Total vaginal reconstruction with combined ‘Split Labia Minora Flaps’ and full-thickness skin grafts

Caghan Baytekin¹, Adnan Menderes², Fahri Mola², Ozan Balik², Volkan Tayfur³ and Haluk Vayvada²

¹Kocaeli Acibadem Hospital, Department of Plastic and Reconstructive Surgery, Izmit, ²Dokuz Eylül University, Department of Plastic and Reconstructive Surgery, Izmir and ³19 Mayis University, Department of Plastic and Reconstructive Surgery, Samsun, Turkey

Abstract

Purpose: Vaginal reconstruction with split-thickness skin grafts is the most common method for total vaginal reconstruction. Although it has disadvantages like contraction of the graft, foreshortening, donor site morbidity and long-lasting periods of vaginal standing; its easy surgical technique makes it popular. A new method using split labia minora (LM) flaps and full-thickness skin graft is discussed in this study.

Method: A 19-year-old female was presented with amenorrhea. A total absence of vagina was present and the patient underwent a total vaginal reconstruction for possible sexual intercourse.

Results: We observed no contraction and no foreshortening with a patent vaginal cavity up to 11 cm and 4.5 cm width. The need for continuous standing period was as short as 4 weeks and for intermittent standing up to 4 months. Sexual intercourse was encouraged after 4 weeks. During sexual intercourse no external lubrication was reported to be needed. There was no need for further reconstructive intervention.

Conclusion: Vaginal reconstruction in congenital vaginal agenesis with split LM flaps and full-thickness skin grafts is a simple and effective method, which shortens the standing period and decreases the contraction in neovagina. Total vaginal reconstruction with split LM flaps could also be possible; to achieve this goal, expansion of LM flaps could be a further alternative.

Key words: congenital anomalies of female urogenital system, intersex, müllerian anomalies.

Introduction

Müllerian agenesis, which is a congenital malformation, is detected one in 4000–5000 females.¹ It is the second most common cause of primary amenorrhea.² It is usually recognized at the pubertal age, due to amenorrhea or failure to achieve active sexual intercourse. These patients may also present with hematometra, hematocolpos or increased abdominal mass due to accumulation of menstrual products.³ Uterovaginal agenesis (which usually is associated with normal fallopian tubes or tubule fimbriae, female karyotype, and complete differentiation of the ovaries) is known as Mayer-Rokitansky-Kuster-Hauser syndrome.⁴ External genitalia and secondary sex characteristics are normal in most cases. The syndrome may be associated with other embryogenic abnormalities, including urinary and skeletal defects.

Treatment of vaginal agenesis is the development of a neovagina. Both operative and non-operative techniques have been described. Some of these techniques are, passive dilatation of the vaginal remnant,⁵ progressive traction using the Vaccetti device with or without usage of laparoscopy,⁶,⁷ vaginal reconstruction with split-thickness skin grafts (STSG),⁸ reconstruction with full-thickness skin graft (FTSG),⁹ and...
amnion grafts, reconstruction with bowel flaps, reconstruction with various types of fasciocutaneous and musculocutaneous flaps and total vaginal reconstruction with labia minora flaps (LM flaps).

Creation of a neovagina using STSG (the McIndoe method) is the most preferred method in some clinics. However the STSG method can lead to neovaginal stenosis, contracture and foreshortening after surgery. It requires vaginal standing for as long as 1 year. The full-thickness skin graft method has decreased contraction and foreshortening rates, but it has also the possibility of introit circular contraction. Vaginal reconstruction using labial flaps was advocated by Graves, Brody and Williams, and total vaginal reconstruction with a detailed anatomy of the LM flaps was published by Hwang in 1985.

Materials and Methods

A 19-year-old female, non-married, presented with amenorrhea and a history of failure to achieve active sexual intercourse. She was already evaluated by the Obstetrics & Gynecology department of the same institute 5 years earlier. Ultrasonographic (USG) examination revealed complete uterovaginal agenesis. Normal appearance of ovaries, fallopian tubes and fimbria were shown also. No skeletal or urinary tract abnormalities were detected following radiographic examination. Chromosomal karyotyping revealed 46 XX.

The pubic and axillary hair was normal. Pelvic examination revealed normal-appearing external genitalia but only a small shallow dimple at the vaginal introital site, which invaginated 1 cm on pressure. (Fig. 1)

Vaginal reconstruction with split LM flaps and FTSG obtained from the bikini line was performed.

Surgical anatomy

According to the detailed description of labium minus circulation and innervation by Hwang, the blood supply to the Labia minora comes from the external superficial pudendal artery and internal pudendal artery. Near the root of labium majus, external superficial pudendal artery and the posterior labial artery, which is a branch of the internal pudendal artery, form an anastomotic network. This arterial anatomic arch gives rise to eight arterial branches to the labia minora. Three of them anastomose to form the second anastomotic arch near the interlabial groove. From the second arch three to four branches arise in the labia minora to form the third and fourth arches. The veins are satellites of the homologs arteries. The innervation of the labia minora comes from the posterior labial branch of the pudendal nerve. The posterior labial nerve again gives two branches, which accompany the vascular ramifications.

The labia minora are covered with a skin similar to the mucous membrane containing sweat glands but no hair follicles. They possess a subcutaneous tissue, rich in elastic fibers, which makes the dissection between internal and external surfaces easy.

Surgical technique

A full preoperative bowel preparation was used. Under general anesthesia with the patient in lithotomy position, a Foley catheter was inserted into the urethra to avoid urethral injury during neovaginal cavity reconstruction. An index finger was placed in to the rectum to avoid further complications. A transverse ‘H’ type incision was made through the mucosa of the vaginal remnant and deepened until the undersurface of the peritoneum was reached. The neovagina created was enlarged digitally to admit two fingers width. Hemostasis was achieved by meticulous electrocoagulation.

After dissection of the neovaginal cavity, split LM flaps were planned on the medial (internal) surface of both labia minora (Fig. 2). Both flaps were elevated through the subcutaneous plane between the internal and external layer of the labia minora with sharp dissection (Fig. 3). Prepared flaps that were 7 × 6 cm each were opposingly transposed to the neovaginal pouch forming the orifice and distal half of the reconstructed neovagina. Flaps were sutured to the pouch and each other with 4/0 chromic catgut sutures. A 20 × 8 cm
elliptical FTSG was obtained from the bikini line of the patient and the donor area was closed primarily (Fig. 4). The FTSG was mashed manually and inverted over a 150 cc inflatable silicone stent (Vaginal inf. stent; Silimed, Dallas, TX, USA) and fixed to the proximal end of the neovaginal cavity and distal ends of LM flaps (Fig. 5). The silicone stent was embedded into the neovaginal cavity and inflated. The outer layer of the labia minora was folded on itself and sutured to close the flap donor area (Fig. 6).

Figure 2 Drawing of split labia minora flaps.

Figure 3 Both split labia minora flaps.

Figure 4 Full thickness skin graft (FTSG) donor area.

Figure 5 FTSG meshed and wrapped around a silicone stand.

The silicone stand was deflated on the 6th post-operative day and the skin graft was evaluated. The inflatable silicone stand was used for another 3 weeks continuously. After the 4th post-operative week the patient was encouraged to have sexual intercourse and the silicone stent was used intermittently for another 3 months.

Results

We observed no contraction and no foreshortening with a patent vaginal canal up to 11 cm and 4.5 cm width (Figs 7,8). The need for continuous standing period was as short as 4 weeks and for intermittent standing up to 4 months. Sexual intercourse was encouraged after 4 weeks. During sexual intercourse no external lubrication was reported to be needed. There was no need for further reconstructive intervention.

Discussion

For vaginal reconstruction in congenital vaginal agenesis, various techniques have been described.
Non-operative passive dilatation of the vaginal remnant usually takes 6–8 weeks and the success rate defined by normal sexual function is 76%. Passive dilatation can also be achieved surgically using the Vachetti device, which is reported to create a neovaginal chamber of 7 cm and epithelizes totally in 5 months. The most commonly used method in vaginal reconstruction is the McIndoe method. It involves surgical dissection of the neovaginal cavity and grafting of the created cavity with STSG. The most important aspect of the procedure is the long standing period. Bleeding after intercourse, lack of lubrication, dyspareunia, stricture and foreshortening of the vaginal cavity are other pitfalls. FTSG, buccal mucosa grafts and amnion grafts are also used in the epithelization of the neovaginal cavity. Less contraction and foreshortening compared to the STSG technique are reported but contraction, especially in the vaginal orifice, is of great concern. Mucosal triangular flaps were used to overcome this problem.

Colpopoiesis using the peritoneum or intestinal segments are also described. Although introital stenosis was still reviewed as one of the most common post operative problems in sigmoid colpopoiesis, it responded well to dilatation under anesthesia. Still, transfer of the intestinal tissues is a major procedure with a lot of morbidity in inexperienced hands.

Fascial, muscular or musculo-cutaneous flaps are mostly preserved for vaginal reconstruction after ablation or radiotherapy.

Labia minora flaps for total reconstruction of the neovagina as described by Hwang, or in a horseshoe shape are an excellent alternative to the vaginal mucosa; they can produce a medium sized tube that
can be dilated over a period of 2–3 months by gradual dilatation. Usage of vaginal reconstruction with LM flaps has become unpopular due to its surgical difficulty and labia minora loss. Labia minora loss is aesthetically displeasing and difficult to reconstruct.

We used split LM flaps in combination with FTSG for vaginal reconstruction in congenital vaginal agenesis. The introitus and distal half of the vaginal cavity was reconstructed with split LM flaps, whereas the distal half of the cavity was reconstructed with FTSG. Anatomical results regarding the neovaginal cavity and aesthetic appearance were satisfactory. Sexual intercourse of the patient was encouraged after 4 weeks and no dyspareunia, no need for external lubrication was reported. There was no need for a further reconstructive intervention.

The rich arterial supply of labia minora allows us to form internal and external based split flaps for vaginal reconstruction. This simple technique makes the neovagina sensitive soft, pliable and self lubricative. Total reconstruction of the vagina with LM flaps is also possible but needs a second intervention for reconstruction of the labia minora. Reconstruction of an aesthetically pleased labium minus is a difficult goal to achieve.

Vaginal reconstruction in congenital vaginal agenesis with split LM flaps and FTSG is a simple and effective method, which shortens the standing period and decreases the contraction in the reconstructed vaginal cavity. There is also no need for external lubrication during sexual intercourse. Although the surgical dissection of the internal and external layer of labia minora does need experience, split LM flaps are a good alternative for vaginal reconstruction. Total vaginal reconstruction with split LM flaps could also be possible; to achieve this goal, expansion of the LM flaps could be a further alternative.

References
