by splinting the suture line, help to maintain an appropriate diameter and alignment of the ureter, and limit ureter kinking.[22] Woo and Farnsworth used only internal ureteral stents rather than both a stent and a nephrostomy tube because the former showed a low rate of postoperative complications and a decreased postoperative hospital stay.[16] Ninan *et al.*, reported a review of the records of 60 patients who underwent pyeloplasty in 2008.[11] They strongly recommended double 'J' stenting, claiming that it was the safest mode of drainage in paediatric pyeloplasty. The disadvantages of the double 'J' stent include that it can cause stent-related complications such as urinary tract infection and provoke obstruction of the ureter by irritating the mucosa of the ureter or the renal pelvis. Furthermore, leaving a double 'J' stent in neonates or paediatric patients requires additional general anaesthesia for removal. More ever the DJ stent may act as a foreign body and incite stone formation.

The advantages of the IFT as nephrostent used in this series include: Serve as a stent as well as nephrostent, easily available, easy to remove, less chances of blockade, easy to manage, minimal postoperative complications. The complication rate in our series was 7.5%. Infection was seen in 1.5% of cases managed with the up gradation of antibiotics. Non-drainage was seen in 1.5% of cases, all requiring cystoscopy and retrograde DJ placement. Urinary leak which was seen in 2.2% of cases was subsided with Foley's catheterisation only. RDS scans at 3 and 9 months follow-up depicted improved drainage in 124 (92.5%), preserved renal function in 10 (7.5%) cases. The overall success rate was 92.5%. Chemoprophylasis was given at least for 6 months in all cases. USG and RDS were performed after 3 months and 9 months post-surgery followed by USG annually thereafter with emphasis on cortical thickness, pelvic diameter and SFU grading. In our series no redo surgery was required in any of the cases. Saing *et al.*, has reported complications after pyeloplasty as UTI in 7.7%, recurrent obstruction in 2.1% and persistent leak in 1.7%.[23]

## CONCLUSIONS

Pyeloplasty in children with lumbotomy approach is a feasible time-saving options with excellent cosmetic and functional results. Use of IFT as nephrostent is economically cheaper, easy to use. It is not only patient friendly with added comforts and cosmesis without jeopardising an effective anastomosis and risk of a non-intubated approach but also avoids the complications usually encountered with the use of nephrostomies, or double J stents.

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