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Early outcome following diathermy versus cold knife ablation of posterior urethral valves

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KEYWORDS
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Abstract *Objective:* To compare early outcomes following diathermy versus cold knife ablation of posterior urethral valves (PUV).
Methods: All neonates and children who underwent primary ablation of PUV between January 2004 and March 2011 were included. Primary ablation was performed using an 8.5 resectoscope, with either diathermy hook (Group I) or sickle-shaped cold knife (Group II). A uniform management protocol was used and voiding cystourethrogram was repeated in all patients at 3 months follow-up. All patients with poor anterior urethral stream and persistent dilatation of posterior urethra on follow-up underwent repeat cystoscopy. Early outcomes were compared between Groups I and II using Fisher's exact test.
Results: During the study period, a total of 83 cases underwent primary PUV ablation. Group I included 42 patients (mean age 6.2 months; 10 days to 9 years) while Group II included 41 (mean age 3.4 months; 12 days to 5 years). Overall 12/83 (14.4%) required repeat procedure for persistent obstruction: stricture 9 (10.8%); residual valve 3 (3.6%). Group I had a significantly higher stricture rate (9/42; 21.4%) than Group II (0/41) ($p = 0.02$). There was no significant difference in terms of residual valves, haematuria, retention or extravasation between groups.
Conclusion: Cold knife ablation is superior to diathermy in relieving PUV obstruction in a single attempt.
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Introduction

Posterior urethral valves (PUV) are the commonest cause of congenital obstruction of the urethra [1]. Persistent obstruction of the urethra following primary valve ablation may be due to stricture or residual valve. The reported incidence of stricture in the literature varies from 2% to 50%, in various studies, depending on the techniques used [1—7]. The valve leaflets may be ablated using an infant resectoscope, a 3-F bugbee electrode using cutting current, a Nd:YAG laser or a cold knife [8]. The valve may also be ruptured with a Fogarty balloon [9,10] or valvotome [11], both being done without direct vision.

Bugbee electrode or laser does not engage the valve and carries the risk of energy dissipation to adjacent structures.

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Primary ablation with a resectoscope enables the surgeon to engage the valve with a diathermy hook or sickle-shaped cold knife precisely before dividing. In the present study, the authors compared early outcomes following diathermy hook ablation versus cold knife ablation using a resectoscope.

Patients & methods

All neonates and children who underwent primary ablation of PUV by a single surgeon in our centre between January 2004 and March 2011 were included. Pre-term or low birth weight neonates in whom the resectoscope could not be passed were excluded. Those who had complicated PUV (urinoma, urinary ascites, sepsis) and required vesicostomy or ureterostomy diversion were also excluded.

Preoperative management included: initial catheter drainage, and stabilization with antibiotics and intravenous fluids as required. Voiding cystourethrogram (VCUG) was performed in all cases to confirm the diagnosis. Primary ablation was performed with an 8.5 resectoscope using either diathermy hook (cutting current; minimum power setting) in Group I or sickle-shaped cold knife in Group II (Fig. 1). All PUV ablations were performed under glycine infusion and valve leaflets were ablated at 12, 4 and 8 o'clock positions in all patients. Successful ablation was confirmed under endoscopic vision as well as with the demonstration of good stream following suprapubic compression, at the end of the procedure. All patients had 48 h of urethral catheterization (8-F silastic Foley catheter) post PUV ablation and were discharged on prophylactic antibiotics. Early complications (significant haematuria, retention, urine extravasation) were documented.

Repeat VCUG was performed in all patients at 3 months follow-up. Those with a poor anterior urethral stream and persistent dilatation of posterior urethra on VCUG were considered to have persistent obstruction (Fig. 2) and subjected to repeat cystoscopy. Long-term outcomes such as recurrent urinary tract infection, renal impairment, persistent upper tract dilatation, bladder dysfunction and growth retardation were not analysed as a part of this study. Results were compared between Group I and Group II using Fisher's exact test.

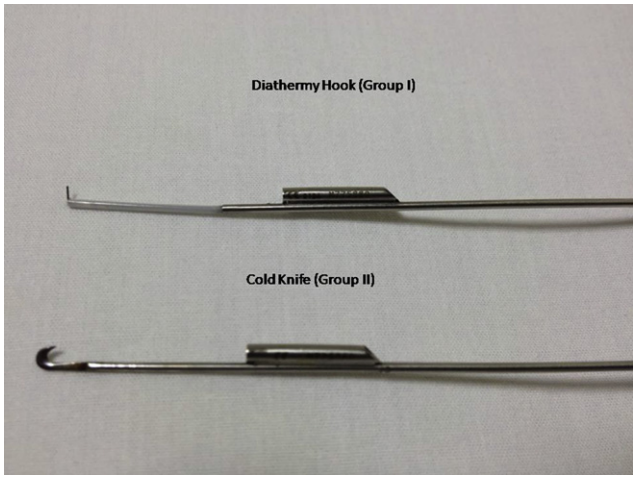

Figure 1 PUV ablation was performed with 8.5 infant resectoscope using either diathermy hook in Group I or sickle-shaped cold knife in Group II.

Results

During the study period, a total of 83 cases underwent primary PUV ablation. Group I included 42 patients (mean age 6.2 months; 10 days—9 years) while Group II included 41 (mean age 3.4 months; 12 days—5 years). The presentations are detailed in Table 1. There was no significant difference in age distribution or presentation between the groups. All patients had classical type I PUV on cystoscopy. The early surgical outcomes are detailed in Table 2. A total of 3 patients developed significant haematuria during the postoperative period (1 in Group I and 2 in Group II). There was no significant difference between the groups in terms of haematuria, postoperative retention or extravasation. There was no morbidity due to sepsis or electrolyte imbalance during the postoperative period in any of the patients.

Persistent obstruction on repeat VCUG was noted in 12/83 (14.4%): Group I, 10/42 (23.8%) compared to Group II, 2/41 (4.8%) ($p = 0.02$). All 12 patients underwent repeat cystoscopy; there was stricture in 9/83 (10.8%) and residual valve in 3/83 (3.6%). Among the 10 patients in Group I, 9/42 (21.4%) had a short segment stricture (cicatrization) at the level of PUV and 1/42 (2.4%) had residual valve. There was no stricture and 2/41 (4.8%) residual valve in Group II. A significantly higher stricture rate was found in Group I (Table 2) compared to Group II ($p = 0.02$). All 12 patients were treated by cold knife ablation at the second sitting; repeat VCUG 3 months later confirmed no subsequent obstruction. Urodynamics performed in 7/12 patients in the failure group did not reveal any significant abnormality.

Discussion

Resolution of obstruction following PUV ablation is an important factor in the long-term, and several authors have highlighted the importance of repeat VCUG to document this [12—14]. Objective measurement of posterior to anterior urethral ratio has been reported recently although there is no consensus on the cut-off. Menon et al. [12] felt a postoperative ratio of more than 1.9 should alert to persistent obstruction while Gupta et al. [13] considered a ratio of 2.5—3 to be an acceptable result. Bani Hani et al. [14], on the other hand, reported 2.6 as the normal urethral ratio in those without PUV, 8.6 in those with PUV and 3.5 as an acceptable postoperative outcome.

Posterior urethral dilatation often persists, although it slowly improves over time, following successful PUV ablation. Depending on the urethral ratio one applies as cut-off to consider persistent obstruction, and the timing of postoperative VCUG, outcomes are likely to vary. Since our study began prior to the reports on urethral ratios and there was no consensus, we have not applied a urethral ratio. Instead, the authors have used a combination of poor

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