

Vaginal Reconstruction Using the Ileocecal Segment after Resection of Pelvic Malignancy

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ABSTRACT

Aim of the work: This prospective study was carried out at the National Cancer Institute, Cairo University. The aim of this study is to evaluate the use of the ileocecal segment as a vaginal substitute in young female patients undergoing vaginal resection for malignant pelvic tumors.

Patients and Methods: The study included eleven patients with different pelvic malignancies undergoing vaginal resection as a part of surgical treatment. The ileocecal segment, based on the ileo-colic artery, was used for vaginal reconstruction in all cases. Five cases had cervical carcinoma that underwent extended Wertheims operation. Three cases had urinary bladder cancer that underwent anterior pelvic exenteration. Two cases had endometrial carcinoma, and one case had ovarian tumor. In 2 cases the terminal ileum was used, in addition, for ureteric replacement in one case, and as a bladder substitute in the other case. Their ages ranged from 39 to 47 years, with a mean age of 42 years. Primary reconstruction was done in 9 cases, while secondary reconstruction was performed in 2 cases.

Results: An average of one hour was consumed in addition to the time of the original operation. Mucous discharge, as an early post operative complication was recognized only in 2 cases (18%). Late complications, in the form of inspissated mucous secretion, were encountered only in 3 cases (27%). Sexual function was satisfactory in most of the cases (10 cases) (90.9%).

Conclusions: The ileo-coecal segment, although not the ideal, is an excellent substitute for vaginal reconstruction, with minimal post operative complications and satisfactory sexual function.

Key Words: Vaginal reconstruction - Ileocecal.

INTRODUCTION

Although the most common indication for vaginal reconstruction is congenital absence of the vagina, patients undergoing ablative surgery

for pelvic malignancy constitute a large group who is worth sexual rehabilitation. Rehabilitation of young patients is important for sexual, psychological and social demands. Simple procedures for vaginal reconstruction were first described by Heppner in 1872 using labial flaps [1]; this was considered about 300 years after the first report of vaginal agenesis by Realdus Columbus in 1573 [2]. All the articles in literature, starting from Heppner, were describing reconstruction for congenital vaginal agenesis. Other methods were described by Abbe (1898) using split-thickness skin graft [3], McIndoe (1938) and Counseller (1948) used partial thickness skin graft [4,5]. In 1927, Frank and Geist described the pressure procedure for treating incomplete vaginal atresia [6]. The use of myocutaneous flaps for vaginal reconstruction was introduced after the understanding of the blood supply of muscles, myocutaneous, and fasciocutaneous flaps introduced by Tansini in 1906 [7]. The use of bilateral gracilis myocutaneous flaps was described by Mc Craw et al. in 1976 [8]. In 1988, Tobin reported the use of vertical rectus abdominis myocutaneous flap for vaginal reconstruction [9]. The Singapore neurovascular pudendal thigh flap was described on 1989 by Wee and Joseph for neovagina formation [10]. The idea of using a bowel segment for vaginal reconstruction was introduced in 1892 when Sneguireff used the rectum for vaginal reconstruction leaving the patient with terminal colostomy [11]. Popow (1910) and Schubert (1914) had transplanted the rectum without laparotomy [12,13]. The use of a double loop ileal segment for reconstruction of the congenitally absent vagina was described in 1907 by Baldwin [14]. An isolated sigmoid segment was successfully used for the first time by Ruge in 1914, and the technique was modified by Kun in 1975 [15,16].

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The first time for the ileocecal segment to be described for vaginal reconstruction was in 1975, as an alternative for the isolated sigmoid segment, when during operation Kun found a short distal sigmoid colon. This procedure was then reported by Burger et al. in 1989 as a successful method of vaginal reconstruction with excellent results [17].

PATIENTS AND METHODS

This prospective study was carried out between 2001 and 2004 at the National Cancer Institute, Cairo University, Cairo, Egypt. The study included eleven patients with pelvic malignancy that necessitated vaginal resection as a part of radical resection of their tumors (Table 1). Their ages ranged from 39 to 47 years, with a mean of 43 years. All patients were married and sexually active. Five patients (5/11) had cervical stump carcinoma and they underwent extended Wertheim's operation. Three patients (3/11) had urinary bladder carcinoma and underwent anterior pelvic exenteration, 2 of them had uretero-colic implantation, and one case had ileal loop substitute for the urinary bladder. Two cases had endometrial carcinoma (2/11) and underwent pan-hysterectomy. One case (1/11) had a recurrent ovarian tumor and underwent tumor resection with partial ureterectomy, partial cystectomy, and vaginectomy. Primary reconstruction, at the same time of resection, was done in 9 cases, while secondary reconstruction, minimum 6 months after resection, was done in 2 cases. One of the 2 cases, who underwent delayed reconstruction, had cancer cervix which was treated 6 months earlier by extended Wertheim's operation. The other case had been treated for an ovarian tumor by pan-hysterectomy, partial cystectomy, right partial ureterectomy, omentectomy, and right uretero cutaneous implantation eight months earlier. None of the patients had received post operative radiation therapy, and all of them were followed for a minimum of 6 months after the operation.

Operative Technique:

All the patients had preoperative colonic preparation with repeated enema at the night of operation. In all patients, the vaginal stump left after resection was about 3 to 4 cm above the introitus. Vaginal reconstruction was performed in all the patients using the ileocecal segment based on the ileocolic artery of the superior mesenteric artery. The terminal ileum was

resected about 5 cm from the ileocecal valve (Fig. 1). The cecum and the ascending colon were mobilized up to the hepatic flexure and were isolated based on the ileocolic artery. Ileotransverse anastomosis, to restore bowel continuity, was performed. Intra-operative wash of the colonic segment was done with iodophoresaline solution. The ileal stump was closed with vicryl 3/0 running double layers sutures, and the appendix was removed. The ileocecal segment was passed retro ileal and was turned upside down without tension and without excessive twisting of the vascular pedicle. The segment was insinuated between the rectum and the urinary bladder. The open end of the ascending colon was sutured to the vaginal stump by end-to-end anastomosis with one interrupted layer of vicryl 2/0 sutures with knots outside the lumen (Fig. 2). Care was taken that the suture line was not under tension. The cecum was then fixed to the promontory with two to three interrupted non absorbable sutures. The neovagina was not sutured to the pelvic floor. In two cases, an additional procedure was performed consuming about 15 cm of the terminal ileum just proximal to the isolated ileocecal segment. In one case, with recurrent ovarian tumor, the ileal segment was used for uretero-ileoplasty (Diagram 1). In the other case, with cancer bladder, the ileal segment was used to perform an ileal bladder as a bladder substitute (Diagram 2). The ileal segment was sutured to the urethral stump (Fig. 3).

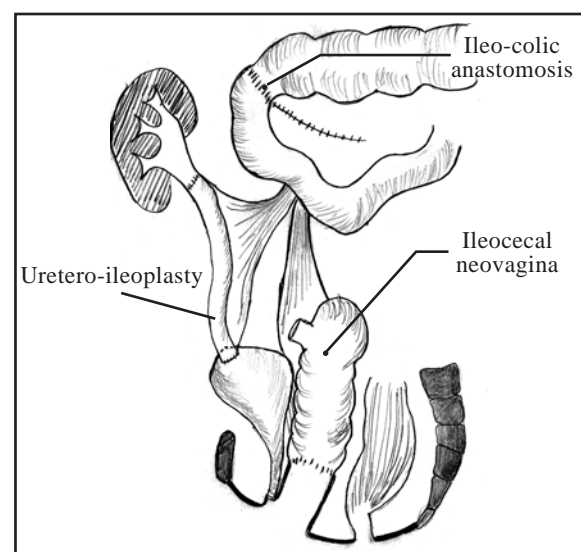


Diagram (1): A diagram illustrating the use of an ileocecal segment for vaginal reconstruction in addition to the ureteric substitution using the terminal ileum.

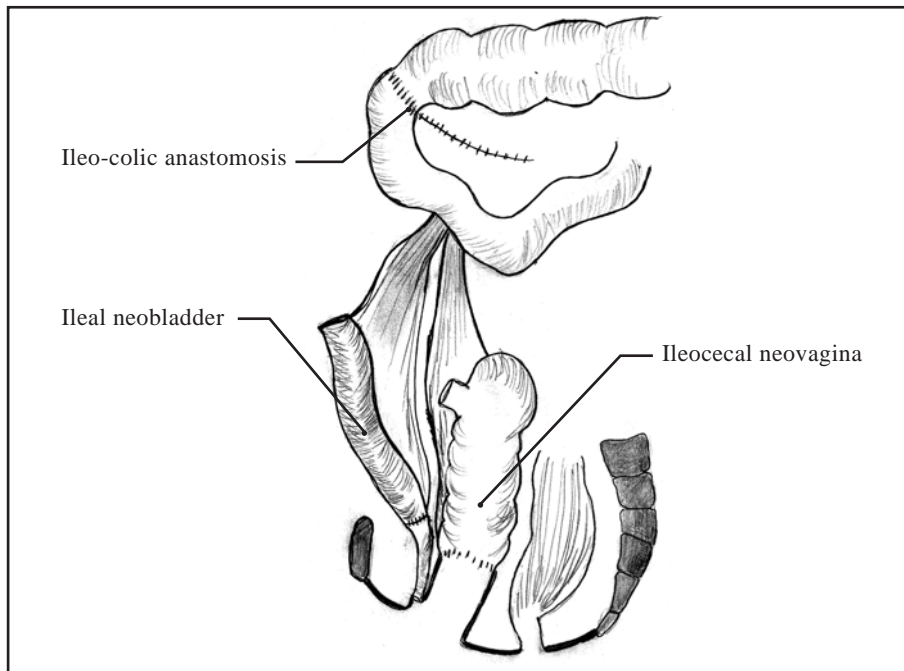


Diagram (2): A diagram illustrating the use of ileocecal segment for vaginal reconstruction in addition to the bladder substitution using the terminal ileum.



Fig. (1): Isolation of the ileocecal segment based on the ileo-colic artery.

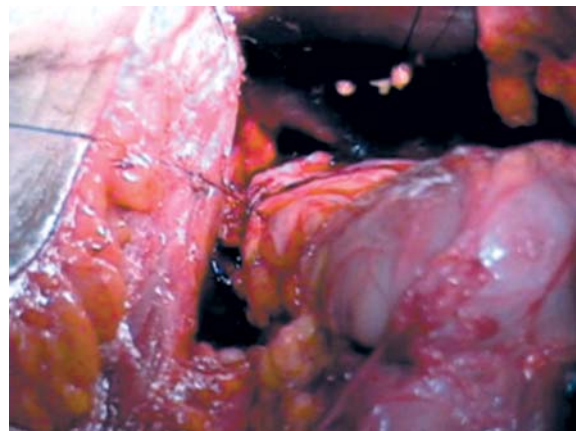
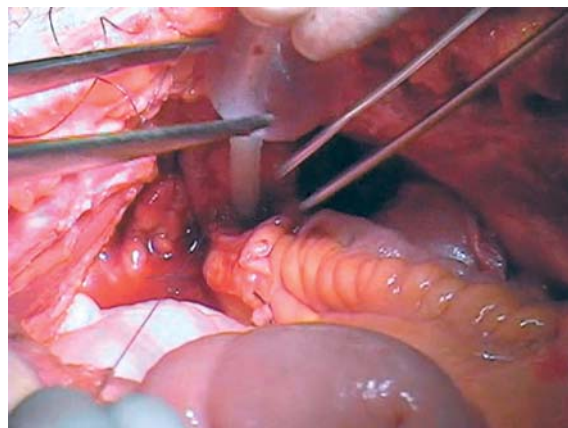


Fig. (2): The ileocecal segment turned upside down and sutured to remnant of the vagina.

Fig. (3): The ileal segment sutured to the urethral stump to constitute bladder substitution.



RESULTS

The ages of our patients ranged from 39 to 47 years with a mean age of 43 years. An average of one hour was consumed for reconstruction added to the operative time of the original operation. An average of 150 ml of blood was calculated, during the vaginal reconstruction procedure, as an extra amount of blood loss (Table 1). There were no postoperative mortalities among our cases. Postoperative minor morbidity, related to vaginal reconstruction, was recorded in 5 cases (45%), all of them were due to excessive mucous secretion. Two of these 5 cases (18%) were recorded in the early postoperative period, and three cases (27%) presented with late inspissated mucus secretion due to lack of personal hygiene. None of the patients had suture disruption, ischemia at the suture line, and none of them had late stenosis at the suture line. Ileocolic dehiscence or fecal fistulae were not encountered in our study.

Complications not related to the procedure of vaginal reconstruction were recorded in two cases (18%); one of them had wound infection and responded to drainage and antibiotic therapy. The other case, with ileal loop substitute, urinary leakage had developed and responded to non-operative conservative treatment with spontaneous closure after two weeks (Table 2). Practicing sexual function was allowed for all patients minimum three months after the operation. Sexual functions were satisfactory in most of the patients (90.9%). In one case (9.1%), although this patient had practiced sexual function, results were not satisfactory due to urinary incontinence. This patient had an ileal bladder substitute after anterior pelvic exenteration for carcinoma of the urinary bladder. None of the patients had to use lubricants for intercourse due to adequate lubrication of the neo-vagina by the mucus secreted by the colonic segment. None of them had experienced dyspareunia and none had developed vaginal stenosis (Table 3).

Table (1): Patient's characteristics.

	Age	Diagnosis	Procedure	Reconstruction	Extra blood loss (ml)	Extra operative time (min)
1	46y	Ca. cervix	Extended Wertheim's	1ry	100	55
2	45y	Ca. cervix	Extended Wertheim's	1ry	150	60
3	47y	Ca. cervix	Extended Wertheim's	1ry	100	60
4	47	Ca. cervix	Extended Wertheim's	1ry	100	50
5	45y	Ca. cervix	Extended Wertheim's	2ry	120	75
6	40y	Rec. Ca. Ovary	Pan-hysterectomy, Partial cystectomy, Rt. ureterectomy	2ry	200	75
7	40y	Ca. Bladder	Ant. Pelvic exenteration, ureteo-colic	1ry	100	55
8	39y	Ca. Bladder	Ant. Pelvic exenteration, ureteo-colic	1ry	150	70
9	43y	Ca. Bladder	Ant. Pelvic exenteration, ileal neo-bladder	1ry	100	60
10	46y	Endometrial Ca.	Panhystrectomy	1ry	120	60
11	45y	Endometrial Ca.	Panhystrectomy	1ry	200	75

Table (2): Early post operative morbidity and mortality related to vaginal reconstruction with the ileocecal segment in 11 patients.

	No.	%
Wound infection	1/11	9
Mucous discharge	2/11	18
Necrosis	0	0
Delayed int. move	0	0
Suture dehiscence	0	0
Mortality	0	0

Table (3): Late post operative morbidity and mortality related to vaginal reconstruction with the ileocecal segment in 11 patients.

	No.	%
Mucous cast	3/11	27
Stenosis	0	0
Dyspareunia	0	0
<i>Sexual activity:</i>		
Satisfactory	10/11	90.9
Non satisfactory	1/11	9.1

DISCUSSION

Although most of the studies in literature are discussing reconstruction for congenital agenesis during childhood, there is a large number of patients who had their vagina resected during their sexually active period while they were treated for pelvic malignancy. Vaginal reconstruction for this group of patients is a challenging procedure for surgeons, and is an essential psychological, social, and functional demand for patients. According to reconstruction procedures these can be classified into simple, myocutaneous flaps, and bowel procedures. Simple procedures are in the form of labial flaps, split thickness skin grafts, and partial or full thickness skin grafts. Although these procedures are simple with no recorded operative mortalities, the recorded morbidities are abundant and annoying. All the patients undergoing these procedures will unavoidably suffer from prolonged discomfort due to prolonged use of vaginal forms and self dilatation. Also, the high incidence of stenosis, graft necrosis, short vaginal stump resulting in dyspareunia, lacerations and bleeding, in addition to the mandatory use of lubricants during intercourse render these

procedures unsatisfactory for most of the patients [3-6,18]. The use of the myocutaneous and fasciocutaneous flaps including the rectus abdominis, gracilis, and Singapore flaps are more tedious procedures and are associated with a high incidence of complications. Flap dehiscence, partial necrosis, and major flap loss are the most serious complications that may be encountered with these procedures and may reach up to 12.5%, 18.8%, and 15%, respectively. Stenosis and subsequent dyspareunia may reach up to 35%. Other drawbacks of these procedures, like donor site complications, secondary infection and prolapse are added to the list of morbidities that makes the use of myocutaneous and fasciocutaneous flaps less favorable for vaginal reconstruction [9,10]. The use of bowel segments for vaginal reconstruction has the advantage of rapid patient rehabilitation that does not necessitate prolonged post operative care and meticulous follow-up. Also, it has the potential for reconstructing a capacious wide neovagina avoiding the annoying continuous dilatation or the discouraging insertion of vaginal forms. The potential for using adequate length of bowel segment will prevent post coital dyspareunia and vaginal trauma. Moist neovagina by mucous secretions will allow adequate lubrication of the vagina without using lubricants and decrease the incidence of dyspareunia. These advantages point that the use of bowel segments for vaginal reconstruction, although not the ideal procedure, is the most acceptable procedure with less complications and more satisfactory results. The use of bowel for vaginal reconstruction was first described in 1892 by Sneguireff [11] utilizing the distal rectum with terminal colostomy, followed by Popow (1910) [12] and Schubert (1911) [13] describing rectal transplantation. These procedures with subsequent fecal incontinence are now obsolete and no more acceptable. The use of isolated sigmoid for reconstruction of neovagina is widely applicable by many centers. The technique which was described by Ruge in 1914 was associated with very high incidence of fecal fistula, dehiscence, necrosis and mortalities due to short sigmoid [15]. Kun in 1975 [16] modified the technique by incisions at the root of mesosigmoid to add more length avoiding tension at suture lines. In spite of this important modification, still this procedure may result in anastomotic leakage in about 2% of the cases with the development of fecal fistula [19]. Stenosis

is still a problem with this procedure (15%), and short neovagina which may result in obturator rupture with subsequent pelvic peritonitis in 5% of cases [19]. Also, excessive discharge was reported to occur in about 33% of cases [20,21]. The simple ileal loop substitute for vaginal reconstruction has the disadvantage of stenosis with subsequent dyspareunia, and bleeding. This complication may be avoided by performing the double loop ileal segment described by Baldwin 1907 [22]. Excessive discharge from ileal loops is unavoidable and causes extreme discomfort and scalding of the perineal region for the patient and penile inflammation for the partner. The use of ileocecal segment for vaginal reconstruction is not frequently discussed in the literature. Kun [16] reported the use of ileocecal segment as an alternative for the short sigmoid segment. Burger et al. in 1989 [17] presented 10 cases of ileocecal neovagina with excellent results. Mobus (1996) reported 44 cases with vaginal reconstruction including only one case of ileocecal neovagina [23]. None of these authors had reported complications concerned with the use of the ileocecal segment as a vaginal substitute. This statement may put vaginal reconstruction with the ileocecal segment as one of the best of reconstruction procedures. In our study, all our eleven patients had pelvic malignancy that necessitated vaginal resection. An average of one hour was added to the operative procedure, which could be tolerated by all of them due to their young ages. An extra blood loss of an average of 150 ml also had no harmful effect and could be easily compensated. All patients had rapid recovery from the operation compared to the use of skin grafts or myocutaneous flaps that require postoperative dilatation for a minimum of three months, and the use of the annoying vaginal moulds may be for life. None of our patients had developed vaginal stenosis, which is found superior to other procedures where stenosis was reported to occur in most of the patients with skin graft reconstruction, up to 35% of cases with myocutaneous flaps, and up to 15% on using the sigmoid colon for reconstruction. Flap dehiscence, partial and total loss may reach up to 12.5%, 18.8%, and 15%, respectively, with myocutaneous flaps. None of our patients had developed suture line dehiscence or graft necrosis. Short neovagina is common on using skin grafts, myocutaneous flaps, or sigmoid colon for reconstruction. In our study, none of the

patients had short vagina because of using the capacious cecum and potentially the whole ascending colon could be used allowing a long vagina. This long segment will avoid dyspareunia, traumatic bleeding, and the serious obturator rupture with subsequent pelvic peritonitis. The mucous secretion of the ileocecal segment will allow adequate lubrication of the neovagina and none of our patients had to use lubricants during sexual intercourse. Compared to other procedures consuming skin for reconstruction, the use of lubricants is mandatory. Using double loops of ileum for vaginal reconstruction may not be associated with vaginal stenosis with its subsequent discomfort and complications, but perineal skin excoriation and partner penile inflammations are serious complications due to the digestive nature of the ileal secretions. This complication was not reported in our study due to the lubricant and soothing nature of the mucous secretion of the large bowel. Sexual function was satisfactory in all our patients except only one where urinary incontinence resulted in severe discomfort. This patient had urinary bladder substitute with an ileal loop and her discomfort was due to urinary incontinence and not related to the procedure of vaginal reconstruction.

Conclusions:

From our study, we may conclude that vaginal reconstruction for the patient who lost her vagina during her active sexual life, as a result of treatment from pelvic malignancy, is important for sexual, psychological, and social rehabilitation. Using the ileocecal segment for vaginal reconstruction is one of the best available procedures for reconstruction of neovagina. This procedure has the least incidence of morbidity with minimal added burden on the patient during operation. Rapid postoperative rehabilitation without the need for annoying prolonged self dilatation and the use of vaginal moulds will avoid the extreme discomfort reported in other procedures. Creation of a capacious long vagina will prevent dyspareunia, vaginal lacerations, bleeding and obturator rupture. Most of the patients will practice rapid and satisfactory sexual life. Low incidence of morbidity and high rate of success concerning sexual function ranks this procedure as one of the excellent substitutes for vaginal reconstruction after surgical extirpation for pelvic malignancy.

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