Laparoscopic Surgery for Colpopoiesis with the Pelvic Peritoneum: First Report in Japan

KENICHIRO IKUMA, M.D.
CHIEF, DEPARTMENT OF OBSTETRICS AND GYNECOLOGY
SHUICHI OHASHI, M.D.
CHIEF, DEPARTMENT OF SURGERY
TAKARAZUKA CITY HOSPITAL, TAKARAZUKA, HYOGO, JAPAN

Several methods have been developed for colpopoiesis in patients with vaginal agenesis. Nonetheless, various problems remain, including technical difficulty, invasiveness, operative stress, and poor cosmetic results, as well as the insufficient naturalness of the vagina itself. We have successfully completed colpopoiesis using the pelvic peritoneum in a laparoscopic surgery for Rokitansky-Küster-Hauser syndrome (RKH).

This method is considered to be exceptionally effective in terms of minimal operative stress, simplicity, and aesthetics, making it possible to construct a substitute vagina when RKH has been diagnosed. However, it is not ideal, since the natural characteristics of the vagina itself have not been duplicated. Further studies are needed to achieve even better results.

Laparoscopic surgery has been used to treat various diseases in many regions and is now becoming established as a separate subdivision of surgical therapy called "Minimally Invasive Surgery."[1,2] We use this technique for oophorocystectomy,[3] vaginal hysterectomy,[4] etc.

This report describes a colpopoiesis we performed by laparoscopic surgery using the peritoneal tissue in a patient with vaginal agenesis corresponding to RKH. We used Rothman's procedure[5] with Davydov's technique. We compare this method with laparotomy for colpopoiesis with the use of sigmoid colon[6,7] and discuss the advantages and drawbacks of the two methods and our future policy.

CASE REPORT

A 16-year-old female with amenorrhea was referred to us by a gynecologist who had diagnosed vaginal agenesis; she came to our hospital for a definite diagnosis and a colpopoiesis on April 7, 1993. Her secondary sexual development, such as the growth of breasts and external genitalia, was normal except for a blind loop at the vaginal introitus. Her height was 165 cm and her weight 63 kg. The uterus could not be detected by ultrasonotomography. Laboratory examinations revealed FSH 3.2 mIU/L, LH 2.3 mIU/L, E2 90 pg/mL, Prog. 2.5 ng/mL, and aldosterone 106 pg/mL in the blood, and a 46 XX chromosome pattern. Her basal body temperature was biphasic.

These findings led to a diagnosis of vaginal agenesis. After being informed in detail about the diagnosis and treatment, she gave her written consent and underwent a colpopoiesis by laparoscopic surgery with the use of peritoneal tissue on August 11, 1993.

SURGICAL PROCEDURE

Laparoscopy was conducted under general anesthesia with endotracheal intubation.

First, pneumoperitoneum was produced through the lower part of the umbilical fossa, and a trocar for a laparoscope was inserted for observation. As shown in Figure 1, the vagina ended in a blind loop with no introitus. The Fallopian tubes and ovaries showed a normal morphology; there were right and left vestigial uteri. Therefore, our diagnosis was vaginal agenesis corresponding to RKH.

Next, we proceeded to construct a vaginal tunnel for a colpopoiesis. As shown in Figure 2, after a cruciform incision to make a vaginal inlet, the tissues between the bladder and the rectum were separated gently by the fingers, under observation through a laparoscope, to detach the pelvic peritoneum at the Douglas pouch. As shown in Figure 3, after sufficient detachment, the pelvic peritoneum was dissected by an electric cautery under observation through a laparoscope.

As shown in Figure 4, the pelvic peritoneum which had been detached and dissected as described above was pulled to the vaginal inlet; we sutured around it by single transfixion sutures to create a peritoneal vaginal wall.

Finally, a cervical canal dilator (Hegar No. 30) was inserted into the vaginal duct for about 10 cm, and pneumoperitoneum was induced again. Figure 5 shows the pelvic peritoneum sutured with transfixion sutures at four points, right, left, and central parts, under laparoscopic observation. The colpopoiesis was now complete.

RESULTS

The operation took about 90 minutes, and blood loss was about 100 g mainly from the blunt dissection to and from the vaginal tunnel. As shown in Figure 6, there were three wounds in the abdominal wall: a perforating wound (10 mm in diameter) for the laparoscope, and two perforating wounds (each 5 mm in diameter) for forceps. Normal ambu-

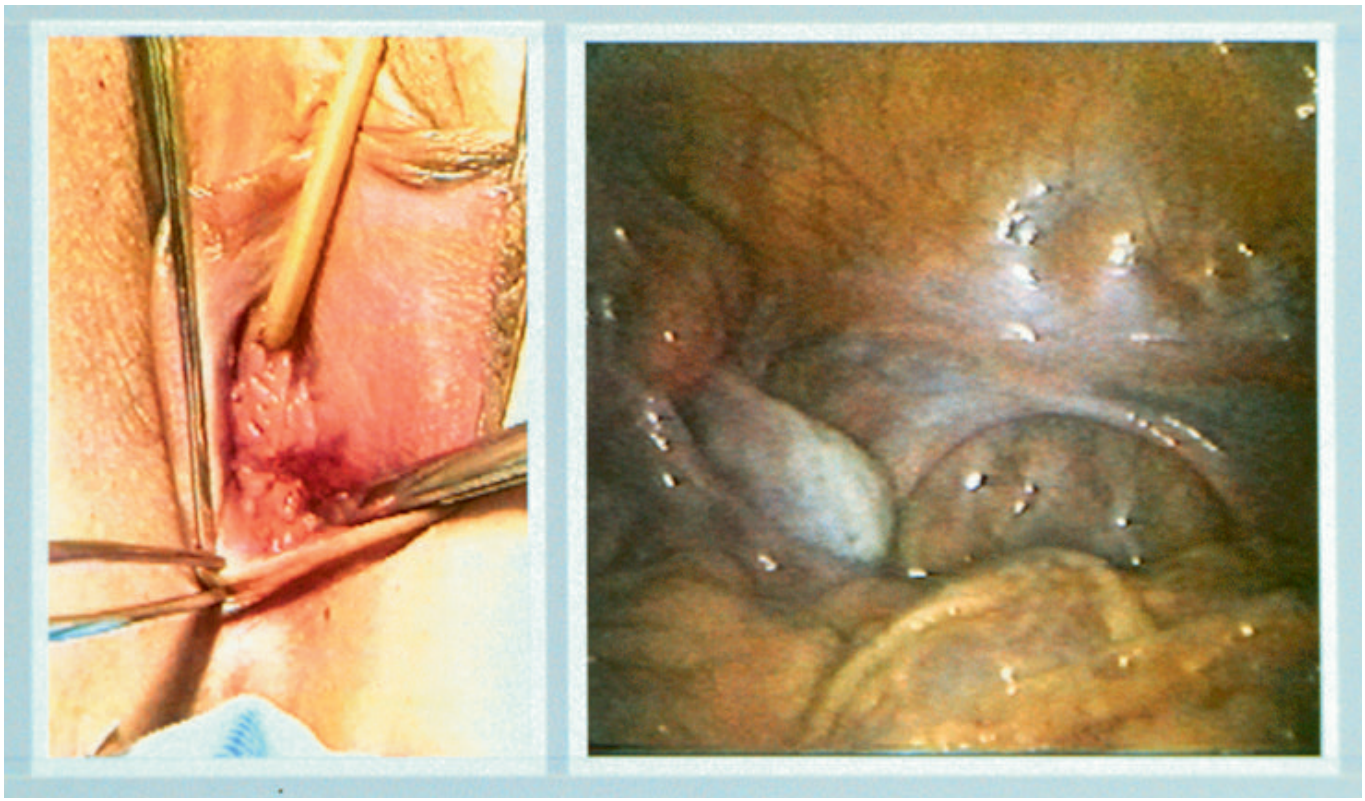

Figure 1. External genital and intrapelvic findings.

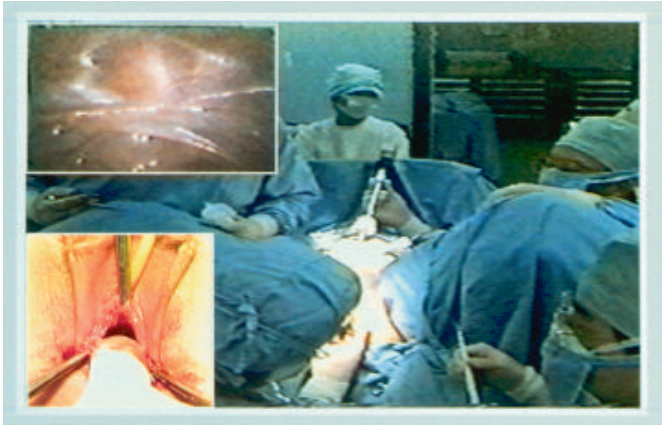

Figure 2. Blunt dissection of vaginal tunnel in preparation for colpopoiesis.

Figure 3. Dissection of the peritoneum under laparoscopy.

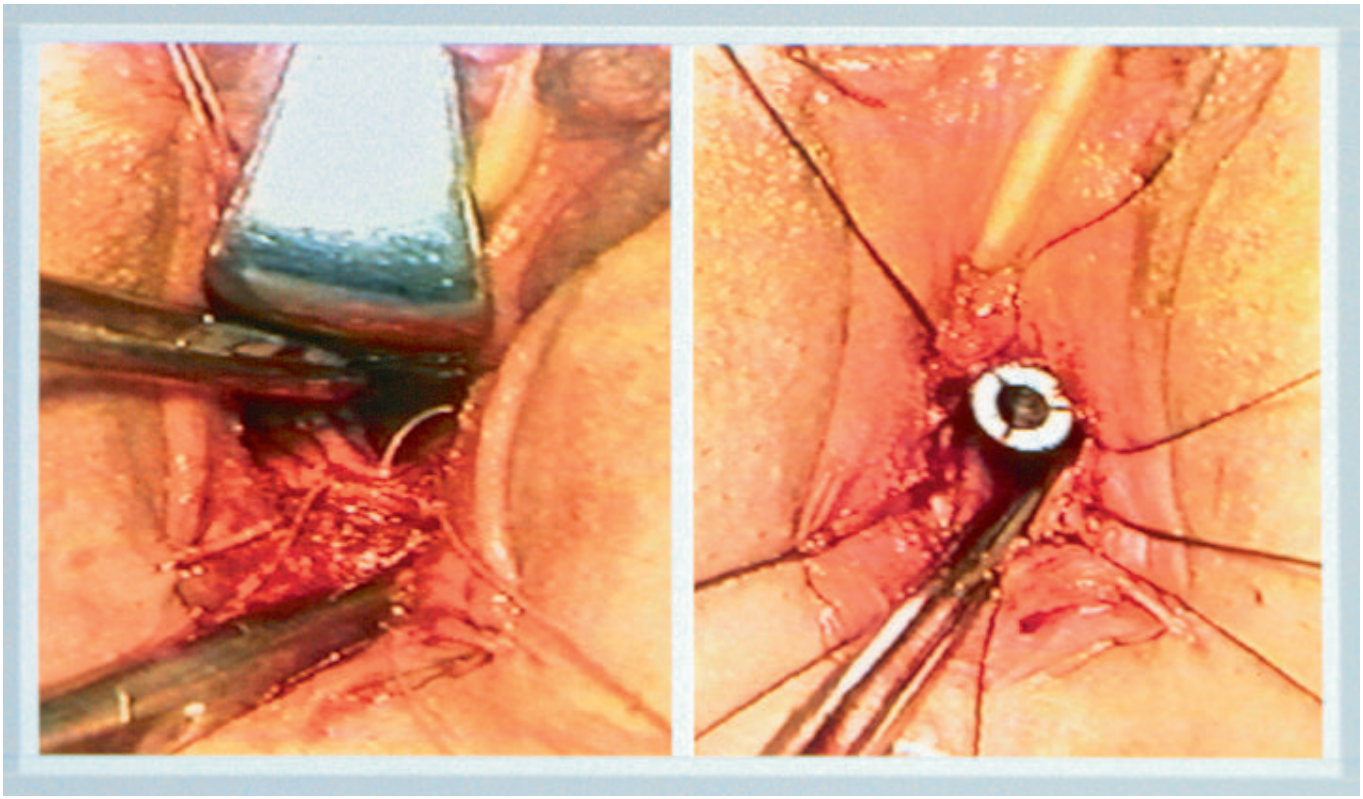

Figure 4. Suturing of pelvic peritoneum to vaginal introitus.

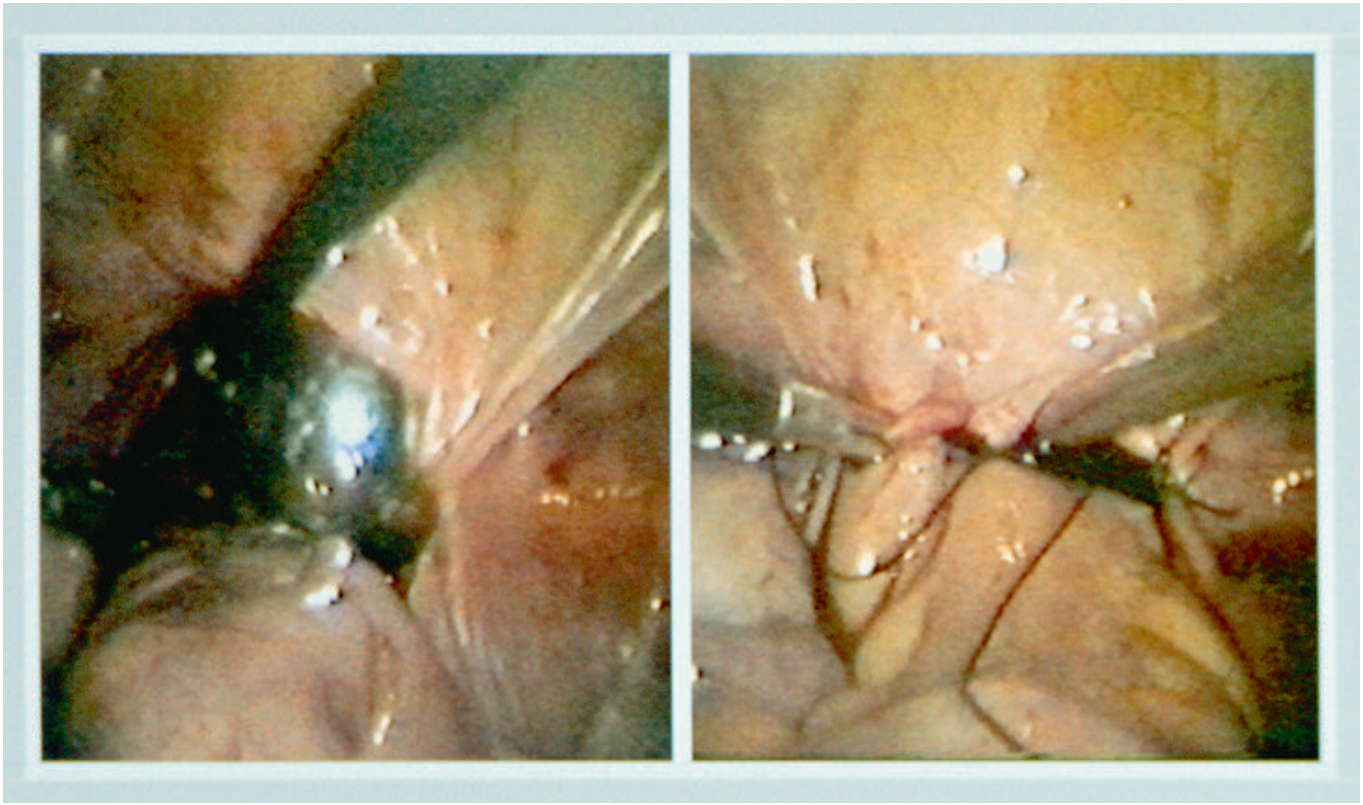

Figure 5. Colpopoiesis completed with transfixion suturing to pelvic peritoneum.

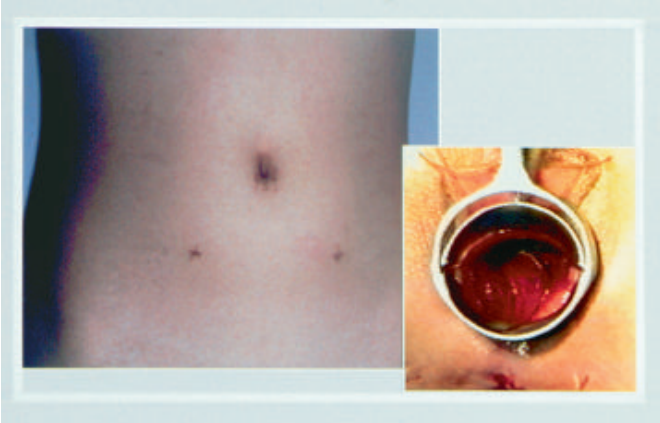

Figure 6. Healing of operative wound and constructed vagina.

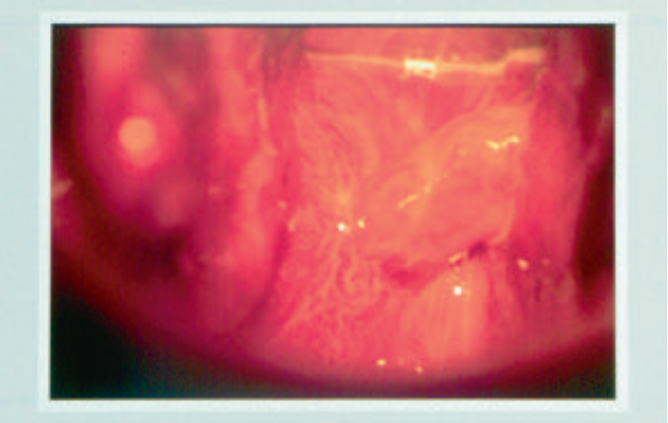

Figure 7. Postoperative vaginal lumen after one year.

lation and a regular diet were possible the day after surgery.

The continuous insertion of a prosthesis to maintain the colpopoiesis and daily irrigation of the vagina are necessary to keep the vaginal lumen open. She was taught to do these procedures herself and was discharged 14 days after the operation. Normal activity was possible by the day of discharge, and regular exercise was possible with the prosthesis in place starting one month after the operation.

Now, 13 months after the operation, as shown in Figure 7, although the vaginal lumen is well maintained because she can insert the prosthesis herself, metaplasia of the peritoneum to stratified squamous epithelium characteristic of vaginal wall tissue is not obvious, and granulation and some bleeding are still present. Besides, cytological examination does not show definite keratinocytes, so we consider it necessary to continue periodic observation.

DISCUSSION

Various techniques of colpopoiesis for vaginal agenesis corresponding to RKH have been devised, and a number of surgically treated patients and follow-up investigations[6-9] have been reported. The important techniques used in our country are free skin graft, pelvic peritoneum, and sigmoid colon.

We believe that the essentials for a good colpopoiesis are the following: (1) making a vagina as natural in morphology and function as possible; (2) postoperative easy management and permanent maintenance; and (3) the possibility of pregnancy.[8,9]

We used to think that a colpopoiesis using the sigmoid colon would be the ideal method to fulfill the above conditions, and we performed two colpopoieses using the sigmoid colon with laparotomy.[6,7] However, there are still several controversial points and difficulties: (1) the hazards of the technique, (2) invasiveness of the operation itself, and (3) the appearance of the abdominal scar.

In July 1991, we introduced the technique of laparoscopic surgery,[1,2] which has spread explosively as "Minimally Invasive Surgery," and we have used it in a procedure we developed for oophorocystectomy,[3] vaginal hysterectomy,[4] and others including, as described above, a colpopoiesis using pelvic peritoneum which we found to be a relatively safe and convenient surgical technique.

As demonstrated in our patient, colpopoiesis under laparoscopy has the following advantages: (1) it is conducted after a definite diagnosis has been made; (2) there is minimal invasiveness and early recovery; and (3) it is superior cosmetically.

On the other hand, certain technical difficulties must be solved: (1) it requires skill in laparoscopic surgery; (2) the technique is complicated; and (3) coordinated teamwork is essential.

Furthermore, despite its great advantages of convenience, safety, and cosmetic superiority, it does not provide a perfectly natural permanent vagina for these reasons: (1) self-management with a prosthesis must be continued for a long time; (2) granulation in the vaginal mucosa may cause prolonged leukorrhea and bleeding; and (3) metaplasia to stratified squamous epithelium takes a long time.

In our hospital RKH has been diagnosed in only three of the 18,904 new patients examined. The next time we see a patient with this syndrome, we intend to use this technique as the first choice. Our second choice will be laparoscopic surgery using the sigmoid colon, since sigmoidectomy by laparoscopic surgery is already an established procedure.[1]

CONCLUSIONS

1. We used laparoscopic surgery for a colpopoiesis and found it to have many advantages over laparotomy.
2. Further investigation is necessary, because colpopoiesis using peritoneal tissue does not necessarily provide satisfactory naturalness and permanence.
3. Because colpopoiesis using sigmoid colon is considered to be ideal, we hope to investigate laparoscopic colpopoiesis using the sigmoid colon. STI

REFERENCES

1. Zucker KA, ed. Surgical Laparoscopy Update. St. Louis: Quality Medical Publishing; 1993.
2. Hulka JF, Reich H, eds. Textbook of Laparoscopy. Pennsylvania: W.B. Saunders; 1994.
3. Ikuma K, Shiotani T, Shibahara H. Laparoscopic resection of ovarian cysts: precautions and improvements in the procedure and application of the mini-laparotomy. Acta Obst Gynaec Jpn 1993;45:1305.
4. Ikuma K, Shiotani T, Shibahara H. Laparoscopy-assisted vaginal hysterectomy. Acta Obst Gynaec Jpn 1993;45;691.
5. Davydov SN. Colpopoiesis from the peritoneum of the uterorectal space. Obst Gynecol (Moscow) 1969;12:55. Quoted by: Rothman D. The use of peritoneum in the construction of a vagina. Obstet Gynecol 1972;40:835.
6. Ruge E. Ersatz der Vagina durch die Flexur mittels Laparotomie. Deut Med Wschr 1914; 40:120.
7. Ikuma K, Suno S, Yamada K, et al. Formation of artificial vagina with sigmoid colon: report of two cases. Adv Obstet Gynecol 1989;41:775.
8. Zarou GS, Esposito JM, Zarou DM. Pregnancy following the surgical correction of congenital atresia of the cervix. Int J Obstet Gynecol 1973;11:143.
9. Singh J, Lakshmi Y. Pregnancy following surgical correction of nonfused mullerian bulbs and absent vagina. Obstet Gynecol 1983;61:267.