

## The Value of Radiological Studies of the Ureter in Management of Ureteropelvic Junction Obstruction

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**ABSTRACT.** To evaluate the necessity to do voiding cystogram and retrograde pyelography in the preoperative evaluation of children undergoing pyeloplasty. In the present study, the records of 64 children were reviewed who underwent 72 dismembered pyeloplasty for Ureteropelvic Junction (UPJ) Obstruction between January 1992 and June 2002. The preoperative clinical evaluation included urinalysis, renal function profile, renal and bladder Ultrasound, diuretic renal isotope scan studies, intravenous pyelogram, voiding cytourethrogram, and retrograde pyelogram. The patients were divided into 3 groups according to either they had retrograde pyelogram and voiding cytourethrogram or not. All patients had done ultrasonography and dilated upper ureter was found in 3 cases only. Voiding cytourethrogram had showed vesicoureteral reflux in 5 patients (9.6%) in Groups 1 and 2, one patient had a successful Ureteral reimplantation for bilateral vesicoureteral reflux. In Group 2, the retrograde pyelogram revealed abnormalities in 3 cases (8.1%) and there was no significant difference in the success rate of pyeloplasty among the three groups. Cystoscopy and retrograde pyelogram are unnecessary in preoperative evaluation prior to pyeloplasty.

**Keywords:** Ureteropelvic junction obstruction, Pyeloplasty, Congenital ureteral stenosis

### Introduction

The Ureteropelvic Junction (UPJ) Obstruction is the most common congenital abnormality of the upper ureter, while vesicoureteral reflux is the most common con-

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genital abnormality of the lower ureter. The coexistence of primary vesicoureteral reflux with UPJ obstruction is usually of low grade, it usually resolves spontaneously, and the incidence varies between 9-14%<sup>[1-3]</sup>.

The facts that low grade reflux coexisting with UPJ obstruction spontaneously disappears after pyeloplasty in addition to the fact that the high grade reflux coexisting with obstruction can be easily detected by ultrasonography using real time mode, lead to limit the needs to perform voiding cytourethrogram on each patient with UPJ obstruction and to save VCUG only to those patients with dilated ureters on ultrasonography<sup>[4]</sup>.

Bomalaski *et al*<sup>[5]</sup> series revealed coexistence of vesicoureteral reflux with UPJ obstruction, which resolved in 66% of their series, and in no case did primary ureteroneocystostomy protect against the subsequent need for pyeloplasty. The necessity to perform retrograde pyelogram is also debatable, as rarely UPJ Obstruction is associated with proximal long stricture or multiple strictures of the proximal ureter<sup>[6]</sup>.

In their series of 108 children, Rushton *et al*<sup>[7]</sup> performed routine pyelogram in patients with UPJ Obstruction; they found that it is unnecessary to identify the level of obstruction or concomitant disease.

Ward *et al*<sup>[8]</sup> suggested that when an ultrasound examination is performed by an experienced ultrasonographer who can identify ureteral dilatation, retrograde pyelography is not generally necessary and definite diagnosis may be made by ultrasonography and diuretic renal isotope scan. If the ultrasound or renogram is not clear, in such a case, intravenous pyelography or retrograde pyelography can be performed to delineate the pathology.

## Materials and Methods

The charts of 64 patients were reviewed who underwent 72 dismembered pyeloplasty for ureteropelvic junction stenosis at King Abdulaziz University Hospital (KAUH) between January 1992 and June 2002. The patients under the age of 12 years were entered only in this study. Charts of the patients were reviewed regarding gender, size, and clinical presentation. The clinical preoperative evaluation had included urinalysis, renal function profile, renal and bladder Ultrasound. The diagnosis of ureteropelvic junction stenosis was made either by intravenous pyelogram (diuretic renal isotopes scan study using 99 mTc-DTPA or 99 mnTc-MAG3 with computer generated analysis of differential renal function and drainage half time) or with both the renal isotope scan and intravenous pyelography. The postoperative follow-up period was recorded.

All patients underwent dismembered pyeloplasty via a subcostal flank or anterior extraperitoneal incision. 49 cases had either internal stents *i.e.*, double J stents 4 Fr, 5 Fr or 6 Fr, or external stents *i.e.*, Nephrostomy and feeding tube size 5F as stents. 23 cases were unstented. Nephrostogram had been performed at 7-10 postoperative days and

the tubes were removed at that time if the anastomosis proved to be patent. The double J stents were removed at 14 -20 postoperative days.

In this present study, the patients were classified into 3 groups according either they had done cystoscopy and VCUG or not: Group 1's patients had done VCUG only; Group 2's patients had done both VCUG and retrograde pyelography prior to pyeloplasty; Group 3's patients had neither VCUG nor retrograde pyelogram.

### Results

A total of 64 patients underwent 72 pyeloplasty at KAUH in Jeddah during the last 10 years, 6 patients were bilateral, 2 patients were redo surgery, and their age varied between 2 days - 10 years and 7 months with an average age of 4.9 years old. 24 patients were antenately diagnosed: a symptomatic in 9 cases, 17 patients presented with recurrent UTI and flank pain, while 14 patients presented with abdominal mass and 8 patients presented with hematuria.

15 patients were included in Group 1; 37 patients in Group 2; and 12 patients in Group 3.

All patients had a preoperative ultrasonography examination that showed severe degree of hydronephrosis and hugely dilated renal pelvis in all patients. A dilated ureter was detected in 3 cases. In Groups 1 and 2, VCUG revealed vesicoureteral reflux in 5 patients (9.6%); 3 cases had grade 2-3 vesicoureteral reflux; 2 cases had grade 4 and 5; contralateral reflux was found in one; ipsilateral reflux found in 3 cases; and bilateral vesicoureteral reflux found only in one case (Table 1).

TABLE 1. Shows vesicoureteral reflux in UPJ Obstruction patients.

Vesicoureteral Reflux	Number of Patients (%)
Total Number of Patients and Incidence	5 (9.6%)
Unilateral VUR	Contralateral 1 (1.5%) associated UPJ Obst. Ipsilateral 3 (4.6%) associated UPJ Obst.
Bilateral VUR	1 patient (1.5%)
Grade of vesicoureteral reflux	Grade 2-3: 3 patients (4.6%) Grade 4: 1 patient (1.5%) Grade 5: 1 patient (1.5%)

In Group 2, the retrograde pyelogram revealed abnormalities in 3 cases (8.1%), in one of the cases the proximal ureter showed 1.5 cms stenosed segment, while the other 2 cases showed tortuosity of the ureters distal to the area of UPJ obstruction.

Intraoperative findings revealed a narrowed segment of the ureter at the UPJ in 56 cases (77.7%); while obstructing crossing vessels in 8 cases (11.1%); tortuosity of the

upper ureter close to the UPJ obstruction was seen in 32 (44.4%) cases; and abnormal high insertion of the ureter was seen in 5 cases (6.9%).

All pyeloplasty were successful except in 3 patients: two patients from Group 2 required redo surgery and one patient from Group 1 required nephrectomy for a non-functioning kidney.

All the patients with vesicoureteral reflux required no surgical intervention except one patient with bilateral vesicoureteral reflux who had successful ureteral re-implantation 6 months after pyeloplasty.

The follow-up period was 22 - 37 months with an average length of 26 months.

### Discussion

Ureteropelvic Junction Obstruction is a common problem in children; there are an increasing number of diagnoses of UPJ Obstruction since the introduction of antenatal ultrasound.

The vesicoureteral reflux is not that uncommon in patients with UPJ obstruction<sup>[9, 10]</sup>. This present study revealed an incidence of 9.6% coexistence of vesicoureteral reflux with UPJ obstruction, which is within the international reported rates.

The primary diagnostic tool for vesicoureteral reflux has been the voiding cystourethrography till now. It is invasive, unpleasant procedure associated with frequent urinary tract infections.

The necessity to do voiding cytourethrogram or not is debatable. Woo *et al*, and Tsai *et al* recommended routine voiding cytourethrogram for all patients with UPJ obstruction<sup>[11-13]</sup>. Other international studies revealed that voiding cystourethrography is not necessary provided that the ultrasound does not show dilatation of the ureter<sup>[4, 5, 14]</sup>.

In this series, only one patient (1.3%) required reimplantation of the ureters. For this case, pyeloplasty was performed prior to the successful ureteral reimplantation and it was not affected by the outcome of the ureteral reimplantation.

Comparing the surgical outcome of the 3 groups there was no apparent difference in the success rate among the 3 groups. In addition to the fact that we did not encounter undiagnosed distal ureteral obstruction outside the planned operative field. The risk of manipulating the ureter during retrograde pyelogram and the additional expenses of performing cystoscopy and retrograde pyelography as a routine part of preoperative evaluation of the children undergoing pyeloplasty. All of these facts may indicate that neither VCUG nor cystoscopy and retrograde pyelogram are necessary prior to pyeloplasty as a part of the routine preoperative evaluation.

Contrast visualization of the ureter before surgery might be considered in the failed pyeloplasty, in such cases preoperative visualization of the ureter may help to plan the corrective operation<sup>[7, 15]</sup>.

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### References

- [1] **Lebowitz RL, Blickman JG.** The coexistence of ureteropelvic junction obstruction and reflux. *AJR Am J Roentgenol* 1983; **140(2)**: 231-238.
- [2] **Hollowell JG, Altman HG, Snyder HM 3rd, Duckett JW.** Coexisting ureteropelvic junction obstruction and vesicoureteral reflux: diagnostic and therapeutic implications. *J Urol* 1989; **142(2)**: 490-493.
- [3] **Maizels M, Smith CK, Firlit CF.** The management of children with vesicoureteral: reflux and ureteropelvic junction obstruction. *J Urol* 1984; **131(4)**: 722-727.
- [4] **Kim YS, Do SH, Hong CH, Kim MJ, Choi SK, Han SW.** Does every patient with ureteropelvic junction obstruction need voiding cystourethrography. *J Urol* 2001; **165(6)**: 2305-2307.
- [5] **Bomalaski MD, Hirschl RB, Bloom DA.** Vesicoureteral reflux and ureteropelvic junction obstruction: association, treatment options and outcome. *J Urol* 1997; **157(3)**: 969-974.
- [6] **Stroom SB.** Ureteropelvic junction obstruction. Open operative intervention. *Urol Clin North Am* 1998; **25(2)**: 331-341.
- [7] **Rushton HG, Salem Y, Belman AB, Majd M.** Pediatric pyeloplasty: is routine retrograde pyelography necessary? *J Urol* 1994; **152(2)**: 604-606.
- [8] **Ward AM, Kay R, Ross JH.** Ureteropelvic junction obstruction in children, unique Considerations for open operative intervention, *Urologic Clinics of North America* May, **25(2)**: 212.
- [9] **Hendren WH, Donahoe PK.** Renal fusions and ectopia, pediatric surgery, 4th edition, 1986 chapter 119, 1134.
- [10] **Segura JW, Kelalis PP, Burke EC.** Horseshoe kidney in children. *J Urol* 1972; **108(2)**: 333-336.
- [11] **Tsai TC, Huang FY, Chang PY, Hsu CC, Chang HK, Chen CC.** The coexistence of vesicoureteral reflux and ureteropelvic junction obstruction in children. *Zhonghua Min Guo Xiao Er Ke Yi Xue Hui Za Zhi* 1992; **33(4)**: 273-279
- [12] **Woo HH, Farnsworth RH.** Vesico-ureteric reflux and surgically treated pelvic-ureteric junction obstruction in infants under the age of 12 months. *Aust N Z J Surg* 1996; **66(12)**: 824-825.
- [13] **Cockrell SN, Hendren WH.** The importance of visualizing the ureter before performing a pyeloplasty. *J Urol* 1990; **144(2)**: 588-592.
- [14] **Bachor R, Kleinschmidt K, Gottfried HW, Hautmann R.** Is retrograde ureteropyelography necessary before kidney pelvis-plasty in childhood. *Urologe A* 1997; **36(4)**: 335-338.
- [15] **Cakan M, Yalcinkaya F, Demirel F, Satir A.** Is visualizing ureter before pyeloplasty necessary in adult patients. *Int Urol Nephrol* 2000; **32(1)**: 33-35.

## الجدوى من دراسة الحالب في حالات تضيق الملتقى الحالبي الحويضي عند الأُطيب

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المستخلص . هدف هذه الدراسة هو معرفة جدوى إجراء صورة للمثانة والتصوير الراجع للحويضة في التقييم ما قبل العمل الجراحي لعملية تقويم الحويضة. تم مراجعة سجلات ٦٤ طفلاً أجريت لهم ٧٢ عملية تقويم للحويضة بسبب تضيق الملتقى الحالبي الحويضي وذلك في الفترة ما بين يناير ١٩٩٢م حتى يونيو ٢٠٠٢م. تضمن التقييم ما قبل العمل الجراحي : صورة الأمواج الصوتية للمثانة والكلى، مصور ظليل للحويضة ، دراسة وظائف الكلى باستخدام النظائر المشعة ، تصوير الحالب والمثانة أثناء التبول والتصوير الراجع للحويضة. تم تقسيم المرضى إلى ثلاثة مجموعات طبقاً لإجراء التصوير الراجع للحالب وتصوير المثانة أثناء التبول أو عدمه. لوحظ توسع الحالب في ٣ حالات فقط بالتصوير بالموجات فوق الصوتية. صورة المثانة البولية أثناء التبول أو وضحت وجود ارتجاع بولي في خمس مرضى فقط (٦, ٩٪) وتم إجراء عملية إعادة زرع الحالب في مريض واحد يعاني من ارتجاع بولي في الحالبيين. لوحظ في النتائج النهائية لإجراء العمل الجراحي أنه لا يوجد فروق في معدل نجاح عملية تقويم الحويضة بين المجموعات الثلاثة. إن تنظير المثانة والتصوير الراجع للحويضة وتصوير المثانة أثناء التبول هي فحوصات غير ملزمة في التقييم ما قبل العمل الجراحي لتقويم الحويضة في حالات تضيق الملتقى الحالبي الحويضي.