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Case Report

A Single Case of Single-Port Access Laparoscopic Appendectomy During the Puerperium

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Laparoscopic appendectomy is now widely practiced for the treatment of acute appendicitis. As result of increased demand for minimally invasive surgery, single-incision access was introduced and is being performed in various abdominal surgeries. Conventional laparoscopic appendectomy (LA) is gradually being performed in pregnant women. A 33-year-old woman was referred to our department at 39 weeks and 1 day of gestation due to abdominal pain. She was aware of her gastroepiploic pain even after the delivery. Though it was past 2 days, she was not recovering from right lower abdominal pain, so she was transferred to the Department of Gynecology at our hospital on the same day. Although an antibiotic was administered, the right abdominal pain did not improve, and she was referred to our department from the Department of Gynecology. We performed single-port LA (SP-LA). The total operation time was 63 minutes, and the estimated blood loss was 0 mL. She was discharged with no complications on postoperative day 7. We report our initial experience with single-port LA (SP-LA) using the glove technique for treatment of acute appendicitis in a postpartum woman. SP-LA using the glove technique was performed successfully during the puerperium without prolongation of operation time. This approach is less invasive, offers a much better cosmetic result than with conventional methods, and can be performed safely and at low cost.

Key words: PLA (single-port laparoscopic appendectomy) – Puerperium

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The advantages of laparoscopic appendectomy (LA) over open appendectomy (OA) are widely known and include decreased pain, shorter convalescence, and earlier return to work. Especially, LA is advantageous for treating acute appendicitis in pregnant women. Because the appendix of a pregnant woman is shifted from its normal position, OA may leave a larger operative scar than normal. In recent years, efforts of laparoscopic surgeons have resulted in a reduction in both the diameter of the access ports and the number of ports needed.[1] In addition, natural orifice transluminal endoscopic surgery (NOTES) is being developed as another form of minimally invasive surgery.[2] As a part of this process, the single-incision laparoscopic surgery (SILS) technique is presently being developed for various laparoscopic surgeries.[3] SILS is a virtually scarless technique in which the single-port access site is hidden in the umbilicus. We think that the primary advantage of single-port laparoscopic appendectomy (SP-LA) is the superior cosmetic result compared with multi-port access LA. We report a very rare case in which SP-LA was performed to treat acute appendicitis during the puerperium. This approach is less invasive, offers a much better cosmetic result than with conventional methods, and can be performed safely and at low cost.

Case Presentation

A 33-year-old woman who gave birth after a 39-week, 1-day gestation was referred to our department complaining of abdominal pain. There was no relevant past medical history. She was aware of gastroepiploic pain even after the delivery and was still complaining of right lower quadrant abdominal pain 2 days later. Blood tests and chemistry on admission showed a WBC of 10470/μL and CRP of 11.62 mg/dL, indicating high levels of inflammatory factors. Her RBC was 320×10^4/μL, Hb was 9.7 g/dL, and Fe was 26 μg/dL, all indicating low levels. Therefore, she underwent X-ray examination, which showed a distended colon and paralytic ileus, and the patient was transferred to the Department of Gynecology of our hospital on the same day. Computed tomography revealed a swollen appendix lying along the retroperitoneal fascia in a difficult to access location (Fig. 1). Although an antibiotic was administered, the right abdominal pain did not improve, and she was referred to our department from the Department of Gynecology.

Following induction with general anesthesia, the patient was positioned in the supine position, and

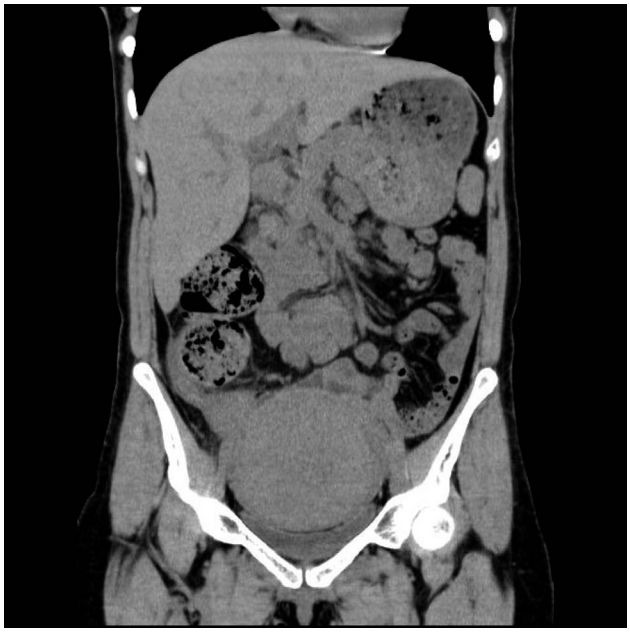

Fig. 1 CT scan revealed the appendix exited swelling on the retroperitoneal fascia.

single-port access technique was then performed. An access device was made using a standard wound protector (small or extra small size ALEXIS wound retractor; Applied Medical, Rancho Santa Margarita, CA, USA) and a size 5.5 sterile latex glove. The wound retractor was introduced through a small umbilical incision of 2.5 to 3 cm in size. The surgical glove was fixed to the outer ring of the wound retractor. A small access hole was made in the tip of 1 finger of the glove, and the CO_2 supply tube was connected to induce pneumoperitoneum. Other accesses were made through others fingers to create working channels for the laparoscopic instruments. Five- or 3-mm diameter traditional or curved laparoscopic instruments were used (Fig. 2).

The necrotic appendix was located along the retroperitoneal fascia and extended nearly to the right hepatic flexure (Fig. 3). We brought the right hepatic flexure down and freed the appendix from the right colon and extracted it directly through the umbilical access, as in a traditional appendectomy. The total operation time was 63 minutes, and the estimated blood loss was 0 mL. She was discharged to home with no complications on postoperative day 7.

Discussion

Acute appendicitis is the most common cause of nonobstetric abdominal surgery during pregnancy,

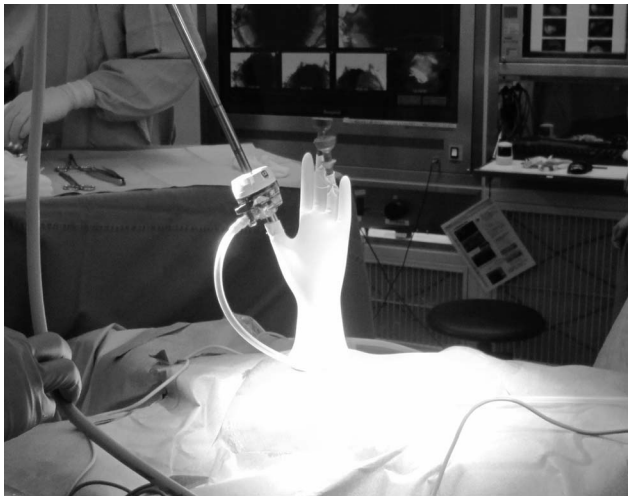

Fig. 2 Placement of surgical glove and instruments.

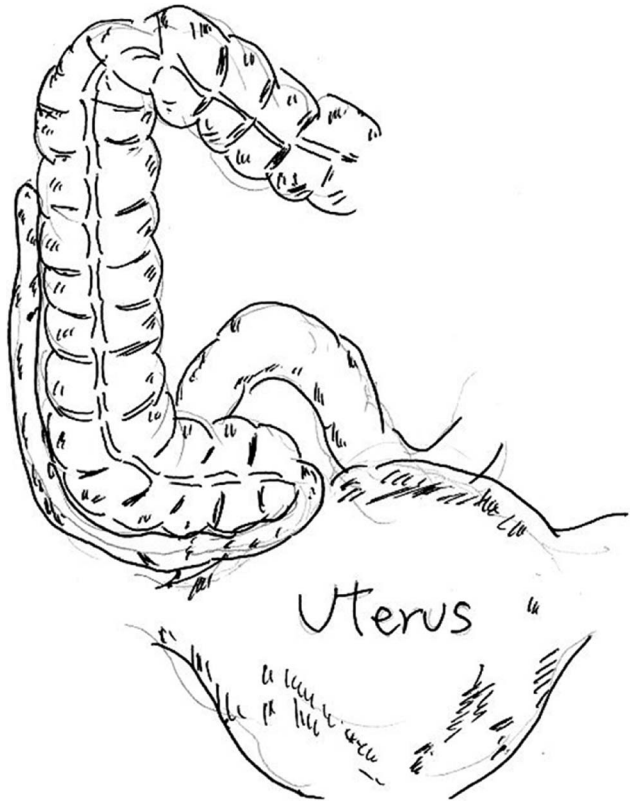

Fig. 3 Operative schema.

with a reported incidence between 0.05% and 0.13%; however, the diagnosis of acute appendicitis during pregnancy is difficult.[4] A ruptured appendix can lead to maternal and fetal morbidity and even fetal loss. Conventionally, the surgical management of choice for acute appendicitis during pregnancy has been conventional appendectomy. Recently, however, several distinct advantages of LA over the OA technique have been found of benefit in postpartum women including better visualization of the abdomen, improved diagnostic accuracy, decreased surgical trauma, reduced postoperative pain, and faster recovery.[5] Especially, because the appendix is shifted from its normal position during the puerperium, the OA technique may leave a larger operative scar than normal. In addition, in recent years, efforts to improve LA have led to a reduction in port size diameter and the number of laparoscopic access sites needed and to the introduction of SILS.[6–9]

Between July 2008 and April 2013, 360 patients with colorectal cancer underwent laparoscopic surgery at our institution. Our experience with this surgical technique showed it to be safe and feasible, with good short- and long-term outcomes. Therefore, we performed SILS using the glove technique in our institution,[10] and the postoperative complication rate was 0%. Requirements of basic surgical technique were respected in approaching the right colon neoplasms. However, the disadvantages of laparoscopy include such issues as the high cost of the device. Therefore, we perform our SP-LA method with an eye towards medical cost reduction. The cost of this technique is very low, which is an advantage when compared with the costs of some commercially marketed dedicated devices.

The surgical equipment used includes a standard wound protector and a latex sterile glove, 5-mm LiNA port × 2 (LiNA Medical, Glostrup, Denmark), a camera port, and a SonoSurg energy device (Olympus Medical Systems Corp., Tokyo, Japan), which can be reused. Moreover, the SP-LA procedure does not require a stapler because we extracted the appendix directly through the umbilical access, as in a traditional appendectomy.

Because of advancements in diagnostic imaging, the number of appendectomies is decreasing. Thus, the tendency for young abdominal surgeons to perform appendectomy using the traditional OA method is decreasing.

In Japan, CT is most widespread with many hospitals in the world. Therefore, the diagnostic imaging is advanced. It is often treated by antibiotic agents (without surgery) with acute appendicitis.

For this reason, appendectomies in our surgical unit are performed by resident surgeons.

This was a very rare case of acute appendicitis occurring during the puerperium when the uterus is still much larger than its normal state, and the

location of the appendix is shifted. In addition, the necrotic appendix of our patient was located along the retroperitoneal fascia extending nearly to the right hepatic flexure. LA is very useful in cases such as this, because the normal surgical incision placed in the right lower abdomen will not allow an adequate surgical view, and the incision will need to be extended. Our previous experience with SILS using the glove technique indicated that only a lateral approach technique in right hemicolectomy is required for this procedure, and no other special techniques are necessary. SILS using the glove technique performed during the puerperium is significantly less invasive and offers much better cosmetic results than LA.

We presented a case of appendicitis during the puerperium in which the necrotic appendix was successfully resected by SP-LA using the glove technique with the first report in English.

In conclusion, this approach is less invasive, offers a much better cosmetic result than with conventional methods, and can be performed safely and at low cost.

Acknowledgments

The author(s) declare that they have no competing interests.

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