

ORIGINAL ARTICLE

How is Vaginal Function in Patients with A History of Sigmoid Vaginoplasty Surgery?

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ABSTRACT

Introduction: Sigmoid colon vaginoplasty is a surgical procedure for the management of vaginal agenesis cases. This technique produces a neovagina that can function as a menstrual blood outlet as well as on penetration during sexual activity. **Methods:** A retrospective case study of vaginal agenesis, where sigmoid colon vaginoplasty surgery was performed at Dr. Sardjito Hospital Yogyakarta Indonesia in 2016-2018. The following post-surgical evaluation were assessed by observing the vaginal function to drain menstrual blood out, as well as function on penetration during sexual activity. **Results:** Sixteen cases of vaginal agenesis surgically performed were reported. Identification of the reproductive organs was carried out, in which 3 patients were without uterus, and 13 patients had menstrual uterine function. The length of sigmoid colon graft was around 15-20 cm. There were no complications during surgery. Post-surgical evaluation of 5 cases who have been married, all have been able to penetrate in sexual activity without meaningful complaints. All cases that had a uterus underwent regular menstrual cycles, with no dysmenorrhea. It can be said as a whole that this surgical procedure can be accepted by the patients, because it produced good vaginal function. **Conclusions:** Sigmoid colon vaginoplasty was a surgical procedure for congenital vaginal agenesis with satisfactory results. There were no complaints of dyspareunia or post-surgical dysmenorrhoea, resulting in a good cosmetic appearance of the external genitalia, and relatively mild complications.

Keywords: Sigmoid colon vaginoplasty, Vaginal agenesis, Vaginoplasty

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INTRODUCTION

The incidence of vaginal congenital agenesis varies in number, reported from 1 in 4000 to 1 in 80000 individuals. Generally, cases are known after the woman comes to see a health worker, especially an obstetrician because she is not yet menstruating during puberty (primary amenorrhoea) (1-3).

The neovaginal surgical procedure is a surgical procedure that can governs cases of vaginal agenesis. This surgery aims to create the vaginal canal that can function in penile penetration during sexual activity, as well as other functions of menstrual bleeding in cases with the functional uterus (4-6). The goal of neovaginal surgery to form a vaginal canal that functions as a way

out of menstrual blood or penetration on sexual activity will determine when the procedure is appropriate. The procedure is generally carried out at the age of teenagers or young adults. At this time, the patient has understood what is happening to her and can be prepared to receive a surgical procedure, including, if necessary, postoperative dilation (4).

Until now, the best neovaginal surgical procedures for various cases of agenesis vagina have not been determined. The first surgical procedure should be done as well as possible to prevent subsequent surgical procedures that are usually more difficult. Complications that may occur in the formation of the vagina with a sigmoid colon include perforation of the bladder and rectum, necrosis of the graft, fistula, colitis, even intestinal malignancy used as the vaginal graft (4).

As the aim of sigmoid colon vaginoplasty surgery is to be evaluated, it is necessary to evaluate the vaginal function that has been made. Evaluation results in the

postoperative period include vaginal function to drain menstrual blood out, as well as penetration function on sexual activity. This is what underlies the need for research on the function of the vagina resulting from sigmoid colon vaginoplasty surgery.

This study aimed to evaluate the vaginal function as a result of surgical vaginoplasty using sigmoid colon in cases of congenital vaginal agenesis.

MATERIALS AND METHODS

This study was done retrospectively by including all medical records of vaginal agenesis patients who underwent sigmoid colon vaginoplasty surgery. There were no exclusion criteria since the rarity of the case itself.

Surgery was carried out in the operating room of Surgery Building of Dr. Sardjito Hospital Yogyakarta in the period of 2016 to 2018. Surgical routes were conducted through laparotomy and vaginal. Subjects were chosen from population who had not yet been married or had sexual activity, had a functioning uterus or without a uterus. Evaluation results in the postoperative period include vaginal function to drain menstrual blood out, as well as penetration function on sexual activity, carried out by anamnesis and physical examination of the neovagina.

RESULTS

In this period, 16 sigmoid vaginoplasty surgeries were performed in the Department of Gynecology Obstetrics-Division of Urogynecology and Reconstructive Surgery, Dr. Sardjito Hospital Yogyakarta. Surgery was carried out together with colleagues of the Digestive Surgery Consultant from the Department of Digestive Surgery, Dr. Sardjito Hospital Yogyakarta. The patient characteristics were stated in Figure 1 and Figure 2.

There were 3 patients who did not have a uterus, with each diagnosis being Complete Androgen Insensitivity Syndrome (CAIS) and Mayer-Rokitansky-Kuster-

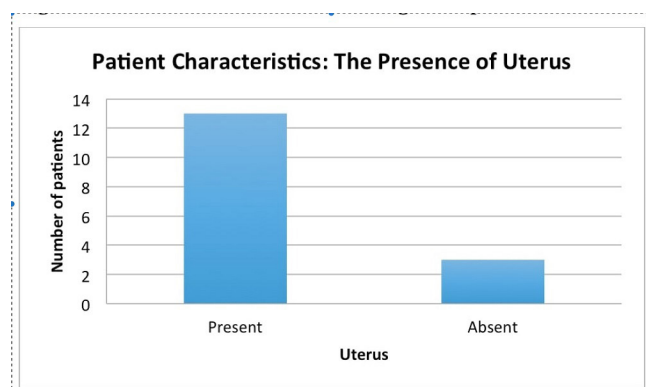


Figure 1: Patient characteristics' according to the presence of uterus

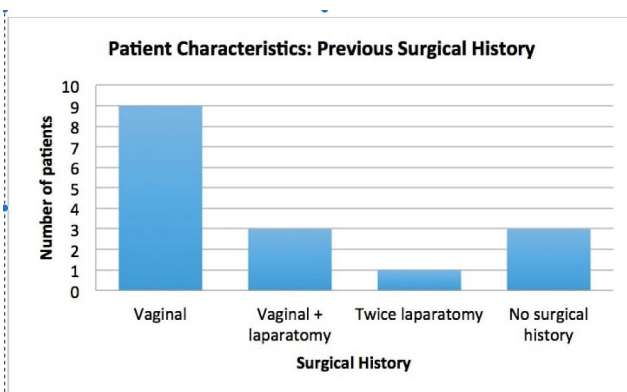


Figure 2: Patient characteristics' according to previous surgical history

Hauser syndrome (MRKH). Thirteen other cases of vaginal agenesis had a functional uterus that producing menstrual blood. There was no previous surgical history in 3 cases, while 13 other cases had several types of surgical history. The most common procedure through the vaginal route was 5 times, generally in the form of drainage attempts against hematometra. Vaginal surgery history was only 1-5 times in 9 cases. History of laparotomy and vaginal combination surgery was found in 3 cases. Twice laparotomy histories were found in 1 case.

Five cases were married before surgery, while 2 patients were married after surgery (3 months and 1 year after surgery). In cases that have been married, complaints of inconvenience to sexual activity due to difficulties or unable to full penetration, as well as the presence of infertility problems are the main complaints in 2 cases, while 1 person who had a history of laparotomy complained of repeated and severe pain due to hematometra and hematosalpinx. The main complaint of another case that was unmarried and had a uterus was increasingly severe periodic pain due to menstrual bleeding.

From the results of the surgery, five patients with contraperistaltic placement of a sigmoid colon graft, while the other 11 were isoperistaltic. The proximal side of the sigmoid colon graft in 3 cases without the uterus was closed with a seam that was continue suture in an absorbable thread no. 2-0. The sigmoid colon graft tissue was fixed with the proximal edge of the vaginal peak to reduce the risk of prolapse. In 13 cases with the uterus, the proximal end of the sigmoid colon graft was implanted into the uterus using absorbable no 2-0 or 3-0 threads, 10 cases with end-to-side anastomosis uterosigmoid, 3 case of with side-to-side anastomosis. There were no complications that occurred during the surgical process even though adhesiolysis had to be done in half of the patients, generally due to endometriosis or suspected history of infection. Other surgical procedures such as cystectomy, salpingectomy, appendectomy were performed in 9 patients. The amount of bleeding

ranged from 200 ml to 1300 ml in 1 case with severe adhesion. The duration of surgery lasted from 3 hours to 8 hours.

Generally, patients undergo fasting after surgery for 2-5 days, then a diet to eat and drink gradually. Total parenteral nutrition was given during the fasting phase.

DISCUSSION

The Procedure of Vaginoplasty Surgery

Vaginal formation surgery procedure or vaginoplasty as a procedure for vaginal agenesis aimed to produce the vagina (neovagina) by functioning as a way out of menstrual blood and penile penetration in sexual activity (2-4). Various procedures to form neovagina had been widely conveyed. Frank's method has long been known, it was a long-term dilated procedure. Vecchiatti added with a laparotomy procedure, while Abbe-Mc Indoe used tissue grafts from the peritoneum, buccal mucosa and intestinal grafting (3-5).

There were various types of procedures or surgical techniques for vaginoplasty to form neovaginas. Starting from surgery according to Abbe-McIndoe modification. This procedure dissected bladder and separated it with rectum, then put the mold that has been coated with skin from the skin grafting in the neovagina burrow. Furthermore, it was necessary to help post-surgical vaginal dilatation. The Davydov procedure consisted of several surgical stages that required dissection of the rectovesicular space by mobilizing the peritoneal segment and placing it on the introitus. Other procedures were the Vecchiatti procedure and other laparoscopic modifications of surgery previously performed with laparotomy. The Vecchiatti procedure made neovaginas by doing external traction using a device that was temporarily attached to the abdominal wall. Vaginoplasty procedures could also use tissue or graft from the peritoneum, intestine, buccal mucosa, bladder mucosa, amnion and other allografts (3,4).

Surgical procedures for vaginoplasty often must be followed by vaginal dilatation as one of the postoperative neovaginal treatments or maintenance. The need for this dilation must be planned since counseling before surgery. Vaginal dilatation carried out from the start after surgery usually resulted in better results (4).

Sigmoid Colon Vaginoplasty

Neovaginal surgery was a reconstruction procedure to form the vaginal canal including the vulvar area, which could be performed in patients with vaginal agenesis, sexual or transgender organ developmental disorders, and in patients with a history of colpectomy. The flap or graft used could come from the jejunal intestine, ileum, caecum, or sigmoid colon segment (5).

The most indications of surgery for intestinal vaginoplasty were congenital vaginal agenesis or known as agenesis Mølleri or Mayer-Rokitansky-Küster-Hauser syndrome

(MRKH). This syndrome occurred due to the failure of embryological growth of the Mullerian duct which resulted in the development of the vagina, uterus, or both at the same time. The vagina can not be formed at all or very short. Ovaries, because they came from different embryological structures, were shaped and function normally. MRKH patients had 46 XX chromosomes, with a normal karyotype and hormonal profile. Sufficient reported incidence rates varied from 1 in 4000 to 5000 female births. The second indication was that patients with sex disorders (Disorders of Sex Development), including Congenital Adrenal Hyperplasia (CAH) and Androgen Insensitivity Syndrome (AIS) (5).

MRKH patients often came to see a health worker with a primary complaint of primary amenorrhoea. The presence of the ovary made secondary sex development within normal limits, although sometimes accompanied by abnormalities in the urinary tract or skeletal system. Vaginal formation for these patients was deemed necessary with the consideration of achieving optimal sexual life and the role of body image in the entire life of the woman concerned (2).

Sigmoid colon vaginoplasty was a complicated surgical procedure that required high skill from the operator. Surgery was expected to produce a vagina that could function for life for the patient as a menstrual bleeding and for penetration function on sexual activity. However, the patient's strong awareness and willingness to get optimal surgery results was needed because there was still a need for post-surgical dilation to prevent stenosis (6).

Various preparations were carried out before the patient undergoes surgery. Psychological examinations and mentoring, physical examinations including Tanner, as well as various investigations such as ultrasonography, hormonal profiles, karyotyping, urinary tract examination, and magnetic resonance imaging. Intestinal preparations were generally carried out by using sodium phosphate (fleet phosphorus and fleet enema), it could be done within 24-48 hours before surgery.

In anesthesia, the patient's position was semilitotomy, with the surgical area being prepared was the abdominal and perineal plane. Consideration of abdominal incisions can be median or Maylard for cosmetic purposes. At the time of surgery, making the vaginal opening began by opening the area between the estuary of the external and fourchette urethra, deepened and bluntly spread at least up to 2 loose fingers. The peritoneum on the side of the abdominal cavity was opened with a transverse incision to penetrate the abdominal cavity. The sigmoid colon segment as long as 15-20 cm (Figure 3) was used as a graft to form neovagina, striving to maintain good blood flow in the intestinal graft (Figure 4) which has been cleaned with normal saline flow (Figure 5), was inserted into the vaginal canal in isoperistaltic or antiperistaltic

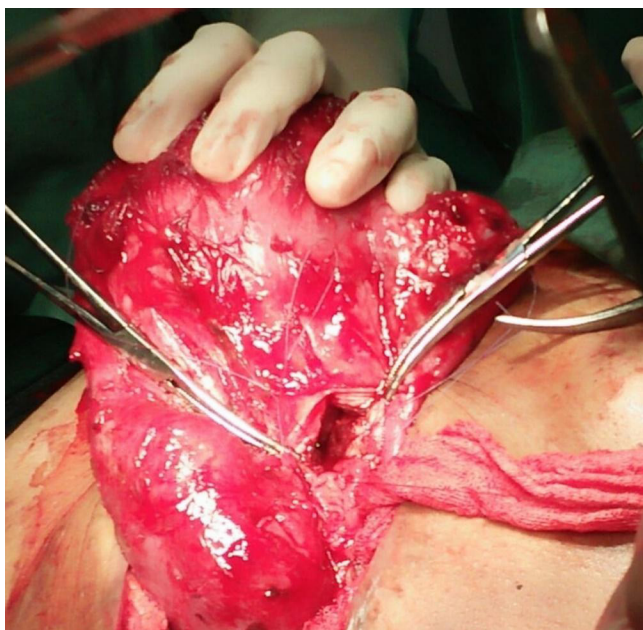


Figure 3: Part of sigmoid colon, which will be cut to become a sigmoid graft

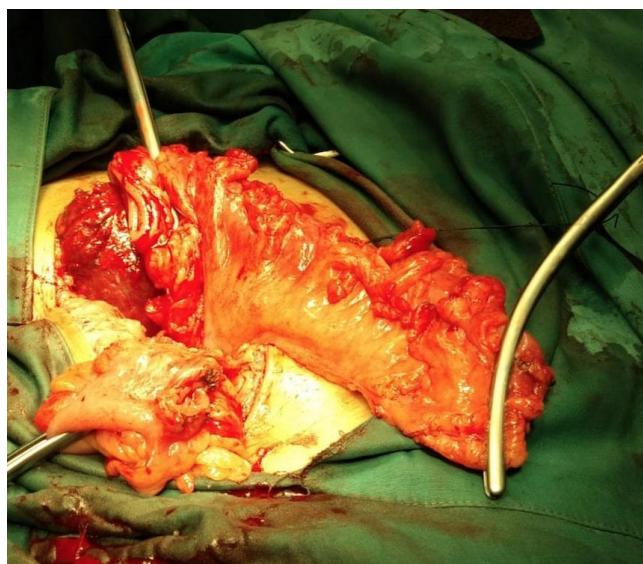


Figure 4: The sigmoid graft

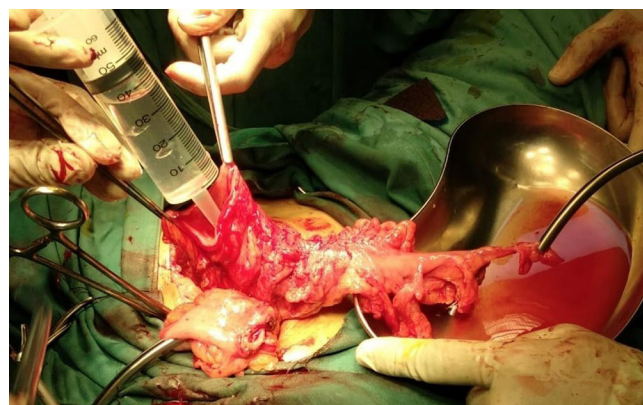


Figure 5: The sigmoid graft is cleaned with saline before being placed in rectovesical space

directions, and the distal side was sutured to the skin of the neovaginal introitus with simple sutures using polyglactic acid thread number 3-0. The proximal side of the graft in the abdominal cavity was closed with a continue suture using the same thread. The end to end colon anastomosis was done using polyglactic acid suture number 3-0 or using stappler (2-4).

Sigmoid transposition in these cases were carried out isoperistaltic or antiperistaltic/contraperistaltic, depending on several factors such as the course of the inferior mesenteric artery, mesosigmoid length, location of the sigmoidea artery branching in the mesosigmoid, and the location of the sigmoidea artery branch preservation. In cases without uterus, a sigmoid colon transplantation was placed only on one side of the vaginal introitus. In the case of having a uterus and neovagina was intended for the purpose of flowing menstrual blood out of the body, then the anastomosis is performed in 2 places, namely the vaginal introitus (distal side, as sigmoid perineal anastomosis) and in the uterus (proximal side, as uterosigmoid anastomosis).

In these cases, surgery was performed using an approach through laparotomy and vaginal. Identification of the reproductive organs was carried out, in which 3 patients were without uterus, and 13 patients had menstrual function. Sigmoid colon resection for about 15-20 cm was carried out, taking into account the preservation of arterial feeding of the sigmoidea artery branch. Both ends of the resected sigmoid colon were end to end anastomoses using absorbable threads no. 2-0 or stappler. An incision was made in the area between the bladder and rectum (rectovesical space) with an abdominal assisted vaginal approach, sharply and bluntly, reaching the peritoneal cavity. The distal side of the sigmoid colon graft was isoperistaltic or contraperistaltic, it was carried through the rectovesical burrow until it reached the vaginal introitus area, sewn simple suture on the skin of the vaginal introitus area using absorbable threads no. 3-0. Before placing the sigmoid graft into the rectovesical space, the direction of the sigmoid graft to the position of the uterus was adjusted and the depth of the vaginal canal reaches the introitus was reassured. If the arterial pedicle is long enough and closer to the vaginal introitus, the sigmoid graft can generally be placed isoperistaltically. If the pedicle is not too long, or is located far from the vaginal introitus, the sigmoid graft can be placed contraperistaltically.

Postoperative Evaluation of Colon Sigmoid Vaginoplasty

Cedric conducted a literature review of thirty publications with a total of more than 900 patients. Data on vaginoplasty that used the jejunal intestine, ileum and cecum were still very poor when compared to sigmoid colon grafts so they could not be compared properly. Assessment of surgical results needed to be uniformed to facilitate evaluation of postoperative neovaginal function. Vaginoplasty using the intestine was generally

intended to achieve the purpose of penetration on sexual activity. General sexual function after the surgery should be properly evaluated. One way that could be used for this purpose was to use a Female Sexual Function Index (FSFI) questionnaire, which has not been done for a while (5).

Karateke's study mentioned on post-surgical physical examination, evaluation needs to be done about the presence of mucocutaneous stenosis, excessive mucus and the presence of a foul odor. For 1-4 years of evaluation after sigmoid colon vaginoplasty surgery patients generally no longer required dilatation (2). Another researcher, Sundeep Kisku, reported that there was mild stenosis requiring continued management of dilatation in 7 of 39 patients, as well as severe stenosis in 2 patients requiring neovaginal excision (6).

From the cases we report this time, periodic postoperative evaluation for all of these patients were carried out starting every week for 1 month, then every month to 3 months, and every 6 months to the next 1 year. There were no complaints of excessive pain, vaginal discharge or post-surgical vaginal bleeding. All married patients were encouraged to engage in sexual activity. History taking has been carried out to obtain data on sexual activity, use of lubricants, vaginal bleeding during penetration on sexual activity, dyspareunia, digestive system problems, and sexual satisfaction. Regarding resection of sigmoid colon anastomosis that have been done, no digestive system disorders were found after the surgery. Evaluation of digestive disorders includes excessive nausea and vomiting, diarrhea or constipation, to the presence of leakage as a result of anastomotic leak.

In postoperative evaluation, within 2 weeks after neovaginal formation, introitus was found to have mild stenosis from its original size around 3 cm in diameter to around 1-2 cm. In the case of the main purpose of vaginoplasty was to immediately penetrate sexual activity, a neovaginal introitus was dilated using a vaginal dilator. Dilatation as a preparation for penetration on sexual activity was initially carried out every 2-3 days for 1 month, then every day, gradually using number 18 up to number 32. Six cases that have been married, all have been able to penile penetration into the neovagina in their sexual activity. One case has not been able to perform sexual penetration. Four cases required the help of lubricants and vaginal dilatation before penetration, while two others can penetrate directly. In cases with neovaginal introitus stenosis, vaginal dilatation could also be performed using the patient or partner's finger, before penetrating. Completion of the Female Sexual Function Index (FSFI) questionnaire in 5 cases within 1 year after surgery resulted in values of 27 - 30.4, indicating no sexual dysfunction. The other unmarried cases have never done sexual activity, vaginal function in the menstrual cycle could function properly, there

was no dysmenorrhoea or other complaints such as mucocutaneous stenosis that causes menstrual blood obstruction, excessive mucus or a foul odor (Table I).

TABLE I: Characteristics of cases

Characteristic	Result	Number
Age	<18 year old	7
	≥18 year old	9
Uterosigmoid anastomosis type	End to side anastomosis	10
	Side to side anastomosis	3
	Proximal side closed	3
Sigmoid graft direction	Isoperistaltic	11
	Contraperistaltic	5
Meatal stenosis	Yes	12
	No	4
Penetrate sexual activity	Yes	6
	No	1
	Not yet	9
Vaginal dilator (from 6 penetrate sexual activity cases)	Yes	4
	No	2

Evaluation using a sonde or finger examination was performed to determine the intestine neovaginal patency. There were no severe adhesion or stenosis that required further treatment. On ultrasound examination, the diameter of the uterosigmoid anastomosis was around 1.5-2 cm.

From many reports, it was known that from various types of intestines used as neovaginal grafts had low complications during and after surgery even for the long term thereafter. It can be said that vaginoplasty using the intestine was a fairly safe surgery, although it cannot be said that one segment of the intestine was better than the other segment of the intestine (6-8). The surgeon can make the decision to choose the segment of the intestine that would be used as a graft for neovagina based on the patient's experience and background. Psychological assistance from before to after surgery was important to improve the success of surgical vaginoplasty (6). In this report, all cases used a graft originating from a part of the sigmoid colon, one case used a rectosigmoid colon. Consideration of the use of sigmoid colon was mainly vascularity which can be maintained well for sigmoid graft, because the location was quite close to the area where neovagina must be made, in addition to the diameter and thickness of the colon wall better as a substitute for the vagina.

CONCLUSION

Sigmoid colon vaginoplasty was a surgical procedure for congenital vaginal agenesis with satisfactory results. There were no complaints of dyspareunia or post-surgical dysmenorrhoea, resulting in a good cosmetic appearance of the external genitalia, and relatively mild

complications. Menstrual function can take place well in cases that had a uterus. Cosmetic appearance was quite good with relatively low complications. It can be said as a whole that this surgical procedure can be accepted by the patient, because it produced good vaginal function.

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