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Review Article

Laparoscopic Promontofixation for the Treatment of Recurrent Sigmoid Neovaginal Prolapse: Case Report and Systematic Review of the Literature

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ABSTRACT Prolapse of a sigmoid neovagina, created in patients with congenital vaginal aplasia, is rare. In correcting this condition, preservation of coital function and restoration of the vaginal axis should be of primary interest. A 34-year-old woman with vaginal agenesis underwent vaginoplasty using sigmoid colon. Almost 6 years after the initial operation, she started complaining of a bearing-down sensation and an increase in vaginal discharge. She underwent 2 open surgeries and one vaginal surgery to treat the prolapse with no success. She came to our service and at vaginal examination the neovagina protruded approximately 5 cm beyond the hymen. The prolapse was treated successfully using a laparoscopic approach to suspend the neovagina to the sacral promontory (laparoscopic promontofixation). Prolapse of an artificially created vagina is a rare occurrence, without a standard treatment. Laparoscopy may be an alternative approach to restore the neovagina without compromising its function. Journal of Minimally Invasive Gynecology (2012) 19, 176–182 © 2012 AAGL. All rights reserved.

Keywords: Sigmoid vaginoplasty; Prolapse; Neovagina; Promontofixation; Laparoscopy; Sacrocolpopexy

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Mayer-Rokitansky-Küster-Hauser syndrome is a congenital anomaly of the female genital tract, estimated to occur in approximately 1 in every 5000 females [1]. Affected women usually have functioning ovaries, normal external genitalia, and a female karyotype (46,XX), but they have vaginal agenesis and uterine abnormality ranging from rudimentary uterine remnants to absent uterus [2].

The creation of a neovagina for vaginal aplasia in patients with Mayer-Rokitansky-Küster-Hauser syndrome is an important part of sexual rehabilitation [3]. Rectosigmoid colon presents a good choice for vaginoplasty [4–6] with favorable postoperative anatomic and functional results. Long-term sexual and psychological outcomes also seem to be satisfactory [4,6,7].

Prolapse of an artificial vagina derived from the sigmoid colon is a rare event but is a considerable nuisance for the patient [3]. In the series by Djordjevic et al [4], neovaginal prolapse occurred in 7 of 86 cases (8.1%) of rectosigmoid vaginoplasty. The treatment of such entity is not standardized [8,9], but some authors have already described the role of the laparoscopic surgery to manage this complication [8,10,11].

Sources

A Medline literature search of all publications in English language from 1992 through 2011 with the search term "sigmoid vaginoplasty," as well as review of references was performed to summarize the existing clinical experience on the incidence of neovaginal prolapse after sigmoid vaginoplasty [12–33]. Another MEDLINE literature search of all publications in English language from 1978 through 2011 was conducted with the search terms "prolapse" and "sigmoid neovagina" to identify the existing reported cases on surgical treatment of sigmoid neovaginal prolapse.

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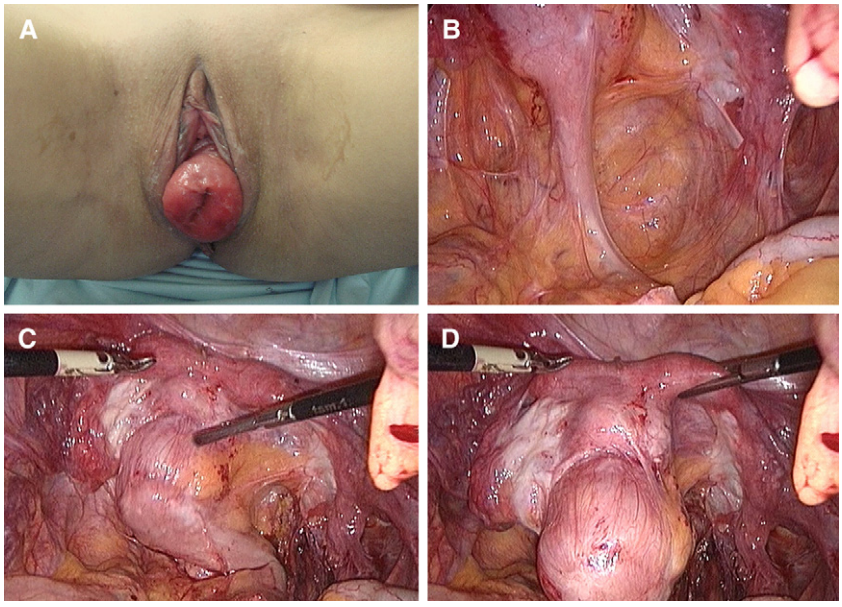
Fig. 1

(A) Vaginal examination demonstrating the sigmoid neovaginal prolapse. **(B** to **D)** Laparoscopic inspection of the pelvis: the sigmoid neovagina, the uterine remnant, the adnexa.



We report an additional case of recurrent sigmoid neovaginal prolapse repaired by laparoscopic promontofixation.

Study Selection

Entrance criteria for the first Medline search ("sigmoid vaginoplasty") included patients undergoing sigmoid vaginoplasty, as well as a description of postoperative mucosal or neovaginal prolapse. The review of the English-language literature identified 44 articles. A total of 22 studies met entrance criteria.

Entrance criteria for the second Medline search ("prolapse" and "sigmoid neovagina") included the following: patients with prolapse of sigmoid neovagina, as well as description of the surgical repair. The review of the English-language literature identified 15 case reports. We report an additional case; therefore the total study cohort consists of 16 cases.

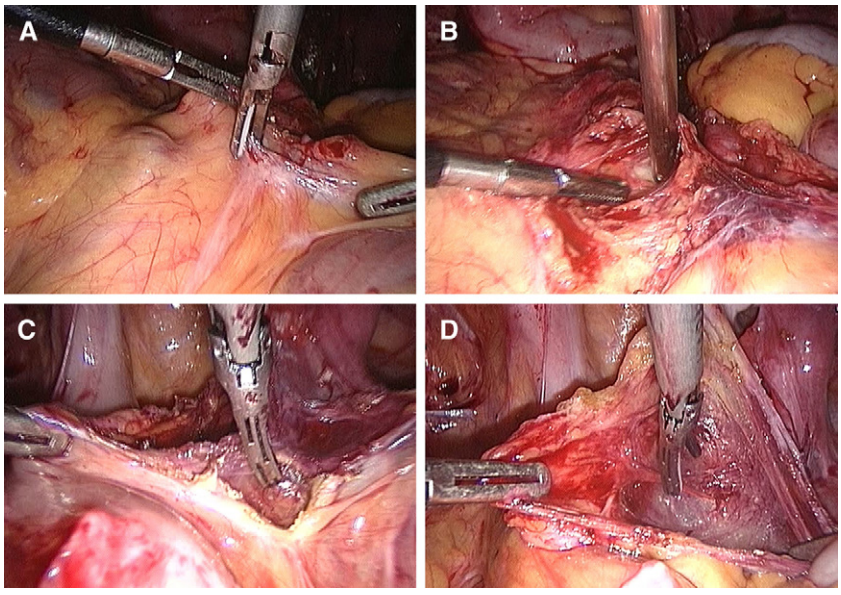
Case Report

A 45-year-old woman came to our service complaining about a bearing-down sensation and an increase in vaginal discharge. She was born with vaginal agenesis and underwent vaginoplasty with the sigmoid colon when she was 34 years old. Six years after the initial operation, she presented a complete protrusion of the neovaginal mucosa and underwent an open abdominal procedure with a mesh used to treat the prolapse. On the fifteenth postoperative day, the patient realized the prolapse had already recurred. She had been suffering from this prolapse for about 2 years when she decided to undergo another surgical procedure to fix the prolapse. The surgery was performed by means of a vaginal approach with a mesh, and the patient had a good postoperative course for 3 years, when the prolapse recurred again. She underwent another open surgery in which the neovagina was sutured to the round ligaments, without using any prosthetic material. The third recurrence of the prolapse arose on the same day. After all these unsuccessful attempts, the patient was sent to our service. At vaginal examination (Fig. 1A), the neovagina protruded approximately 5 cm beyond the hymen with augmentation of intraabdominal pressure (Valsalva maneuver).

Informed consent was obtained for the laparoscopic procedure. The classic laparoscopic setup was established with an umbilical trocar for the 10-mm zero-degree laparoscope and three 5-mm trocars in the suprapubic region. One trocar was positioned at the midline, 8 to 10 cm below the umbilical trocar, and 2 trocars were placed in the iliac fossae about 2 cm medial to the anterior superior iliac spine. The pelvis was inspected (Fig. 1B to 1D). The procedure started by opening the retroperitoneum and identifying the promontory (Fig. 2A and 2B). A retroperitoneal tunnel was made from the promontory to the right lateral border of the neovagina (Fig. 2C and 2D). The intervesico-neovaginal space was dissected (Fig. 3A). The mesh (Gynemesh; Ethicon, Inc., Somerville, NJ) was fixed to the anterior neovaginal wall (7 stitches) (Fig. 3B to 3D) and to the anterior vertebral ligament on the right side of the promontory (1 stitch) with 2-0 polyester suture (Fig. 4A). The retroperitoneum was closed over the mesh

Fig. 2

(A and **B)** Dissection of the sacral promontory. **(C** and **D)** Opening the retroperitoneum.



to keep it completely extraperitoneal (Fig. 4B and 4C). The surgical procedure took 120 minutes, and the estimated blood loss was 50 mL. The patient was discharged on the first postoperative day.

The postoperative follow-up in 40 days, 3 months, and 6 months did not reveal any recurrence of the prolapse (Fig. 4D). The patient has maintained a satisfactory sexual life with her husband since the operation.

Results

A total of 22 studies met entrance criteria for the first Medline search ("sigmoid vaginoplasty") (Table 1), including 560 patients who underwent sigmoid colon vaginoplasty. The procedure was performed by laparoscopy in 86 patients (15.4%), by robotics in 1 patient (0.2%), and by traditional open access in the remaining 473 patients (84.4%). The

Fig. 3

(A) Dissection of the inter-vesico-neovaginal space. **(B** to **D)** Suturing the mesh to the anterior wall of the neovagina.

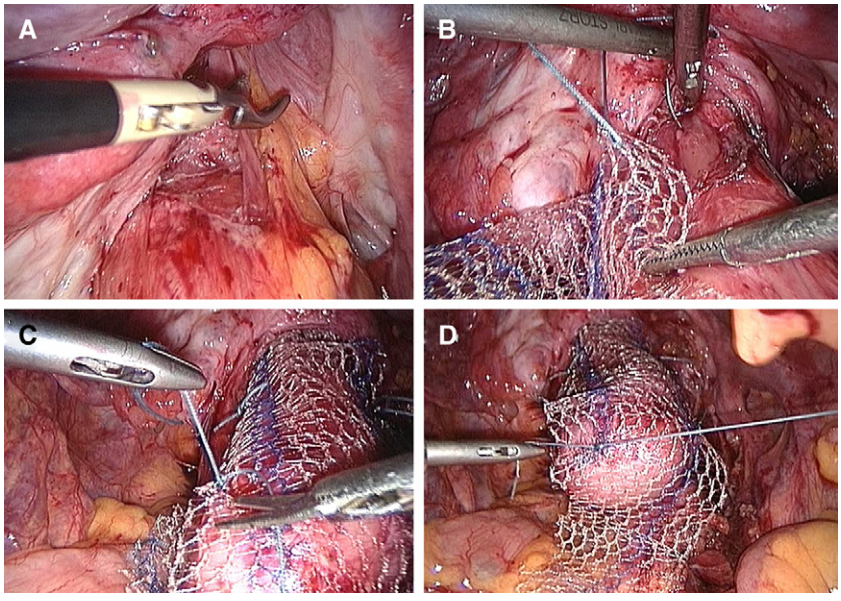
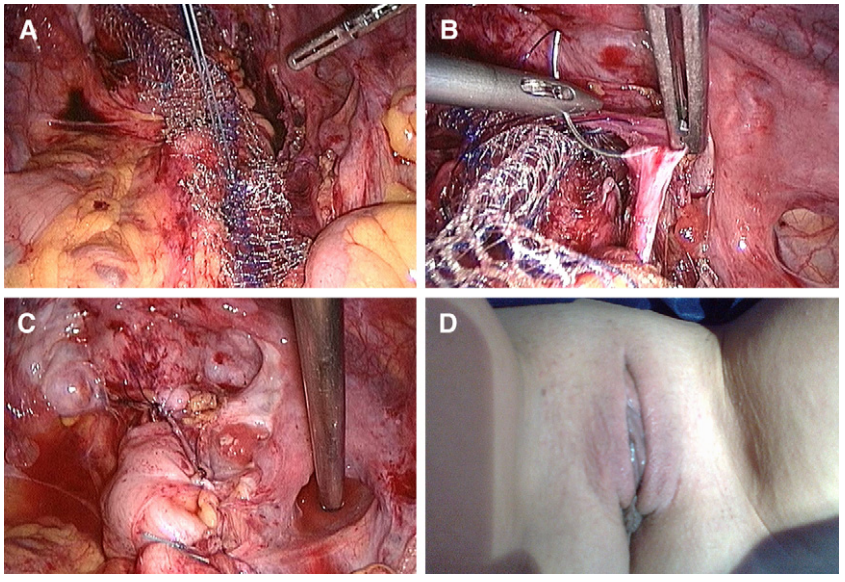


Fig. 4

(A) Suturing the mesh to the sacral promontory. **(B)** Peritonization over the mesh. **(C)** Final aspect of the surgery. **(D)** Postoperative result.



rate of postoperative neovaginal prolapse was 2.3% (13 cases), and the rate of postoperative mucosal prolapse was 1.25% (7 cases).

Including the current case, a total of 16 cases met entrance criteria for the second Medline search ("prolapse" and "sigmoid neovagina") (Table 2). The elapsed time from surgery to prolapse was well described in 7 cases, ranging from immediate postoperative prolapse to 33 years. The surgical procedure to repair the first neovaginal prolapse was well reported in 9 cases. Different surgical techniques were

Table 1

Results of literature review of studies on sigmoid vaginoplasty reported from 1992 to 2011

Author	No. of cases	Surgical approach	Neovaginal prolapse	Mucosal prolapse
Lima et al [5]	46	Open	4 (8.7%)	0
Rawat et al [12]	8	Open	0	1 (12.5%)
Karateke et al [13]	27	Open	0	0
Li et al [14]	45	Laparoscopic	0	0
Kim et al [15]	1	Robotic	0	0
Cai et al [16]	26	Laparoscopic-assisted	0	0
Djordjevic et al [4]	86	Open	7 (8.1%)	0
Imparato et al [17]	62	Open	1 (1.6%)	0
El-Sayed et al [18]	26	Open	0	0
Khen-Dunlop et al [19]	26	Open	0	2 (7.7%)
Ekinci et al [20]	6	Open	0	0
Kapoor et al [21]	14	Open	0	0
Wedler et al [22]	11	Open (n = 2) Laparoscopic (n = 9)	0	0
Urbanowicz et al [23]	5	Laparoscopic	0	0
O'Connor et al [24]	6	Open	0	0
Del Rossi et al [25]	20	Open	0	0
Kwun Kim et al [26]	36	Open	0	0
Parsons et al [27]	28	Open	1 (3.6%)	4 (14.3%)
Daraï et al [28]	1	Laparoscopic	0	0
Lenaghan et al [29]	60	Open	0	0
Franz [30]	13	Open	0	0
Hitchcock and Malone [31]	7	Open	0	0
Total	560		13 (2.3%)	7 (1.25%)

Table 2

Results of literature review of studies on surgical repair of sigmoid neovaginal prolapse reported from 1978 through 2011

Author	Case	Elapsed time from surgery to prolapse (y)	First procedure to repair the neovaginal prolapse	Recurrence
Kondo	Current case	6	Abdominal sacropexy	Yes, 15 days after the procedure
Djordjevic et al [4]	7 cases	?	"Minor surgery"	No (?)
Yokomizo et al [3]	Case 1	3	Abdominal suspension + vaginal resection	Yes, 4 years after the procedure
Yokomizo et al [3]	Case 2	5	Laparotomic resection of the artificial vagina + neovagina with vulvoperineal fasciocutaneous flaps	No
Matsui et al [32]	1 case	33	Abdominal sacropexy	No
Freundt et al [9]	Case 1	4	Abdominal suspension of the neovagina to the Cooper ligament	No
Freundt et al [9]	Case 2	3	Abdominal suspension of the neovagina to the Cooper ligament	Yes—suspension to the sacral promontory
Freundt et al [9]	Case 3	Immediately after the surgery	Vaginal resection of the redundant sigmoid	Yes—abdominal suspension to the Cooper ligament Another recurrence—repair by vaginal approach
Novak et al [33]	2 cases	?	Resection of a ring of the prolapsed neovagina	No

used, and the abdominal sacropexy seems to be a good option for the treatment of neovaginal prolapse. We are not sure about the exact technique of abdominal sacropexy performed in our patient because she had a recurrence 15 days after the procedure. Abdominal suspension of the neovagina to the Cooper ligament may be an alternative approach. Sometimes, vaginal resection of the redundant neovagina may also play a role in the management of such cases. The rate of recurrence after surgical treatment of sigmoid neovaginal prolapse seems to be as high as 25%.

Discussion

Sigmoid colon provides an excellent tissue for vaginal replacement in those women with vaginal agenesis. The cosmetic and functional results of sigmoid vaginoplasty seem to be good. The advantages of this technique are (1) rare contraction of the neovagina, (2) vaginal width and depth maintained without the need of long-term vaginal stent, (3) spontaneous mucus production facilitating sexual intercourse, (4) avoidance of the malodor frequently accompanying skin graft, and (5) texture and appearance similar to that of the natural vagina [26]. Recently, some authors confirmed the feasibility of sigmoid vaginoplasty by minimally invasive approach, either with laparoscopy [14,16,22,23,28] or robotics [15].

On the basis of our literature review, the incidence of postoperative sigmoid neovaginal prolapse is 2.3%. The cause of such prolapse is not known [3,34], but it has been hypothesized that sexual activity may result in progressive lengthening of the neovagina, with discontinuation of the neovaginal fibrotic adhesions [35] in the absence of normal female suspensory mechanisms.

There are several surgical procedures described in the literature for the treatment of vaginal vault prolapse [34,36,37], by either a vaginal or abdominal approach. The aim of the surgical repair is to permanently correct the anatomic defect, to restore the sexual function without painful scarring [9,38], and to improve the patient's quality of life.

Laparoscopic fixation to the sacral promontory (promontofixation) has been used to repair pelvic organ prolapse with good long-term results, low recurrence and morbidity rates, and good postoperative quality of life [36,39]. According to the Cochrane review [40], the abdominal sacral colpopexy is associated with lower rates of recurrent vault prolapse and dyspareunia compared with vaginal sacrospinous colpopexy. There is limited evidence regarding the optimal management strategy for recurrent vault prolapses. Current evidence suggests that sacrospinous ligament fixation and sacrocolpopexy have good outcomes in such cases [41].

To date, there are only a few articles in the literature reporting prolapse of sigmoid neovagina, and it is clear from the literature that reconstructive treatment varies greatly [3,4,9,20]. Freundt et al [9] reported 3 patients with sigmoid neovaginal prolapse. The first patient was successfully treated by an abdominal suspension to the Cooper ligament. The second patient underwent an abdominal suspension to the Cooper ligament, but the prolapse recurred. The reoperation consisted of an abdominal suspension to the sacral promontory. The third patient underwent 3 procedures: resection of the redundant sigmoid by vaginal route, abdominal suspension to the Cooper ligament, and another vaginal surgery to resect the redundant sigmoid. Matsui et al [32] also reported 1 patient who had development of prolapse of a sigmoid neovagina 33 years after the operation that was successfully repaired by abdominal retroperitoneal

sacropexy. Yokomizo et al [3] described 2 patients who had development of severe prolapse of a neovagina derived from the sigmoid colon. One patient underwent resection of the redundant sigmoid and suspension of the neovagina to the abdominal wall; however, the prolapse recurred. The other patient was treated by removal of the entire sigmoid neovagina and an alternative neovagina was reconstructed with a pudendal thigh flap. Recently, Christopoulos et al [8] repaired a prolapse of a neovagina created by vaginal dilation in a patient with Rokitansky syndrome by means of a laparoscopic sacrocolpopexy.

According to our literature review, sacropexy seems to be the best option to repair the sigmoid neovaginal prolapse. Suspension of the neovagina to the Cooper ligament may be an alternative approach. Whenever possible, these procedures should be performed by laparoscopy to minimize the surgical trauma. In the presence of redundant neovagina, resection by vaginal access may play a role. The rate of recurrence after surgical treatment of sigmoid neovaginal prolapse is high (25%).

In our patient the sigmoid neovaginal prolapse was successfully repaired with a mesh attached to the anterior sigmoid neovagina wall and to the sacral promontory. We did not use the complete approach (anterior and posterior meshes) described by Rivoire et al [36] to try to avoid mesh-related complications. In fact, we do not know what could be the effects of 2 meshes attached to the sigmoid neovagina in terms of erosion and stricture of the neovagina. Also, the vascularization of the neovagina was coming from its posterior aspect. Therefore the placement of a posterior mesh could compromise the vascularization of the sigmoid neovagina.

Conclusion

Laparoscopic promontofixation seems to be an alternative option to treat neovaginal prolapse and appears to accomplish the goals for correction of this situation.

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