

# Technical safety of robotic pyeloplasty in horseshoe kidney in pediatrics

M Banakhar, H Mosli

## Citation

M Banakhar, H Mosli. *Technical safety of robotic pyeloplasty in horseshoe kidney in pediatrics*. The Internet Journal of Urology. 2008 Volume 6 Number 1.

## Abstract

The management of UPJ has evolved dramatically over the past 20 years in response to the development of new technology. Endoscopic and laparoscopic procedures have largely replaced open pyeloplasty for the majority of primary UPJ obstruction. Yet laparoscopic pyeloplasty is a technically demanding procedure requiring advanced intracorporeal suturing skills. With the robotic (Da Vinci system), the suturing and laparoscopic tools is handled with a great degree of freedom much more than the laparoscopic instruments which allows the surgeon to treat even anatomical demanding difficult UPJ. We report the technique of Robotic Pyeloplasty in a 9 year old child with horseshoe kidney and aberrant vessel.

## INTRODUCTION

Laparoscopic pyeloplasty has been shown to have equivalent surgical outcomes with less surgical morbidity when compared to the open approach. Yet, the laparoscopic approach has traditionally been performed in a few specialized training centers because of the advanced technical skills required to perform this complex reconstructive procedure specially suturing. The introduction of robotic technology into the modern day operating suite has brought on a new era and has simplified complex urologic reconstructive procedures. The Da Vinci robot provides the advantages of three-dimensional vision, magnification, and a robotic articulating wrist. These features allow precise dissection and suturing capabilities. We report robotic pyeloplasty in horseshoe kidney with aberrant vessel, in pediatric patient.

## CASE REPORT

9 year old female, presented to our institute with left flank pain, no hematuria & no masses.

Her systemic review, past medical & surgical history were unremarkable.

She is obese otherwise her clinical examination was within normal.

& so was Urea, electrolyte & Creatinine

Ultrasound & DTPA showed left ureteropelvic junction

obstruction T1/2 30 min & split function of 40% with features of horseshoe kidney, which was confirmed latter on by IVP.

Because of the various anomalies that can be associated with horseshoe kidney, C.T angio was done & it showed features of aberrant vessel.

Subsequently, She was booked for Robotic pyeloplasty.

Pre-operatively, the patient had the routine blood work, cross matching, prophylactic antibiotic & bowel prep.

## OPERATIVE PROCEDURE

Intra-operatively, under general anesthesia in lithotomy position cystoscopy was done followed by left RGP, DJG insertion & Foley's catheter. After that, she was placed into complete flank position (90 degree) left side Up. Then, the patient was properly strapped to the operating table. The operating table was tilted to the left side to allow placement of the ports.

## 1-TROCAR PLACEMENT

Intra-abdominal access is obtained at the umbilicus through a Veress needle and a 12 mm trocar is placed for the camera. The abdomen is insufflated to 14 mm of pressure with 4 L in. For the da Vinci surgical system, special 8 mm trocars were placed directly lateral to the umbilical trocar which were inserted undervision. The trocars were placed at least between 8 and 10 cm away in order to prevent the robotic

arms from obstructing against each other. An accessory 10 mm port was also placed on the contralateral portion of the abdomen about 2 cm from the midline between the umbilical and subcostal trocars. This trocar is placed contra laterally because the robot comes in the ipsilateral side of obstruction . After that the table was tilted back to the neutral position at which the patient was in complete flank..

## **2- DISMEMBERED ROBOTIC PYELOPLASTY**

The robot was advanced to the patient on the left side and docked to the trocars securely. The camera was introduced through the umbilical trocar and the robotic arms are extended through the daVinci ports. A robotic grasper was placed in both daVinci arm and cautery connected to the right. Dissection was started at the Tolds line & the colon was reflected medially. At the lower pole of the kidney the psoas muscle was exposed and medial dissection identified the stented ureter. The ureter was then dissected cranially to the renal pelvis preserving collateral vessels. The level of UPJ obstruction was identified with crossing aberrant vessel & ballooned pelvis. The renal pelvis was then dissected out of any surrounding fibrous tissue and all crossing vessels preserved. Once the proximal ureter and renal pelvis were fully mobilized the ureter was dismembered at the site of UPJO. Then the articulating robotic scissors was used for lateral spatulation of the ureter. The articulation of the robotic wrist of the scissors allowed for easier spatulation. The renal pelvis was then modified to the appropriate size. The crossing vessel was preserved & moved posterior to the uretero-pelvic anastomosis . Lastly, the anastomosis was performed using robotic needle drivers with interrupted suture with 4-0 absorbable suture ( vicryl on RB1 needle) at the apex of the spatulated ureter, first completing the posterior wall and then the anterior wall. The stent was pushed into the renal pelvis before finishing the anterior line of anastomosis. An abdominal portovac drain was placed. Then, ports were removed under vision & closure of the fascia by J needle 3/0 vicryl, followed by the skin with monocryl interrupted inverted stitch.

Post operatively, the patient was on pain management & antibiotic . The Foley's was removed at the 3<sup>rd</sup> day post operative & the Drain at the 4<sup>th</sup> day The patient was discharged at the 5<sup>th</sup> day post operative in a good condition. Her follow up in the clinic showed healed port scars.

On follow up 9 months latter , IVP & C.T Showed excellent results., Figure 1 &2.

**Figure 1**

Figure 1a: IVP, pre-operative



**Figure 2**

Figure 1b: IVP, post-operative



**Figure 3**

Figure 2: UPJO features on C.T (excretory phase), notice the aberrant vessel features .A: cut section, B: coronal section, , both pre-operative .



**Figure 4**



## CONCLUSION

Robotic pyeloplasty is safe in anomalous kidney , technically the procedure is done smoothly aided by the free robotic articulation that help in fine dissection & organ identification .

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**Author Information**

**Mai Banakhar, M.D**

Resident Urology (Academic), Surgical Department - Urology, King Abdul Aziz University Hospital

**Hisham Mosli**

Professor in Urology, Surgical Department - Urology, King Abdul Aziz University Hospital