



Original Article

Reconstruction of Vagina with Bilateral Pudendal Thigh Flap: A Solution for Atresia/ Agenesis of Vagina

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Abstract

Reconstruction of vagina is a technically challenging surgery. The aim is to create a functionally and aesthetically satisfactory neovagina in a way that will be reliable and suitable for most patients. Use of bilateral Pudendal thigh flap to create a neovagina may overthrow the conventional methods as there is no necessity for postoperative dilation or vaginal intercourse to maintain adequate vaginal length and diameter.

Vaginal reconstruction was done with bilateral Pudendal thigh flaps, in seven patients with vaginal agenesis, during 2 years, from July 2021 to June 2023. This method of vaginoplasty is simple, safe, and reliable and has shown satisfactory functional and cosmetic results. The reconstructed vagina has a natural angle and is sensate in its lower part. No postoperative stenting or dilatation is required. The donor site can be closed primarily and the scar is well hidden in the groin crease.

Key words: Vaginal reconstruction, Pudendal thigh flap, Mullerian agenesis, Vaginal stenosis.

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Introduction

Vaginal reconstruction is needed for patients with congenital abnormalities of genitalia or after ablative surgery of genitalia.¹Müllerian agenesis, also referred to as Mayer–Rokitansky–Küster–Hauser syndrome, or vaginal agenesis is caused by embryologic underdevelopment of the Müllerian duct, with resultant agenesis or atresia of the vagina, uterus, or both. The vaginal canal is markedly shortened and may appear as a dimple below the urethra. A single midline uterine remnant may be present or uterine horns (with or without an endometrial cavity) may exist. The ovaries are usually normal in both structure and function as their embryological origin is different from that of uterus and vagina. Patients with

Müllerian agenesis usually are identified when they are evaluated for primary amenorrhea with otherwise typical growth and pubertal development.²

On physical examination, patients with Müllerian agenesis have normal height, breast development, body hair, and external genitalia. The vagina is absent and may appear as a small flush dimple, or longer, without a cervix at the vaginal apex.²

The first line management of patient with Mullerian agenesis is counselling and psychosocial support. Then comes the correction of anatomical abnormalities. Child bearing may be possible with assisted reproductive techniques. Otherwise in these patients, child bearing is

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possible. Neo-vagina is only for sexual intercourse.

In order to correct the anatomical abnormalities, the options are either vaginal elongation or surgical creation of neo-vagina.² Although primary vaginal elongation by dilatation is effective in most of the patients, surgical reconstruction is also needed in some patients in whom dilatation fails or is not applicable as where there is total absence of vagina.

There are various techniques for creation of neo-vagina. The theme is to create a pocket between urinary bladder and rectum.¹ The aim is to create a vaginal canal sufficient for penetrative intercourse.² The lining epithelium of the newly created vagina varies according to the technique used.¹

In the modified Abbe–McIndoe operation, a space is dissected out between the rectum and bladder, a stent covered with a split-thickness skin graft is placed into the space.³ The laparoscopic Vecchiotti procedure is a modification of the open technique in which a neovagina is created using an external traction device that is affixed temporarily to the abdominal wall.⁴ Another procedure, the Davydov procedure, was developed as a three-stage operation that requires dissection of the rectovesicular space with abdominal mobilization of a segment of the peritoneum and subsequent attachment of the peritoneum to the introitus.⁵⁻⁸ Postoperative dilation is essential to prevent significant neovaginal stenosis and contracture in all these techniques.

In 1989, Wee and Joseph described a new technique of vaginoplasty using bilateral pudendal thigh flaps, the base of which is designed horizontally at the level of the posterior margin of the introitus. Placed adjacent to the outer border of the labia majora, it extends towards the femoral triangle in a conical fashion centered on the inguinal crease. The branches of the internal pudendal artery anastomose with their counterpart and also with the deep external pudendal, circumflex femoral and anterior branch of the obturator artery and hence form a rich vascular anastomosis around the orifice. This vascular

network provides the basis of our perforator flaps. The posterior labial branches of the pudendal nerves and twigs from the perineal branch of the posterior cutaneous nerve of the thigh provides the innervations of the flap.¹

Materials and Methods

Vaginal reconstruction was done with bilateral pudendal thigh flaps, in seven patients with vaginal agenesis, during 3 years, from February 2020 to January 2023. The flaps were raised on either side of labia and sutured to each other in midline to form a vaginal tube. This neo-vagina was inserted into the space between the rectum and bladder. Vaginal packs were kept for five days. Patients were followed up in 2 weeks, after 1 month and 6 months post-operatively.

Surgical Technique

The surgery was done under Spinal anesthesia with the patient placed in the lithotomy position with the legs on stirrups. Urethral catheterization was done prior to operation. Broad spectrum antibiotics were given. Bilateral pudendal-thigh flaps were marked with a length x breadth 15x 6cm (maximum), base at the level of introitus extending from lateral to hair bearing part of labia majora across groin crease to medial thigh [Figure: 1]. It is arterialized throughout by the posterior labial artery and deep external pudendal arteries. Hand held doppler was used per-operatively to locate the perforator vessel.

After that, surgeon started the procedure to perform the recanalization of the neo-vagina. The dissection was meticulously proceeded in between the urethra and urinary bladder anteriorly and rectum posteriorly. Adequate care was taken not to injure these vital structures during dissection. Bilateral pudendal-thigh flaps were raised. The tendon of the adductor longus muscle was identified and flap elevation started at the apex.

The incisions made along the margins except posteriorly and carried down to include the epimysium of the adductor muscle. Elevation of the flaps was carried out in this plane until the base was reached. The deep fascia was tacked to the edges to prevent shearing. The skin at the base

of the flap is incised to the sub-cutaneous tissue level and is undermined in this plane posteriorly for a short distance. This allows rotation of the flap medially and brings the posterior margin next to the inner edge of the labia to which it will be sutured. The labia were lifted off the pubic rami and perineal membranes and flaps from both sides were tunneled under labia. This was safe for the posterior labial nerves as they had entered the labial fat far posteriorly. Clitoral nerves were also in no danger because they do not pass through the superficial perineal pouch and course through the deep perineal pouch to reach the clitoris.

Flaps from both sides, tunneled under the labia majora were everted through introitus so both come to lie together in the middle without tension. Posterior suture line was completed first [Figure: 2] and after the tip was reached then anterior suture line was commenced [Figure: 3]. The tip of cul-de-sac was then invaginated and simply anchored to the tissue at the upper part of the vaginal space. The opening of the neo-vagina was sutured to the muco-cutaneous edge of labia minora. Donor site was closed primarily without tension [Figure: 4]. Post operatively the patient was kept in bed for 48 hours. Urinary and cervical catheter was maintained for 3 weeks, the vaginal canal was packed (soaked with Jesocaine jelly) for 5 days and washed with normal saline and Povidone Iodine solution every day and parenteral broad spectrum antibiotics were given for 5 days. And laxative should be used post-operatively to prevent constipation. Movement should be restricted for at least five days.



Figure 1: Flap marking (Flap size 6x15cm, Perforator Vessels marked by Hand Doppler)

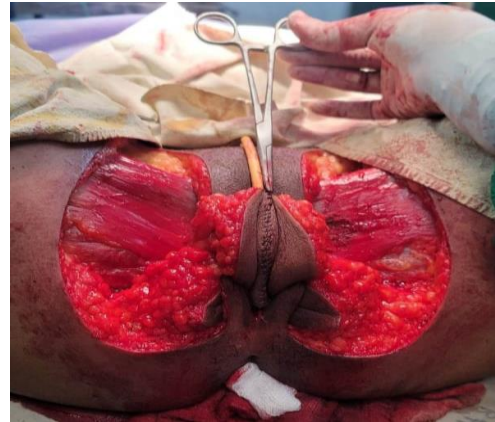


Figure 2: Flaps passing beneath the Labial folds and sutured together at first posterior margin

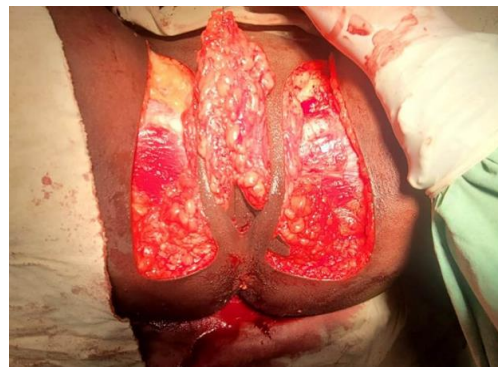


Figure 3: Flaps Suturing together to create a tubular Neo-vagina



Figure 4: Donor sites closed primarily without tension



Figure 5: Follow up after 1 month



Figure 6: Follow up after 3 months

Results

This flap was used in seven patients without major postoperative problems and with good anatomical and functional results. Per-vaginal examination revealed a satisfactorily wide vaginal canal (about three fingers could be introduced, 12cm) with intact sensation.

Patient	Age (in year)	Flap used	Introitus	Sensation
Mim	15	Bilateral pudendal thigh flap	Three fingers	Intact
Mitu	16			
Ismat	16			
Chadni	17			
Pallobi	14			
Meem	18			
Shimu	20			

Discussion

The incidence rate of MRHK syndrome is 1:5000 female birth.⁹ The surgical management of the absence of the vagina is a complex problem and constitutes a significant technical challenge.¹⁰ Vaginal reconstruction is critical for maintenance of sexual functioning, psychosocial health, restoration of body image, and for pelvic support to prevent bladder, rectal, and pelvic prolapse.¹⁰ There are many methods of vaginal reconstruction with their own advantages and disadvantages. They include the serial dilatation¹¹, use of split skin graft¹², use of full thickness graft¹³, use of

buccal mucosal graft¹⁴ and use of amniotic membrane¹⁵, Ileum and pelvic colon.¹ Gracilismyo-cutaneous and Groin fascio-cutaneous flaps have also been used.¹ Serial dilatation is a non-operative technique and has no morbidity but it requires long extended duration of stent use to be effective. Use of split skin graft (SSG) or McIndoe technique is the gold standard by which all other techniques are compared. It is a simple procedure and easy to perform and carries less morbidity. Good vaginal length is easy to obtain. Disadvantage of this technique is the shrinkage of the cavity in due course of time because of contraction of the skin graft and the

patient has to wear some type of a stent at all times. Use of full thickness graft (FTG) instead of split skin graft was done in order to prevent contraction of the graft, but it carries greater morbidity and the necessity of wearing the stent is still there. Use of amniotic membrane to line the cavity instead of SSG or FTG has been used but remains far away from the ideal solution as amniotic membrane never takes but acts as a biological dressing that helps in accelerating the wound healing and also requires wearing a stent. As Baldwin procedure, which popularized the use of the various portions of the bowel such as Ileum and colon to reconstruct the vagina, bears increased mortality and morbidity associated with intra-abdominal surgery, along with other disadvantages associated with the use of ileum included bleeding with coital trauma, excessive mucous secretion, periumbilical pain associated with coitus and tendency to prolapse. Baldwin procedure is generally abandoned in favor of the other safer operations. Gracilis myo-cutaneous flap became very popular for perineal reconstruction. But it carries a pedicle, which is very precarious, and chances of flap failure are quite high especially for a surgeon in his early learning curve. Furthermore it produces a very conspicuous thigh scar. Comparing the above problems, the pudendal thigh flap is a sensate fascio-cutaneous flap based on the terminal branches of the superficial perineal artery, which is a continuation of the internal pudendal artery. It looks to be very ideal, as it has got a robust blood supply and chances of necrosis are almost negligible. The technique is simple, safe, and reliable, and no stents or dilators are required.¹ The reconstructed vagina has a natural angle and is sensate retaining the same innervation of the erogenous zones of perineum and upper thigh.¹⁶ The donor site in the groin can be closed primarily with an inconspicuous scar well hidden in the groin crease.¹ There are certain disadvantages with this Pudendal thigh flap. It is technically slightly more difficult than McIndoe technique and requires more time. The problems of hair in the neo-vagina can be dealt by depilatory creams or by Laser therapy.¹ In some cases there is numbness of the vagina. This is because the anterior part of the

flap near the medial corner of the femoral triangle is supplied by the nerve twigs of genitofemoral and ileo-inguinal nerves which are cut in the process of elevation, hence sensation is retained only in the lower part of reconstructed vagina.¹

Conclusion

This method of vaginoplasty is simple, safe, and reliable and has shown satisfactory functional and cosmetic results. The reconstructed vagina has a natural angle and is sensate in its lower part. No postoperative stenting or dilatation is required. The donor site in the groin can be closed primarily and the scar is well hidden in the groin crease.

Conflict of interest: None declared

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