Journal of Pediatric Urology (2014) 10, 1089—1094

Journal of Pediatric urology

Laparoscopic ureteral ligation (clipping): A novel, simple procedure for pediatric urinary incontinence due to ectopic ureters associated with non-functioning upper pole renal moieties

R.L.P. Romao [a,b], V. Figueroa [a], J.L. Pippi Salle [a], M.A. Koyle [a], D.J. Bägli [a], A.J. Lorenzo [a,*]

[a] *Division of Urology, The Hospital for Sick Children and University of Toronto, 555 University Avenue, Toronto, Ontario, Canada M5G 1X8*
[b] *Division of Urology, IWK Health Centre and Dalhousie University, Halifax, Nova Scotia, Canada*

Received 24 November 2013; accepted 22 April 2014
Available online 9 May 2014

KEYWORDS
Urinary incontinence;
Ectopic ureter;
Laparoscopy;
Ureteral ligation;
Children

Abstract *Objective:* A simplified approach for the surgical management of symptomatic ectopic ureters, associated with a non-functioning upper moiety, with laparoscopic ureteric clipping is presented in this research paper.
Materials and methods: Prospectively collected data on nine consecutive girls with ectopic ureters associated with urinary incontinence who underwent laparoscopic clipping between February 2011 and December 2013. Surgical technique consisted of cystoscopy and insertion of ureteral catheter in the lower pole ureter to aid in identification and clipping of the ectopic ureter, which was achieved by standard trans-peritoneal laparoscopy.
Results: Median age was eight years (range 4—17 years). Diagnosis was based on clinical findings, which were supported by: ultrasound (US), nuclear scans and magnetic resonance urography in Cases 9, 8 and 5, respectively. Bilateral complete duplication was present in two patients; the combination of cystoscopy and laparoscopy allowed adequate identification of the ectopic ureter causing incontinence in both. All nine patients were immediately dry after surgery and remain asymptomatic after a maximum follow up of 27 months. Eight out of nine patients had developed some degree of asymptomatic upper pole hydronephrosis on follow-up US.

* Corresponding author. Tel.: +1 416 813 6465 (office); fax: +1 416 813 6461.
E-mail addresses: armando.lorenzo@sickkids.ca, AJLMD@aol.com (A.J. Lorenzo).

http://dx.doi.org/10.1016/j.jpurol.2014.04.008

Conclusion: Laparoscopic clipping holds promise as a simple alternative to other more-complex surgical procedures in the treatment of incontinence due to an ectopic ureter. Despite favorable and encouraging initial results, further follow up is warranted in order to determine the fate of expected associated upper-pole hydronephrosis.

Introduction

The ideal surgical approach to ectopic ureters, associated with a poorly or non-functioning upper moiety, in girls presenting with persistent urinary incontinence is controversial. While some authors choose an upper urinary-tract approach, i.e. upper pole heminephrectomy, others prefer a lower-tract strategy such as distal uretero-ureterostomy; both techniques are amenable to open or minimally invasive procedures [1—4]. Although both are safe and effective interventions, there are important associated complications, morbidity and potential risk of damaging the ipsilateral functioning lower moiety. Undoubtedly, a simplified procedure with quicker recovery and lower morbidity would be a welcome addition to the armamentarium of surgical options.

In a seemingly unrelated topic, Timsit et al. (2010) reported a prospective experience with routine end-to-end pyelo-ureterostomy to the native distal ureter as the urinary reconstruction of choice for consecutive patients (both adult and children) undergoing renal transplantation [5]. These authors and others have shown that, contrary to what would be expected, high-risk immunosuppressed patients in whom the native proximal ureter is simply ligated without conducting a concurrent nephrectomy (i.e. leaving behind a poorly functioning obstructed system) did not experience subsequent urinary tract infections, and were seldom symptomatic [6,7]. Based on this concept, in the current study, it was hypothesized that otherwise healthy girls with urinary incontinence due to an ectopic ureter associated with a non-functioning upper moiety would also be candidates to simple laparoscopic ureteral clipping; a procedure that is technically less demanding than the aforementioned ones, does not carry any associated morbidity to the functioning lower pole and provides resolution of continuous urinary incontinence. Herein, the preliminary experience with this technique is reported.

Materials and methods

After obtaining Ethics Board approval, a descriptive case series of nine consecutive female patients, from two pediatric referral centers in Canada, who underwent laparoscopic ureteral clipping for ectopic ureters associated with a non-functioning upper moiety was compiled. The procedure was conducted after fully informed consent, which was secured after explaining the rationale for this novel approach and providing the existing literature to substantiate it. All patients presented with persistent urinary incontinence and had subsequent confirmation of a duplication anomaly with loss of upper pole function and absence of an associated ureterocele. The following data were prospectively collected: Age at surgery; imaging studies performed; affected side; intraoperative findings and complications; post-surgical outcomes (including resolution of incontinence, urinary tract infections, pyonephrosis or development of flank pain); length of hospital stay; presence and degree of postoperative hydronephrosis; and length of follow up.

Surgical technique

All procedures began with cystoscopy in the lithotomy position. After examining the vulva and introitus for evidence of ureteral ectopia, the urethra was carefully examined. The trigone area was then assessed to determine the number and location of intravesical ureteric orifices. The external genitalia and urethra were surveyed and probed with a guide wire in an attempt to identify the ectopic ureteric opening. A 4 or 5 French open-ended or whistle tip ureteral catheter was then advanced into the lower pole ureter of the presumably affected side, under fluoroscopic guidance. In cases where bilateral duplication was suspected, based on preoperative imaging, ureteral catheters were inserted on both sides. The ureteral catheter(s) were then secured to an indwelling Foley catheter.

Subsequently, the patient was repositioned in supine or kept in the low lithotomy position (depending on preference for access to the external genitalia and option to repeat cystoscopy). Standard laparoscopy was then performed with a 5 mm camera and two additional 3—5 mm working ports. Initial access was placed at the umbilicus for 10—12 mm Hg CO_2 insufflation and visualization through a 0—30° camera. Two other ports were then inserted around the mid-clavicular line at the level of the umbilicus, a configuration that can be selectively adjusted based on body habitus, planning for optimal triangulation towards the affected side.

Upon laparoscopic inspection of the pelvis, with the patient in slight Trendelenburg position and contralateral tilt, it was possible to visualize the ureters at the crossing point anterior to the iliac vessels. The ureter harboring the ureteral catheter was then identified and spared, while the ectopic ureter was dissected free in a distal direction, clipped twice with either non-absorbable polymer locking (WECK® Hem-o-loks®) or titanium clips, and transected. The key steps of the surgical technique are briefly illustrated in the enclosed video.

Supplementary data related to this article can be found online at http://dx.doi.org/10.1016/j.jpurol.2014.04.008

In cases where the side of the ectopic ureter was equivocal, particularly in the presence of bilateral duplication, a surgical maneuver is worth highlighting: location