Sigmoid Vaginoplasty with a Modified Single Monti Tube: A Pediatric Case Series

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Purpose: No consensus exists regarding the most effective procedure for neovagina formation. We describe our experience with modified single Monti tube colovaginoplasty in pediatric patients with disorders of sexual differentiation.

Materials and Methods: Six patients were retrospectively identified who underwent primary sigmoid vaginoplasty with a modified single Monti tube between 2009 and 2012. Data were collected from patient charts. The procedure is performed by isolating an 8 to 10 cm segment of distal sigmoid colon or proximal rectum, which is detubularized along the anterior mesentery, folded and retubularized longitudinally, leaving the mesentery in a cephalad position. A channel is dissected in the pelvis to accommodate the neovagina.

Results: Mean patient age was 12.7 years (range 6 to 17). The primary diagnosis was androgen insensitivity in 3 cases (50%), and Mayer-Rokitansky syndrome, partial androgen insensitivity and persistent cloaca in 1 each (16.7%). Chromosomal analysis revealed 46XY in 4 patients (66.7%). Median followup was 7.9 months (range 3 to 41). One patient who engages in vaginal intercourse reported satisfactory vaginal length without discomfort. In 1 patient an anastomotic stricture developed, which was managed by buccal mucosal grafting.

Conclusions: Modified single Monti tube sigmoid vaginoplasty is a safe, effective technique for neovagina formation in pediatric patients with disorders of sexual differentiation. Compared to other existing methods, our technique allows for the use of shorter bowel segments with decreased tension of the vascular pedicle.

Key Words: vagina; colon, sigmoid; reconstructive surgical procedures; sex differentiation; androgen-insensitivity syndrome

Abbreviations and Acronyms

DSD = disorder of sexual differentiation

Accepted for publication August 26, 2013.

Study received institutional review board approval.

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VAGINAL malformation can result from various DSDs. To date several methods have been described for forming a neovagina with varied results, including progressive dilation, buccal mucosa graft, sigmoid or other intestinal substitution, or skin grafting.[1–5] Use of an isolated bowel segment is a common method of reconstruction since it provides natural lubrication and avoids the need for regular dilation.[5] Specifically, sigmoid colon is often used due to its proximity and the location of its blood supply. Long-term followup has shown an acceptable complication rate and overall patient satisfaction.[6–8]

Vaginoplasty using an intestinal segment requires mobilization of a segment of bowel into the pelvis with adequate mesenteric length. One may

0022-5347/14/1915-1537/0
THE JOURNAL OF UROLOGY®

http://dx.doi.org/10.1016/j.juro.2013.08.073
Vol. 191, 1537-1542, May 2014
Printed in U.S.A.

note tension on the vascular pedicle in cases of a short mesentery, obesity or a masculinized pelvis. This can ultimately result in ischemia and anastomotic stenosis of the neovagina. The Monti technique of detubularization was described using ileum in the transgender population and as a double Monti tube in the pediatric population.[9,10] It provides a solution by forming a tubularized structure with a modified mesenteric configuration and longitudinal mucosal orientation. We modified this technique. We describe the feasibility, safety and efficacy of modified single Monti tube primary sigmoid vaginoplasty in 6 pediatric patients with DSD.

METHODS

Patients

After obtaining institutional review board approval we retrospectively identified 6 children who underwent sigmoid vaginoplasty with the modified Monti technique, as performed by 2 surgeons between 2009 and 2012. Data were collected from patient charts, including age at surgery, chromosomal status, primary diagnosis, pelvic configuration, vaginal primordium details and last followup. Postoperative events were also collected, such as anastomotic stricture, excessive mucus production and intercourse.

Sigmoid Vaginoplasty Steps

Step 1. An 8 to 10 cm segment of distal sigmoid colon or proximal rectum is resected for neovaginal reconstruction. Mesenteric mobility and bowel segment diameter determine the length of the vagina and ease of reach to the perineum (fig. 1).

Step 2. The isolated bowel segment is detubularized along the mesenteric border anterior by making an incision 1 cm from the mesenteric edge with electrocautery (fig. 2, *A*). The antimesenteric border gains elasticity since it is no longer anchored to the mesentery, allowing for a larger diameter distal segment, if necessary.

Step 3. The segment is retubularized longitudinally in 2 layers by first loosely approximating the longer border of the neovagina with 4-zero interrupted poliglecaprone suture and then using a running full-thickness longitudinal polyglecaprone suture. A full-thickness running polyglecaprone suture is placed along the mesenteric border to approximate the superior edges (fig. 2, *C*). Extreme care is taken to avoid the mesenteric vessels so as not to compromise the neovaginal blood supply. Interrupted sutures may be placed for the last few cm if it appears that the flap may be too long to facilitate shortening the neovagina.

Final neovaginal length is determined by the circumference of the bowel segment selected. The final diameter is determined by the length of the selected segment. If a longer vagina is needed, one can incorporate 1 to 3 cm of upper rectum because it provides a wider bowel segment.

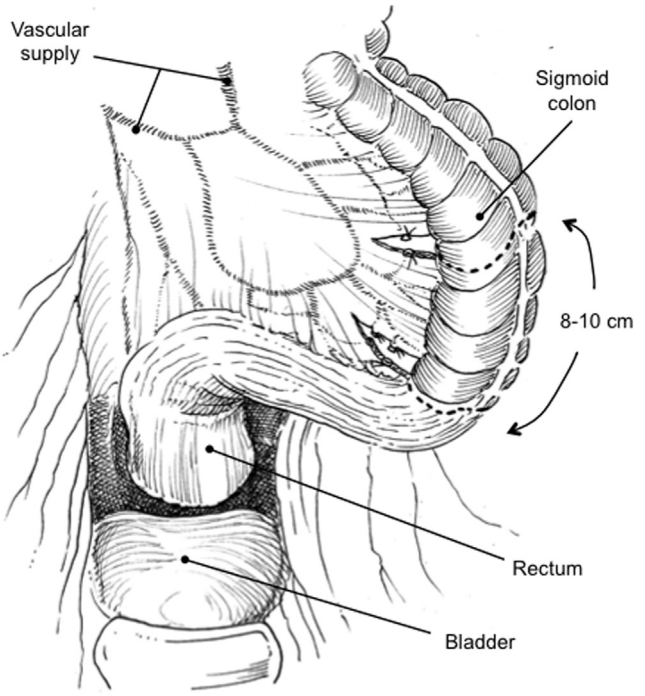

Figure 1. Incisions are made in mesentery at level of proximal and distal ends of segment chosen for neovagina. Extra care is taken to preserve blood supply, which is ideally located in segment mid portion.

Step 4. A plane is created in the pelvic floor and perineum to accommodate the neovagina (fig. 3). The neovagina is delivered and anastomosed with interrupted poliglecaprone sutures in the fashion originally described by Hensle and Reiley (fig. 4).[1] Finally, the omentum is mobilized to the pelvis and wrapped around the area of bowel anastomosis to prevent adhesions and fistulization with the suture lines of the neovagina.

The neovagina is not fixed to the presacral fascia since it is suspended by the mesentery proximally. Attempting to do so would risk vascular injury to the pedicle, compromising the flap.

At the end of the procedure a Foley catheter is placed as well as a 4 × 10 cm foam vaginal stent, which is prepared inside a sterile latex glove and coated with estrogen cream (Premarin®). Postoperatively, patients receive nothing by mouth until they are noted to pass flatus. The stent and Foley catheter are left in place for 5 days. During this time strict bed rest is ordered.

After hospital discharge patients are seen in the office 2 weeks, and 3 and 6 months postoperatively, and annually thereafter. At each visit manual digital examination of the neovagina is attempted. The introital anastomosis is evaluated by external inspection and satisfactory introital width is determined by easy passage of 2 fingers across the point of anastomosis. Vaginal mucus production is qualitatively assessed as reported by the patient, and daily vaginal irrigation is recommended to aid in mucus drainage. Pelvic examination and vaginoscopy or vaginogram are not routinely performed postoperatively, the latter due to the need for