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# Can vesicoureteral reflux be predicted in infants with urinary infection?

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All examinations performed in children with urinary tract infection (UTI) have been aimed at detecting congenital urinary tract abnormalities in order to prevent parenchymal sequelae. Vesicoureteral reflux has been the malformation most commonly associated to renal scars, which have in turn been related to hypertension, proteinuria, and chronic renal failure. Serial voiding cystoureterography has been routinely performed in most centres until advanced ages to diagnose the presence of vesicoureteral reflux. However, in recent years it has been questioned whether the long-term prognosis of children with a history of UTI with vesicoureteral reflux and renal scars is as poor as presumed, and doubts about the need for urinary tract examination in these patients have therefore arisen.[1,2]

Today, urinary tract examination is intended to first diagnose the parenchymal sequelae caused by infection and prenatal reflux, and second, to detect the presence of malformations that may facilitate repeat infections and new renal scars that may benefit from both a corrective and prophylactic therapeutic approach. There is no agreement in imaging tests to be performed. Ultrasonography is used for diagnosing structural malformations (dilation, ureterocele, double systems, and changes in bladder wall thickness) and for detecting changes caused by infection (pyonephrosis foci, inflammatory increase in kidney size, and bladder debris).[3] A renal scan with TC 99m-DMSA (DMSA) is the best procedure for diagnosing renal scars, and is recommended to be performed 6 to 12 months after infection. Serial voiding cystoureterography (SVCU) or radionuclide cystography (RNC) are the tests of choice for diagnosing vesicoureteral reflux.[4] The American Academy of Pediatrics (AAP) recommended some years ago that a SVCU or RNC be performed as soon as possible in any child under 2 years of age with UTI. Other authors recommend performance of SVCU because it detects a high reflux percentage (from 19%-30%) that should be taken into account until it is shown that there is no indication for therapeutic intervention (medical or surgical). A more current trend bases the diagnostic approach in detecting parenchymal changes first, and performing SVCU or RNC only when such changes are found. At any rate, all authors agree in a trend to reduce the number of invasive examinations, and more specifically SVCU.[5-9]

In agreement with this, the Sanchez-Bayle et al. study published in this issue of *NEFROLOGIA*[10] was intended to validate a formula proposed some years ago to predict the presence of vesicoureteral reflux[11] adding the germ causing infection as an additional factor to be adjusted and, logically, to reduce the indication of serial voiding cystoureterography in infants with urinary tract infection. This study enrolled 267 children aged from 2 days to 24 months, much in agreement with the current trend to avoid indication of this imaging test to older children.[3] These children had undergone renal ultrasonography, voiding cystography, and CRP measurement. The pathogen causing infection was recorded. Most patients were above the cut-off point (zero) according to the Oostenbrink formula. Only 14 patients had a lower score, despite which 8 patients had vesicoureteral reflux. The conclusion that this formula is not valid for predicting the presence of vesicoureteral reflux is therefore appropriate. However, a multivariate logistic regression analysis revealed that when ultrasonographic changes and/or urinary infection by a pathogen other than *E. coli* were jointly assessed and refluxes were very consistently divided by their therapeutic implication into > grade III or < grade IV reflux in the International Reflux Classification, 100% and 81% sensitivities were found for reflux higher and lower than grade IV respectively. The fact that in the Sanchez Bayle[10] study all grade IV or higher refluxes were detected by assessing ultrasonographic changes and/or urinary infection by a pathogen other than *E. coli* is of great value because, according to current evidence, those would be the refluxes benefiting from therapeutic interventions. As stated by authors themselves, the only limitation would be the small number of high grade refluxes detected.

Over the years, we paediatric nephrologists have become aware that in our eagerness to prevent sequelae, we may have requested too many invasive and uncomfortable imaging tests for children. These tests, based on evidence from management of vesicoureteral reflux that recommends surgical correction for patients with repeated pyelonephritis only and questions the value of antibiotic prophylaxis for preventing pyelonephritis and new scars, could be avoided.[12-15]

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## KEY CONCEPTS

**1**. SVCU should not be routinely performed for urinary tract examination in children with pyelonephritis.

**2**. Urinary tract dilation in renal ultrasonography is closely related to the existence of vesicoureteral reflux.

**3**. Prophylaxis of urinary infection in low grade reflux has not been shown to reduce the number of pyelonephritis episodes or new scars.

**4**. Correction of vesicoureteral reflux reduces the number of subsequent pyelonephritis episodes.

**5**. The endoscopic procedure is as effective as open surgery for correcting vesicoureteral reflux.

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