

## OPEN

# Pedicled Peritoneal Flap Vaginoplasty in Male-to-Female Gender Affirmation Surgery: A Case Report

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Peritoneal vaginoplasty has been used for the reconstruction of vaginas in females born with congenital vaginal agenesis (eg, Mayer-Rokitansky-Küster-Hauser [MRKH] syndrome).<sup>1</sup> Traditionally, the eponymic “Davydov” procedure uses a sliding peritoneal flap pull-down into the vaginal cavity.<sup>2</sup> Recently, a series of laparoscopic vaginoplasty techniques using a single peritoneal flap in MRKH syndrome patients has been reported.<sup>3</sup> The advantages of using the peritoneum for vaginal reconstruction include its abundant availability, proximity to the vagina, mucosal-type surface, and self-lubrication.<sup>4</sup>

In male-to-female (MtF) gender affirmation surgery, penile skin inversion (PSI) vaginoplasty remains the standard surgical technique. Intestinal vaginoplasty or nongenital grafting is often used for secondary deepening procedures. Some authors reported successful use of the Davydov procedure for augmenting neovaginal length in a postsurgical transgender woman (TGW).<sup>5,6</sup> Peritoneal vaginoplasty has become an exciting procedure for TGW who are unable to undergo (or have failed) PSI.<sup>4</sup>

Although the pedicled peritoneal flap can achieve a deeper neovaginal cavity than the original pull-through procedure, there are no reports of its use in primary vaginoplasty in TGW. We present the case of a transgender woman with penoscrotal hypoplasia who underwent primary peritoneal vaginoplasty for her gender incongruence.

## CASE REPORT

A 25-year-old transgender woman was referred to our clinic for gender affirmation surgery. Her history regarding sex transition included 10-year feminizing hormone therapy and breast augmentation. She had 2 referrals from psychiatrists and had passed all criteria for MtF genital surgery.<sup>7</sup> From physical examination, her

penile and scrotal skin was insufficient to create a neovagina with the patient’s desired functional depth. The patient did not want to have any bowel resection but agreed to undergo an abdominal procedure. To obtain a vaginal depth more than that obtained by the Davydov pull-through procedure, we decided to proceed with peritoneal vaginoplasty using a pedicled peritoneal flap based on the deep inferior epigastric vessels. The operative procedures are described below. Indocyanine green angiography was used to demonstrate the flap perfusion intraoperatively.<sup>8,9</sup> The study was exempted from review by the institutional review board of Chulalongkorn University, and informed consent was obtained from the patient.

## Operative Procedures

The operation was a team effort performed by the senior general surgeon (S.U.), an expert in advanced laparoscopy, and the plastic surgeon (P.S.), an expert in MtF vaginoplasty. The procedures were divided into 3 steps: laparoscopic, groin, and perineal. Total operative time was 8 hours, the estimated blood loss was 250 mL; no blood transfusion was needed along the operation.

## The Laparoscopic Step

This step included 2 parts: first, dissection of the preperitoneal space, and second, the intraabdominal peritoneal flap harvesting. The operation began with making an umbilical incision and dissecting the preperitoneal space on the left-sided abdominal wall, using a balloon dissector. After completing the dissection, the preperitoneal space was insufflated with CO<sub>2</sub> to a pressure of 12 mm Hg, and the 2 other trocars were then placed on the left subcostal and suprapubic areas.

The left deep inferior epigastric artery (DIEA) was identified using video laparoscopy. The peritoneal branches of the DIEA were preserved, whereas the musculocutaneous perforators to the rectus abdominis muscle were ligated and divided (Fig. 1). The peritoneum was opened cranially, and the intraperitoneal cavity was entered. The incision was continued in a horizontal direction along the superior border of the created preperitoneal space, establishing the pneumoperitoneum.

From the inside of the abdominal cavity, the peritoneal flap was measured and harvested in a rectangular shape, measuring 6 × 9 inches in size, from the cranial to caudal direction. At the caudal end of the flap, the DIEA pedicle was isolated and mobilized to the external iliac artery origin.

## The Groin Step

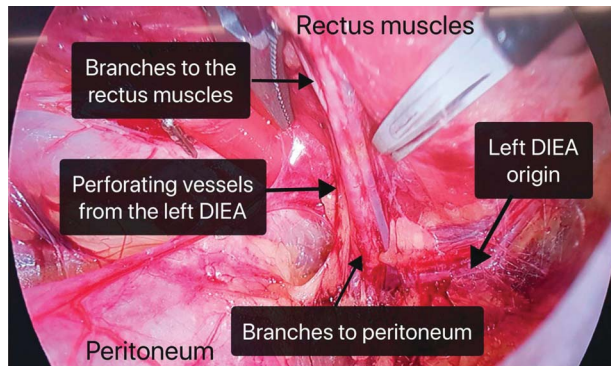
A 2-inch transverse incision was made on the left groin crease, in parallel to the Langer’s lines. The preperitoneal space was developed on the left inguinal region by separation of the external oblique, internal oblique, and transversus abdominis muscles. A tunnel was created and connected from the space toward the abdominal cavity superiorly. The peritoneal flap was delivered through the tunnel toward the groin pocket (Fig. 2). Then,

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**FIGURE 1.** Identification of musculocutaneous and peritoneal branches of the left DIEA via laparoscopy.

intraoperative indocyanine green angiography was performed to evaluate the peritoneal flap perfusion. Angiographic imaging showed complete filling of the flap (Fig. 3). The flap was rolled and sewn into a pouch over the dilator (Fig. 4).

### The Perineal Step

The patient was placed in a Trendelenburg position, the urinary bladder was catheterized, and a sponge forceps with gauze was inserted into the rectum. A skin incision was made midway between the ischial tuberosities. A sharp dissection was made between the bulbospongiosus and superficial transverse perineal muscles to create a safe entrance to the pelvic floor. When the loose plane of the Denonvilliers' fascia was reached, a blunt dissection was carried out up to the peritoneal reflection. The neovaginal cavity was connected with the groin pocket via the extraperitoneal route. Subsequently, the peritoneal flap was delivered into the neovaginal cavity. Care was taken to prevent kinking or twisting of the pedicle.

After completing the peritoneal flap inset, orchidectomy was performed. The urethra was divided and straightened. The penile prepuce skin was incised circumferentially at 3 to 4 cm proximal to the corona of the glans penis. The penile skin flap was dissected off the penile glans superficial to the Buck's fascia. The tunica albuginea was excised, and the dorsal neurovascular penile-preputial flap was developed.<sup>10</sup>

The penile glans was outlined in an M-shaped to form a neoclitoris. The preputial flap was partially divided on the dorsal side at midline and pulled down to create the inner lining of the

labia minora. The penile flap was divided at midline to create the outer layer of the labia minora. Finally, the labia majora was made up by trimming the excess scrotal skin and subcutaneous fat. All surgical wounds were closed in layered by using Vicryl 4-0 and 5-0.<sup>11</sup>

### Postoperative Care

The patient stayed in bed for a couple of days. No acute complications were reported. The condom with betadine-soaked petrolatum gauze was removed on day 3 postsurgery. A vitality check of the peritoneal flap revealed good color and turgor. The drains and urinary catheter were removed, and voiding was examined. Standard wound care was applied. Vaginal dilation was performed immediately by using a small-sized acrylic dilator, twice daily, until the next follow-up visit. The patient was discharged on postoperative day 4.

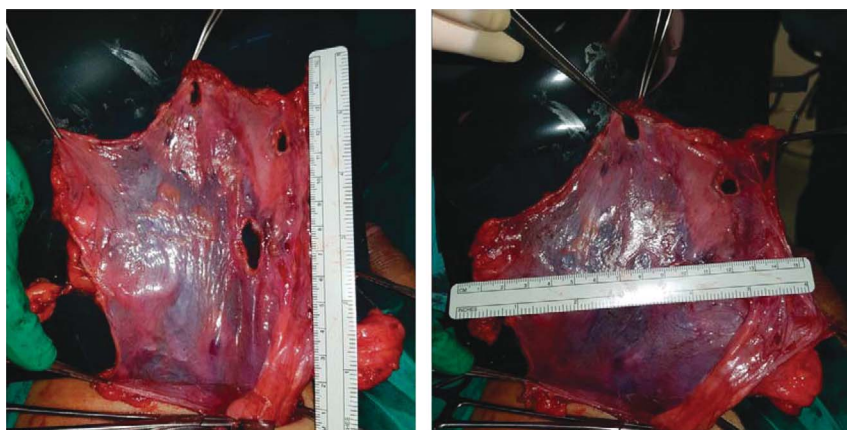
### Postoperative Follow-Up Protocol

An outpatient visit was scheduled in the first week, and the patient was instructed to gradually increase to medium- and large-size dilators every 1 to 2 weeks. The standard follow-up protocol included evaluation of sexual and urogenital functions, along with physical examination of the vulva, and speculum examination of the neovagina. The patient was doing well at follow up. All wounds healed within 3 weeks. The neovaginal depth was maintained at 14 cm at the 6-month visit. Endoscopic vaginoscopy was performed at 3 weeks and 9 months postoperatively (Fig. 5). The latter vaginoscopy revealed good neovaginal surface and self-lubricated. Histologically, the neovaginal lining was the squamous epithelium.

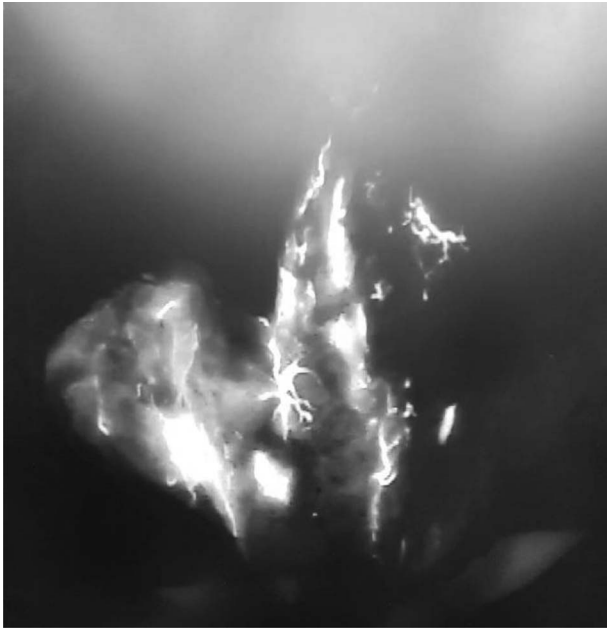
### DISCUSSION

Among the current vaginoplasty techniques, PSI vaginoplasty is the most frequently performed method and considered to be the gold standard.<sup>12,13</sup> Other techniques, such as intestinal or peritoneal vaginoplasty, nongenital skin grafting, and mucosal grafting, are mainly used as a secondary corrective procedure.<sup>14</sup> Intestinal (mostly sigmoidal) vaginoplasty is the most commonly used procedure after failed PSI.<sup>15</sup>

Davydov peritoneal vaginoplasty was first introduced in 1974 to construct vaginas in patients with MRKH syndrome.<sup>1,2</sup> There are many advantages of using the peritoneum for vaginal reconstruction, because it is moist, expansible, of adequate size, and lined by nonhairy, nonkeratinized stratified squamous epithelium.<sup>16</sup> Moreover, the peritoneum is believed to be an ideal

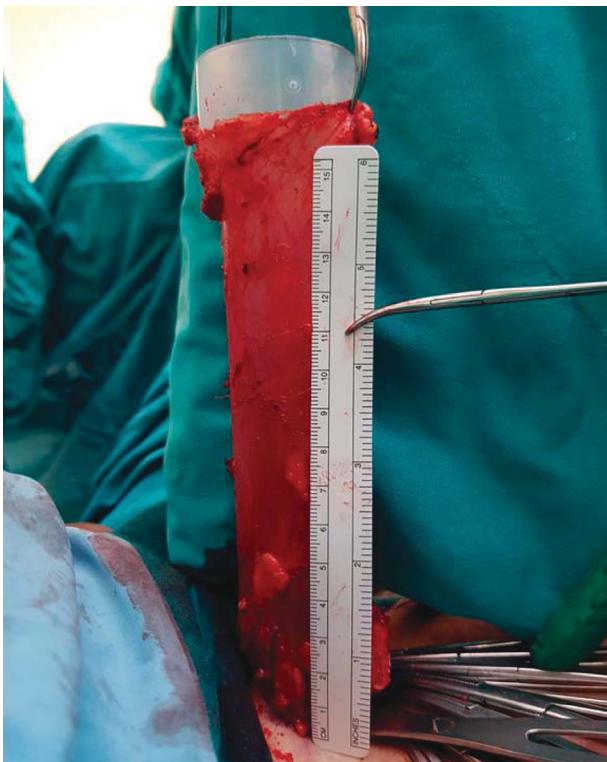


**FIGURE 2.** The peritoneal flap delivered through the groin incision, measuring 6 × 9 inches in size.

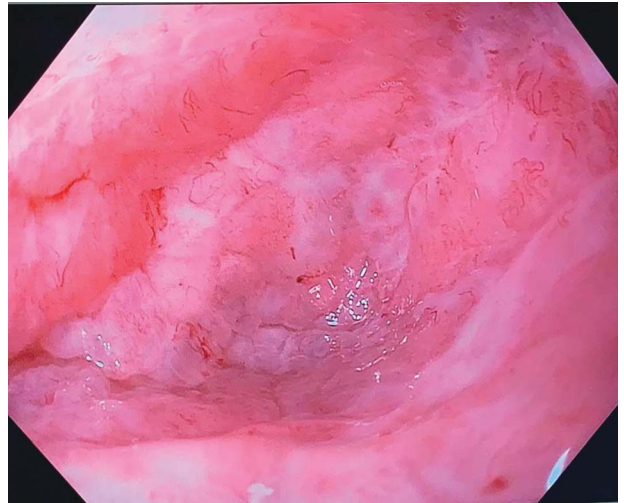


**FIGURE 3.** Angiographic image showing good distribution of fluorescence throughout the flap.

tissue to reconstruct a vagina owing to its innate functions of absorption, secretion, and defense mechanisms similar to those of the normal vaginal mucosa. The donor site also has good healing ability. Further, the peritoneum's smooth, soft, and moist surface allows for a satisfying sexual experience.<sup>17</sup>



**FIGURE 4.** The peritoneal flap was rolled and sewn into a pouch over the dilator.



**FIGURE 5.** The appearance of the neovagina under vaginoscopy at 9 months.

Although peritoneal vaginoplasty is a popular technique in female vaginal reconstruction, it is still not commonly used in TGW. Yao et al.<sup>16</sup> compared laparoscopic peritoneal vaginoplasty and sigmoid vaginoplasty after radical surgery for vaginal carcinoma in female patients and concluded that peritoneal vaginoplasty is simpler and more feasible. Theoretically, the anatomy of TGW is similar to that of MRKH patients because of their male chromosomal pattern.<sup>18</sup> Therefore, we hypothesized that using the peritoneum to construct neovaginas in TGW should be more suitable for a better outcome than other techniques.

Today, peritoneal vaginoplasty has become an area of interest among TGW because of its advantages. Moreover, unlike intestinal vaginoplasty, there is no risk of bowel anastomosis.<sup>19</sup> Additionally, laparoscopy is currently an essential step in every abdominal procedure, and laparoscopic modification of the Davydov procedure has become the standard technique.<sup>20</sup> Zhao et al.<sup>3</sup> reported their 10-year experience of performing laparoscopic vaginoplasty by using a single peritoneal flap in patients with MRKH syndrome; they emphasized the feasibility and effectiveness of this approach over the original Davydov laparoscopic technique.

To the best of our knowledge, this is the first reported use of a single pedicled peritoneal flap for primary vaginoplasty in a transgender woman (based on a search in Google Scholar by using the keywords: peritoneal flap male to female vaginoplasty). In the report by Jacoby et al.,<sup>21</sup> they used the sophisticated robot to harvest anterior and posterior peritoneal flaps for augmenting the inverted penile length for the lining of neovaginal cavity. In our operation, the peritoneal flap was mobilized and transferred in a single, pedicled fashion, so that it could be larger and more freely delivered down to the neovaginal cavity. This could achieve deeper neovaginal lining (14 cm) than the original pull-through technique described in a previous study (8–10 cm).<sup>12</sup>

The demanding surgical techniques used in this case have some limitations, as they cannot be performed easily in a rural hospital without fully-equipped facilities. Moreover, the risks of the abdominal procedure must be weighed against the benefits. We believe that the PSI should still be the standard technique for vaginoplasty in TGW, especially in those who have adequate penile-scrotal skin. Peritoneal vaginoplasty should be conducted only for patients with penoscrotal hypoplasia or failed PSI.

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