Journal of Bangladesh College of Physicians and Surgeons
Vol. 41, No. 2, April 2023

Laparoscopic Assisted Vaginoplasty with Amnion Graft

M AFROZA[a], B ROKEYA[b], F RESHMA[c], A SHAMIMA[d], K FATEMA[e]

Abstract:

Background: Around 1 in 400–5000 live births of females result in vaginal agenesis, a malformation of the female genital tracts. Using an amnion graft to treat vaginal agenesis is a straightforward, widely accessible, economically advantageous, and physiological surgery that leaves no additional scars on the body. This study sought to ascertain whether individuals with vaginal agenesis may successfully undergo laparoscopic-assisted vaginoplasty utilising amnion as a transplant to create a neovagina.

Methods: Ten cases of vaginal agenesis linked to Mayor-Rokitansky-Kuster-Hauser (MRKH) Syndrome were included in this case series and were hospitalised within a year. The ladies with MRKH condition were either previously married or unable to consummate their marriage due to a blind vagina when they were brought for surgical intervention. To maintain the patency of the neo-vagina, a laparoscopically guided vaginoplasty was carried out as part of the care.

Results: In all but one of the patients, laparoscopy-guided vaginoplasty with an amnion graft was effective. The procedure was stopped when the rectum was hurt, and the harm to the rectum was repaired. Except for one example, the functional outcomes of the neovagina were quite good. None experienced any major postoperative problems. The patients were happy with the postoperative results. Also, the neovagina was psychologically acceptable and sufficiently patent for sexual function.

Conclusion: Over the past few years, the new vaginoplasty technique has developed. The most common practice, however, is a laparoscopic approach using several graft materials. A safe and efficient method for treating MRKH syndrome patients with vaginal agenesis is vaginoplasty with amnion grafts.

Keywords: Vaginal agenesis, Mayor Rokitansky Kuster Huster Syndrome, Vaginoplasty, amnion graft.

(J Bangladesh Coll Phys Surg 2023; 41: 177-182)
DOI: https://doi.org/10.3329/jbcps.v41i2.64584

Introduction:

Vaginal agenesis is a congenital condition of the female genital system that can happen alone or in conjunction with other defects.[1] According to estimates, 1 in 4000–5000 live female births result in vaginal agenesis.[2] Common causes of vaginal agenesis include Mullerian agenesis, the Mayer Rokitansky Kuster-Hauser (MRKH) syndrome, and androgen insensitivity syndrome (AIS).[3] A short or aplastic vagina in the presence of functioning ovaries, normal-gonadotrophic sex steroid level, typical secondary sexual characteristics (SSC), and normal female karyotype are all symptoms of MRKH syndrome, congenital agenesis of the paramesonephric duct (46XX).[4] The Mullerian duct fails to develop embryologically, resulting in agenesis or hypoplasia of the uterus and vagina.[5] There are two different MRKH syndromes described. The proximal two-thirds of the vagina are absent in type-I MRKH syndrome. In Type-II MRKH syndrome (30%), they have renal anomalies, whereas 12% have skeletal defects, mainly in the vertebrae.[6] Type-ll typically exhibits primary amenorrhea, a typical SSC looks, and are genetically female. They lack a uterus/ small, incomplete rudimentary uterus, or absent or short and blind-ending. Ovaries have specific structural and functional characteristics from other embryologic origins. External genitalia is normal. Hence, a diagnosis is typically overlooked at birth but is made after puberty when these young females present for a primary amenorrhea inquiry.[7] Because of their negative self-perception, these problems may have an emotional, social, and sexual impact on them.

Neovagina creation is an option for treatment for MRKH syndrome for sexual function, which should satisfy both partners with the least amount of morbidity. Both surgical and nonsurgical options are available. [8] The least invasive treatments, such as the nonsurgical Frank techniques and gradual self-vaginal dilatation with hand-held dilators or dilators mounted on a bicycle seat stool,

a. Dr. Afroza Mazumder, Associate Professor, Dept. of Gynae & Obst, USTC, Chattogram.
b. Dr. Rokeya Begum, Adviser, Dept. of Gynae & Obst, USTC, Chattogram.
c. Dr. Reshma Feroze, Assistant Professor, Dept. of Gynae & Obst, USTC, Chattogram.
d. Dr. Shamima Akther, R/S, Dept. of Gynae & Obst, USTC, Chattogram.
e. Dr. Fatema Khan, Assistant Professor, Dept. of Gynae & Obst, Merin City Medical College, Chattogram.

Address of Correspondence: Dr. Afroza Mazumder, Associate Professor, Gynae & Obstetrics dpt, USTC. Mobile: 01816307396, E-mail: dr.afrozaustc@gmail.com

Received: 06 March, 2022 **Accepted:** 22 January, 2023

need a lengthy course of therapy and may be uncomfortable for the patient.[9,10] Split-thickness skin grafts (McIndoe procedure) or full-thickness skin grafts, Sigmoid Vaginoplasty, peritoneal grafts (Davydov procedure), and the Vechietti technique, which uses an external traction device mounted on the abdomen to continuously apply pressure on the vaginal dimple via a 2 cm olive bead and amnion graft, are surgical methods for creating a neovagina [11] The optimum approach out of all of these, though, is still unclear. An extra scar is made in the skin during a skin transplant treatment so that the graft can be removed. However, unlike vaginoplasty with skin grafts, an amnion graft does not need a second scar to allow for graft retrieval. The amnion is also less expensive, easier to get, and more physiological than a skin graft. [12] At a private tertiary care institution in a developing nation like Bangladesh, this case series sought to explain the results of amnion vaginoplasty in vaginal agenesis caused by MRKH syndrome after receiving patients' written informed consent.

Methodology:

The cases for this case series were gathered from the obstetrics and gynaecology inpatient department at Bangabandhu Memorial Hospital, USTC, Chittagong, between January 1 and December 31, 2019. This case series featured ten patients that were admitted to this hospital.

After evaluation, it was determined to perform an amnion vaginoplasty on the diagnosed case of MRKH Syndrome. A thorough examination, the surgical process, and the postoperative follow-up results were reported. The girl who must perform functional sexual activity soon (within three months of reconstruction) due to impending nuptials or who was previously married but unable to consummate the relationship due to a short, blind vagina opted to have this procedure. This case series does not include cases of vaginal agenesis brought on by AIS. The SSCs were all normal, and every subject had primary amenorrhea. A vaginal dimple, a short blind vagina, and a fully blind vagina were all seen during an abdominal-pelvic exam. All patients underwent ultrasounds, revealing that none had a uterus or a rudimentary one. Ultrasonography in every case indicated the presence of ovaries. Congenital anomalies outside of the genitalia were not included in this study. Everyone's karyotype was 46 XX. All subjects' endocrine profiles fell within the usual range. Following examination, a diagnostic laparoscopy with an amnion vaginoplasty for neovaginal creation was performed in all patients.

Presentation:

All the girls were between 16 and 20 years (four were older than 16); eight were single, and two were married. No other skeletal anomaly was discovered; all patients had primary amenorrhea, normal secondary sexual development, and normal psychological condition. In two females, the vagina was short and blind; in eight girls, there was only a dimple at the introitus.

Married participants lamented their incapacity to engage in sexual activity and mild dyspareunia. External genitalia revealed during pelvic examination followed a typical female pattern. All of the girls' labia were normal, but two patients' introituses resembled a dimple and were one to five centimetres long. In contrast, the introituses of the other patients were either absent or covered by a membrane.

Each individual underwent ultrasonography, revealing a small, non-functioning uterus with nodules. Both ovaries had their typical anatomical structures and locations. There were no cases where renal problems were also present. Also, each patient exhibited distinct endocrine levels and showed normal serum FSH, LH, TSH, and prolactin levels before therapy planning. Every case had a 46 XX karyotype.

Operative Procedure:

Before surgery, patients and their parents received in-depth counselling about the procedure, possible recovery times, problems, potential results, and follow-up. All patients received follow-up care for six months and were instructed to return any time for additional follow-up.

In each case, diagnostic laparoscopy and amnion vaginoplasty were performed. All of the intraabdominal cavity was assessed after entering the abdominal cavity.

All patients had general anaesthesia. Abdominopelvic organs were seen following a diagnostic laparoscopy, which ruled out additional pathology. In all cases, a laparoscopy revealed a smaller, more primitive uterus; the ovaries appeared normal. A peritoneal fold was discovered to be attached to the undeveloped uterus,

and the fallopian tube was present. After considering vaginoplasty, an elective cesarean procedure was scheduled concurrently to obtain amnion. A sterile environment was used to harvest the placenta with membranes. After being detached from the layer underneath it (the Chorion), the amnion was washed in a sterile normal saline solution and injected with amoxicillin. Mothers underwent hepatitis B, syphilis, and HIV testing before collecting amnion.

A planned transverse incision was made on the midpoint of the perineum or the vaginal dimple following an abdominal-recto-pelvic assessment while the patient was in the lithotomy position. By using blunt digital dissection, a prospective space between the bladder urethra and rectum was made. A 4-5 cm wide by 8-10 cm large gap was created. A neovagina was produced under the catheter's anterior guidance and, with the help of a finger, inserted inside the rectum to protect it.

A sterile sponge was shaped to prepare vaginal mould covered with latex condom rinses in cidex solution. This mould is inserted inside the newly built vaginal cavity after the amnion has been collected and wrapped in an amnion tent. The labia majora was lightly sutured with silk after the mould was placed in the vagina to hold the mould in place. Half an hour before the procedure, a prophylactic broad-spectrum antibiotic was started and continued for seven days. The mould and catheter were removed on the eighth day while taking all necessary aseptic measures. When the mould was removed, povidone-iodine was used for vaginal douching. The second mould was created using the same technique and held for seven days with the labia majora attached while administering local anaesthesia. The second mould was removed on the fifteenth postoperative day. All patients received information on how to prepare for the formation of a mould by inserting a sponge piece covered in a latex condom into the newly formed vagina, continuing to place it there for a follow-up period of three months, and then inserting it exclusively at night for an additional three months. Patients were checked in at two, six, twelve, and finally, six months. After three months post-op, married ladies were recommended to start engaging in vaginal sex.

Outcome:

The entire operative procedure took 45 to 60 minutes. In one case, the postoperative consequences included rectal injury, which was treated immediately. At three months, in 8 patients, the vaginal length was approximately 7-8 cm. In 2 cases, there was vaginal constriction because of poor compliance; later, they were advised to regular vaginal digital dilatation by a lubricant. All married couples were encouraged to engage in regular sexual activity. Follow-up at three months was satisfactory in 90% of cases, and 10% required a second procedure and counselled about reasons behind poor compliance. Follow-up at six months was good regarding anatomical and functional vaginal length patency in 100% of cases. All patients were advised to come for follow-up at any time during a subsequent period.

Fig.-1: *Showing preoperative presenting signs of an absence of the vagina.*

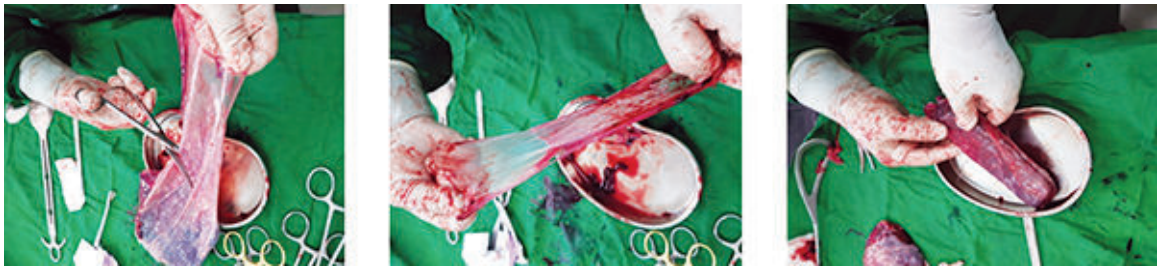

Fig.-2: *Showing a picture of soft mould preparation.*

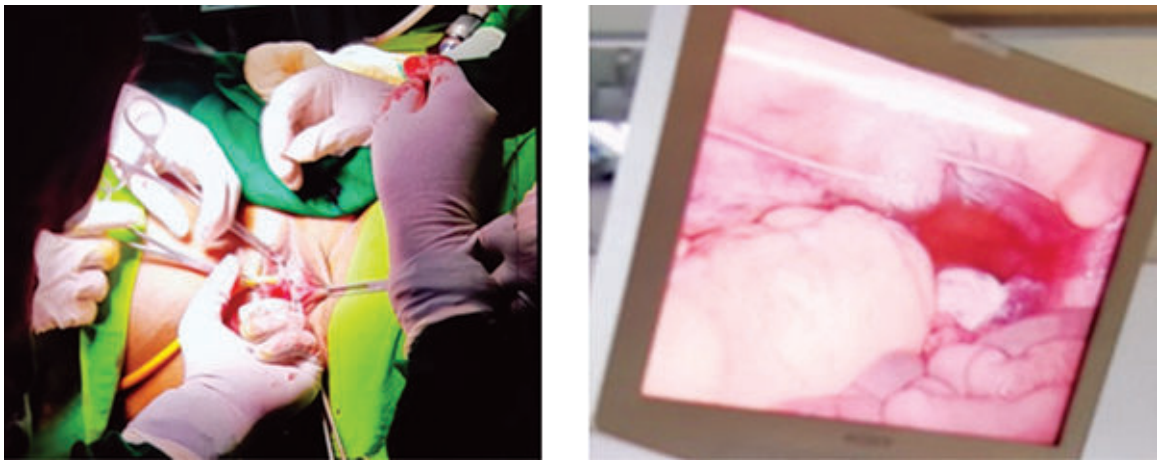

Fig.-3: *Showing per-operative findings of vaginoplasty.*

Discussion:

Surgical rebuilding of the vagina, treating skin burns and chronic leg ulcers and preventing tissue adhesion all use amniotic membranes as grafts.[13] Amnion grafts are suitable for vaginoplasty since they are readily available and do not elicit tissue reactivity.[14] Since amnion does not have any blood supply, hence HLA-A, B, or DR, antigens are not expressed in its lymphatics. So, an amnion transplant does not experience immunological rejection.[15] Amnion is also thought to have antibacterial qualities, which lowers the chance of postoperative infection.[16] Epithelialisation is aided by its anti-fibroblastic effects, cell migration, and growth-promoting properties.[17] Also, Its preparation techniques were not complex after an elective caesarean section during concomitant vaginoplasty.[18] A skin graft may leave patients with scars if the skin graft is used.[19] Using the gut as graft results in ongoing discharge and foul odour.[20] The laparoscopic approach helps examine the abdominal cavity even if it takes longer than conventional treatments.[21]

Although being a simple vaginoplasty procedure, the digital dilatation technique requires greater drive and ongoing monitoring.[22] Similar outcomes were seen in a 2006 trial using amnion transplants on ten patients in Lahore, Pakistan, over four years. In that study, one patient underwent surgery while suffering rectal damage (90% of operations were successful). However, the procedure was still performed following rectal repair. They had an 80% success rate after six months, one patient experienced cicatrisation, and one patient was lost to follow-up.[23]

Similar results were also reported in a 2009 German study that involved seven patients.[24] One patient experienced severe operational problems, and 85.71% of operations were successful. Follow-up anatomical and functional outcomes at 18 months were successful in all instances.[25]

Dissection between the rectum and the bladder and the mould placement into the resulting space are two surgical techniques similar to McIndoe Reed that are often covered by a split-thickness skin graft. But just 71–90% of people claimed to be sexually satisfied.[26] Davydov entails cutting open the rectovesical area, moving a piece of the abdominal peritoneum, and attaching it to the introitus. The postoperative consequences are injuries to the bladder and rectum, peritonitis, and lower urinary tract infection. However, no one experienced urinary problems following catheter removal throughout our follow-up.

Even though amnion has only been used in a few experiments to create a neovagina, the outcomes are excellent. This operation has the benefit of being secure, affordable, and simple to carry out. Neovagina's epithelial lining resembles the regular vaginal lining, making for more comfortable sexual activity. There is, therefore, less emotional tension and better economic and cosmetic advantages.

Conclusion:

With the MRKH syndrome, vaginoplasty varies and depends on several variables. Acceptance of the vaginoplasty techniques is influenced by the surgeons' experience, patients' preferences, the readiness of the patients, and the facilities that are accessible. Laparoscopy-assisted vaginoplasty might increase the success of vaginoplasty using an amnion graft.

Limitation:

Laparoscopic-assisted amnion vaginoplasty was done in MRKH Syndrome only, and other cases required additional methods.

Recommendations:

Vaginoplasty with amnion graft should be an option for reconstructing neovagina for vaginal agenesis because it is less technically challenging, safer, and more effective than more advanced and cutting-edge operations.

Acknowledgments:

I acknowledge my colleagues and all the patients of vaginal agenesis who allowed us to do the surgery for this case series.

References:

1. American College of Obstetrics and Gynaecologist Committee on Adolescent Health Care.ACOG committee opinion no. 355. Vaginal agenesis diagnosis, management, and routine care. ObstetGynaecol 2006;108:1605-9.
2. Templeman CL, Lam AM, Hertweckk SR. Surgical management of vaginal agenesis. ObstetGynaecolSurv. 1999; 54:583-591.
3. Folch M, Plegm I, KonjeJC. Mullerian agenesis, aetiology, diagnosis, and management. Obstet Gynaecol Survey. 2000;55:644-649.
4. Oppelt P, Renner SP, Kellermann A, et al. Clinical aspect of Mayer – Rokitansky –Kuester syndrome recommendations for clinical diagnosis and staging. Hum Reprod. 2006;21:792-797.
5. Evans TN, Poland ML, Boving RL. Vaginal malformation. Am J ObstetGynaecol . 1998;141:910-20.
6. Murray JM, GambrellRD Jr. Complete and partial vaginal agenesis. J ReprodMed.1979;22:101-105.
7. Sultan C, Biason – Lauber A, Philbert P. Mayer –Rokitansky –Kauser –Hauser syndrome . Recent clinical and genetic findings. Gynecol Endocrinol. 2009;25(1):8-11.{ Pub Med }[Google Scholar].
8. Fedele L, Bianchi S, Zanconato G, Raffaelli R. Laparoscopic creation of a neovagina in patients with Rokitansky syndrome: analysis of 52 cases. Fertil Steril. 2000;74(2):384-389. [Pub Med }[Google Scholar].
9. Wabrek AJ, Millard PR, Wilson WB Jr, Pion RJ. Creation of a neovagina by the Frank non operative method. Obstet Gynaecol. 1971;37:408-413.
10. Roberts CP, Haber MJ, Rock JA. Vaginal creation for Mullerian agenesis. Am J ObstetGynaecol . 2001; 185:1349-1352.
11. Ingram JM. The bicycle seat stool in the treatment of vaginal agenesis and stenosis: a preliminary report. Am J ObstetGynaecol .1981;140:867-873.
12. Langebreke A, Istre O, Busund B, Sponland G, Gjonnaess H. Laparoscopic assisted colpoclesis according to Davydov . ActaObstetGynaecolScand. 1998;77:1027-1028.
13. Ismail IS, Cutner AS, Creighton SM. Laparoscopic Vaginoplasty: Alternative technique in vaginal reconstruction. BJOG 2006;113:340-343.
14. Dua HS, Azuara –Blanka A. Amniotic membrane transplantation. Br J Ophthalmol .1999;83:748-52.
15. Adinolfi M, Akle CA, McColl I, Fenson AH, et al. Expression of HLA antigen, beta 2-microglobulin and enzymes by human amniotic epithelial cell. Nature 1982;295:325-7.
16. Akle C, Adenolfi M, Welsh K I, Leibowitz S, McColl I. Immunogenicity of human amniotic epithelial cell after transplantation into volunteers.Lancet. 1981; 2(8254):1003-1005.{Pub Med }{Google Scholar}.
17. John T. Human amniotic membrane transplantation:past, present, and future. Opthalmol Clin North Am 2003;16(1):43-65. {Pub Med } [Google Scholar]

18. Michelle N, Jaques D. Vaginoplasty using amniotic membrane in cases of vaginal agenesis or after vaginectomy. J Gynaecol Surg . 1992;8:25-27.{Pub Med}[Google Scholar].

19. Zhcu JH, Sun J, Yang CB, Xie ZW, Shaw WO, Long term outcome of transvestibular vaginoplasty with pelvic peritoneum in 182 patients with Rokitansky's Syndrome. FertilSteril 2010;9:2281-5.

20. Baldwio JF. The formation of an artificial vagina by intestinal transplantation. Ann Surg.1904;40:398-403.

21. Darai E, Toullalan O, Besse O, Potiron L, Delga P. Anatomic and functional results of laparoscopic and perineal neovagina construction by sigmoid colonoplasty in women with Rokitansky's syndrome. HUM Reprod. 2003;18: 2454-59.

22. Gargollo PC, Cannon GM, Diamond DA. Should progressive perineal dilatation be considered first line therapy for vaginal agenesis ? J Urol .2009 ;182:1882-89 .

23. Chohan A, Burr F, Mansoor H, Falak T. Amnion graft in vaginoplasty – an experience at 3 teaching hospitals of Lahore. Biomedia 2006;22(1):21-4.

24. Fotopoulou C, Sehouli J , Gehrmann N , Schoenborn L, Lichtenegger W. Functional and anatomical results of amnion vaginoplasty in young women with Mayer – RokitanskyKusterHauster syndrome. Fertil Steril . 2010;94:317-23.

25. Klingele CL, Gebbert JB, Crook AJ, DiMarco CS. McIndoe procedure for vaginal agenesis . Long term outcome and effect on quality of life . Am J Obstet Gynaecol ;189:1569-1572.

26. Karapinar OS, Ozkan M, Okyay AG, Sahin H, Dolapcioglu KS. Evaluation of vaginal agenesis treated with the modified McIdoe technique. A retrospective study. J Turk Ger Gynecol Assoc. 2016;17(2):101-105. Doi :105152/jtgga 2016.16013.

27. Buruch Y, Nale R, Parma M, Di Fatta S, Fedele L, Candiani M, et al. Lower urinary tract symptoms in patients with Mayer Rokitansky kuster Hauser syndrome after neovagina creation by Davydov's procedure. Int Urogynecol J. 2020;31(12):2529-2533.