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Surgical management of enlarged prostatic utricle

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Abstract The prostatic utricle (PU), or prostatic pouch, is a rudimentary structure present in the male prostatic urethra, and is derived from both the müllerian and wolffian ducts. As the PU is of mixed origin, a patient with an enlarged utricle should be carefully examined to ascertain whether it is associated with female internal organs. The clinical presentation, diagnostic evaluation, and a new surgical approach, posterior sagittal rectum retracting, are discussed. A plan for management of PU with proximal hypospadias is suggested.

Key words Prostatic utricle · Utricle pouch · Posterior sagittal rectum retracting approach · Hypospadias

Introduction

The prostatic utricle (PU), a rudimentary structure present in the male prostatic urethra, is thought to be derived from the müllerian ducts in its cranial portion and the wolffian ducts and urogenital sinus (UGS) for the caudal segment [3]. As it is of mixed origin, a patient with an enlarged PU should be carefully examined to ascertain whether it is associated with female internal organs. The “vagina masculina” is a medical term to describe this pouch when a patient has female internal organs such as fallopian tubes and uterus [2]. When enlarged, the PU may be associated with urinary tract infection (UTI), stone formation in the pouch [14], dysuria, back-pressure changes, and pseudoincontinence due to secondary trapping of urine in the pouch.

We evaluated six patients who presented with symptoms related to an enlarged PU. The etiology, diagnostic

evaluation, and surgical management are reviewed. Based on a prospective study in all cases of proximal hypospadias, we propose a flow chart for the management of these patients.

Materials and methods

Six patients were evaluated for symptoms or physical findings related to an enlarged PU. The details are shown in Table 1. All had a history suggestive of recurrent UTI; all but one had hypospadias. Two of these cases were remarkable: after repeated UTI (pyelonephritis), one developed renal calculi and nephrotic syndrome and is awaiting surgery (case 6). The other, after full correction of hypospadias, continued to have UTI, dysuria, and post-voiding dribbling. He went on to develop end-stage renal disease. A PU was detected at the time of routine pre-transplant cystoscopy and excised by a posterior sagittal rectum-retracting (PSRR) approach.

One patient who presented with repeated attacks of epididymo-orchitis even underwent scrotal exploration to rule out torsion. The only patient who did not have hypospadias presented with a pelvic mass. He had the unusual finding of a purulent discharge per urethram on rectal examination. Although micturating cystourethrography (MCU) was helpful in diagnosing four cases (Figs. 1, 2), in one case ascending urethrography (Fig. 3) was used and in one cystoscopic passage of a ureteric catheter (Fig. 4) with instillation of dye helped in demonstrating the enlarged PU.

These findings prompted us to do a prospective study of all cases of proximal hypospadias, i.e., penoscrotal, scrotal, and perineal. All patients had cystoscopy and/or a contrast study prior to hypospadias repair using Foley’s adaptor to the syringe; contrast injected directly into the urethra. The size of the utricle was graded as per Ikoma and Shima’s classification [5].

Surgical technique

Of all the approaches described, we found PSRR most satisfactory, and all but one patient, who had suprapubic transvesical excision, were operated upon by this approach.

No preoperative bowel preparation is required. Cystoscopy is done and a ureteric catheter placed in the pouch. The patient is catheterized beside the ureteric catheter and placed in a prone jackknife position. A no. 10 rubber catheter is kept in the rectum. The incision is made from the 3rd sacral segment to about 1.3 cm posterior to the anus in the midline. It is deepened in the midline, dividing the parasagittal muscles and levator ani without cutting the external sphincter, with the use of a muscle stimulator until the rectum is reached. The investing fascia is divided in the midline and

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Table 1 Cases. *RUG* Retrograde urethrography; *VUG* voiding cystourethrography; *PSSR* posterior sagittal rectum refracting approach; *UTI* urinary tract infection; *UDT* undescended testis

Case no.	History	Findings	Surgery
1	5 years, TFS, 46XY scrotal hypospadias, fully corrected, repeated UTI	RUG and scopy, grade II utricle	PSRR
2	10 years, mid penile hypospadias, fully corrected, repeated epi-orchitis with sinus	VUG and scopy, grade II utricle	PSRR + Abd. exploration
3	10 months, pyuria and fever, PR-cystic mass bladder neck, pus discharge on pressure	USG cystic mass, scopy, grade II utricle	Transvesical
4	1 year 6 months, penoscrotal hypospadias with micropenis, fully corrected, repeated UTI and post-void dribble	RUG and scopy, grade II utricle	PSRR
5	9 years, patient in CRF, penoscrotal hypospadias repaired elsewhere H/O, repeated UTI, dysuria and post-void dribble	MCU, RUG and scopy, grade II utricle	PSRR
6	6 years, penoscrotal hypospadias and eight UDT, complete repair repeated UTI developed nephrotic syndrome and stones	RUG and scopy, grade II utricle	Awaiting Sx

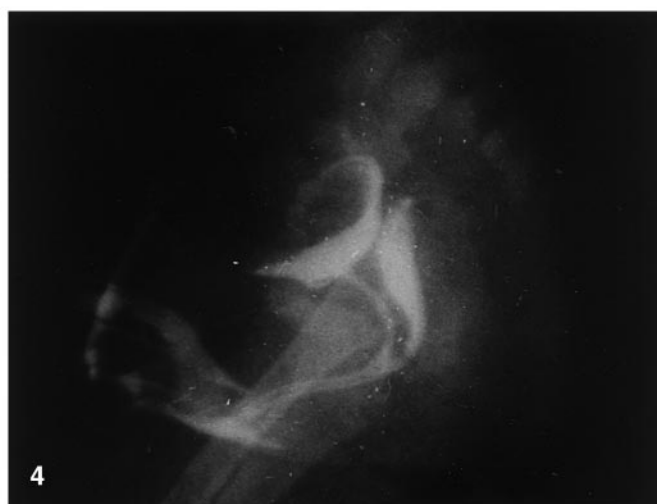
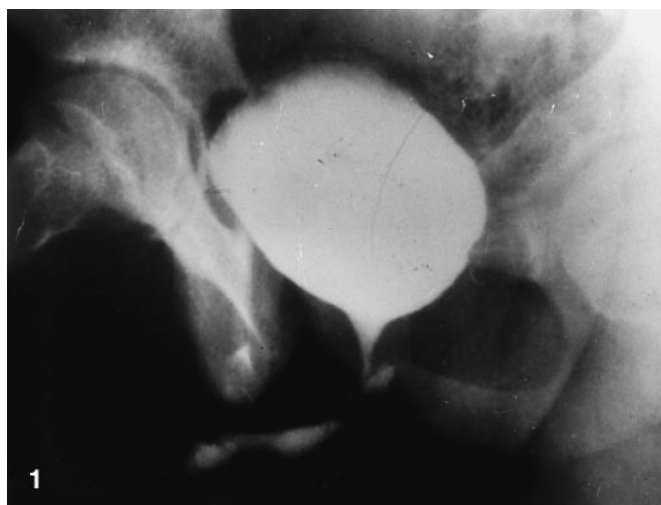
Fig. 1 MCU showing grade I utricle

Fig. 2 MCU showing grade II utricle

Fig. 3 Ascending urethrography showing grade 0 utricles

Fig. 4 Cystoscopic contrast study showing grade III utricle

the rectum retracted on the patient's right side. The pouch, which lies in the center of the wound anterior to the rectum and posterior to the urethra, is identified by palpating the ureteric catheter. It is picked up and dissected free from the urethra, seminal vesicle, and vas, which are easily identifiable with this approach, thus avoiding injury to these important structures. Dissection starts in the portion



of the PU that is in direct vision, and is carried proximally until the dome is completely dissected and then carried distally to its junction with the urethra and excised flush with the urethra. The urethral opening is closed using a 3/0 absorbable suture. The rectum is allowed to fall back into position and the wound is closed in layers with a glove drain.

Results

All the operated patients were free of urinary symptoms at follow-up after 6 months to 3 years except the one who had a transvesical excision, had persisting infection, and cystoscopy showed incomplete excision. One patient who had grade IV vesicoureteric reflux (VUR) now has grade II VUR 1 year after surgery. All patients are fully continent of stool and urine.

A prospective study of 20 patients showed 10 (50%) with different grades of PU (Table 2). One patient with a grade II utricle also had grade I–II trabeculation of the bladder, suggesting obstruction. This was excised before doing the hypospadias repair, since then he is infection-free. One patient with a grade II PU had a large swelling in the left trigone displacing the left ureter, causing hydroureteronephrosis, and is awaiting surgery.

Discussion

It has been postulated that enlargement of a PU might be caused by delayed regression of the paramesonephric duct and/or decreased androgenic stimulation of the UGS [2]. It is interesting that higher grades of PU (II and III) were seen only in patients with severe hypospadias. This confirmed the direct relationship between the degree of hypospadias and increasing size of the PU observed by Howard [4] and Devine et al. [2]. It has been suggested that the enlarged PU and müllerian-duct cysts have different embryological origins [15], the cysts being remnants of the paramesonephric ducts alone.

Patients can present with various complaints including lower-urinary-tract irritative symptoms, post-voiding dribbling, urethral discharge, repeated UTI, stone formation in the pouch [14], or pseudoincontinence due to secondary trapping of urine in the pouch. An enlarged utricle can be discovered by inadvertent catheterization of the utricular orifice, which can be frustrating when trying to establish urinary diversion during hypospadias repair.

Müllerian-duct cysts are usually found later in life, and the external genitalia are usually normal. They present as

a fluctuant midline mass palpated just above the prostate on rectal examination. The finding of a rectal mass anteriorly with purulent discharge on pressure, as was seen in one of our cases, has not been reported before in a child.

Recurrent episodes of epididymo-orchitis because of an enlarged PU have been reported before. This occurs because of the obstruction to the ejaculatory ducts or vasa, or the ducts may open into the cyst cavity. Since the vasa and ejaculatory ducts are mesonephric derivatives, some explanation must be given for their termination in this müllerian-duct remnant. The ejaculatory duct terminates on either side of the verumontanum, which is derived from the UGS. An abnormality of the UGS that contributes to the formation of the PU could account for the ectopic insertion of these ducts. Alternately, there could be disruption caused by the enlarged PU or müllerian-duct cyst that prevents the ducts from reaching their insertion. It is easy to see why these patients present with epididymo-orchitis, as was seen in one of our cases.

Enlarged PUs are readily demonstrated by retrograde urethrography or MCU. The contrast fills a tubular structure posterior to the prostate and bladder. Ikoma et al. [5] proposed a grading system for PUs as seen

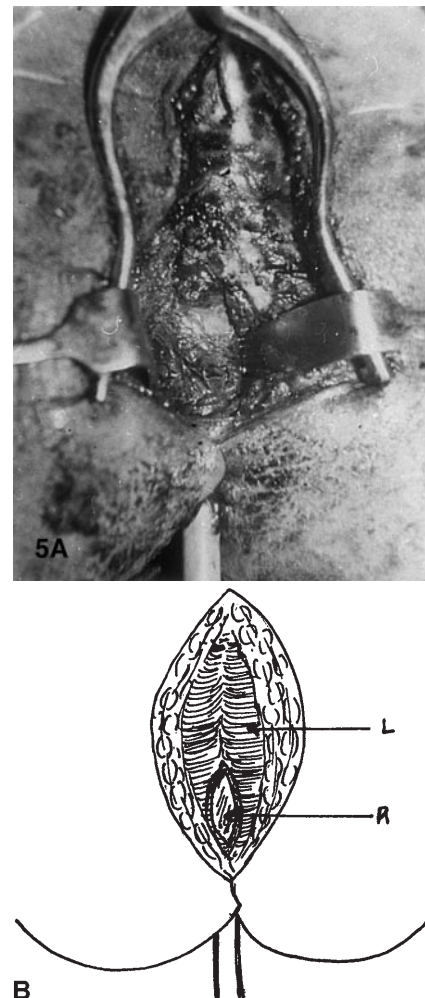


Fig. 5 A PSRR approach, levator retracted showing underlying rectum. B Line diagram of approach

Table 2 Grades of prostatic utricle in patients with hypospadias

Type of hypospadias	Grade of utricle				Total
	0	1	2	3	
Penoscrotal	0	5	3	0	8
Scrotal	0	0	1	0	1
Perineal	0	0	1	0	1
Total	0	5	5	0	10

radiographically: grade 0 – confined to the veru; grade 1 – below the bladder neck; grade II – extending above the bladder neck; and grade III – opening distal to the external sphincter.

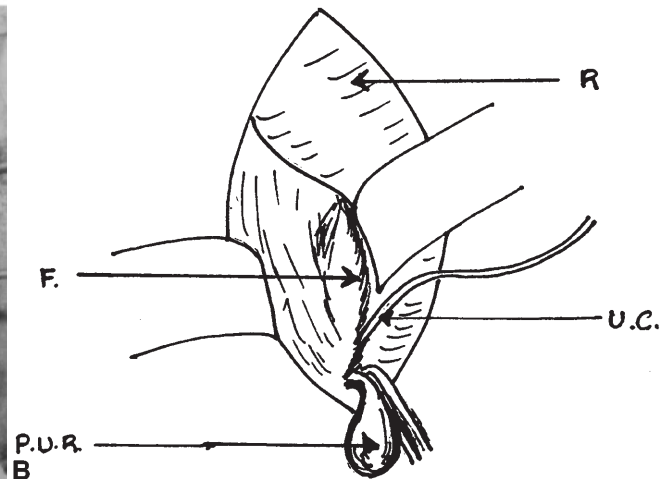
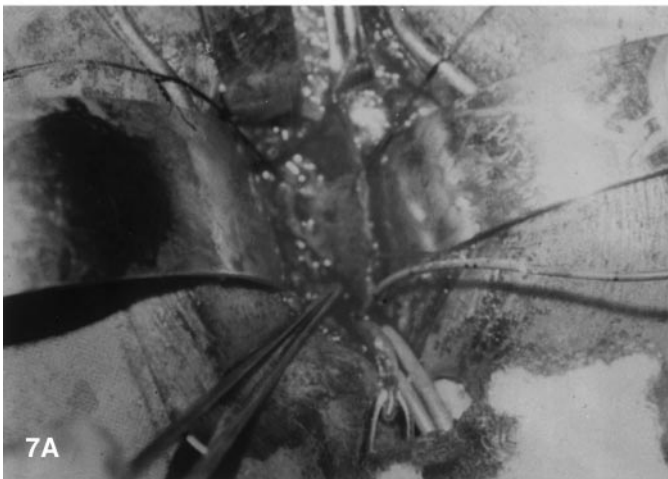
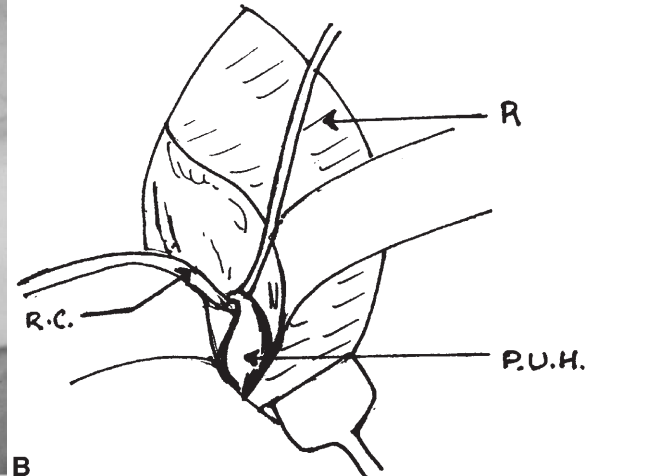
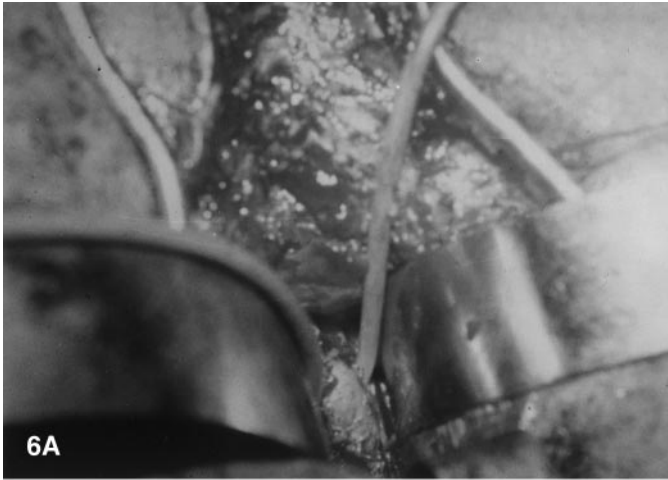
Ultrasonography (US) is the next most important imaging technique, and can also identify a uterus if present. Computed tomography and magnetic resonance imaging are accurate in detecting these lesions, but do not add any information to pelvic US. If the cyst cavity has not been demonstrated on other radiographic studies, catheterization of the utricular orifice and injection of contrast can be done [10]. We have found that the most useful investigation for an enlarged PU is cystoscopy with identification of the utricular orifice in the posterior urethra. We then enter the pouch to determine its size and the presence of a cervix to rule out utriculus masculinus and, if required, catheterization of the utricle with injection of contrast is done to delineate the pouch more clearly. Howard [4] and Devine et al. [2] considered a PU to be enlarged when a cystoscope could be introduced into its lumen for at least 2 cm.

Surgical excision is the definitive treatment of a symptomatic enlarged PU. Many approaches have been described, including transurethral [8], transvesical [1, 9], suprapubic [13], retropubic [14], perineal, and posterior with a transrectal approach [12] or rectum retracting [7]. Transurethral deroofting of an enlarged utricle can not be a curative treatment if it is very large. The abdominal extravesimal approach has the advantage that the internal organs derived from the paramesonephric ducts, mesonephric ducts, and bilateral gonads can be explored at the same time without opening the bladder. However, it is difficult to remove the PU by this approach because of the narrow working field in the distal extent of the dissection, and it is also difficult to free the rectum from the prostate to give access to the lesion [6].

The perineal approach again gives a restricted field for dissection and can lead to injury to the rectum, external sphincter, or pudendal nerve. Monfort [1, 9] recommended a transvesical approach because of the excellent exposure, ease of surgery, good reconstruction, and lack of sequelae. However, this approach has a theoretical disadvantage of interference with the function of the trigonal musculature, resulting in postoperative VUR. Schuhrke and Kaplan [11] reported unsatisfactory surgical results with 58% incomplete excision of PUs by the suprapubic, retrovesical, or trans-

Fig. 6 A Rectum retracted to right side of patient, utricle hooked in rubber catheter. B Line diagram

Fig. 7 A Utricle dissected to junction with urethra and divided. Ureteric catheter shows junction. B Line diagram



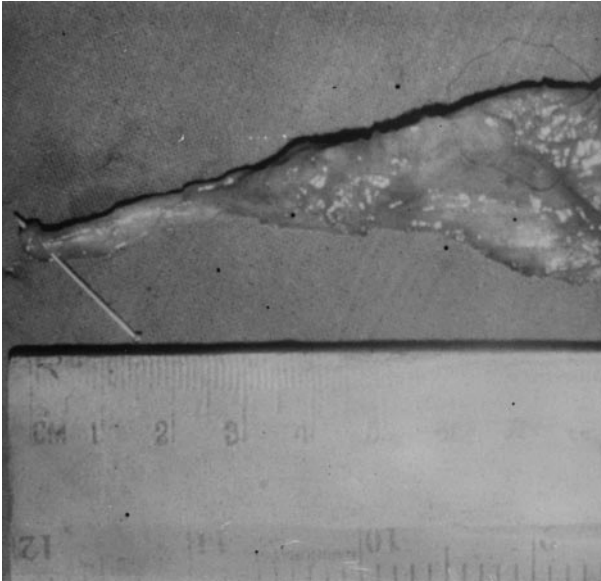


Fig. 8 Resected specimen

vesical approach in their review of the literature. Although the transrectal posterior sagittal approach provides excellent exposure, it requires extensive bowel preparation and fasting of the patient for 9 to 10 days, thus necessitating I.V. hyperalimentation.

The most difficult part of any technique is complete resection of the PU without damaging the urethra, external sphincter, and branches of the pelvic plexus. We have now used the PSRR approach in five cases for excision of a PU and found the advantages of good exposure and exact visualization of all important structures as shown by intra-operative photographs and line diagrams (Figs. 5–7). All patients are infection-free and postoperative endoscopy has shown complete excision.

We encountered ten patients with enlarged PUs in a prospective study, one of whom had bladder trabeculat-

ions suggesting obstruction and had elective excision of the PU before hypospadias repair. One patient was found to have an enlarged PU that was lifting up the left hemitrigone and ureter, causing left hydroureteronephrosis, and is awaiting elective excision. The other eight are in various stages of hypospadias repair and close follow-up postoperatively (Table 2).

We propose (Fig. 6) that all cases of proximal hypospadias should be evaluated for an enlarged PU by ascending urethrography or MCU and cystoscopy preoperatively. If detected, the PUs require excision pre-hypospadias repair if causing outlet obstruction. The rest can be repaired, but need close follow-up postoperatively for development of UTI or deterioration of renal function until the patient reach adulthood.

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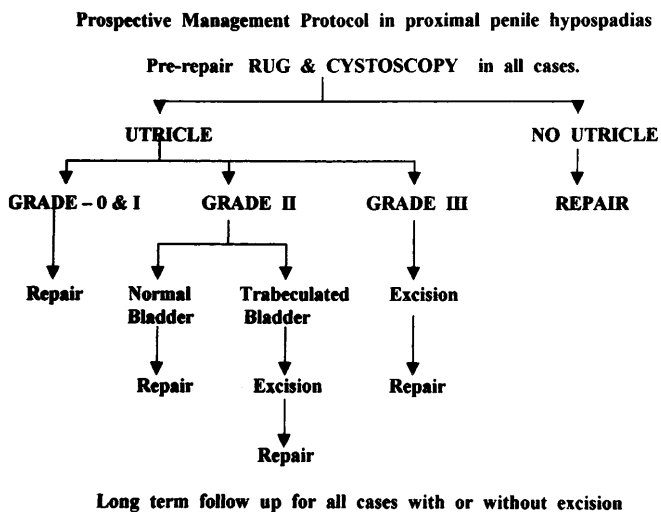


Fig. 9 Flow chart proposing the management protocol for enlarged prostatic utricle in proximal hypospadias (RUG retrograde urethrography)