RECURRENT URINARY TRACT INFECTIONS IN CHILDREN WITH SECONDARY VESICOURETERAL REFLUX - STUDY OF 10 CASES

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Abstract

Recurrent urinary tract infection (UTI) raises a question mark regarding the anatomy and functionality of urinary apparatus of the child. (1)

Recurrent UTIs are common in children with renal malformations. Proper treatment can prevent or at least slow down the destruction of the renal parenchyma of the child until the renal abnormalities are, if possible, resolved. (2)

We will try to present a study on a small group of children with recurrent UTIs and secondary VUR, which releases secondary reflux, due to bladder diseases.

Due to a study conducted over a period of 3 years, we found that bladder dysfunction of different causes may maintain VUR, and recurrent UTIs proper treatment helps maintain normal kidney function. Bladder dysfunction may be primary or secondary.

Conclusion: Secondary VUR maintain recurrent urinary tract, and their correct treatment slows down the kidney destruction.

Key words: recurrent UTIs, secondary VUR, child

Introduction

Urinary tract infections are one of the most common infections of the childhood. It is a child's grief, a concern for parents, and may cause permanent kidney damage.(1)

Primary vesicoureteral reflux represents an alteration idiopathic uretero-vesical with junction structure.(2)

Well known is also the association of vesicoureteral reflux with urinary tract infection and the occurrence of secondary nephropathy characterized by renal scarrs and secondary cortical atrophy, called reflux nephropathy. The natural evolution of VUR cases associated with UTI is a well known cause of chronic kidney failure. There are some contradictions known regarding vesicoureteral reflux therapeutic attitude between the pediatricians and surgeons pediatrics, coming not from the interpretation of literature data, but probably from the existence of a case law, very heterogeneous as a personal history.

Neurological dysfunction of the bladder (neurogenic bladder) is the result of congenital or acquired diseases affecting the bladder in nervation. The most common cause of neurogenic bladder in children is the myelomeningocele and spina bifida. Traumatic pathology can not be ignored but it is less relevant than in adults, due to occupational particularities. Another important pathology is the iatrogenic after pelvic interventions in the post operatory child.

The impossibility to ensure the storage function is explained either by hypertonicity of detrusor with bladder instability or bladder incompetence. Failure of emptying is caused either by sphincter hypertonicity or by the inability of detrusor contraction. These characteristics of neurogenic bladder can be objectified by urodynamic studies to guide therapeutic indication. Yet, in our country urodynamic studies can not be performed.

PUVs (Posterior Urethral Valves) occur exclusively in males (fig 1). The homolog to the male verumontanum from which the valves originate is the female hymen.(4)

PUVs are usually diagnosed before birth or at birth, when a boy is evaluated for antenatal hydronephrosis. Before the era of prenatal ultrasonography, PUVs were discovered during evaluation of urinary tract infection (UTI), voiding dysfunction, or renal failure.(3)

Vesicoureteral reflux is present in one half of male patients with a posterior urethral valve and is often thought to be physiologic, with high bladder pressures overcoming the competence of the ureterovesical junction. Reflux may also be anatomic, secondary to abnormal ureteral orifice position resulting from abnormal ureteral bud development during embryogenesis. (3)

Objectives

During this study we tried to follow certain cases in order to prove that everything is done to protect future adult kidney.

We tried to prove that medical management, and implicitly correct treatment of recurrent urinary tract infections, is the only correct treatment in these complex cases. Surgery is reserved only for cases with malformations of urinary system.

Material and method

The clinical-statistical study has been performed within The Pediatric Clinic of the Clinical Hospital „Sfânta Maria" Iaşi.

There were 10 children aged 6 months to 10 years old, with an equal incidence to the area of origin, but with a different provision towards the cause of releasing vesicoureteral reflux.

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Fig .1. Anteroposterior view of the abdomen during a voiding cystourethrographic study. This image demonstrates bilateral grade 4 vesicoureteral reflux. No intrarenal reflux is noted, at child with PUV. (3)

We folowed:

1. Epidemiology of secondary causes of VUR
2. Proper diagnosis of urinary tract infections
3. Monitoring of renal functions
4. Correct treatment of recurrent UTI episodes
5. Physical and psychological means to educate the future adult.

There were cases of posttraumatic neurogenic bladder, through myelomeningocel operated, or unstable bladder syndrome, and 2 cases of posterior urethra valve.

In all cases recurrent UTI led to the establishment of investigations on the association of vesicoureteral reflux, proving once again their association.

Cases were all monitored on a clinical, laboratory, biological and radiological data.(1)

Results

10 cases were studied over a period ranging from 1 to 4 years, from 2003 until 2007.

There were 8 girls and 2 boys, aged 6 months to 10 years old (table 1).

Area of origin was easily dominated by urban (table 2).

Secondary vesicoureteral reflux was facilitated by these diseases (table 3).

Table 1.

Age	0-1 years	1-3 years	4-7 years	More than 7 years
No of cases	3	2	4	1

Table 2.

Urban	**Rural**
6	4

Table 3.

Neuromuscular dysfunction	4
Neurogenic bladder incontinent type	1
Traumatic neurogenic bladder	1
Postoperative neurogenic bladder	2
Posterior urethral valve	2

Biochemistry analysis

Biochemical analyses showed 7 patients with an association of intrainfection anemia in 100% of cases, also the presence of inflammatory tests positive in 50% of cases (table 4).

Pyuria is present in urine tests from all 10 cases during the flare, and the flare-ups who periodically returned, (5)unable to establish favorable conditions (table 5).

Table 4.

No of cases	Normal	High	Low
Hemoglobin			10
No leukocytes		10	
No platelets	10		
Blood urea	10		
Blood Creatinine	10		
Calcium	10		
Blood sedimentation rate	4	6	
FIibrinogen	6	4	
C-reactive protein	6	4	
Total protein	4		

Table 5.

No of cases	Present	Absent
Pyuria	10	-

As an etiology, we found in all cases many types of germs, which shows heterogeneity causes of these infections, and the need to respect rigorous hygiene measures (table 6).

Table 6.

E coli + Enterobacter	1
E coli + candida	1
E coli + pseudomonas	1
Enterobacter + Klebsiella + group D streptococcus	1
E coli + pseudomonas + Klebsiella + Enterobacter	1
Enterobacter + candida + mixed flora	1
Proteus + Klebsiella + enterococcus + mixed flora	2

In all cases, antibiotic treatment was perforemd, according to antibiogram, initially intravenously for 1 to 3 days in order to improve the general condition, and then orally until 10 to 14 days, depending on the severity.(6)

Besides antibiotic treatment,a major role was played by other adjuvant methods (table 7).

Table 7.

Adjuvant methods	No of cases
Fluid consumption 1.5 l liquid / day	10
Correct clining of external genital organs	10
Control monthly urine culture	10
Urine culture if fever	10
Complete evacuation of the bladder and at regular intervals	10
Bladder catheterization	1
Driptane treatment	8
Anemia treatment	10
Combating constipation	10
kinetotherapy and physiotherapy	6

On the 2 children with posterior urethral valve, resection was performed on the posterior urethral valve, and was found a significant improvement in reflux, especially since they were monitored during 1 year (they did not come for the follow-up, for reasons we do not know), and they had no episodes of UTI.

In other cases both children were monitored, and there was no improvement in reflux, although adjuvant methods were used.

Discussions

Secondary vesicoureteral reflux is a serious disease, usually associated with other diseases that alter the general condition of the child, the future adult.

In this paper we tried to show that proper treatment of urinary infections allowed a normal renal function during the follow-up. Vesicoureteral reflux association aggravates long-term prognosis of children. Surgical treatment of two cases with posterior urethral valve, allowed a considerable

decrease of vesicoureteral reflux (from grade IV to grade II), and therefore it stopped urinary infections and the appearance of new renal scarrs and secondary reflux nephropathy.

We have noticed that under prolonged treatment with antibiotics for recurrence prevention of urinary infections it did not improve vesicoureteral reflux in other cases, the clinical conditions did not permit antireflux surgery on children.

In these circumstances, in order to establish a long-term prognosis of future adult, it has been tried a medical manangement. It has also been tried a proper treatment for all urinary infections and adjuvant methods correctly specified.

Conclusions

1. All cases had monitored secondary VUR and UTI.
2. Area of origin was easily dominated by urban, feminine sex were dominant in 80% of cases. Male was present in the 2 children with posterior urethra valve.
3. The etiology of urinary tract infections is multiple and still dominated by E coli.
4. Urinary tract infections treated appropriately according to antibiogram were protected during monitoring renal function, preventing reflux nephropathy in 9 of 10 cases.
5. Cases resolved surgically improved VUR, and UTI has not been revealed.
6. In these complex medical cases associated with vesicoureteral reflux, medical management is the only possibility for the time being.

References

1. Kanwal K Kher, H William Schnaper, Sudesh Paul Makker. *Clinical Pediatric Nephrology*. Ed. a 2-a, Informa Healthcare, Milton Park, 2007 p.713 -720
2. Bâscă Ion. *Refluxul vezico-ureteral la copil*. Editura Ştiinţifică, Bucureşti, 1998 p.87-90
3. Horowitz M, Harel M, Combs A, Glassberg K. *Surveillance cystoscopy in the management of posterior urethral valves*. J Urol. Apr 2009;181:172.
4. Tietjen Douglas N., GLOOR James M., Husmann Douglas A. *Proximal Urinary Diversion in the Management of Posterior Urethral Valves: Is it Necessary?* The Journal of Urology, Volume 158, Issue 3, September 1997, p. 1008-1010
5. Anderson JD, Chambers GK, Johnson HW. *Application of a leukocyte and nitrite urine test strip to the management of children with neurogenic bladder*. Diagn Microbiol Infect Dis. Jul 1993;17(1):29-33.
6. Merguerian PA, Sverrisson EF, Herz DB, McQuiston LT. *Urinary tract infections in children: recommendations for antibiotic prophylaxis and evaluation*. An evidence-based approach. Curr Urol Rep. Mar 2010;11(2):98-108.

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