Is it Always Necessary to Treat a Ureteropelvic Junction Syndrome?

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The term ureteropelvic junction (UPJ) obstruction covers different morbid entities, and the old aphorism, “A UPJ is not a UPJ” remains true. Hydronephrosis is readily seen on antenatal ultrasonography but does not necessarily imply obstruction. Although most cases will resolve spontaneously, the probability of a significant pathology is related to the degree of pyelectasis, as seen on the third trimester study. Criteria of obstruction are difficult to define with precision, but two that are well-accepted are size of the renal pelvis (> 15 mm) and relative renal function, as determined by adequate isotopic studies. A new therapeutic standard has been established, and minimally invasive surgery has finally dethroned its open rival. Possibly facilitated by robotic assistance, laparoscopic dismembered pyeloplasty is the present gold standard, albeit endopyelotomy remains the least invasive with similar results in carefully selected patients.

Introduction

Routine neonatal ultrasonography readily recognizes hydronephrosis and has led to earlier recognition of ureteropelvic junction obstruction (UPJO) while arousing the spectrum of overdiagnosis and overtreatment. Although the majority of cases are presently discovered in the neonatal period, many are still diagnosed later in life. Significant differences between those presentations have led to the identification of several entities of different etiopathology requiring individualized treatments. The development of minimally invasive techniques in endourology and laparoscopy has also contributed to a new repartition of preferred interventions, now that open pyeloplasty has lost its leading position. Intervention in UPJO is now carefully individualized, technically and chronologically.

Diagnosis and Neonatal Detection

The widespread use of prenatal ultrasound has been responsible for the earlier recognition of UPJO because hydronephrosis is readily diagnosed and caused by UPJO in 40% to 50% of all cases. Examination of the New York State Department of Health database, accrued over a 19-year period, demonstrated that the overall rate of ureteropelvic junction (UPJ) repair had not changed, but there had been a trend toward repair at an earlier age, obviating the need for later repair. The fact that the repair rate has remained constant is encouraging because neither overdiagnosis or overtreatment seems to have occurred [1•]. A surprising trend in the male-to-female ratio according to age was noted. In newborns, a 3:1 male-to-female ratio is classically seen, whereas in adults, the rate in females remains constant while it decreases in males. The ratio even reverts in these series to a 1:2 male-to-female ratio after age 30 years. This suggests that there might be a difference of etiologic factors between genders and confirms earlier observations that there is a significant difference in etiology according to presenting symptoms. Only 11% of patients with prenatally diagnosed obstruction had crossing vessels, whereas crossing vessels were present in over 50% of symptomatic patients [2] (Table 1). These findings have significant implications. Theoretically, based on those statistical differences and well-known risk factors [3••], endopyelotomy should have a higher success rate in young children because they are less likely to have extrinsic etiologic factors (albeit they are the most technically difficult to perform the procedure on). In contrast, though endopyelotomy is easier to perform on adults, the risk of failure is higher due to the high proportion of extrinsic factors of obstruction. The constant progress in laparoscopic expertise is therefore a welcome addition [4,5].

The degree of antenatal hydronephrosis (ANH) can be used to direct postnatal management [6••]. Any degree of ANH indicates a greater risk of postnatal pathology. Moderate-to-severe ANH definitely carries a significant risk and deserves to be investigated, whereas the potential risk for mild hydronephrosis remains undetermined despite numerous studies [6••,7••]. The magnitude of renal pelvic dilation correlates with obstruction. A 15 mm renal pelvic dilation represents a significant threshold and is commonly regarded as an indicator for intervention.
Relative renal function (RRF) is another significant predictor for surgery [8••]. Admittedly, renal function is difficult to assess in infancy, and carefully performed isotopic studies, ie, DTTPA and MAG3 (diaminetrizine-pentaacetic acid and mercaptoacetyltriglycine) diuretic renograms are presently the major evaluation tools and are routinely performed [9]. These tests, however, are not without pitfalls in this age group, contrary to older children and adults [10]. Renal parenchymal thickness or preferably volume may be a more accurate instrument, especially in high-grade obstruction [11•]. When universally available and affordable, MRI may become a major challenger because it is less invasive and less irradiative, especially when sequential testing is required. In addition, magnetic resonance urography (MRU) combines the information of several conventional studies in one test [12]. Its role in infancy remains controversial because adequate sedation is necessary. A RRF below 40% and deterioration of renal function are accepted indications for surgery [7••,13,14]; however, timing of intervention remains a matter of debate. Although it is commonly accepted that chronic obstruction could cause renal function deterioration, controversy continues about renal function improvement after correction of obstruction [15,16]. Despite the fact that recuperation is possible (mainly early in life), it is inconstant and minimal in the older patient because if kidney function deteriorated up to the point of equilibrium and when chronically installed, atrophy becomes irreversible [17].

The New Therapeutic Gold Standards
Open pyeloplasty has been regarded as the gold standard of management of UPJO. It delivers outstanding and reproducible results because it allows a thorough evaluation of the anatomy and a complete correction of both intrinsic and extrinsic etiologic factors, a tailored reduction of a redundant renal pelvis, as well as treatment of associated pathologies. Nevertheless, it carries a higher morbidity related to the open surgical approach. It is therefore logical that the less invasive endourologic and laparoscopic alternatives have challenged the time-honored leader. Taking advantage of the constant and meticulous improvements in technology, endourologic and laparoscopic alternatives have nowadays superseded the old surgical standard.

In selected cases dorsal lumbotomy appears equally noninvasive but carries the disadvantage of a limited working space. It appears, therefore, to represent a transitory alternative awaiting generalization of endoscopic and laparoscopic techniques [18].

Laparoscopic dismembered pyeloplasty combines the advantages of open surgery with the inherent benefits of a minimally invasive procedure and produces comparable functional results. Modern series recently published support the view that laparoscopic pyeloplasty is ready to replace open surgery as the gold standard in the treatment of UPJO [4,19]. Laparoscopic pyeloplasty remains, however, a difficult operation and requires advanced technical skills.

Robotic computer-assisted pyeloplasty may reduce the technical challenges of the reconstructive portion of the operation and therefore stands as a real challenger to a simple laparoscopic procedure because it has been shown to provide results similar to those of conventional laparoscopic pyeloplasty [20].

The endourologic approaches (antegrade and retrograde endopyelotomy) have reasonably high success rates (70%–90%), but patient selection is critically important to the success of any endourologic approach. Patients with a significantly dilated renal pelvis, UPJO longer than 2 cm, poor kidney function (less than 25%) and/or anterior crossing vessels are less likely to have a successful outcome (less than 50%) after endopyelotomy [3••,21]. The role of the anterior crossing renal vessel as a culprit in UPJO continues to generate considerable controversy, but clinical and research data accumulate to suggest that it is real. The less invasive retrograde approach is preferred over the antegrade counterpart. In the former option, a holmium laser incision under direct vision may provide more constant and higher quality results than the cutting balloon [22,23]. Recent studies have reiterated that late recurrences occur after endopyelotomy and justify long-term follow-up, thereby confirming our earlier recommendations [3••,21,24••,25]. An excellent review paper provides a balanced discussion of the minimally invasive options with their respective indications and results [5].

Conclusions
The term “ureteropelvic junction obstruction” covers different morbid entities, and the old aphorism, “A UPJ is not a UPJ” remains true. Hydronephrosis is readily seen on antenatal ultrasonography but does not necessarily imply obstruction. Whereas most cases will resolve spontaneously, the probability of a significant pathology is related to the degree of pyelectasis, as seen on the third trimester ultrasonographic study [6••]. Criteria of obstruction are difficult to define with precision, but two that are well-