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OUTCOMES OF EARLY PYELOPLASTY IN INFANTS WITH URETEROPELVIC JUNCTION OBSTRUCTION GRADE 3-4 SFU: MORPHOLOGICAL AND FUNCTIONAL PROSPECTIVE.

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Introduction

Congenital ureteropelvic junction obstruction is considered one of the common causes of prenatally diagnosed hydronephrosis , which if left untreated , it can lead to progressive renal impairment [1].UPJ obstruction is one of the most common causes of antenatally detected hydronephrosis, with an estimated ultrasonographic incidence of fetal upper urinary tract dilatation in approximately 1 in 100 pregnancies; however, only 1 in 500 are later diagnosed with significant urologic problems, PUJ obstruction is found in approximately 50 % of patients diagnosed with antenatal hydronephrosis[2].

Prenatal sonographic diagnosis of ureteropelvic junction obstruction allows early detection and intervention according to the degree of renal impairment.Historically, all children with ureteropelvic junction obstruction underwent open pyeloplasty which is safe, with a high success rate of 90%-95% [3] .

Recent Studies have recommended that starting a conservative management is an appropriate for infants who might have less severe form of UPJO and delaying surgical correction when needed[4-6]. In the same way, some reports have suggested conservative regimen for severe hydronephrosis as a safe modality of treatment along with the feasibility of delayed surgical correction at elder age rather than younger ones in favor of surgical maneuver, outcomes and anesthetic complications [7, 8].

However, other reports have recommended early surgical intervention of Grade 3-4 SFU ureteropelvic junction obstruction for maximal recovery of renal function and morphology instead of delayed surgical intervention which follows conservative management[9-11].Therefore, the optimal time for surgery for infants with perinatal hydronephrosis remains controversial.

An intervention scheme for prenatally diagnosed hydronephrosis has been proposed by the European Association of Urology[12]. According to this guideline,repeated scintigraphy should be performed at the third month of life, even if initial differential renal function (DRF) is less than 40%. Surgery is considered in symptomatic patients with increasing Anteroposterior pelvic diameter and an obstructed renogram with DRF <40% or more than 10% loss of DRF during follow up.

While in the past it was believed that most UPJ obstructions with severe hydronephrosis detected prenatally required surgical correction, several studies have shown a relatively high rate of spontaneous recovery. This has led to a change in the management, based on the serial imaging of the renal dilation and function to identify the children that will eventually require surgery as early as possible without irreversible loss of the renal function[13].

The rates of resolution and/or improvement even for severe hydronephrosis, as in grade 3 and 4 SFU are reasonable as complete resolution rates in observed children varies from 33 to 70%. In the literature, the resolution rate is lower with high grade SFU. Also, a change in SFU Grade from 3–4 to 1–2 during follow up is considered of clinically significant and likely reflects a kidney without significant risk of functional affection[5, 6, 14-19].

Furthermore, the degree of hydronephrosis does not correlate with split renal function measured on diuretic renography. Data from several studies showed that between 10 and 39% of children with SFU grade 3 & 4 have a reduced split renal function at diagnosis which defined as <40%. These children are usually offered early onset surgical repair. However, if observation is offered for them, renal function remains stable in about 80% for 1 year. It remains unclear how many may experience later deterioration without intervention[15, 20].

- **Clinical Risk Factors of Renal Deterioration.**

Several studies in the literature try to investigate the ideal risk factor for renal deterioration and thus identify candidate who would benefit from early surgery. This is based on the belief that operating on a child whose

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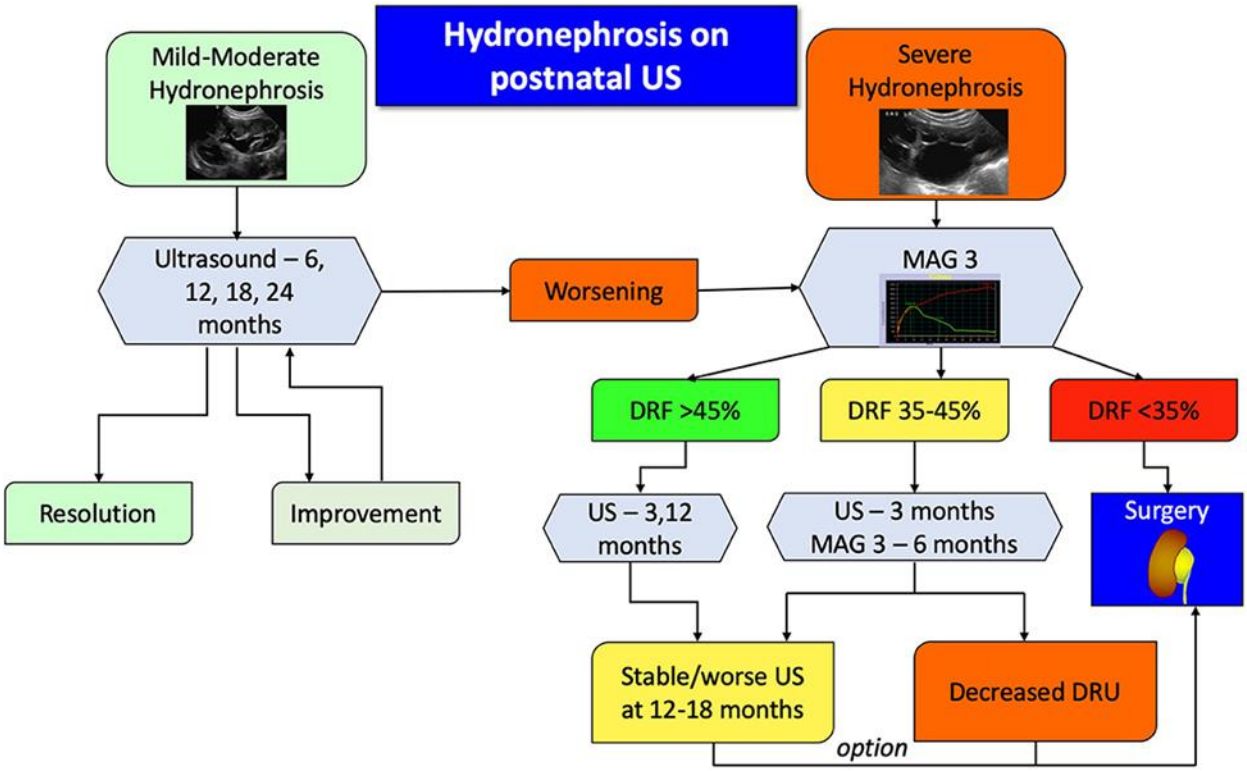
split renal function has not deteriorated yet will lead to better long-term results. However, there are studies showing that lost renal function during follow up will be recovered after surgical repair [16] and will last till puberty[21].

Furthermore, early detection of surgical candidates can potentially reduce the costs of follow-up by imaging as well as parents stress. The prediction usually depends upon parameters obtained from ultrasonography and diuretic renogram. As regard renal function affection, infants with a >10% difference in split renal function between the hydronephrotic kidney and contralateral healthy one at initial evaluation has been found to develop renal function deterioration 3 times more often and to be 2 times more likely to be symptomatic[22].

Another factor should be in mind is delayed cortical transit time, which has been found to be a predictor of deterioration. AS having adjusted for other factors such as Split function, T1/2 and degree hydronephrosis[23, 24].

Anterior-posterior pelvic diameter (APD) on initial ultrasound has been found to be an independent



hematuria, kidney stones, or renal mass from the severely dilated kidney.

Another absolute indication for surgery is the child with clinically significant obstruction in a solitary kidney and evidence of reduced overall renal function. For all other patients, the algorithm (Figure 1) is a suggested.

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Figure 1 : treatment algorithm for UPJO in infants. From: Passoni, N. M., & Peters, C. A. (2020). Managing Ureteropelvic Junction Obstruction in the Young Infant.*Frontiers in Pediatrics, 8*(242). doi:10.3389/fped.2020.00242

1) SURGICAL TREATMENT.

Modern advances and new technology have resulted in many surgical options for correction of a pediatric UPJ. The main surgical principle that must be considered when surgery is indicated is repair by excision of hypoplastic ureteral adynamic segment and reanastomosis or by incision and splinting.

The suitable surgical technique and approach is a matter of debate, open surgical technique versus primarily endoscopic. If open technique will be used, determination of the operative approaches is of another concern. Choice of suture material, use of splints or proximal diversion (external versus internal), or both or stentless all are also debatable issues.

Meanwhile, in endoscopic repair, many approaches can be applied such antegrade versus retrograde, and direct vision versus fluoroscopic guided incision.

With technology advancement, the use of a laparoscopic/robotic-assisted repair or Open versus Endoscopic Technique is another dilemma. Figenshau and Clayman129 hypothesized that at the present time neonates and infants are not good candidates for endourologic intervention. The technical problems include radiation exposure and high reoperation rate. So, open surgery remains the management of choice compared with an endourologic approach. In older preadolescent and adolescent children, the choice is wide and more controversial.

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