

Vesicoureteral reflux in patients diagnosed with pyeloureteral junction obstruction. Is screening justified?

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ABSTRACT

Introduction. The prevalence of vesicoureteral reflux (VUR) concomitant with pyeloureteral junction obstruction (PUJO) ranges from 5.2% to 18%. Today, there is no consensus on whether routine screening should be performed or not to rule out reflux, and it can be limited to selected patients.

Objectives. To study VUR prevalence in patients diagnosed with PUJO, estimate reflux levels in patients with positive study, and limit serial voiding cystourethrogram (SVCU) or ultrasound cystography to selected patients (dilated ureter at ultrasound imaging and previous UTI).

Materials and methods. Observational, retrospective study carried out in 74 patients undergoing surgery for PUJO. Information on sex, preoperative VUR screening, results (positive or negative for VUR), and reflux levels was collected.

Results. 53 cases (71.6%) were male and 21 (28.4%) were female. Reflux screening was performed in 55 patients (74.3%), vs. 18 (24.3%) where no study was carried out. 16.2% of cases with VUR preoperative study were managed using ultrasound cystography. The preoperative study was positive in 6 out of the 73 patients (1 patient was excluded after being diagnosed with posterior urethral valves), which means VUR prevalence in patients already diagnosed with PUJO was 10.7%. Of the six cases, one case was grade I, two cases were grade II, one case was grade III, one case was grade IV, and one case was grade V.

Conclusions. VUR has a slightly higher incidence in patients diagnosed with pyeloureteral junction obstruction than in the general population. Routine screening of vesicoureteral reflux is unnecessary, unless in case of previous urinary infection, dilated ureter at ultrasound imaging, or suspected secondary cause.

KEY WORDS: Pyeloureteral junction obstruction, PUJO; Vesicoureteral reflux, VUR; Serial voiding cystourethrogram, SVCU; Ultrasound cystography.

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REFLUJO VESICoureTERAL EN PACIENTES DIAGNOSTICADOS DE ESTENOSIS DE LA UNIÓN PIELoureTERAL. ¿ESTÁ JUSTIFICADO EL SCREENING?

RESUMEN

Introducción. La concomitancia entre la estenosis de la unión pieloureteral (EPU) y el reflujo vesicoureteral (RVU) se sitúa entre el 5,2 y el 18%. Actualmente, no existe consenso sobre la realización de *screening* rutinario para descartar dicho reflujo, pudiendo limitarlo a pacientes seleccionados.

Objetivos. Estudiar la prevalencia del RVU en los pacientes diagnosticados de EPU. Estimar el grado de reflujo en aquellos pacientes con estudio positivo. Limitar la realización de cistouretrografía miccional seriada CUMS o de ecocistografía a pacientes seleccionados (uréter dilatado visible en ecografía, ITU previa).

Material y métodos. Estudio observacional y retrospectivo sobre 74 pacientes intervenidos de EPU. Se ha recogido información acerca del sexo, realización de despistaje preoperatorio de RVU, los resultados (positivo o negativo para RVU) y grado de reflujo.

Resultados. 53 casos fueron masculinos (71,6%) y 21 (28,4%) femeninos. El despistaje de reflujo fue realizado en 55 pacientes (74,3%) frente a 18 (24,3%) en los que no se realizó ningún estudio. El 16,2% de los casos en los que se realizó el estudio preoperatorio de RVU fueron abordados mediante ecocistografía, siendo el estudio preoperatorio positivo en 6 pacientes del total de 73 estudiados (un paciente fue excluido por ser diagnosticado de válvulas de uretra posterior), lo que sitúa la prevalencia de RVU en pacientes ya diagnosticados de EPU en un 10,7%. De estos, un caso fue de grado I, dos grado II y un caso grado III, IV y V, respectivamente.

Conclusiones. El RVU en pacientes diagnosticados de estenosis de la unión pieloureteral presenta una incidencia ligeramente mayor que en la población general. El *screening* rutinario del reflujo vesicoureteral es innecesario, debiendo realizarse en casos que presenten infecciones urinarias previas, visualización del uréter dilatado en la ecografía o sospecha de causa secundaria.

PALABRAS CLAVE: Estenosis de unión pieloureteral (EPU); Reflujo vesicoureteral (RVU); Cistouretrografía miccional seriada (CUMS); Ecocistografía.

INTRODUCTION

Pyeloureteral junction obstruction (PUJO) and vesicoureteral reflux (VUR) are two of the most frequent conditions in pediatric urology. They are usually considered two independent entities requiring different treatments. Vesicoureteral reflux concomitant with confirmed pyeloureteral junction obstruction has been an issue of discussion for years, with highly controversial aspects regarding diagnosis and treatment. This subject is still widely unknown – both conditions (PUJO and VUR) have been known and studied for a long time, but they are under constant change and evolution.

Our knowledge of VUR in PUJO patients is limited, but we know it has a low incidence and it tends to be low grade VUR, so it will probably not cause an increase in UTI incidence. Therefore, it will rarely compromise prognosis in an adequately treated PUJO.

This raises two important questions:

1. Should VUR be systematically ruled out in these patients?
2. May this test be performed in selected patients only?

SVCU and ultrasound cystography are known to be uncomfortable and potentially morbid. Even though these tests are safe, they are not free from complications, such as those arising from urethral probing (UTI and urethral lesion) and other related issues (radiation in the case of SVCU, and low availability and operator dependence in the case of ultrasound cystography).

Most authors agree that obstruction should be tackled first, which is another reason for limiting routine SVCU and ultrasound cystography in PUJO patients.

OBJECTIVE

To assess whether systematic SVCU or ultrasound cystography can be avoided in patients diagnosed with pyeloureteral junction obstruction.

MATERIALS AND METHODS

Observational, retrospective study carried out in patients undergoing surgery for PUJO in our healthcare facility, together with a review of PubMed literature, using the aforementioned terms.

74 patients undergoing surgery for PUJO between 2010 and 2018 were included. Information on sex, preoperative ultrasound cystography and SVCU, results (positive or negative for VUR), and reflux grade – if there was any – was collected.

Patients with causes of hydronephrosis other than PUJO were ruled out. One patient initially diagnosed with PUJO where SVCU demonstrated the presence of

posterior urethral valves (PUV) as the cause of bilateral hydronephrosis was excluded.

The IBM SPSS statistics software, version 22, was used for statistical analysis purposes, with a descriptive analysis of frequencies.

RESULTS

Of the 74 patients, 53 (71.6%) were male and 21 (28.4%) were female.

Screening was carried out in 55 patients (74.3%) vs. 18 (24.3%) where the presence of VUR was not studied preoperatively.

Of the various imaging techniques available to rule out VUR, ultrasound cystography was performed in 16.2% of cases. 6 of the 73 patients studied were VUR positive in the preoperative study, with a 10.7% prevalence. Most cases were low grade VUR (one grade I case, two grade II cases, and one grade III case), with two dilated ureter high grade cases (one grade IV case, and one grade V case).

DISCUSSION

PUJO has a prevalence of 1 out of 500 live newborns, and it is more common in male patients. Typically, lesions have been described in the left kidney – ilateral PUJO has a prevalence of 10%⁽¹⁾.

Vesicoureteral reflux (VUR) is caused by the retrograde ascent of urine from the bladder towards the ureters as a result of ureterovesical junction malfunction.

Prevalence in healthy children is estimated at 1% approximately, with a certain degree of family aggregation⁽²⁾. In addition, 30-50% of patients with previous urinary tract infection (UTI) will suffer from underlying vesicoureteral reflux⁽³⁾. VUR concomitant with PUJO has a low incidence, ranging from 5.2%⁽⁴⁾ to 18%⁽⁵⁾. It tends to be low grade VUR, which is believed not to cause a significant increase in UTI incidence as compared to PUJO without reflux, so the need for VUR screening is currently under discussion.

After analyzing the data gathered in the literature review, it should be pointed out that even though routine screening used to be performed in all patients diagnosed with pyeloureteral junction obstruction in our department, a recent tendency to limit tests in patients with previous UTI, ureteral dilatation at baseline ultrasound imaging, or suspected secondary cause has been noted.

As previously stated, reflux had a prevalence of 10.7% in our patients, consistent with the data reported in the literature. Unsurprisingly, VUR was mostly low grade VUR and did not compromise evolution or required further surgery.

Traditionally, European societies such as the EAU have recommended systematic complementary tests to rule out the presence of VUR⁽⁶⁾. However, many authors believe these tests are not necessary, so they do not prescribe SVCU and ultrasound cystography at all, or they only prescribe them in certain patients. In 1982, Lebowitz and Blickman⁽⁷⁾ reported the first cases of VUR concomitant with PUJO and stressed how difficult diagnosis was. However, they did take a clear stance – and probably have not changed their minds since then – on the need to treat obstruction first. They were the first to argue that, in mild cases, reflux was likely to improve spontaneously following pyeloplasty. However, if re-implantation (the only anti-reflux technique available before the advent of ultrasound) was decided upon, this could exacerbate inflammation and therefore obstruction in an already stenotic system. Later, in 1992, Doctor Estornell et al.⁽⁸⁾ studied another series of 106 PUJOs undergoing surgery, with a reflux incidence of just 8.25%. No statistically significant differences between groups (VUR concomitant with PUJO, and PUJO only) were found in terms of preoperative symptoms (UTI), so they were the first to question the need for routine SVCU screening.

Kim et al.⁽¹¹⁾ were the first to establish one of the main hypotheses our work is based on. They studied a cohort of 106 patients undergoing surgery for PUJO and a routine preoperative SVCU, with a normal reflux incidence (11.3%). Of these patients, half of them had low grade reflux (defined as invisible ureter at ultrasound imaging), and half of them had high grade reflux (defined as visible and therefore dilated ureter). High grade reflux patients required anti-reflux techniques, whereas patients with an invisible ureter at ultrasound imaging (low grade reflux) had no postoperative incidences. This led them to conclude that routine preoperative SVCU could perhaps be limited to patients with suspected high grade reflux (suggested by ureteral visualization at ultrasound imaging), whereas in cases of low grade – and therefore self-limited – reflux, SVCU could be unnecessary.

A multi-center study by Hubertus et al.⁽¹²⁾ dug deeper into this. VUR concomitant with PUJO had an incidence of 7.3%, 3% of these patients presenting ureteral dilatation (based on Kim et al.'s classification). And the study demonstrated that even though PUJO with underlying reflux was associated with a higher number of febrile UTI episodes than PUJO only, the difference was not statistically significant, whereas ureteral dilatation at ultrasound imaging did have a significant relationship with underlying reflux. Therefore, they concluded that preoperative SVCU could be limited to patients without “suspicious” signs or symptoms such as ureteral dilatation at ultrasound imaging or urinary infection. In 2017, El Sheemy et al.⁽¹³⁾ conducted a retrospective study on PUJO cases undergoing surgery, with a VUR incidence of 5%, in line with the numbers described in the literature. Similarly to previous studies,

they concluded that SVCU could perhaps be limited to patients with visible ureter, UTI, or suspected secondary cause.

In order to analyze 20 articles from the literature together, Weitz and Schmidt⁽¹⁴⁾ carried out a retrospective review in 2017 where they merged the data published up until then. In the 20 articles studied, VUR concomitant with PUJO had an incidence of 8.2%, and an NNT (necessary number to treat) of 207-278 patients. Both diagnoses were treated with antibiotics to avoid one UTI every year and one renal scar every two years. Finally, Mears et al.⁽¹⁵⁾ demonstrated that the approach suggested by the aforementioned authors was feasible. From 1999 to 2002, they selected a group of patients requiring preoperative SVCU (bilateral hydronephrosis, ureteral dilatation, renal scars, duplicated systems, and vesical wall thickening) and differentiated them from the other patients, who did not undergo VUR screening. None of the patients presented UTI in the 3-year follow-up period, so they concluded they had been able to reduce the number of unnecessary tests (SVCU) without increasing UTI incidence and renal damage.

As a result of this, we believe a research study should be carried out to assess the possibility of limiting routine SVCU in patients diagnosed with PUJO with no additional risk factors.

CONCLUSIONS

VUR has a slightly higher incidence in patients diagnosed with PUJO than in the general population. It tends to be low grade VUR, which rarely interferes in the natural course of PUJO.

In light of the above, we believe VUR routine screening is unnecessary and can be limited to patients with previous urinary infection, visible ureter at ultrasound imaging, or suspected secondary cause.

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