

Inverted balloon vaginoplasty

An obstructed upper vaginal pouch was pulled downward to form a neovagina

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Problem: vaginal aplasia with functioning uterus

Over 7 months, an 11-year-old girl experienced abdominal pain that recurred monthly and was progressively increasing. An abdominal examination revealed a centrally located lower abdominal mass equivalent in size to a uterus at 14 weeks. Inspection of the vulva and perineum revealed normal external genitals and a blind vaginal pouch. Sonography and magnetic resonance imaging were performed. A cystic upper vagina and distended uterus were identified; the lower two-thirds of the patient's vagina were absent because of congenital vaginal aplasia.

Our solution

Class I Müllerian anomalies range from absence of all Müllerian derivatives to various degrees of vaginal agenesis combined with a functioning uterus. Balloon vaginoplasty (BV) is a real advance in the management of vaginal aplasia, regardless of its cause.¹⁻⁵ The original BV techniques were introduced for treatment of isolated complete vaginal aplasia.²⁻⁶ A blend of canalization and BV procedures

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Inverted balloon vaginoplasty technique was performed for a case with segmental vaginal aplasia and upper hematocolpos within 50 min operative time without any complications. The neovagina was naturally covered, 11 cm in depth and communicated with dimple at hymen's site. Regular painless menstruations were reported.

Key words: balloon vaginoplasty, female genital anomalies, Müllerian anomalies, neovagina, vaginal aplasia, vaginoplasty

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was successful in treatment of vaginal aplasia coupled with a functioning uterus.⁷

After comprehensive counseling and discussion of treatment options, our patient and her family signed an informed consent for inverted BV. This was conducted at the Woman's Health Hospital, Assiut University, Assiut, Egypt, after obtaining institutional review board approval.

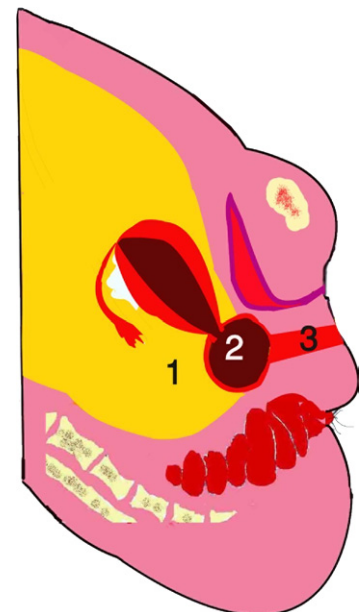
First, the surgical area was sterilized, and the patient was draped in the dorsal lithotomy position. A local examination revealed a normal vestibule and a blind vaginal dimple with complete obstruction above it. Next, a digital rectal examination was performed under anesthesia, and this disclosed a tense cystic distention of the upper vagina. Laparoscopy demonstrated that the pelvis was clear with a distended uterus and a noticeable swelling that protruded into the pouch of Douglas; this prominence was the distended vagina (Figure 1).

We used a customized long inserter to penetrate the bulge extending into the pouch of Douglas (Figure 2). This was accomplished with laparoscopic monitoring from above and bidigital guidance from below; the index finger of the left hand was inserted into the rectum to palpate the lower pole of the distended upper vagina, and the thumb of the left hand was placed at the vaginal dimple during the insertion process. The surgeon rotated and pushed the inserter along with his right hand, thus maintain-

ing perfect control during the entire insertion process.

Next, the inserter and a long double-stranded silk suture were used to manipulate 2 balloon catheters into the obstructed vaginal pouch, a process we have previously described (Figure 3).⁷ The hysteroscope was then introduced via the suprapubic port and, under lapa-

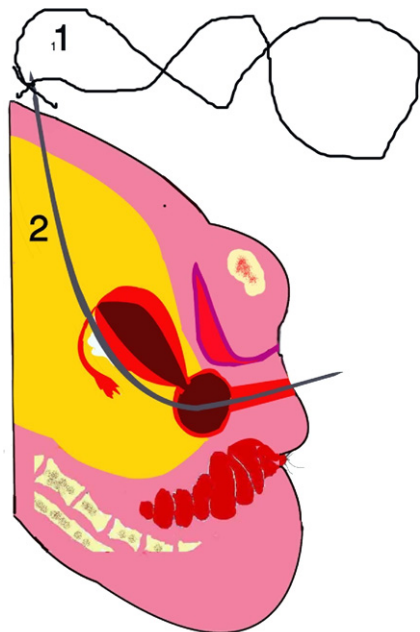
FIGURE 1



The upper vaginal pouch (2) was distended, bulging into the pouch of Douglas (1); the lower two-thirds of the vagina (3) were aplastic.

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FIGURE 2



A double-stranded silk suture is attached to the caudal end of an inserter (1). The inserter is passed into the pouch of Douglas (2), so that the distended portion of the vagina can be pierced.

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roscopic control, passed through the puncture made by the inserter. We inspected the vaginal pouch, confirming accurate placement of the catheters. One catheter was used for drainage; the other was used for stretching (pulling) the vaginal pouch (Figure 4).

The “pulling” catheter was guided through a fenestrated sterile dressing placed on the perineum. Tension was maintained by putting a plastic cord clamp on its stem. Each day for 6 successive days, the catheter stem was pulled down by an additional 1-2 cm. On the sixth postoperative day, the balloon, inflated to 40 mL, was expelled, leaving the patient with a patent natural neovagina (Figure 5).

Total operative time to successful completion of the procedure was 50 minutes. No complications occurred aside from repeated soaking of the dressing after urination. Consequently, the patient was intermittently catheterized 5 times to avoid saturation of the gauze pad. As noted, the desired outcome, creation of a neovagina by pulling down the native tissue of the up-

per vaginal pouch, was achieved in 6 days. It was 11 cm in depth and communicated with the dimple at the site of the hymen. Regular menstruation was achieved and was associated with dramatic relief of menstrual pain.

Examination 3 months after surgery verified that the patient had a patent vagina. This was confirmed by office vaginoscopy/hysteroscopy. It was covered with natural tissue, and the upper vagina was capacious with preserved fornices and a normal cervix. The cervical canal and uterine cavity were also normal; the tubal ostia were well-visualized. Additional follow-up was conducted by telephone.

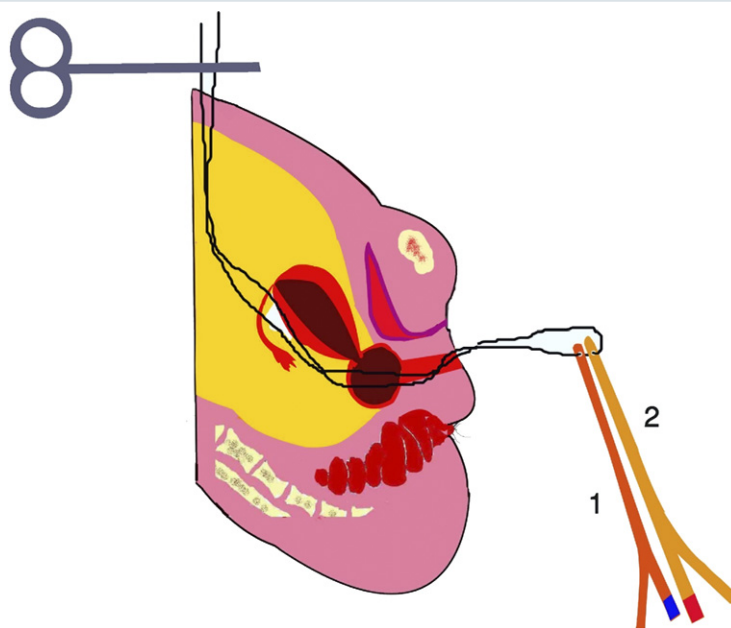
We performed inverted BV successfully for a patient who had upper vaginal distension and was missing the lower two-thirds of the vagina. Obstructive Müllerian anomalies represent a real challenge. Early diagnosis and appropriate treatment prevent the undesired consequences of long-lasting menstrual retention. Furthermore, inappropriate management is associated with recurrences that render subsequent interventions less successful.^{1,7,8} Because BV is performed without surgical dissection,

there is no raw area that might heal with fibrosis. Instead, the vaginal segment is formed by smooth, gradual, tissue displacement. Consequently, scar formation along with shrinkage and narrowing is avoided.

In the past, we presented a logical and successful plan of management for cervicovaginal aplasia, using a novel combination of retropubic BV (RBV), followed by uteroneovaginal communication (UNC).^{6,7} However, RBV relied on traction and distension of the dimple tissue in an upward direction to create a natural neovagina.⁷⁻⁹ Our current patient's natural vaginal tissue was already expanded by menstrual retention in the upper obstructed vaginal pouch, so we inverted the BV procedure, using a catheter to pull the tissue in a downward direction.

Inverted BV has intrinsic merits. Most important, it makes use of the natural, already distended, vaginal tissue. In our previous blend of RBV and UNC, anastomosis was carried out high up at the neovaginal apex. With inverted BV, the neovagina was created in the reverse direction, so anastomosis can occur much more easily at the vestibule. For the pa-

FIGURE 3



Two catheters are manipulated into the obstructed vaginal pouch. One will be used for drainage (1); the other will provide traction (2).

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