

Vesicoureteral reflux in children - there is still much controversy

Authors

Rejane de Paula Bernardes¹

¹ Necker Enfants Malades
Hospital in Paris. Nefrokids
Clinic - Curitiba

Over 4 decades ago, Hodson & Edwards¹ described the association between chronic pyelonephritis and vesicoureteral reflux (VUR). Soon after, the term "reflux nephropathy" started to be used. Since then, urinary tract infection (UTI) and VUR are considered as risk factors for the development of renal scars - which cause hypertension in 10% to 20% of patients and chronic kidney disease (CKD) if the lesions are bilateral. Based on these concepts, urological studies have been recommended at the time of the first acute pyelonephritis in recurrent UTI in children of any age.

In the last decade, NICE² (National Institute for Health and Clinical Excellence) and the AAP³ (American Academy of Pediatrics) published their guidelines, with stringent protocols in relation to investigation, prioritizing young children. There have been several Publications⁴⁻⁸ in order to demonstrate that the injudicious application of these protocols can induce a failure in prevention, since a significant number of children would be without a VUR and scarring diagnosis that can occur after the first UTI in 5%-15% of cases.

If investigation and antibiotic prophylaxis are still controversial nowadays, even more are the indications of conservative, surgical or endoscopic treatment for VUR. In the absence of international consensus, today we try to stratify risk factors according to family history, gender, age, laterality, UTI recurrence, VUR grade, scars and association with lower urinary tract dysfunction (LUTD). In this sense, it is interesting to notice the current trend to separate two groups of patients:

a) Boys with more hydronephrosis, UTI and higher grade VUR in the neonatal period, often with congenital kidney lesion by dysplasia (10%) and which may also include acquired scarring lesions, are best suited to surgical treatment.⁹

b) Girls with higher recurrence of febrile UTI and renal scarring acquired after the neonatal period and related to LUTD. Forty to sixty percent of children with VUR have LUTD and prevalence of renal scarring reaches 30%.¹⁰ LUTD presents symptoms of urine urgency or postponement, daytime and/or nighttime incontinence, changes in urine flow, post-void residual volume, urethra deformations (spindle-shaped) and recurrent UTI; there may be chronic and severe constipation (eliminations syndrome). The American Urological Association (AUA) in their guidelines,¹¹ emphasizes the need to investigate these symptoms early on in the first UTI episode, and thus, the focus should be the treatment of LUTD, stating "A happy bladder is an empty bladder and an empty rectum."

Infants also have VUR-related LUTD. In a recently-published paper¹² (Swedish Reflux Trial), including 203 infants with III-IV grade VUR, 34% had LUTD with a negative effect on VUR resolution and renal scarring in two years of follow up. Noninvasive bladder function assessment in infants is possible and has been applied in this study through the 4-hour voiding observation test,¹³ enabling an early selection of these patients.

Conservative treatment is based on the fact that spontaneous VUR resolution occurs mainly in young patients with

Submitted on: 10/25/2013.
Approved on: 01/03/2014.

Correspondence to:

Rejane de Paula Bernardes.
Nefrokids Clinic - Curitiba.
Rua Brasílio Itiberê, nº 3933.
Curitiba, PR, Brasil. CEP: 80240-060.
E-mail: rejane@nefrokids.com.br

DOI: 10.5935/0101-2800.20140002

low-grade VUR, reaching 80% in I- II VUR and 30%-50% in the III-IV VUR in 4-5 years of follow up.¹⁰

In the present issue of the Brazilian Journal of Nephrology, Teixeira *et al.*¹⁴ described a group of patients with VUR maintained on conservative treatment or referred for surgical treatment and, despite the limited number of patients and its retrospective character, the study confirms literature findings regarding age, gender, UTI recurrence and the high rate of renal scarring (37.2%), reinforcing the need for seriousness in the implementation of investigation and treatment protocols in children with UTI and bringing to discussion current points concerning the stratification of risk groups.

The heterogeneity of the various studies hinders comparative analysis and most recommendations are based on consensus. While primary VUR receives conservative treatment or prophylaxis with endoscopic or open surgery, cases secondary to LUTD benefit from urotherapy, antibiotic prophylaxis, pelvic floor biofeedback, anticholinergics and parasacral transcutaneous electrical stimulation, according to the type of dysfunction, with high resolution of VUR. In our experience,¹⁵ among 402 children with LUTD, 73% females with mean age of 7.3 ± 2.8 years, 29% had VUR - and among these 39% had renal scarring. LUTD treatment brought about cure and reduction in VUR grade in 56% and 24%, respectively.

In Brazil, in addition to a few specialized centers to cater for the large number of patients, social difficulties often hinder the maintenance of antibiotic prophylaxis and monitoring, and these cases end up being taken to surgical treatment, but we should bear in mind that in the presence of LUTD, surgical procedures are often doomed to failure. Many studies are yet to come; and sayings like "an ounce of prevention is better than a pound of cure"⁹ or 'scars may develop in infant kidneys quicker than urine culture can confirm the diagnosis, and that reflux nephropathy has no age limit'⁸ demonstrate the concern of pediatric nephrologists vis-à-vis recurrent UTI and VUR in childhood.

REFERENCES

1. Hodson CJ, Edwards D. Chronic pyelonephritis and vesico-ureteric reflex. *Clin Radiol* 1960;11:219-31. PMID: 13714877 DOI: [http://dx.doi.org/10.1016/S0009-9260\(60\)80047-5](http://dx.doi.org/10.1016/S0009-9260(60)80047-5)
2. National Institute for Health and Clinical Excellence. Urinary tract infection in children. London: NICE, 2007 [Cited 2014 Feb 3]. Available from: <http://guidance.nice.org.uk/CG054>
3. Subcommittee on Urinary Tract Infection, Steering Committee on Quality Improvement and Management.; Roberts KB. Urinary tract infection: clinical practice guideline for the diagnosis and management of the initial UTI in febrile infants and children 2 to 24 months. *Pediatrics* 2011;128:595-610. PMID: 21873693 DOI: <http://dx.doi.org/10.1542/peds.2011-1330>
4. Lytzen R, Thorup J, Cortes D. Experience with the NICE guidelines for imaging studies in children with first pyelonephritis. *Eur J Pediatr Surg* 2011;21:283-6. DOI: <http://dx.doi.org/10.1055/s-0031-1277212>
5. La Scola C, De Mutiis C, Hewitt IK, Puccio G, Toffolo A, Zucchetta P, et al. Different guidelines for imaging after first UTI in febrile infants: yield, cost, and radiation. *Pediatrics* 2013;131:e665-71. DOI: <http://dx.doi.org/10.1542/peds.2012-0164>
6. Pennesi M, L'erario I, Travan L, Ventura A. Managing children under 36 months of age with febrile urinary tract infection: a new approach. *Pediatr Nephrol* 2012;27:611-5. DOI: <http://dx.doi.org/10.1007/s00467-011-2087-3>
7. Shaikh N, Ewing AL, Bhatnagar S, Hoberman A. Risk of renal scarring in children with a first urinary tract infection: a systematic review. *Pediatrics* 2010;126:1084-91. DOI: <http://dx.doi.org/10.1542/peds.2010-0685>
8. Round J, Fitzgerald AC, Hulme C, Lakhnapaul M, Tullus K. Urinary tract infections in children and the risk of ESRF. *Acta Paediatr* 2012;101:278-82. PMID: 22122273 DOI: <http://dx.doi.org/10.1111/j.1651-2227.2011.02542.x>
9. Paintsil E. Update on recent guidelines for the management of urinary tract infections in children: the shifting paradigm. *Curr Opin Pediatr* 2013;25:88-94. DOI: <http://dx.doi.org/10.1097/MOP.0b013e32835c14cc>
10. Tekgül S, Riedmiller H, Hoebeke P, Kočvara R, Nijman RJ, Radmayr C, et al.; European Association of Urology. EAU guidelines on vesicoureteral reflux in children. *Eur Urol* 2012;62:534-42.
11. Peters CA, Skoog SJ, Arant BS Jr, Copp HL, Elder JS, Hudson RG, et al. Summary of the AUA Guideline on Management of Primary Vesicoureteral Reflux in Children. *J Urol* 2010;184:1134-44. DOI: <http://dx.doi.org/10.1016/j.juro.2010.05.065>
12. Sillén U, Brandström P, Jodal U, Holmdahl G, Sandin A, Sjöberg I, et al. The Swedish reflux trial in children: v. Bladder dysfunction. *J Urol* 2010;184:298-304.
13. Holmdahl G, Hanson E, Hanson M, Hellström AL, Hjälmås K, Sillén U. Four-hour voiding observation in healthy infants. *J Urol* 1996;156:1809-12. PMID: 8863622 DOI: [http://dx.doi.org/10.1016/S0022-5347\(01\)65543-5](http://dx.doi.org/10.1016/S0022-5347(01)65543-5)
14. Teixeira CBB, Cançado MAP, Carvalhaes JTA. Refluxo Vesicoureteral primário na infância: tratamento conservador versus intervenção cirúrgica. *J Bras Nefrol* 2014;36:10-7
15. Meneses RP, Braga D, Melamed SCV, Andrade L. Tratamento das disfunções do trato urinário inferior. *J Parana Pediatr* 2010;11:76-81.