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The Cul-de-sac Packing Method with a Metreurynter in Gynecologic Gasless Laparoscopy

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MURAKAMI, T., YOSHINAGA, K., KONNO, R., TERADA, Y., NABESHIMA, H., SAWADA, R., YAEGASHI, N. and OKAMURA, K. *The Cul-de-sac Packing Method with a Metreurynter in Gynecologic Gasless Laparoscopy.* Tohoku. J. Exp. Med., 2002, **197**(3), 133-138 —— Laparoscopic surgery has inherent restrictions with respect to the operative field of view and the range of surgical manipulation. Of the two procedures which secure sufficient operative space, the operative view of the gasless method is inferior to that of a pneumoperitoneum. In order to gain greater surgical visualization in gynecological gasless laparoscopy, the authors devised the cul-de-sac packing method employing a metreurynter, an instrument familiar to obstetricians in Japan. A metreurynter was lead into the cul-de-sac, and was inflated with saline, which resulted in the adnexae being raised up. This method was performed in three patients whose preoperative diagnoses were unknown infertility, ovarian cyst, and ectopic pregnancy, respectively. In all cases this method was able to keep the bowels out of the cul-de-sac space. In the first case, we were able to perform a tubal patency test under tension-free conditions, while at the same time bilateral tubal information could be obtained in a single view. In the latter two cases the adnexal lesions were maintained at an inspectional position throughout the operation without the necessity of being held by forceps to prevent them from falling down into the cul-de-sac space. No complications occurred in our three cases. This method will not be useful for patients whose cul-de-sac space is closed due to adhesions. However, except in such cases, this technique supplies a good operative view while being simple, safe, and inexpensive. Furthermore, this method supports gentler and less traumatic manipulation throughout the operation. ———— gasless laparoscopy; surgical instrument; metreurynter

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Laparoscopic surgery has been performed with dramatically increasing frequency in the gynecological field, because this procedure has the advantages of minimum damage, cosmetic benefits, and rapid recovery. Two methods secure sufficient space for this type of operation: pneumoperitoneum with CO_2 or the gasless technique using instruments which lift up the abdomen. Gasless laparoscopy allows the easy use of conventional instruments such as Pean's forceps and Metzenbaum's scissors (Smith et al. 1993), and thus this procedure is familiar to many physicians. In fact, diagnostic or operative laparoscopy has been introduced in general hospitals in Japan, and 40% of clinicians perform the gasless method of laparoscopy (Murakami et al. 2001). This method, however, involves a restricted operative field of view of less than that provided by pneumoperitoneum (Goldberg and Maurer 1997; Johnson and Sibert 1997). The bowels are often regarded as a nuisance, especially in gasless laparoscopy.

On the other hand, a giant ovarian cyst often keeps the bowels out of the operative field during laparoscopic operations. The authors thought that a metreurynter, a rubber inflated balloon with a nozzle at one end used sometimes in the obstetric field in Japan, may have the same effect of improving the operative view during gasless laparoscopy. This case report summarizes our experience in using the cul-de-sac packing method employing a metreurynter for gynecological diagnostic or operative laparoscopy.

Methods

Gasless laparoscopy was initiated via an open laparoscopy technique, and was followed by an abdominal wall lifting method with long surgical wire (Nagai et al. 1993). A three puncture technique was usually performed, with either the second or third trocar, approximately 10 mm in diameter, located in the bilateral lower abdomen. The operating table was adjusted with the patient's head in a downward position. Following observation of the abdominal and pelvic cavity, the Douglas' cul-de-sac was inspected for free space, after which a forceps-lead metreurynter (Fuji Latex Co., Ltd., Tokyo) was inserted into the bottom of the cul-de-sac through a 10 mm trocar site. A

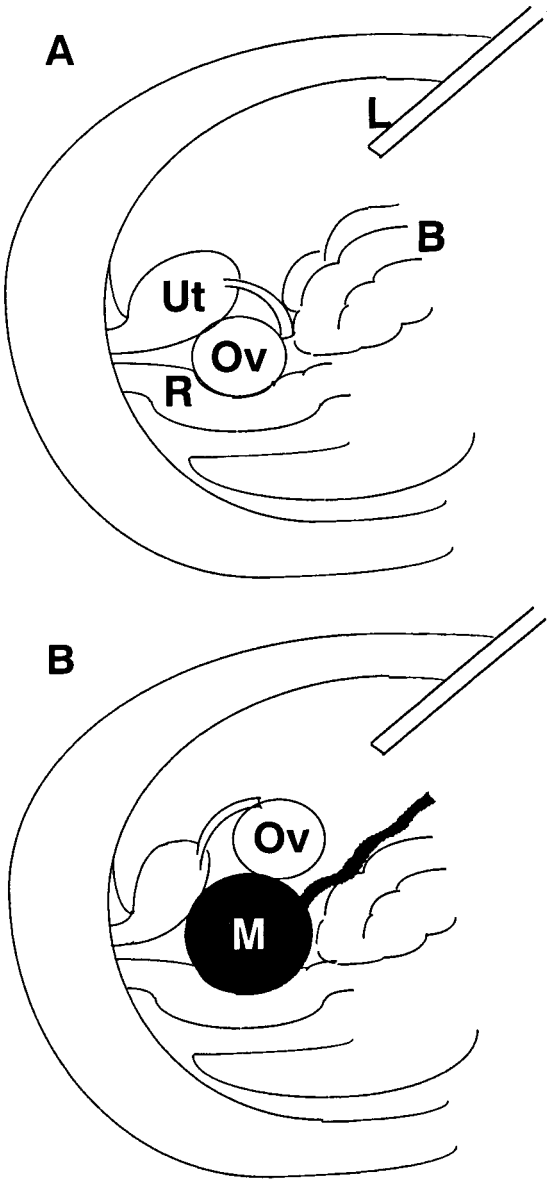

Fig. 1. The cul-de-sac packing method.
Ovarian cyst, which is submerged in the cul-de-sac space in its natural state (A), is raised up by a metreurynter inflated in the cul-de-sac space (B).
Ov, ovarian cyst; Ut, uterus; R, rectum; B, bowels; L, laparoscope; M, a metreurynter.

volume of 200–250 ml saline was extraperitoneally inflated into the balloon component of the metreurynter. The metreurynter was able to move the bowels out of the cul-de-sac and at the same time, it lifted the adnexae up via replacement into the space of the Douglas pouch (Fig. 1). After a tip of the tube was fastened with a strip, all of the metreurynter was inserted completely into the peritoneal cavity.

Case Reports

Patient 1

After 8 years of infertility, a 33-year-old patient underwent diagnostic laparoscopy under general anesthesia with endotracheal intubation. Laparoscopy revealed that she had the incipient stage of endometriosis, namely, blue berry spots on the bilateral sacrouterine ligaments. Because the cul-de-sac was free, the cul-de-sac packing method was performed after the lesions of endometriosis were cauterized electrically. A metreurynter was placed in the cul-de-sac space, and was then inflated with 250 ml saline. Bilateral adnexae were placed on the inflated balloon with forceps. A tubal patency test was performed with indigocarmine under tension-free conditions, so that the difference between the right and left tubal patencies could be identified in a single view (Fig. 2).

Patient 2

A 31-year-old woman, who had two children, was, following mass examination, find to have a tumor on her left ovary. This patient was clinically diagnosed with a mature teratoma as determined by ultrasonography, computer tomography, and tumor markers, and thus underwent gasless laparoscopic left adnexectomy using the cul-de-sac packing method employing a metreurynter. The volume of saline used to inflated the metreurynter was 200 ml. The left ovarian cyst was raised from the cul-de-sac space (Fig. 3). Following coagulation of the tumor side of the left tube and ovarian ligament, their body sides were suture-ligated using a ski-needle. This procedure was also done on the infundibulopelvic ligament as well, and the tumor was incised using electrical scissors. Each stump was clamped with Kelly's forceps and ligated one more time with 0 silk using a ligator (Mizuho Co., Ltd., Tokyo).

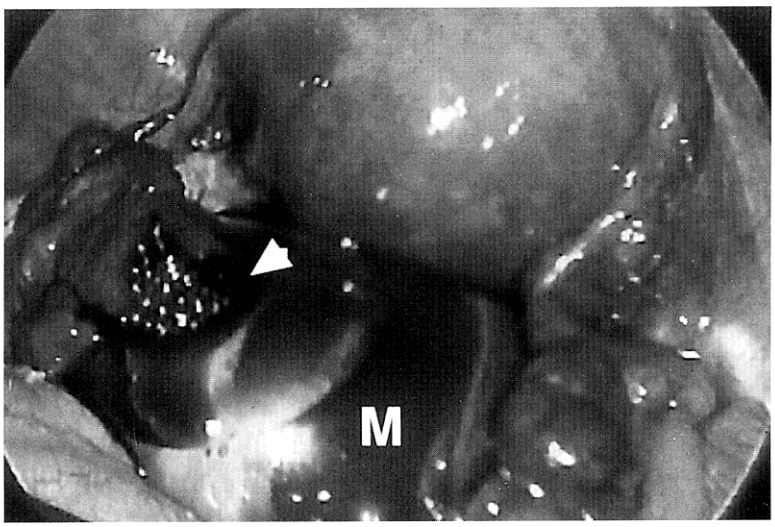

Fig. 2. Tubal patency test in Patient 1.
Tubal patency test was performed under tension-free conditions in diagnostic laparoscopy for unknown infertility. Bubbles flowed out from the left fallopian tube (arrow head).
M, a metreurynter.

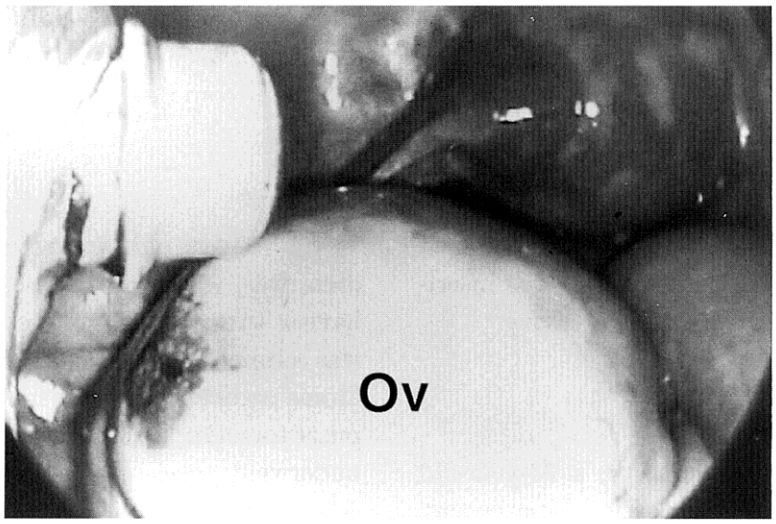

Fig. 3. Operative view in Patient 2.
A left ovarian cyst was raised up from the cul-de-sac space following inflation of the metreurynter balloon.
Ov, left ovarian cyst.

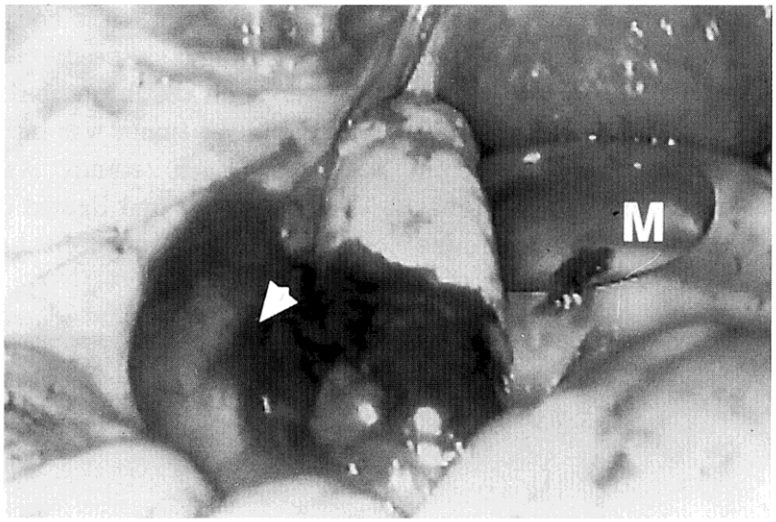

Fig. 4. Operative view in Patient 3.
A portion of left tubal pregnancy (arrow head) was inspectable on a metreurynter without holding the supporting tissues with forceps.
M, a metreurynter.

The ovarian cyst was removed with an impermeable bag. This left salpingo-oophorectomy was performed without bowel interference.

Patient 3

The patient, a 24-year-old primipara woman, was operated on for ectopic pregnancy. There was approximately 100 ml of blood and blood clots in the peritoneal cavity. An unruptured oviductal gestation was present in the ampullar portion of the left tube. Via insertion of a metreurynter into the cul-de-sac space, the bowels were lifted up with 200 ml saline (Fig. 4). A vertical incision using a

monopolar instrument and the removal of the pregnant tissue were then performed on the metreurynter balloon. Because hemostasis was achieved by electrocauterization, the wound could be left open without suturing. The lesion was always on the metreurynter, and thus it was unnecessary to hold the tube and uterus with forceps throughout the operation.

Discussion

Laparoscopic operative view and field are restricted to an artificial space. To create the space necessary for this surgery, certain methods such as bowel preparation, head down positioning, and holding the uterus are routinely performed. Moreover, under the pneumoperitoneum state, intra peritoneal pressure suppresses the bowels and shapes the abdominal wall into a dome. In this, the operative view provided by pneumoperitoneum is superior to that provided by the gasless technique.

To improve the operative view of gasless laparoscopy, we have introduced a cul-de-sac packing method employing a metreurynter. This method created an unexpectedly useful cavity for excellent visualization and surgical manipulation during procedures such as a diagnostic laparoscopy, a benign ovarian cyst, and ectopic pregnancy. If it is not adhesive, this technique allows the adnexae to be smoothly elevated from the cul-de-sac, which in turn makes the manipulation involved in this surgery to be performed easily and gently. In the diagnostic laparoscopy for infertility, the patency test could detect the difference of bilateral tubal patency with the same outcome as hysterosalpingography. During benign adnexal operations, grasping normal tissues, such as the utero-ovarian ligament and fallopian tube in surgeries for ovarian cyst and ectopic pregnancy, respectively, has usually been required in order to completely expose and operate on the adnexal lesion. In the method described in this report, the period required for holding the lesion by grasping neighboring normal tissue could be decreased.

Handling of a metreurynter in this method is very simple. It is easy to insert the metreurynter into the cul-de-sac from a 10 mm port site and inflation of the balloon is performed simply pouring saline into the metreurynter. After use, it is not difficult to extract the metreurynter, if the cap of its tube is knotted with 0 silk beforehand (Fig. 5).

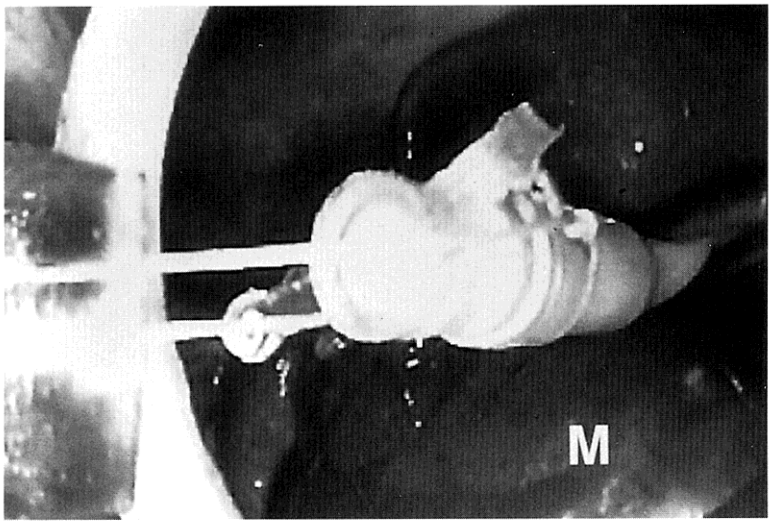

Fig. 5. Extraction of a metreurynter tube.
Following use, the metreurynter is easily removed by pulling on the attached strings.
M, a metreurynter

Although bowel retractors are useful in clearing the field of view for surgery, current models usually occupy one of the trocar sites. Because the entire metreurynter is inserted into the abdominal cavity, the trocar site is not occupied and is available for operative manipulation. Consequently, the cost of a metreurynter is lower than that of a current retractor and one more trocar.

In addition, due to its rubber material, the surface of the metreurynter is very smooth and soft, which makes it safe for surgery because it does not injure surrounding tissues. If electric devices contact the metreurynter, the balloon will not burst or rupture. In our experience, no complications related to the use of a metreurynter have occurred.

In conclusion, although this method is ineffective for patients whose cul-de-sac space is closed, such as in the case of severe endometriosis, this technique is simple, safe, inexpensive, and moreover significantly improves the quality of the operative view and surgical manipulation in gasless laparoscopy.

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