



Two-Stage Operative Treatment of Primary Obstructive Megaureter in Children

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Abstract

Purpose: The management of primary obstructive megaureters has evolved regarding time of operative intervention, type of intervention as well as one stage or two stage operative treatment (cutaneous ureterostomy and then ureteral reimplantation or only ureteral reimplantation), open or laparoscopic approach or even robotic. There is no standard approach and various operative techniques and modes of treatment are described. The purpose of this study was to present experience with two-stage operative treatment of primary obstructive megaureter in children.

Materials and Methods: Over the last 10 years 17 children (14 boys and 3 girls) underwent two-stage operative treatment of primary obstructive megaureter. The first stage of surgical treatment included creation of Williams ureterocutaneostomy. The indications for ureterocutaneostomy were as follows: progressive dilatation of ureter as estimated ultrasonographically, together with progressive deterioration of split renal function with significant obstruction as estimated on radionuclide scan. The second stage of operative treatment included simultaneous Politano-Leadbetter ureteral reimplantation (in 8 with additional remodeling of the ureter using Kalicinski plication) and closure of ureterocutaneostomy.

Results: In all 17 children follow-up studies (ultrasound and radionuclide examinations) showed gradually decrease of dilatation of urinary tract together with constant improvement in renal function and renal drainage. In 5 out 17 children (all without plication) high grade vesicoureteral reflux was noted postoperatively. In 2 repeated ureteroneocystotomy was done, in 3 endoscopic correction was performed resulting in reflux resolution.

Conclusions: Our experience with staged method of operative treatment of primary obstructive megaureter has been favorable. Surgical intervention in selected cases of megaureter still is valuable option.

Keywords: Primary obstructive megaureter, Ureteral reimplantation, Ureteral folding; Ureteroneocystotomy

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Introduction

Megaureter is a nonspecific term implying a spectrum of anomalies associated with grossly dilated diameter of ureter (i.e. ureters wider than 7 mm to 8 mm). Management of megaureter in children classified as obstructive, refluxing and non-obstructive, non-refluxing according to its etiology, still is challenging [1,2]. The majority of congenital megaureters can be managed conservatively with spontaneous remission rates of up to 85% in primary megaureters. However, there is a group of patients, especially with the primary obstructive megaureter, who require operative treatment. Surgical management is generally indicated in cases with recurrent urinary tract infections coexisting with megaureter, deterioration of renal function and significant obstruction. Data suggest that children with a ureteric diameter more than 10 mm to 15 mm are more likely to require intervention [1-5]. We present our experience with two-stage operative treatment of primary obstructive megaureter in children.

Material and Methods

Over the last 10 years 17 children (14 boys and 3 girls) underwent two-stage operative

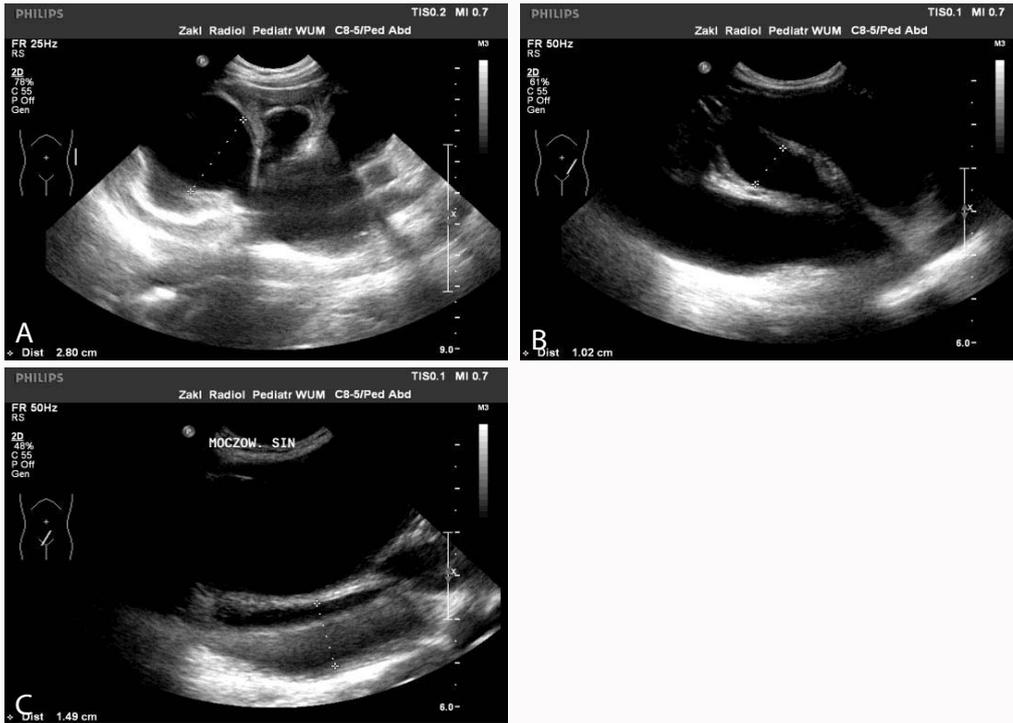


Figure 1: A,B,C: US: grossly dilated renal collecting system, left ureter dilated, elongated.

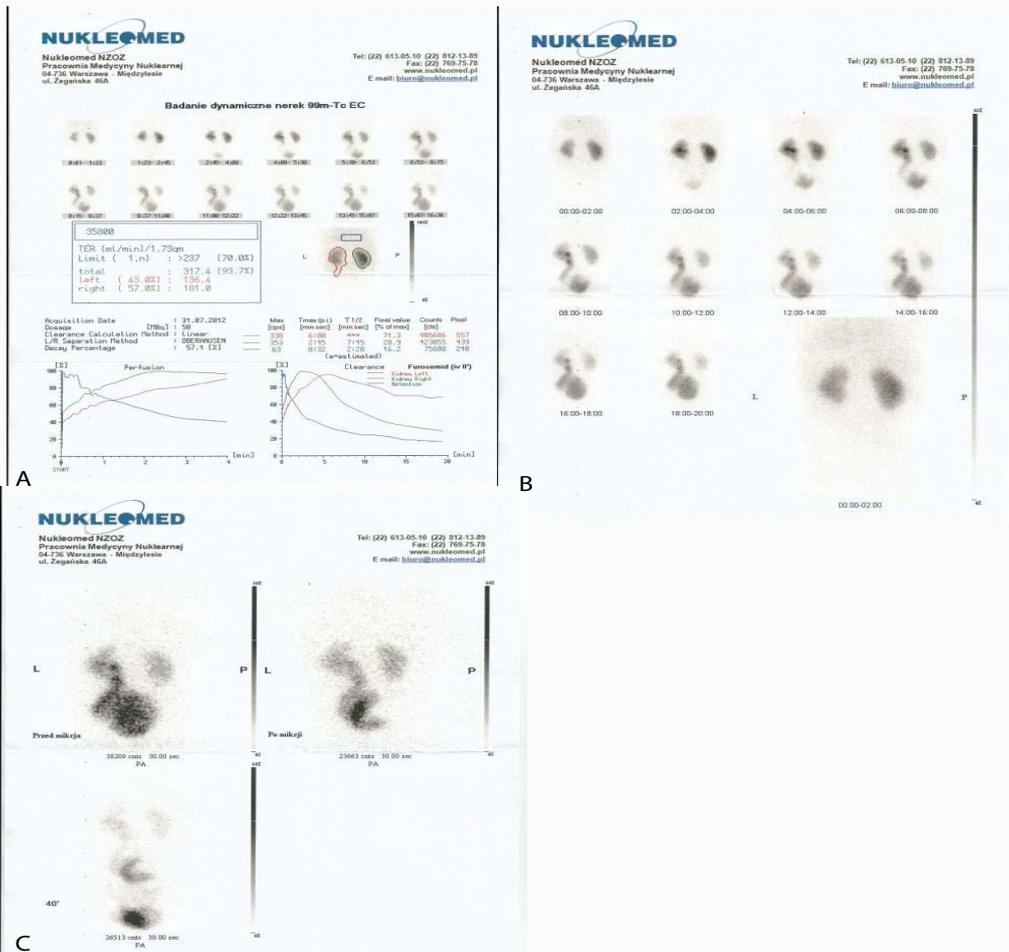


Figure 2: A,B,C: Dynamic scintigraphy: obstructive curve of renogram.



Figure 3: A,B: Williams ureterocutaneostomy.

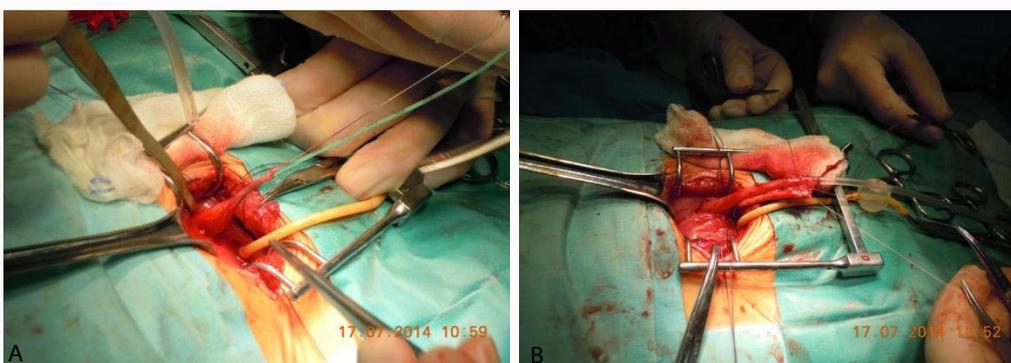


Figure 4: A: Intraoperative view: stenotic distal part of megaureter. B: Intraoperative view: ureteral folding (Kalicinski technique).

treatment of primary obstructive megaureter. At the same period of time almost 80 children were managed conservatively because of obstructive megaureter. Ultrasound examination, radionuclide study, i.e. dynamic scintigraphy, Voiding Cystourethrography (VCUG) as imaging studies and urodynamic study constitute the diagnostic algorithm. The first stage of surgical treatment included creation of Williams ureterocutaneostomy. The indication for ureterocutaneostomy were as follows: progressive dilatation of ureter as estimated ultrasonographically, i.e. more than 1.5 cm in diameter; in majority of patients the diameter of ureter was wider than 2 cm to 2.5 cm (Figure 1A,B,C) together with progressive deterioration of split renal function with significant obstruction as estimated on radionuclide scan (Figure 2A,B,C). Williams ureterocutaneostomy (Figure 3 A,B) was done at a mean age 1.6 years (ranged 0.3-4.6), including 10 children less than 1 year of age. Then each child was controlled ultrasonographically and underwent control radionuclide scan 6 and 12 months after stomy creation. The second stage of operative treatment included simultaneous Politano-Leadbetter ureteral reimplantation (in 8 with additional remodeling of the ureter using Kalicinski plication) and closure of ureterocutaneostomy (Figure 4A,B). The final operation in 16 children was performed at mean 1.8 year after the first stage (ranged 0.8-2.4) and in the remaining one exceptionally after 4.1 years.

Results

Postoperative follow-up ranged from 1 year to 10 years. All children underwent VCUG 6 months after ureteral reimplantation. In 5 out of 17 high grade vesicoureteral reflux, i.e. VUR grade IV or V was noted (Figure 5): In 2 (both patients operated almost 10 years ago) repeated ureteroneocystostomy was done, in other 3 (operated during

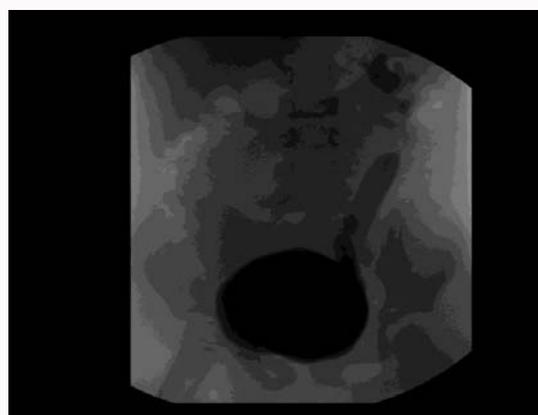


Figure 5: Postoperative VCUG: grade IV reflux.

last years) endoscopic correction using polyacrylate-polyalcohol copolymer (PPC, Vantris®) as a bulking agent was performed resulting in reflux resolution (Figure 6A,B). In all 17 children postoperative studies (ultrasound and radionuclide examinations) performed every 6 months within first 2 years of follow-up and later based on individual basis, showed gradually decrease of dilatation of urinary tract together with constant improvement in renal function and renal drainage.

Discussion

The management of primary obstructive megaureters has evolved regarding time of operative intervention, type of intervention as well as one stage or two stage operative treatment (cutaneous ureterostomy and then ureteral reimplantation or only ureteral reimplantation),

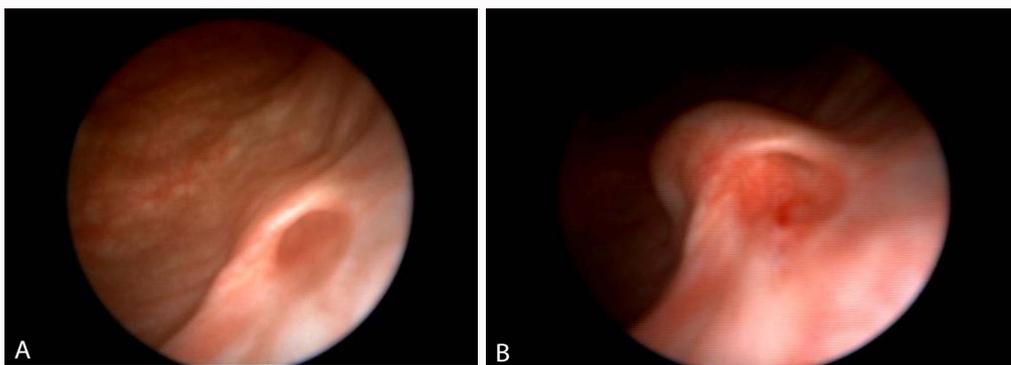


Figure 6: A: Refluxing ureteral orifice after ureteral reimplantation because of primary obstructive megaureter. B: Ureteral orifice after injection of polyacrylate-polyalcohol copolymer.

open or laparoscopic approach or even robotic. There is no standard approach and various operative techniques and modes of treatment are described [1,2, 6-12]. Over the last years also new types of less invasive interventions were described, i.e. temporary double-J stenting, endoscopic balloon dilatation, endoureterotomy [13-16]. Operative reimplantation of dilated ureter is technically demanded. It can be achieved by either intravesical, extravesical or combined approach. Straightening of the ureter and usually ureteral tapering is necessary to achieve proper diameter for an antireflux procedure [1,2]. Several tailoring techniques were described, including plication or infolding, or excisional tapering [17-19]. As method of ureteral reimplantation generally for intravesical approach Politano-Leadbetter technique is chosen [2]. All our patients were operated using open Politano-Leadbetter technique, and in cases of grossly dilated distal ureter despite the decompression of the upper urinary tract by ureterocutaneostomy, ureteral folding technique according to Kalicinski method was used. In all 8 children after plication no vesicoureteral reflux was noted in control VCUG. In the remaining 9 only ureteral implantation was performed without ureteral folding, because the diameter of the ureter was estimated intraoperatively as suitable to achieve successful ureteroneocystostomy without any distal ureter remodeling. Among these 9, in 5 postoperative VCUG showed high grade postoperative reflux. Postoperative reflux and stenosis of ureteral orifice with subsequent obstruction are well known complications after operative treatment of primary obstructive megaureter, however the incidence of above complications are estimated to be low [1,2,6,7,9,10]. Generally, low grade persistent reflux is scheduled for further observation and any obstruction or stenosis at the vesicoureteral junction is managed operatively. No ureteral obstruction was seen in our patients, 2 of 5 operated almost 10 years ago, repeated ureteral reimplantation was done because of postoperative high grade reflux, in the remaining 3 reflux was corrected successfully endoscopically. There is also still under debate treatment strategy of the primary obstructive megaureter. In 2014 in Journal of Pediatric Urology was published a peer-reviewed consensus guideline of British Association of Paediatric Urologists for the management of the primary megaureter [6]. This paper presents the wide spectrum of options how to manage megaureter in children. In conclusion our experience with staged method of operative treatment of primary obstructive megaureter has been favorable. Surgical intervention in selected cases of megaureter still is valuable option.

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