Calyceal plication with Anderson-Hynes pyeloplasty in a 7-year-old boy with giant hydronephrosis of a single right kidney

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Title page

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Informative title: Calyceal plication with Anderson-Hynes pyeloplasty in a 7-year-old boy with a giant hydronephrosis of the single right kidney

Short title: Calyceal plication with pyeloplasty of a giant hydronephrotic kidney

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Abstract
A 7-year-old boy presented with distended abdomen without any other complaints. A plain abdominal radiograph demonstrated an extremely large soft tissue shadow that occupied right and part of the left hemiabdomen. Ultrasound revealed large hydronephrotic right kidney that occupied whole abdomial cavity without visualization of the left kidney. Dynamic scintigraphy confirmed extreme renal functional damage of the single right kidney. Operation was not indicated according to significant renal impairment. Percutaneous nephrostomy was made. After 9 months with slight functional renal improvement operation was indicated. At operation ureteropelvic junction obstruction was found and Anderson-Hynes pyeloplasty was made with calyceal plication of dilated calyces. Postoperative scintiscans and serial sonographies showed preservation of renal parenchyma with slight functional improvement. This modification of Anderson-Hynes pyeloplastys obviated the need for nephrectomy and was especially valuable in this patient with giant hydronephrosis of the single kidney when nephrectomy would inevitably lead to dialysis and subsequent renal transplantation.

Key words Pelviureteric junction stenosis, Giant hydronephrosis, Pyeloplasty, Calyceal plication

Introduction

Giant hydronephrosis is rare and is diagnosed when the volume of the collecting system exceeds 2–4% of body weight [10].The most common cause is ureteropelvic junction obstruction (UPJO). Nephrectomy is considered if the function of the affected kidney is less than 10%, and the other kidney is normal [8]. The gold standard for the repair is the Anderson-Hynes pyeloplasty [1]. However, the results of this technique alone for giant hydronephrosis are not always optimal, often making it difficult to salvage the affected kidney on long term. Therefore standard technique was modified by performing plication of the renal calyces as an adjunct to dismembered pyeloplasty [13]. This is the first case of giant hydronephrosis of the single kidney in a child treated by Anderson-Hynes pyeloplasty modified with calyceal plication.

Case report

A 7-year-old boy presented with distended abdomen without other complaints. Initial laboratory findings, urinalysis and urine culture were normal. A plain abdominal radiograph delineated soft tissue shadow that occupied right and a part of left hemiabdomen and pelvis dislocating the loops of small and large intestine in most lateral left hemiabdomen. Ultrasound (US) detected giant cystic right kidney measuring 224 mm with pyelon 129 mm and particular calyces up to 42 mm. The left kidney was not found. Excretory urography demonstrated an extremely large cystic formation that occupied right hemiabdomen without visualisation of contralateral kidney. Voiding cystourethrogram was normal. Preoperative 99mTc-DMSA scan showed reduction in the lower pole with extreme pyelocalyceal dilatation in the middle part with resulting discontinuity of renal parenchyma. 99mTc-DTPA scan showed radioisotope transit time through the right renal parenchyma of 18.20 min; 10.02 min through the pelvis and 28.22 min through the entire kidney. Left kidney was not visualised on both scintiscans. Furosemide administration did not result in elimination of renal activity which implicated mechanical obstruction of the renal collecting system. Retrograde urogram showed catheter crossing the midline to the left with subsequent filling of a cystic space that occupied right hemiabdomen crossing the midline (Fig. 1). After the procedure the boy developed urosepsis and broad spectrum antibiotics were introduced. Then Cystofix was introduced percutaneously on emergent basis draining initially 3000 ml of urine. Antibiotics were changed according to the antibiogram. After 10 days laboratory findings and urine culture were normal and urography through Cystofix showed significant regression of dilatation but large hydronephrosis was still present. The dilemma was which treatment is optimal in this situation and percutaneous drainage during several months was instituted. Position of percutaneous drainage catheter was checked 1-2 times a month with addition of laboratory and urine examinations. Uroprophylaxis was trimetoprim-sulphametoxasol 14 days and nitrofurantoin 14 days alternately. Ambulatory abdominal US showed significant reduction of giant hidronephrotic kidney. After 9 months the boy was hospitalized and excretion urography was made after Cystofix oclusion. Significant reduction of hydronephrosis lead us to operative intervention. At operation UPJO was found and Anderson-Hynes pyeloplasty was made with calyceal plication of dilated calyces. On 12th postoperative day after ureteral stent extraction, antegrade urography through T-drain showed normal contrast passage through pyeloureteric junction, ureter and vesicoureteric junction. After 3 months the patient was symptomless with normal laboratory findings, urinalysis and urine culture. Excretory urography showed excretion of concentrated contrast within 20 min. with atypical contours of collecting system made of elongated but narrowed calyces (Fig. 2). Ureteropelvic junction

was normal with rapidly filling, nondilated ureter and urinary bladder. US showed right kidney 114 mm long with uneven width of renal parenchyma: along calyces it measured 10-16 mm and in between calyces up to 26 mm. Postoperative 99mTc-DTPA scan showed no signs of opstruction in the elimination curve with significantly faster transit time: through the renal parenchyma 5.12 min; 3.04 min through the pelvis and 8.16 min through the entire kidney. The patient was asymptomatic 12 years postoperatively. Follow-up US examinations demonstrated nearly complete disappearance of the preoperative hydronephrosis.

Discussion

Giant hydronephrosis is defined as the presence of more than 1000 ml of fluid in the collecting system of the kidney or when when the volume of the collecting system exceeds 2–4% of body weight [11, 12]. UPJO is the commonest cause (80%) of giant hydronephrosis in children [2, 7, 10]. Incidence of nephrectomy for giant hydronephrosis is, with a wide variations, between 3 and 70% [3, 4, 6, 11]. Pyeloplasty in patients with UPJO significantly improves function compared to conservatively treated patients [9]. There are several operative techniques added to Anderson-Hynes pyeloplasty to improve renal function. As rare pathology, small series of patients could be obtained with comparation of the techniques. Kato et al. [15] in a series of 6 patients found significantly improved renal function in 3 patiens with nephroplication added to Anderson-Hynes pyeloplasty. One modification (Calyceal plication with pyeloplasty) made by Zupancic et al. [13] reported significant renal functional improvement in 10 cases of giant hydronephrosis without the need for nephrectomy. This was especially valuable in this patient with giant hydronephrosis of the single kidney when nephrectomy would inevitably lead to dialysis and subsequent renal transplantation.

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Fig. **1** Retrograde urogram showed catheter crossing midline to the left with subsequent filling of a cystic space that occupied right hemiabdomen also crossing the midline

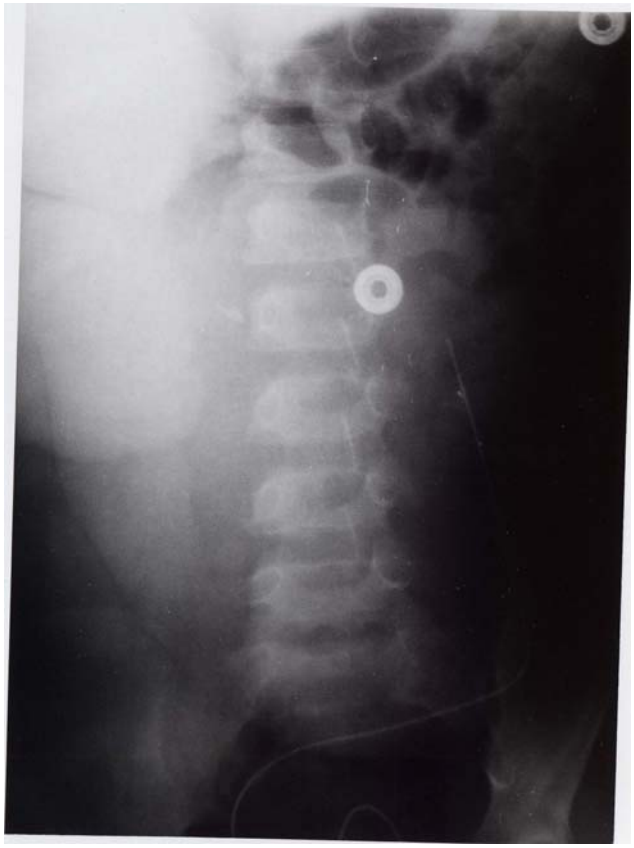

Fig. **2** Excretory urography 3 months after the Anderson-Hynes pyeloplasty with calyceal placation showing normalization of excretory function