INTRODUCTION

To describe the operative details and results of a modified posterior sagittal transanorectal approach for the reconstruction of urogenital sinus (UGS) anomalies.

TECHNICAL CONSIDERATIONS

Six children with UGS anomalies underwent surgery using this technique. In a prone jack-knife position, a midline incision was continued to the puborectalis muscle. A plane of dissection was created circumferentially around the rectum separating it from the underlying UGS. Circumferential transanal mucosectomy and a transanal dissection was carried proximally for 5 to 10 cm. The mucosal tube with the serosal wall was resected, exposing the proximal part of the UGS. The posterior and anterior sphincters, anus, and perineal body were then divided in the midline, completely exposing the UGS. Reconstruction of the urethra and vagina was done. At completion of UGS reconstruction, an endoanal pull through of the rectal tube and a low coloanal anastomosis were performed. The muscle complex and perineal body were closed in layers. The modified technique of posterior sagittal transanorectal approach allowed excellent exposure in all 6 patients. None developed any complications related to suture line leak. Fecal and urinary continence was preserved in patients who were continent before the operation.

CONCLUSIONS

The modified posterior sagittal transanorectal approach is a safe and effective technique in the treatment of UGS anomalies and can be performed without the need for a protective colostomy.

MATERIAL AND METHODS

This was a prospective study performed in the Department of Surgery at B. P. Koirala Institute of Health Sciences, Dharam, Nepal from March 2004 to March 2006. Six patients with intermediate (n = 2) or high (n = 4) pure UGS anomalies were H11005

SURGICAL TECHNIQUE

The operative details in the clinical cases and their diagrammatic illustrations are shown in Figs. 2B to 2F and Fig. 3, respectively. All patients underwent rectal washes before surgery. A 6F Foley catheter was placed through the UGS into the vagina for easier identification. The operation was performed with the patient in a prone jack-knife position. An incision of the cutaneous and subcutaneous planes was made from the sacrococcygeal junction to approximately 1 cm from the anus (Fig. 2A). The dissection in the midline was continued to the
puborectalis muscle, which was identified using a muscle stimulator (Bajpai AIIMS muscle stimulator). The puborectalis muscle was then retracted downward to expose the rectum. A plane of dissection was created circumferentially around the rectum separating it from the underlying UGS (Fig. 2B). Traction sutures were then placed circumferentially on the posterior and anterior walls of the anus. The anal mucosa was circumferentially incised, using electrocautery, approximately 5 mm from the dentate line, and the submucosal plane was developed. Epinephrine solution can be injected into the submucosal plane, if desired. The proximal cut edge of the mucosal cuff was tagged with multiple fine sutures, which were used for traction. The endorectal dissection was then carried proximally, staying in the submucosal plane. When the submucosal dissection extended superiorly for about 5 to 10 cm, the mucosal tube was excised and the rectal muscle divided circumferentially in the posterior sagittal wound (Fig. 2C). This resulted in a cranial rectal tube and a lower seromuscular tube. The superior rectal tube could be retracted cranially, partially exposing the proximal part of the UGS. The posterior and anterior sphincters, anus, and perineal body were then divided in the midline, completely exposing the UGS (Fig. 2D). The UGS was opened posteriorly in the midline from the meatus to the vaginal confluence. The distal atretic vagina was then opened on its posterior aspect into the more normal proximal vagina. With a retractor then placed in the vagina and directed upward, the critical aspect of the confluence was optimally exposed to facilitate dissection of the anterior wall of the vagina away from the proximal urethra and bladder. This position also provided excellent vision for tubularization of the urethra, which was done in two or three layers with fine absorbable suture over a Foley catheter (Fig. 2E). Healthy fatty tissue was brought from either side together in the midline to separate the urethra and vagina. After adequate mobilization (depending on the length of the sinus and vagina), the posterior vaginal wall was opened, and the anterior vaginal wall was separated from the urethra, which was then closed in two layers. In cases of mid-confluence (2 cases), the sinus was split laterally, and the ventral part was used to construct a mucosal-lined vestibule and the dorsal part to form the anterior vaginal wall. In high-confluence cases (4 cases), the sinus was split dorsally, and the flap was used as an anterior vaginal wall flap. The posterior vaginal wall was incised and the U flap then sutured to it, allowing a wide vaginal opening. At completion of the UGS reconstruction, the rectal tube was pulled down the endoanal route and anastomosed to the lower anorectal mucosa (Fig. 2F). The muscle complex and perineal body were closed in three layers using absorbable Vicryl 4-0 suture. A dressing was placed over the perineum. A Foley catheter was left in the bladder for 1 week, and a vaginal tube was left as a drain for 5 days. The patients all underwent digital rectal examination approximately 1 week postoperatively. Routine dilations were not done unless a stricture was believed present. Patients were followed up on a monthly basis for the first 3 months and every 3 months thereafter.

RESULTS
The follow-up in this group of patients ranged from 6 months to 2 years. In all patients, separate openings for the urethra and vagina were created. No anastomotic leak necessitating an emergency diverting colostomy occurred. Two patients with complete sacral agenesis remained incontinent to urine and feces. In 6 patients, daily vaginal dilation was started in the postoperative period but was discontinued in 3 patients because the vagina was of adequate caliber. Cosmesis was excellent. The vaginal examination 3 months postoperatively showed a wide orifice and normal mucosal lining without urethrovesical fistulas in any patient.

COMMENT
UGS abnormalities occur in a wide spectrum. Powell et al.1 classified them as follows: type I, labial fusion; type II, distal confluence; type III, proximal or high confluence; and type IV, absent vagina. The proper surgical approach should be chosen to fit the needs of each case. Various techniques have been used to repair UGS anomalies.3–5 The key to successful repair is good definition of the anatomy. In patients with a normal anus and rectum, separation of a low-confluence vagina and urethra can be performed with a perineal approach. However, in a mid or high vaginal confluence, separation is difficult using the perineal route because of a narrow operative field and its close proximity to the external sphincter. The ingenious contribution by Peña et al.2 using the PSTA, which divides the posterior and anterior rectal walls and the
The modification of the PSTA, as described in this study, has three important components. First, a limited anal mucosectomy is begun just above the dentate line and extended for about 5 cm. Second, the rectum is divided circumferentially, rather than splitting the posterior and anterior walls. The circumferential division has the advantage of preserving the blood supply and obviates the repair of the split posterior and anterior rectal walls. Third, at completion of the UGS repair, the proximal rectal stump is pulled through the seromuscular cuff and anastomosed at the dentate line. This low coloanal anastomosis minimizes the risk of anastomotic fecal leak and complications, even if a protective colostomy is not performed.
tomy is not created. However, we always obtain consent for a colostomy before the definitive operation. A surgeon should not hesitate to divert if the bowel preparation has been inadequate or the repair is compromised by a marginal blood supply. Although initially we were concerned that the PSTA would compromise fecal continence, all 4 patients who were continent before the repair remained so. The results from our limited series of 6 patients has reinforced the observation of other reports that the transanorectal approach does not interfere with bowel control in a patient with normal sacral development.8,9 The other added advantages of this modification have been the excellent access to the vaginal confluence, accurate repositioning of the urethra/vagina, a shorter operative time, and the excellent cosmetic outcome.

CONCLUSIONS
The PSTA appears to be a useful technique for the treatment of UGS anomalies. However, many surgeons hesitate to use this excellent technique, mainly because of pressure from patients and their families against creating a protective colostomy. The modification of PSTA we have described safely allows one to use it without an accompanying colostomy. The fear that division of the sphincters will lead to fecal incontinence does not appear to be well founded, as long as a midline approach is used, and meticulous repair is accomplished.

References


