Main topic

Treatment of vesicoureteral reflux in children by endoscopic injection of Teflon

Review of 3 1/2 years’ experience

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Abstract. From November 1986 to April 1990, 326 refluxing ureters in 197 children were treated by endoscopic injection of Teflon paste. Complications were observed in only 3 cases: 1 child had immediate bilateral ureteral stenosis requiring surgery at 48 h. In 1 case it was impossible to probe 1 ureteral orifice after injection, and Cohen reimplantation was immediately performed; in a 3rd case ureteral dilatation occurred 1 year later without anatomic stenosis at surgery. Three hundred twenty-two ureters were examined after 1 month: reflux had disappeared in 286 (88.82%). The stability of these results after one injection was verified 1 year later for 179 ureters: recurrence of reflux was observed in 19 cases (10.60%); 21 non refluxing ureters were again examined 2 years later: reflux reappeared in 2 cases. Analysis of the midterm results showed that failure was observed in 17.31% of cases of primary reflux and 19.04% of malformative or secondary refluxes. It was more significant in grade IV or V (21.11%) than in grade I–III (16.85%) reflux. Of the 57 immediate or secondary residual refluxes, 10 were followed and 2 spontaneously disappeared, 24 underwent successful surgical reimplantation, and 23 had a repeat injection with 22 successes and only 1 failure that was secondarily cured by surgery. Overall, reflux disappeared after one or two injections in 165 children (83.25%).

Key words: Endoscopic Teflon injection – Vesicoureteral reflux

Introduction

The concept of endoscopic treatment of vesicorenal reflux in adults was presented for the first time in 1981 by Matouschek [9]. In 1984 O’Donnell and Puri [11, 14] presented an experimental study in pigs and for the first time treated vesicorenal reflux in children by endoscopic injection of Teflon paste. Among the subsequent studies, those of Schulman et al. [16] greatly contributed to the development of this technique.

It is known that vesicorenal reflux is linked to shortness of the intravesical course of the ureter, an abnormally large ureteral orifice, poor anchorage of the ureter to the trigone, and trigonal laxity. Endoscopic injection of Teflon paste modifies the morphology of the ureteral orifice, improves the anchorage of the ureter, and confers better posterior support, against which the action of the intravesical pressure on the terminal ureter is strengthened. We report our experience in 197 children presenting with 326 refluxing ureters.

Materials and methods

From November 1986 to April 1990, 326 refluxing ureters in 197 children (167 girls and 30 boys) were treated by endoscopic injection of Teflon paste. Reflux was unilateral in 68 children and bilateral in 129. The average age was 4 years (2 months–17.5 years) (Fig. 1). Thirty-one type I refluxes were treated, always associated with more pronounced contralateral reflux; 104 type II without distensibility on cystography and no radiological sign of pyelonephritis; 140 type III where one of these signs was present; 46 type IV with ureteropyelocaliceal dilatation on intravenous urography; and only 5 type V (megadolichoureter with reflux). Two hundred eighty-four refluxes were primary (87.11%) and 42 malformative or secondary: 14 complete pyeloureteral duplications, 15
vesical immaturities or vesicosphinchteric dyssynergies, 8 surgical reimplantation failures, 2 refluxes in neurogenic bladders, 2 bladder extrusions, and 1 ureteral valve (Fig. 2).

Endoscopic treatment was always performed during caudal anesthesia after verifying that the urine was sterile. Teflon paste was used without supplementary dilution. For injection of Teflon, we used a flexible Ch 5 catheter inserted into a Ch 14 cystoscope (Storz).

The quantity of Teflon used varied from 0.02 to 2.5 ml, but in over 80% of cases it ranged from 0.20 to 0.35 ml; at present, the average is 0.30 ml. It has markedly increased with experience due to the secondary resorption of glycerine, which accounts for 50% of the product. Verification of permeability after injection was done by means of an ureteral catheter, which was possible in most cases. The disappearance of reflux was always checked immediately on the operating table by cystography in the first 130 cases; echography at 24 h revealed ureteral expansion, considered slight in 10 of the 130 cases and marked in 7 (3 of these 17 ureters presented with relapsing reflux at 1 month). At present these examinations are no longer done, and children can return to their families 6 h after injection.

Results

Immediately after endoscopic treatment no pain was noted. Three children presented with an infection of the lower urinary tract: 1 child had an episode of pyelonephritis and in another macroscopic hematuria resolved quickly within 24 h. One child had immediate bilateral ureteral stenosis with anuria requiring surgery after 48 h (in retrospect the indication was poor, obstructive megaureter with reflux). In a 2nd case it was impossible to probe 1 ureteral orifice after injection, and Cohen reimplantation was immediately performed. In a 3rd child ureteral dilatation occurred 1 year later after initial good results, without anatomic stenosis at surgery.

Three hundred twenty-two ureters were examined by cystography and echography at 1 month. Reflux had disappeared in 286 (88.82% of cases) and failure was observed in 36 (11.18%). The stability of results after one injection was checked 1 year later for 179 non refluxing ureters. Recurrence of reflux was observed in 19 cases (10.60%); 21 ureters were controlled 2 years later and reflux had reappeared in 2 cases. In all, immediate and secondary residual refluxes were observed in 57 cases (17.70%). Analysis of these midterm results disclosed some significant features: failure (Fig. 3) is less frequent in primary than in secondary refluxes (17.31% and 19.04%). Among these, we noted 5 of 14 complete duplications. Failure also depended on the type of reflux: 12.90% for type I, 15.53% for type II, 18.71% for type III, and 21.11% for types IV and V. With experience, results have improved: immediate and secondary failure was observed in 42.86% of 14 cases in 1986, 21.35% of 89 cases in 1987, 17.05% of 129 cases in 1988, and 9.68% of 62 cases in 1989 (Fig. 4).

Treatment of the 57 immediate or secondary residual refluxes was variable. Ten type I or II were followed by echographic monitoring and cystography, and 2 spontaneously disappeared; 23 had a repeat injection, with 22 successes and 1 failure that was cured by surgery; 24 underwent successful surgical reimplantation. Overall, the vesicorenal reflux disappeared after one or two injections in 165 children (83.25%); 22 were successfully cured by the Cohen procedure (11.22%); and 9 are still being observed.

Discussion

Failures may be due to a technical error if the injection is poorly centered in relation to the intravesical course of the terminal ureter, injected too deeply so that the product disappears into the extravesical space, injected too superficially so that the product emerges into the ureteral lumen, or insufficient quantity of the product is used. Failure may also be due to unfavorable anatomic factors: complete absence of the submucosal course, a large juxtaureteral diver-