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The role of voiding cystourethrography in asymptomatic unilateral isolated ureteropelvic junction obstruction: A retrospective study☆

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Summary

Introduction
The presence of concomitant vesicoureteric reflux (VUR) and ureteropelvic junction obstruction (UPJO) is uncommon. Nevertheless, the reported VUR coexisting with asymptomatic unilateral isolated hydronephrosis (AUIH) requiring pyeloplasty for correction of UPJO was of low grade and mostly resolved during conservative follow-up. Therefore, VCUG may be not indicated in these children except if voiding symptoms, urinary tract infection (UTI), dilated ureters, or bladder and ureteric abnormalities are suspected.

Objectives
The aim was to evaluate the need for VCUG in infants <1 year old with AUIH for whom a dismembered pyeloplasty was indicated for correction of UPJO.

Methods
Ninety-six children <1 year old with pyeloplasty carried out from January 2012 to March 2014 were retrospectively included. Children with voiding symptoms or dilated ureter, duplex system, fused kidneys, bilateral dilatation, or any bladder abnormality on ultrasound were excluded. Anderson–Hynes pyeloplasty was performed through a flank incision. Preoperative VCUG was analyzed in relation to outcome and any UTI during follow-up. The Student *t* test, Mann–Whitney U test, or Fisher exact test were used to compare variables.

Results
Five children had concomitant VUR with UPJO. Most of the children were circumcised during the first postnatal week. The remaining few children were circumcised at the time of pyeloplasty. Side, grade of detected VUR, and complications (18.75%) (postoperative or during follow-up) are presented in the Table. Outcomes in children with and without VUR were not different. Dismembered pyeloplasty was successful in children with VUR and with no complications except for non-febrile UTI in one child only. Ureters were still not dilated at the last follow-up.

Discussion
The required imaging in infants with AUIH is still a subject of debate. As we expected, there was a low incidence of associated VUR in the present study. They were of low grade without any complications during follow-up and without affecting the outcome. The present study has its limitations, including the retrospective nature and short follow-up. However, as at least 2 years of follow-up were documented without any harm or ureteric dilation, VUR will mostly resolve. The present study is strengthened by inclusion of infants only.

Conclusions
Our data suggest that VCUG is not indicated in infants with AUIH requiring pyeloplasty for correction of UPJO. VCUG will not affect the treatment decision, operative outcome, or postoperative complications. VCUG may be indicated in case of suspected voiding symptoms, UTI, dilated ureters, or bladder and ureteric abnormalities.

Table Detected VUR and outcome in all patients.

	Number of patients (%)
VUR in VCUG	5/96 (5.2%)
Ipsilateral	4 (4.16%)
Contralateral	1 (1.04%)
Grade of detected VUR	
Grade 1	5/5 (100%)
Complications (postoperative and during follow-up):	18/96 (18.75%)
Non-febrile UTI	4/96 (4.16%)
Febrile UTI	1/96 (1.04%)
Leakage	7/96 (7.3%)
Wound infection	1/96 (1.04%)
Obstruction	5/96 (5.2%)
Redo-pyeloplasty	3/96 (3.12%)

VUR = vesicoureteric reflux; VCUG = voiding cystourethrography.

☆ This study was presented in ESPU 2015 (as a non-moderated poster) and ESPU 2016 (as a moderated poster).

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Introduction

The presence of a concomitant vesicoureteric reflux (VUR) and ureteropelvic junction obstruction (UPJO) is uncommon, occurring in only 0.6% of children [1]. Voiding cystourethrography (VCUG) is usually recommended to be carried out in children with UPJO to detect the possible coexistence of VUR [2–4]. Nevertheless, the reported VUR coexisting with isolated unilateral asymptomatic hydronephrosis requiring pyeloplasty for correction of UPJO was of low grade and mostly resolved during conservative follow up [5,6]. Therefore, VCUG may not be indicated in these children with isolated unilateral asymptomatic UPJO, except if voiding symptoms, urinary tract infection (UTI), dilated ureters, or bladder and ureteric abnormalities are suspected. We assessed this hypothesis and evaluated the need for VCUG in infants with isolated unilateral asymptomatic hydronephrosis for whom a dismembered pyeloplasty was indicated for correction of UPJO. To the best of our knowledge, the present study may be the first one about this issue in infants.

Methods

All procedures performed were in accordance with the ethical standards of our institutional research committee and with the 1964 Helsinki declaration and its later amendments. Written informed consent was provided by parents of all children.

The records of all pyeloplasty cases in children less than 1 year old from January 2012 to March 2014 were retrospectively reviewed. Children with preoperative full assessment including creatinine, ultrasound (US), VCUG, and nuclear renography scans were included. Children who had suspected voiding symptoms (including abnormal flow of urine) or had dilated ureter, duplex system, fused kidneys, bilateral renal pelvis dilatation, or any bladder abnormality in US were excluded from the present study.

The hydronephrosis was graded according to the society for fetal urology grading system (SFU) [7]. The anteroposterior diameter of the renal pelvis (APD) was measured at the renal hilum in the transverse section. VCUG was performed at age 0.5–3 months. VUR was graded using the International Reflux Study Committee classification [8]. VCUG was performed initially to exclude VUR in all children, followed by a nuclear renography scan to confirm the obstruction. Nuclear renography scans were performed usually after the age of 3 months and in the presence of a urethral catheter. However, they were performed at an earlier age in some children with more severe obstruction. Indications for pyeloplasty were the presence of a split renal function (SRF) $<40\%$, APD >4 cm, or if any of them (APD or SRF [decreased to less than 40% or decreased $\geq 5\%$]) was deteriorating during follow-up.

The standard dismembered (Anderson–Hynes) pyeloplasty was done through a flank incision in all cases. A drain and a urethral catheter were inserted in all patients. Urethral catheters were removed the next postoperative day for stented pyeloplasty but it remained until cessation of the drain output for non-stented pyeloplasty. This was followed by removal of drains, after which the patients were discharged.

Postoperative follow-up was done for all children for at least 2 years using urine analysis, US, and nuclear renography. Antibiotic prophylaxis was not used for any of the children.

Postoperative nuclear renography was usually done 3 months postoperatively or after removal of the internal stent (if inserted intraoperatively). It can be done earlier when there are symptoms, complications, or progressive dilatation. The SRF and APD at the last follow-up were reported. Redo pyeloplasty was decided if obstruction, non-improvement in renal dilatation, or SRF deterioration ($\geq 5\%$) were reported postoperatively in spite of initial management with insertion of a double-J stent. Non-febrile UTI was defined as the presence of urinary symptoms with positive urine analysis and culture for infection in the absence of fever. If associated with fever, it was defined as a febrile UTI.

Any abnormality in preoperative VCUG was analyzed in relation to intraoperative findings, postoperative outcome, and any UTI during follow-up to assess the value of VCUG and its effect on treatment decision and management.

All statistical calculations were done using SPSS version 15 (SPSS Inc., Chicago, IL, USA). The Student *t* test was used for comparison of numerical variables if normally distributed and the Mann–Whitney U test if not normally distributed. For categorical data, the Fisher exact test was used. A p value < 0.05 was considered statistically significant.

Results

After reviewing the surgical database, 143 pyeloplasty cases were detected during the study period. Forty-seven pyeloplasty cases were excluded or not included in the present study because of the presence of a dilated ureter, bilateral UPJO, or other congenital urological anomaly, particularly a duplex system and fused kidneys, or because of the presence of incomplete records or absence of VCUG. Thus, 96 children (68 boys, 28 girls) were included. All children were asymptomatic. Hydronephrosis had been discovered antenatally or incidentally by postnatal US which had been carried out for non-urological reasons. The median age was 6 (1–12) months. Age, SRF, APD, grade of hydronephrosis, and other preoperative data are presented in Table 1.

VCUG confirmed the absence of any infravesical obstruction in all infants. None of the children had an infravesical obstruction. Five children only showed VUR in the preoperative VCUG. The VUR was grade 1 in these five children. Four (4.16%) children had ipsilateral VUR and the remaining child had contralateral VUR. Most of the children were circumcised during the first postnatal week. The remaining children were circumcised at the time of pyeloplasty.

Intraoperatively, crossing renal vessels and relatively long atretic segments were detected in three and four cases, respectively. Retrograde pyelography was not performed in any patient. Fifty-nine pyeloplasties were stented (external stent or double-J) and the other 37 cases were stentless. This was according to surgeon preference.