

FOLLOW UP IMAGING AFTER PYELOPLASTY FOR URETEROPELVIC JUNCTION OBSTRUCTION (UPJO)

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ABSTRACT

Ultrasonography (USG) and radionuclide renography using technetium diethylene triamine pentaacetic acid (^{99m}Tc DTPA) were done after pyeloplasty for ureteropelvic junction obstruction to confirm the individual renal functions in a young man of age 20 years, and a girl of 22 months.

INTRODUCTION

Approximately 1 in 100 pregnancies are noted to have fetal upper renal tract dilation on ultrasound. However, only 1 in 500 will be found to have significant urologic problems. UPJ obstruction is found in approximately 50% of patients diagnosed with antenatal hydronephrosis. Prior to the use of prenatal ultrasound, most patients with UPJ obstruction presented with pain, hematuria, urosepsis, failure to thrive, or a palpable mass. With the enhanced ability and availability of prenatal ultrasound, urologic abnormalities are being diagnosed earlier and more frequently. In 11-39% of patients, accessory renal vessels (artery alone or artery and vein) cross the UPJ, but this ureterovascular tangle is always associated with a fibrous intrinsic obstruction and may aggravate rather than initiate obstruction.^{1,2} In some of these cases, digital subtraction angiography (DSA) is required. Crossing lower pole renal vessel (s) or entrapment of the ureter by a vessel can prohibit urinary flow down the ureter. Vessels that wrap around the UPJ may be associated with obstruction or can be a product of renal dilation and hydronephrosis that distorts renal vascular architecture.

UPJ = Uretero Pelvic Junction

UPJO = UPJ Obstruction

Case 1

A young man of age 20 years was operated upon twice--first time in January 2000 and then in February 2001 after DTPA renogram showed recurrence of obstructive uropathy in left kidney. Again he had a follow up USG on 21 February 2005 which showed mild pelvicaliectasis in left kidney. There was a large lower polar vascular bundle pressing from front and causing a tight ureteropelvic junction obstruction (UPGO).(Fig.1)

Case 2

A girl of age 16 months had right-sided nephrostomy in Sept. 2004 and right-sided pyeloplasty on 26 Nov. 2004 for neonatal hydronephrosis. Follow up DTPA renogram on 3 March 2005 showed non-functioning right kidney and mild obstruction in left kidney, also seen in ultrasonography (8 Mega-Hertz). (Figs.2&3)

VCUG = Voiding Cysto UrethroGram

UTI = Urinary Tract Infection

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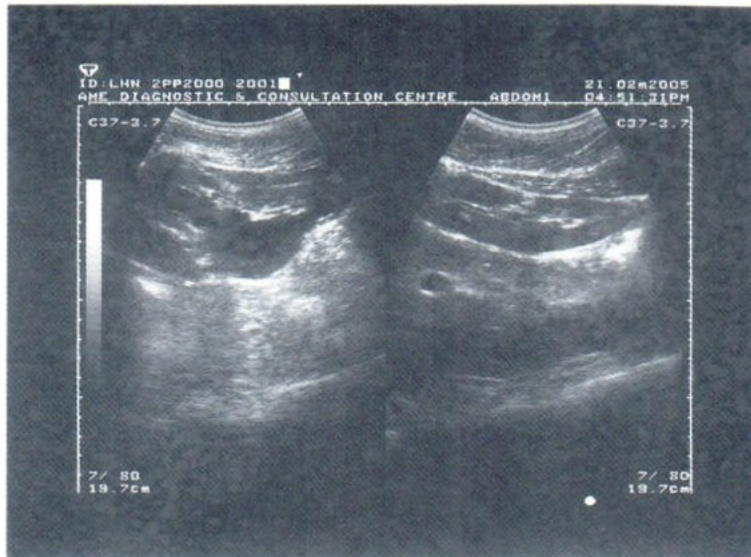


Fig.1 USG showing left hydronephrosis.

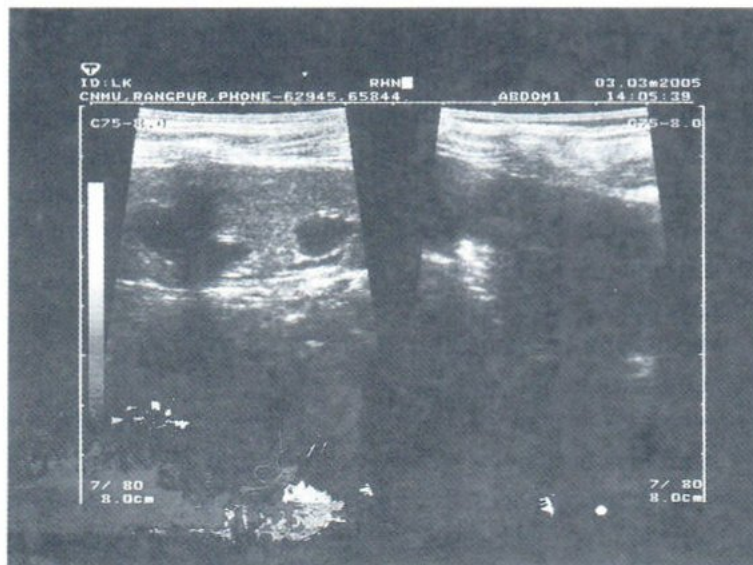


Fig.2 USG showing right hydronephrosis.

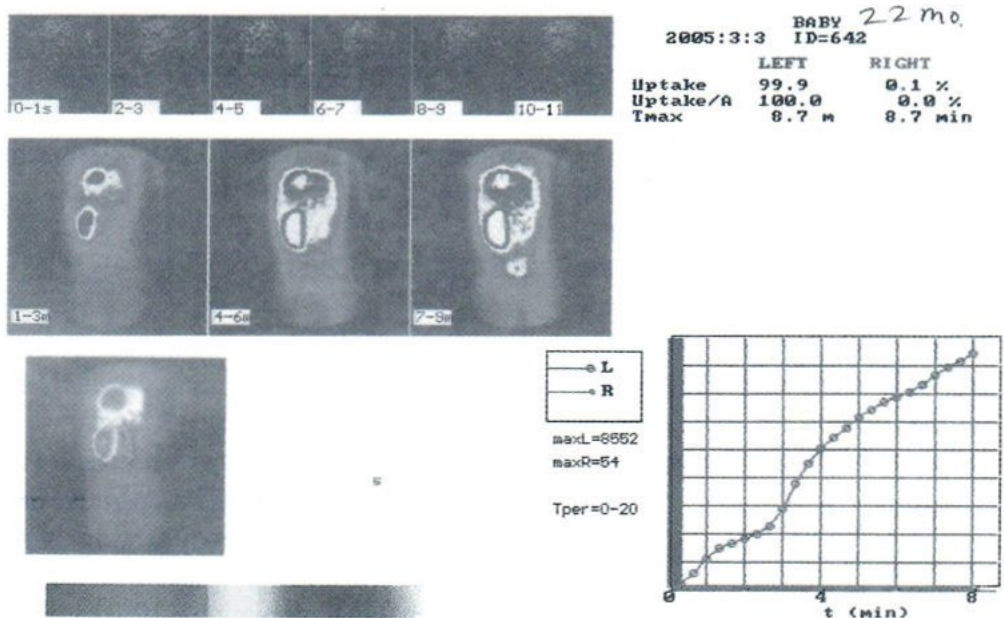


Fig.3 DTPA Renogram post pyeloplasty.

DISCUSSION

Neonates presenting with hydronephrosis should be fully evaluated with both a voiding cystourethrogram (VCUG) to rule out vesicoureteral reflux and a renal ultrasound soon after birth. These patients also should also be placed on prophylactic antibiotics (amoxicillin 15 mg/kg) to prevent urinary tract infections (UTIs), especially while diagnostic imaging is being obtained. If renal sonography demonstrates hydronephrosis without reflux on VCUG, a diuretic renal scan (mercaptoacetyl triglycine [MAG-3], diethylenetriamine pentaacetic acid [DTPA], or dimercaptosuccinic acid [DMSA] should be performed to quantify relative renal function and to define the extent of obstruction. Older children may present with UTIs, a flank mass, or intermittent flank pain secondary to a primary UPJ obstruction. Hematuria also may be a presenting sign if associated with infection. Adults can present with a variety of symptoms, including back and flank pain, UTI, and/or pyelonephritis. Through a detailed history, the pain may be correlated with periods of increased fluid intake or ingestion of a food

with diuretic properties (ie, Dietl crisis). The goals in treating patients with UPJ obstruction are to improve renal drainage and to maintain or improve renal function. Dilation of the intrarenal collecting system or hydronephrosis does not necessarily imply obstruction. Specifically in children, renal pelvic dilation should be followed with serial imaging to assess for changes in dilation, renal parenchymal thickness and/or the presence of scarring, and function. Surgical repair is indicated if a significant differential in serial imaging is present or if progressive deterioration of renal function occurs. Using this algorithm, patients with hydronephrosis are monitored closely with renal ultrasounds and renograms every 3-6 months. Similarly, in adults, repair is recommended if ureteral obstruction is demonstrated on renal scan or intravenous pyelogram (IVP). The evaluation of an obstructed UPJ requires information about ureteral and surrounding anatomy, renal position and ectopy, associated vasculature, and renal function. Prior to surgical intervention, the surgeon frequently evaluates for

renal position/ectopy, mobility, and UPJ anatomy, such as high-insertion variants versus annular stricture variants. The major vascular supply of the UPJ comes from branches of the renal artery. These vessels usually lie in an anteromedial location in relation to the proximal urter. Aberant polar vessels also may be associated with the renal pelvis, causing compression and obstruction of the collecting system. These vessels arise from either the renal artery from a position proximal to the main intrarenal branching site or directly from the aorta. They can surround the UPJ and can be associated with obstruction, or they may be aberrantly positioned secondary to increasing hydronephrosis.³

CONCLUSION

We recommend sonography, nuclear medicine renography and other relevant imaging procedures in suspected UPJO before and after pyeloplasty.

REFERENCES

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