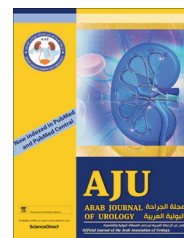




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The embedded nipple: An optimal technique for re-implantation of primary obstructed megaureter in children



Tamer M. Abou Youssif*, Ahmed Fahmy, Hazem Rashad, Mohammed Adel Atta

Department of Urology, Faculty of Medicine, Alexandria University, Alexandria, Egypt

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KEYWORDS

Primary obstructed megaureter;
Ureteric re-implantation;
Reconstructive urology

ABBREVIATIONS

DRF, differential renal function;
DTPA, diethylene-triamine-penta-acetic acid;
HUN, hydrouretero-nephrosis;
POM, primary obstructive megaureter;

Abstract Objectives: To present a novel ureteric re-implantation technique for primary obstructed megaureter (POM) that ensures success in the short- and long-term, as conventional techniques are not ideal for megaureters especially in children, with ureteric stenosis and reflux being common complications after re-implantation.

Patients and methods: Between 2009 and 2012, 22 paediatric patients with POM were enrolled. We performed a new technique for re-implantation of these ureters to ensure minimal incidence of ureteric strictures and easy subsequent endoscopic access. We performed follow-up voiding cystourethrography (VCUG) at 6 months postoperatively.

Results: The cohort comprised 14 boys and eight girls, with a median age of 22 months. Six patients underwent bilateral re-implantation. The mean (range) duration of indwelling ureteric catheterisation was 7.8 (4–14) days. There were no complications in the perioperative and postoperative periods. There was no reflux on follow-up VCUG in any of the patients. One patient developed Grade I reflux after 1 year and presented with a urinary tract infection. Diagnostic cystoscopy was performed in 13 patients showing that the nipple was directed similarly to the native ureteric orifice.

* Corresponding author. Tel.: +20 1115893444; fax: +20 34873076.

E-mail address: tamer.abouyoussif@alexmed.edu.eg (T.M. Abou Youssif).

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US, ultrasonography/
ultrasound;
UTI, Urinary tract
infection;
VCUG, voiding
cystourethrography

Conclusion: The embedded-nipple technique for re-implantation of POM guarantees successful results and permits easy subsequent ureteroscopic access when needed.

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Introduction

The abnormally dilated ureter (megaureter) is classified as: refluxing megaureter, obstructed megaureter, non-refluxing non-obstructed megaureter, or megaureter with obstruction and reflux [1]. It is a clinical problem in both children and adults. Primary obstructive megaureter (POM) is due to abnormal peristalsis of the distal ureter that creates a functional obstruction. Most of these megaureters are treated conservatively, but surgical intervention for such refluxing or obstructed ureters is frequently indicated when febrile UTI or pain occur, or when there is progressive hydronephrosis or deterioration of split renal function [2].

Conventional techniques for tunnelling re-implantation are not feasible in these intact large ureters, especially in young children, because it is difficult to achieve a 5:1 tunnel length to width ratio as recommended [3,4]. Submucosal tunnelling can be used in these dilated ureters only after remodelling of the ureter via trimming or folding to an acceptable width suitable for tunnelling. As tailoring carries the risk of jeopardising the blood supply of the ureter, preservation of the adventitia is suggested. Plication can be improved by tapering the ureter over a catheter by the placement of horizontal mattress sutures and the excess ureter folded on itself. Extravesical submucosal implantation of the intact dilated ureter has been tried with acceptable long-term results. Although, all these reports show successful results with low complication rates the proposed techniques are surgically cumbersome, especially in the relatively small bladder of children [5].

To date, an optimal procedure for re-implanting POM is not available. The present study proposes a novel technique that might be ideal, as shown by the short- and intermediate-term follow-up data. The objective of the present study was to describe a novel anti-reflux technique for POM and review the perioperative outcomes and complications of this technique performed at our institution.

Patients and methods

After approval by the Institutional Review Board of the Alexandria Main Hospital at the Faculty of Medicine, the electronic records for 22 paediatric patients with POM between 2009 and 2012 were evaluated. The chief

complaint was abdominal pain associated with recurrent febrile UTI.

Preoperative studies included: renal ultrasonography (US), voiding cystourethrography (VCUG), diethylene-triamine-penta-acetic acid (DTPA) diuretic renogram, and in some MRI was also performed. Renal US was used to measure the diameter of renal pelvis and distal ureter, and the characteristics of the renal parenchyma. The hydronephrosis (HUN) grade was defined according to the guidelines of the Society of Fetal Urology. VCUG was performed to exclude VUR.

The diagnosis of POM was made according to the following: a distal ureter diameter of > 10 mm, a DTPA diuretic renogram showing an obstructed curve, and no VUR on VCUG. The indications for surgery were a combination of clinical, US, and DTPA findings. Break-through febrile UTIs in those patients under antibiotic prophylaxis were clinical criteria indicating surgery. Worsening HUN and/or a thinned out parenchyma were the US criteria for surgical intervention. Impairment of > 10% of differential renal function (DRF) or a DRF of < 40% were the criteria on DTPA findings for indicating surgery. Exclusion criteria included age of < 1 year, presence of neurogenic bladder, and redo ureteric re-implantation.

Operative technique

All patients were operated upon under general anaesthesia. The technique described in the study involves dissection of the ureter down to the vesical end, where it is separated and brought anterior to the vas deferens in male or round ligament in female patients. The ureter is drawn into the bladder through the detrusor muscle using a splitting puncture, rather than detrusor cutting, allowing the formation of a new hiatus. The new hiatus is made in the bladder wall as close to the bladder base as possible using dissecting forceps. The planned nipple is designed with a length to width ratio of 2:1. A fixing suture is taken passing through the bladder wall, base of the ureter and its distal edge after spatulation of the intravesical ureter opposite to the suture to its middle, and the suture is then tied (Fig. 1).

A raw area in the bladder wall opposite and equal to the nipple is made using diathermy (Fig. 2). A transverse embedding suture is started at the base of the nipple passing through the following structures in sequence:

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