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Abstract

The widespread use of ultrasonography during pregnancy has resulted in a higher detection rate for antenatal hydronephrosis. Ureteropelvic junction obstruction is the most common pathological cause of neonatal hydronephrosis. Surgical indications for this hydronephrosis comprise a decrease of split renal function ($>5\%$) on renography or increased dilatation on ultrasonography in subsequent studies, or existence symptoms such as breakthrough urinary tract infection or the abdominal pain during follow-up.

The Anderson-Hynes dismembered method has been adopted most widely now. It is available in any cases with ureteropelvic junction obstruction due to intrinsic or extrinsic stenosis or high insertion. It is key point for the success of pyeloplasty to anastomose the apex of caudal angle of the renal pelvis and the crotch of the spatulated ureter with five sutures as knock stitch and come the funnel shape with the double pigtail stent finally.

Remove the stent 2–3 months postoperatively under cystoscopy. Evaluate renal pelvic dilatation and split renal function 6 months postoperatively. Success pyeloplasty should be defined as no symptom, reduced pelvic dilatation, and stable or improved split renal function compared to preoperative condition.

Keywords

Hydronephrosis • Pyeloplasty • Ureteropelvic junction

48.1 Etiology and Surgical Indication

The congenital hydronephrosis (ureteropelvic junction obstruction: UPJO) is defined as impaired urine flow from the renal pelvis into the proximal ureter with subsequent dilatation of the collecting system and the potential of renal deterioration. The widespread use of ultrasonography during pregnancy has resulted in a higher detection rate for

antenatal renal pelvic dilatation. UPJO is the most common pathological cause of neonatal pelvic dilatation [1].

Symptomatic hydronephrosis causing urinary tract infection (UTI), flank pain, impaired renal function (split renal function $<45\%$), or the giant hydronephrosis is generally a surgical indication. However, asymptomatic hydronephrosis rarely requires immediate surgical intervention in young childhood even though severe dilatation, since renal function, is generally maintained, and it has higher possibility of spontaneous resolution. In these cases, conservative treatment is initially adopted.

It can be very difficult to distinguish obstructed and non-obstructed renal pelvic dilatation. Currently, the most popular definition is that an obstruction represents any restriction to urinary outflow that, if left untreated, will cause progressive renal deterioration [2]. Grade 1 or

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2 hydronephrosis, as defined by the Society for Fetal Urology [3], rarely has clinical problem and does not require surgical treatment in most cases. On the other hand, surgical correction is needed in approximately 10 % or 60 % of children with grade 3 or 4 asymptomatic hydronephrosis, respectively [2]. Therefore, after diagnosis as severe hydronephrosis, they have prophylactic antibiotics to prevent UTI and serial evaluation using ultrasonography and renography every 3 or 4 months (because it is rare that it causes decreased renal function before increased dilatation, follow-up using ultrasonography mainly is available in grade 3 hydronephrosis) [2].

Surgical indications for asymptomatic hydronephrosis comprise a decrease of split renal function (>5 %) on renography or increased dilatation on ultrasonography in subsequent studies, or existence of symptoms such as breakthrough UTI or the abdominal pain during follow-up [2].

Several surgical techniques for UPJO have been reported, which are classified for the dismembered procedure or the non-dismembered one. The Anderson-Hynes dismembered method has been adopted most widely now [1]. It is available in any case with UPJO due to intrinsic or extrinsic stenosis or high insertion. And surgical result is good because stenotic segment is completely resected, and recurrent stenosis is quite rare postoperatively.

On the other hand, Foley Y-V plasty method, which represents the non-dismembered procedure, is adopted in patients who has high insertion without severe pelvic dilatation or in whom PUJ continuity and its blood supply should be preserved because of history of ureteroneocystostomy.

These methods are also held with laparoscopic or retroperitoneoscopic techniques, or robot-assisted technique recently, with the similar success rates as standard open procedures [1].

48.2 Preoperative Management

Evaluate urinalysis and urine culture. If positive urine culture, administer antibiotics preoperatively. The patient should be performed voiding cystourethrography to evaluate vesicoureteral reflux and lower urinary tract abnormalities.

If the patient does not have typical hydronephrosis without megaureter, evaluate ureteral abnormalities such as mid-ureteral stricture or ureteral polyp using retrograde ureterography just before operation. Retrograde ureterography also shows definitive location of UPJ, and it is helpful to decide adequate skin incision.

48.3 Surgical Techniques

Insert a urethral catheter after induction of general anesthesia, and put the patient as straight flank position. In infants and young children, place a rolled towel under the

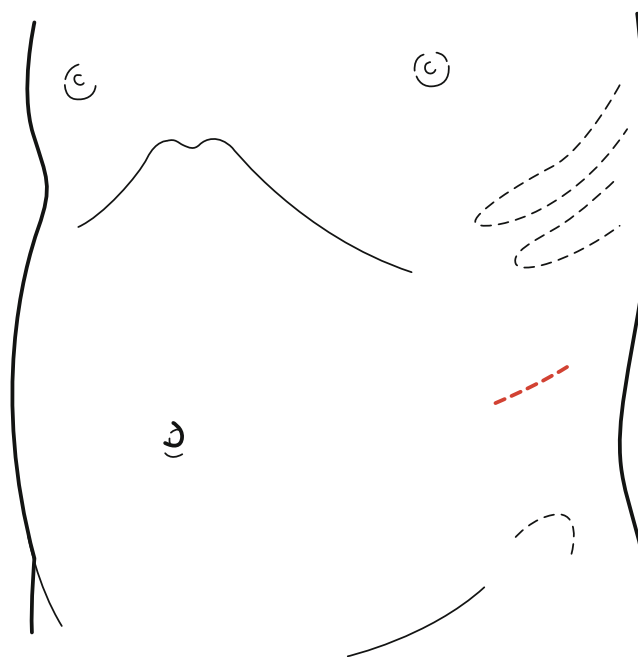


Fig. 48.1 Skin incision for pyeloplasty

contralateral waist on a flat table. Older children are better positioned by placing the table in the flexed position with the kidney rest raised. The position is stabilized by strips of tape from each side of the table across the child at the breast and hip. The flank abdominal area is prepared and draped.

Make a 4 cm incision following the skin lines over the UPJ location (Fig. 48.1). Incise the fascia of external oblique muscle, and split the three muscle layers (external oblique, internal oblique, and transversus abdominis muscle). Dissect flank pad tissue, and incise the lateral fascia vertically as far posteriorly as possible to avoid inadvertently entering the peritoneum.

Open the Gerota's fascia vertically. Once the renal parenchyma is seen, carefully expose the upper ureter first. Place vessel loop around the ureter, and expose the ureter cranially and caudally. Take care not to interfere with the segmental blood supply that enters the ureter medially. After place a wound ring retractor, and look for crossing lower-pole vessels. They usually can be moved out of the UPJ if they are present. With a hugely dilated pelvis, decompression of the pelvis with a 23-G butterfly needle may be required to expose the entire pelvis.

48.3.1 Dismembered Pyeloplasty (Anderson-Hynes Method)

After exposure of the UPJ, map out the diamond-shaped incision with a marking pen. Place stay sutures at the angles of the diamond in the pelvis and at the medial side in the

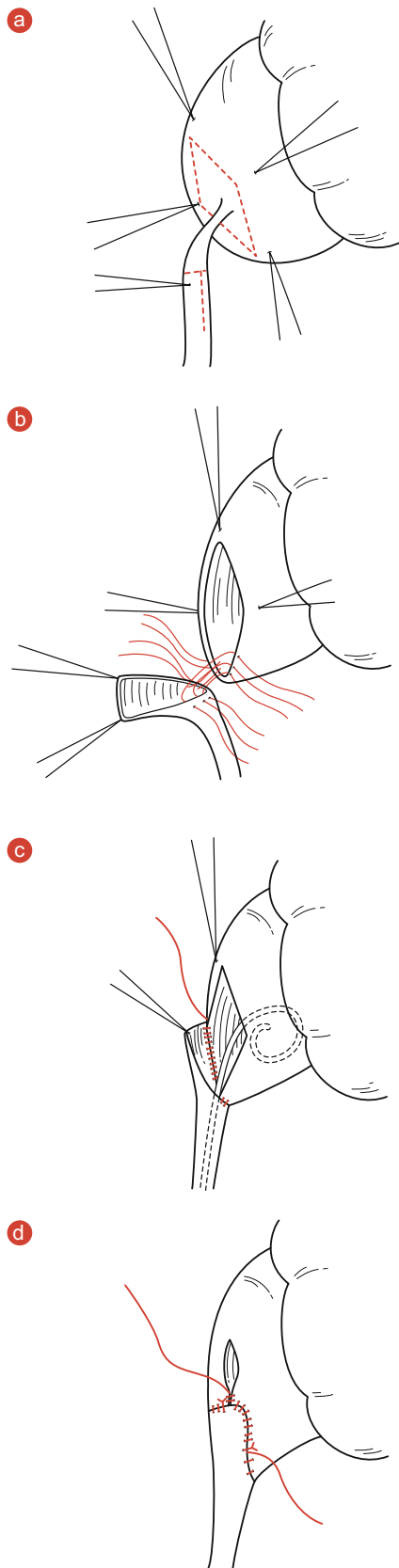


Fig. 48.2 Anderson-Hynes pyeloplasty

ureter (Fig. 48.2a). Cut from inside one stay suture to inside the next in the pelvis, and divide the ureter transversely. Remove the specimen containing the excised pelvis and obstructed UPJ. Spatulate the ureter on less-vascularized lateral surface for enough length beyond a narrow segment.

Insert a 5 Fr feeding tube into the ureter to prevent catching the far wall in a suture. Using loupes, place one 6-0 absorbable suture from the apex of caudal angle of the renal pelvis into and the crotch of the spatulated ureter. Place a second suture 1.5 mm away from the first, and place a third suture at the contralateral side symmetrically from the first. Similarly, place fourth and fifth sutures next to the second and third, respectively. Total five sutures are placed as knock stitch, and tie these sutures in number order (Fig. 48.2b).

Place and tie sixth suture next to the fourth, and continue this suture to the tip of the ureter on the far side as a running stitch. Remove the feeding tube, and insert a 4.7 Fr double pigtail stent with adequate length at this point (Fig. 48.2c). Do the same for seventh suture on the near side. After irrigating the pelvis and calyces free of clots, tie the two sutures together, cut one, and continue with the other to close the pelvic defect (Fig. 48.2d).

If it is difficult to insert a double pigtail stent, place 5 Fr tube into the renal pelvis as pyelostomy and 5 Fr ureteral stent across the anastomosis.

In children with crossing vessel, anastomosis is undergone opposite of crossing vessel. Finally, it is key point that this anastomosis becomes the funnel shape to maintain good urine passage.

Insert a drain and fasten it near, but not touching, the anastomosis or ureter below it by the long-suture technique. Close the wound in layers with absorbable sutures.

48.3.2 Non-dismembered Pyeloplasty (Foley Y-V Plasty)

Put a long Y-shaped marking and incise it between the lower pelvis and upper ureter (Fig. 48.3a). The ureteral incision should exceed a narrow segment enough. Insert a 4.7 Fr double pigtail stent with adequate length.

Anastomose the apex of the V-flap to the crotch of the spatulated ureter with five knock stitch using 6-0 absorbable sutures (Fig. 48.3b). Suture the remainder as a running stitch.

48.4 Postoperative Management

Remove the urethral catheter in 24–48 h, and the drain is removed on the day following removal of the urethral catheter if discharge is minimum. Remove the double pigtail stent 2–3 months postoperatively under cystoscopy [4].

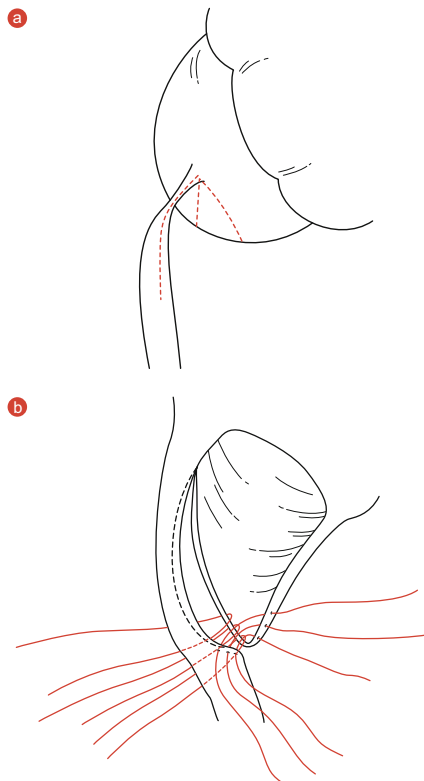


Fig. 48.3 Foley Y-V plasty

If pyelostomy and external ureteral stent has been placed, take the stent out 7 days when a nephrography shows good passage and no leakage at the anastomosis. Remove pyelostomy after a trial of its clamping [4].

Evaluate renal pelvic dilatation and split renal function 6 months postoperatively. Successful pyeloplasty should be defined as having no symptom, reduced pelvic dilatation, and stable or improved split renal function compared to preoperative condition.

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