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Surgical Endoscopy

Laparoscopic reconstruction of vagina using sigmoid autograft

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Abstract. With the advent of advanced laparoscopic techniques in surgery, new applications have been found, which have expanded the role of laparoscopy in the gynecological field. The aim of this paper is to introduce our laparoscopic technique of taking a sigmoid colon autograft for colpopoiesis in a patient with congenital agenesis of the vagina. This technique is less invasive and is easy to perform, and it may be the best choice of operation in respect to the naturalness and the permanency of the vagina that results. The success of this laparoscopic technique of taking a sigmoid autograft for colpopoiesis suggests diverse possible applications in the future.

Key words: Laparoscopic surgery — Colpopoiesis — Rokitansky-Kuster-Hauser syndrome — Congenital vaginal defect — Sigmoid colon

Many operative methods have been developed for colpopoiesis in patients with congenital vaginal defects [1, 4, 5, 6]. With the recent development of laparoscopic surgery, we have successfully performed a laparoscopic colpopoiesis using pelvic peritoneum and compared this method with colpopoiesis using a sigmoid colon by open abdominoperineal approach [2]. The results show that transplantation of the sigmoid colon may be ideal for colpopoiesis in terms of the naturalness and permanency of the vagina [2]. The purpose of this article is to introduce our minimally invasive technique—colpopoiesis using a sigmoid colon autograft laparoscopically.

Patients and methods

Three female patients with amenorrhea, aged 20–24 years, were referred to us by gynecologists who had diagnosed a congenital vaginal defect. They came to our hospital between April and August 1995 for a definite diagnosis and a colpopoiesis. Their secondary sexual development, such as the growth of their breasts and external genitalia, was normal except for a blind vaginal introitus. The uterus could not be detected by ultrasonography.

These findings, along with other laboratory examinations, led to the diagnosis of a congenital vaginal defect. A barium enema of the sigmoid colon (Fig. 1) and an angiogram of the mesenteric vessels were performed (Fig. 2) to identify a probable future sigmoid graft of enough length with adequate vascularity. After being informed in detail about their diagnosis and treatment, the patients underwent a colpopoiesis using sigmoid colon autograft by our laparoscopic technique.

Surgical technique

Under general anesthesia, a standard 12-mm trocar was placed in the supraumbilical position. The laparoscope was introduced into the pelvic cavity through the trocar followed by insufflation of the pelvic cavity with CO_2. The inside of the pelvic cavity was visualized thoroughly. Fallopian tubes and ovaries showed a normal morphology, and there were right and left vestigial uteri. Therefore, our final diagnosis was congenital vaginal defect corresponding to Rokitansky-Kuster-Hauser syndrome. Three additional trocars for surgical instruments were placed in the abdomen; two were placed bilaterally 10 cm from the supraumbilical trocar and one was placed in the suprapubic area, about 5 cm above the pubic tubercle in the median line (Fig. 3).

After investigating the pelvic cavity, a cruciate incision was made in the mucosa of the vaginal inlet. Under laparoscopic video visual control, connective tissues between the bladder and rectum were detached gently through the cruciate incision by finger and cervical dilator (Hegar No. 30) in order to make sufficient room for a vaginal tunnel. Next, a sigmoid colon autograft 15 cm long with intact vasculature was isolated by applying endo-stapling technique (Figs. 4, 5). Intracorporeal end-to-end anastomosis of the remaining sigmoid colon was performed by circular endo-stapler through the anus. No leakage at the anastomotic site was confirmed by per-anal saline injection. After that, an adequate opening (about 5 cm in diameter) of the pelvic peritoneum was made by an electrocauteric incision under laparoscopic guide (Fig. 6). The distal end of the sigmoid colon graft was pulled out of the pelvic cavity through the peritoneal opening to the vaginal exterior and sutured around it by transfixing sutures to create an artificial vagina and vaginal introitus (Fig. 7). The colpopoiesis was then completed. The proximal end of the sigmoid colon graft was left free as a blind end in the pelvic cavity.

Results

The time taken for the operation was about 140 min on average, and bleeding volume was about 30 ml, mainly

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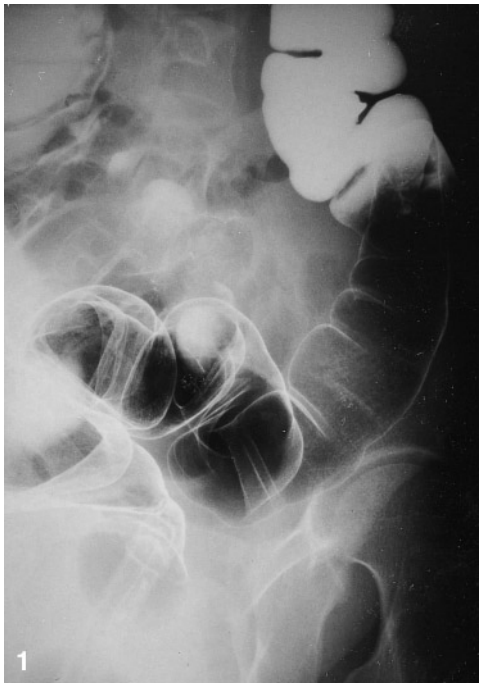

Fig. 1. Barium enema of the sigmoid colon.

Fig. 2. Angiogram of the mesenteric vasculature showing adequate vascularity of the sigmoid colon.

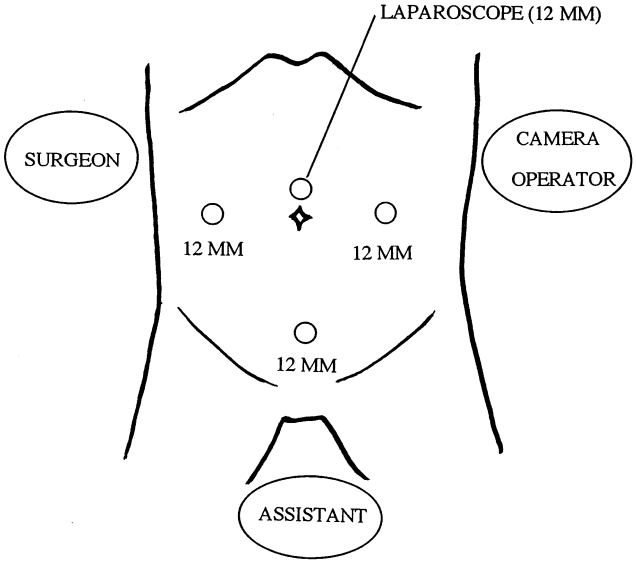

Fig. 3. Diagram of port-site placement.

from the blunt dissection to form the vaginal tunnel. There were four small wounds for trocar insertion in the abdominal wall: one for the laparoscope and three others for surgical instruments. Normal walking and ingestion were possible by a couple of days after surgery. Daily dilation and irrigation of the sigmoid colon graft were necessary for several days in order to maintain the patency of the vaginal lumen, followed by gynecological and morphological examinations of the artificial vagina. The patients were discharged between 8 and 10 days after the operation.

The maximum follow-up to the date was 6 months. The vaginal lumen was found to be well. Moreover, two patients in our series had married and had a satisfying sexual life. Further follow-up is to be done in the near future to observe naturalness and permanency of the colpopoiesis performed by this technique.

Discussion

Various techniques for a colpopoiesis for congenital vaginal defects such as Rokitansky-Kuster-Hauser syndrome have been devised and a number of operations and follow-up investigations have been reported [4]. Among these, the free skin graft, pelvic peritoneum, and sigmoid colon have been commonly used.

We consider that the essential criteria for a good colpopoiesis are (1) making a vagina as natural in morphology and function as possible, and (2) easy postoperative management and maintenance. Colpopoiesis using sigmoid colon meets both these requirements. For this, there was no alternative to the conventional abdominoperineal approach [3]. However, there are still a few disadvantages of open abdominoperineal surgery, including (1) the invasiveness of the operation itself and (2) cosmetic problems associated with the appearance of a permanent abdominal scar. To overcome these above demerits, we have already performed laparoscopic colpopoiesis using pelvic peritoneum [2]. Despite its great advantages of convenience, safety, and cosmetic superiority, it has not provided satisfactory results. This is because, in general, it requires self-management of the colpopoiesis with prosthesis for an extended period.

In addition, granulation tissue in the artificial vaginal mucosa may cause prolonged leukorrhea and bleeding. Moreover, metaplasia to stratified squamous epithelium takes a long time. Therefore, perhaps for the first time, we have introduced a laparoscopic technique that takes sigmoid autograft and applies it successfully in colpopoiesis. There are certain operative technical difficulties in this advanced technique. This is because it requires (1) a skilled hand in laparoscopic surgery and (2) a thorough knowledge of re-

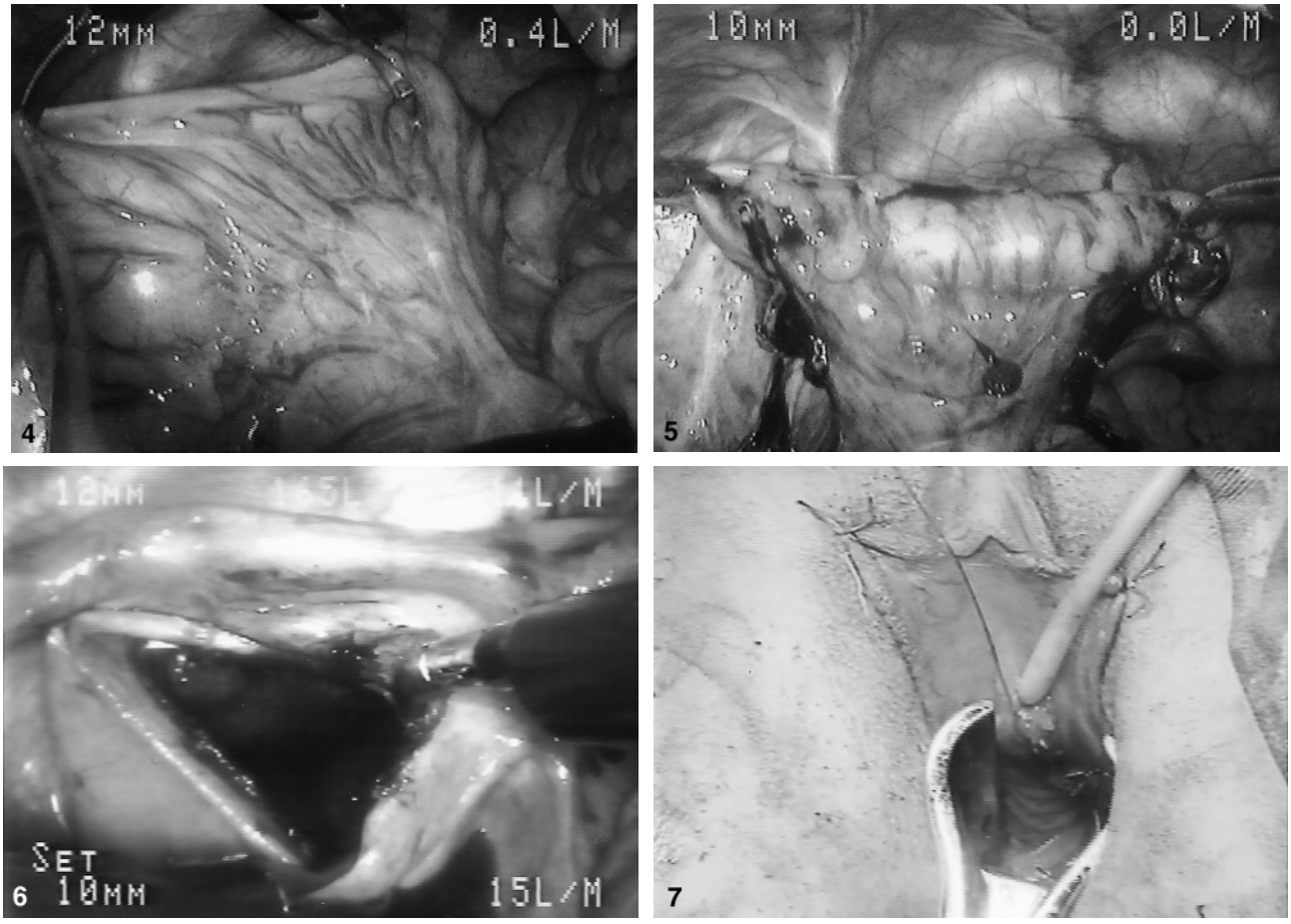

Fig. 4. Laparoscopic view of the sigmoid colon with intact vasculature.

Fig. 5. Sigmoid autograft 15 cm long with attached mesosigmoid.

Fig. 6. Laparoscopic view of the pelvic peritoneal opening through which the sigmoid colon autograft has been pulled out.

Fig. 7. Reconstructed vaginal wall and vaginal introitus after colpopoiesis has been completed.

gional abdominopelvic anatomy with vasculatures, so that a viable and functional sigmoid autograft can be obtained. Although this technique has not yet been established in the world, we speculate that in the near future it might be the most appropriate choice for colpopoiesis in a patient with a congenital vaginal defect. Furthermore, this technique can be used for other vaginal reconstructive surgeries.

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