

Laparoscopic cholecystectomy without visible scar: combined transvaginal and transumbilical approach

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Laparoscopic surgery has decreased trauma and improved results and natural orifice transluminal endoscopic surgery (NOTES) should be a further step in this direction. However the use of flexible gastroscopes in the abdomen is difficult and the generally chosen transgastric approach is not without risk. Therefore we have carried out a cholecystectomy with a combined transvaginal and transumbilical approach, using laparoscopic instruments. The optic and a dissector were inserted in the posterior fornix of the vagina, and a

5-mm trocar was inserted deep in the umbilicus. After dissection the gallbladder was removed through the vagina. The operation was done without problems within 85 minutes and left no visible scar. The postoperative course was uneventful. In NOTES the transvaginal approach has important advantages over the transgastric method (e.g. regarding sterilization and closure); standard laparoscopic instruments can be used whilst there are no flexible endoscopes that are easier to handle.

Introduction

It has always been our aim to optimize minimally invasive surgery by lessening the physical injury as much as possible. Some colleagues believe that the number and size of trocars used in an operation is not important. We on the other hand have tried to operate with as few trocars as possible and to use smaller trocars whenever this seemed reasonable. Less injury to the abdominal wall and a better cosmetic result must be desirable.

Laparoscopic cholecystectomy was usually performed with four trocars (two 10-mm and two 5-mm) in our department. In easy cases, in recent years, we only used two working trocars. The optimal technique required a 10 mm-trocar in the umbilicus and two 5-mm trocars in the upper abdomen, with a 5-mm optic and a 10-mm clip device. The gallbladder of course was removed through the incision in the umbilicus, which had to be widened as much as needed.

We have used the transvaginal approach to the abdominal cavity in the last decade, especially to remove specimens. We started with sigmoid resections, in which we aimed at a totally laparoscopic operation without enlargement of skin incisions, and later we removed the spleen in some cases. When we performed our first laparoscopic

splenectomy in 1992, we thought that an intact organ was required for pathological examination. However, we found that the required size of the abdominal wall incision was so large that it at least partly negated the benefit of minimally invasive surgery. In subsequent cases, we therefore removed the specimen transvaginally, and published a report of this method in 1994 [1]. In later years we abandoned this technique, but the gynecologist in our team (H.-A.W.) continued to use this approach for laparoscopic diagnosis and resection.

Natural orifice transluminal endoscopic surgery (NOTES) has been widely discussed during the last year. All the experimental work that has been done, and the few operations in humans, have been performed with a flexible endoscope. The use of such an endoscope in the abdominal cavity is difficult for several reasons and demands considerable training. The transgastric approach, which is the most frequently used, is both new and has some important potential risks.

Case report

Our concept was to fulfil the aims of NOTES (less injury to the abdominal wall, and consequently

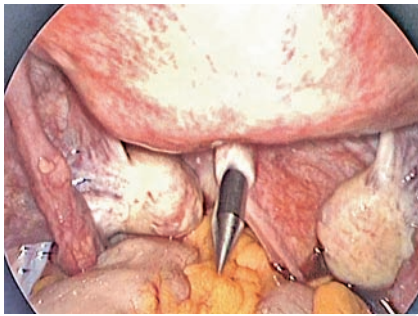


Fig. 1 Insertion of a 5-mm trocar through the posterior fornix of the vagina (uterus above, both ovaries right and left, rectum below left).

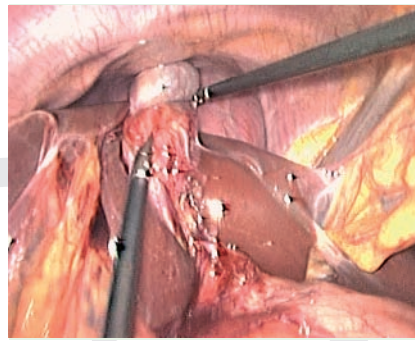


Fig. 3 The gallbladder is retracted with a vaginal instrument (left) and the dissection is done by an instrument from the umbilicus.

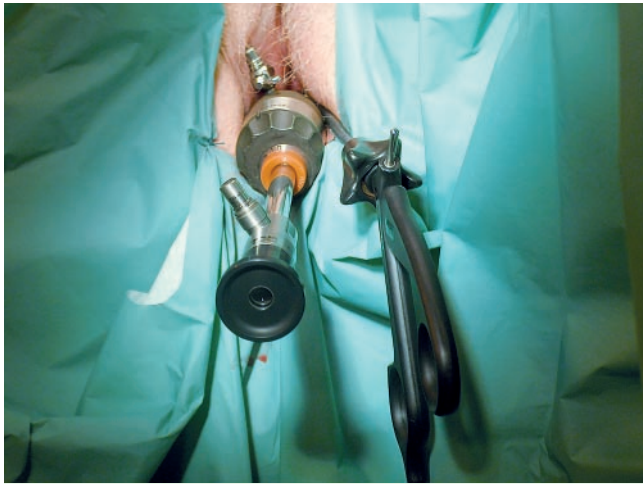


Fig. 2 A 10-mm extra-long optic in a trocar and a 5-mm extra-long dissector, directly inserted through the posterior fornix of the vagina.



Fig. 4 Abdominal wall at the end of the operation.

less pain, and a better or ideal cosmetic result) using both an approach and instruments that we were already familiar with. Hence, in June 2007 we performed a cholecystectomy using two instruments inserted through the vagina and one through a 5-mm trocar hidden in the umbilicus.

With the patient in the lithotomy position we made a 5-mm incision deep in the umbilicus and insufflated the abdomen via a Veress needle. Diagnostic laparoscopy was done using a 5-mm optic through the umbilicus. With the patient in a steep Trendelenburg position, under laparoscopic monitoring, the gynecologist inserted a 5-mm trocar through the vaginal route (● Fig. 1) and replaced it with a 5-mm extra-long dissector (Aesculap, Tuttingen, Germany). A 10-mm trocar was inserted alongside this instrument, through the vagina. An extra-long 10-mm 30° optic (Olympus, Hamburg, Germany), in that trocar, was used from this point of the procedure (● Fig. 2), and we replaced the optic in the umbilicus by another dissector.

With the patient in the anti-Trendelenburg position we then retracted the gallbladder with the vaginal instrument and dissected it with the umbilical dissector. When the cystic duct and the cystic artery were identified, they were clipped through the umbilicus with a 5-mm clip device (Ethicon, Hamburg, Germany) and divided via that route. The gallbladder was then mobilized with an electric hook, via the umbilicus (● Fig. 3).

For removal, we again placed a 5-mm optic through the umbilicus and pulled the gallbladder through the 10-mm colpotomy, which was enlarged bluntly with a clamp by a few millimeters. The defects in the vagina were sutured with resorbable thread.

The operation time was 85 minutes and ● Fig. 4 shows the appearance of the abdomen at the end of the procedure.

The patient was fine next morning and had no pain in the small pelvis. She complained only about the consequences of pneumoperitoneum, a familiar occurrence. Because of the unusual situation we only discharged her on the third postoperative day. A gynecologic check-up after 7 days showed no negative findings, and the following 2 months were uneventful.

Discussion

▼ We hope that this publication contributes to the development of minimally invasive surgery, especially in the field of NOTES. This technique could be a further small step towards the ideal operation. What we have achieved is an ideal cosmetic result, as the cholecystectomy is not visible in our patient. As far as we know, this is the first cholecystectomy without a visible scar. In addition, we believe that this approach could also have advantages relating to pain, risk of infection, and hernia; these complications are almost unknown in the posterior fornix of the vagina. Of course this cannot be proved on the basis of a single case. Nevertheless we now know that this technique is possible, and it can certainly be improved in several details (for example, by the use of a 45° optic). There is also great potential for a shorter operating time.

There is limited experimental experience regarding NOTES cholecystectomy in animals [2,3]. In March 2007 at Columbia University, a woman underwent a cholecystectomy in which a flex-

ible endoscope was used through the vagina with the help of three (!) abdominal trocars [4]. In our opinion this technique makes little sense, because a gallbladder can be operated on using three abdominal trocars alone. Why should then be an additional instrument be used through the vagina?

From the internet and the French press we know that Marescaux and colleagues have performed a cholecystectomy using a two-channel gastroscope inserted through the vagina and a 2-mm trocar in the right middle abdomen [5,6]. The gallbladder was retracted via the 2-mm port and dissected and clipped with the gastroscope. The operation was carried out by three surgeons, a gynecologist and a gastroenterologist. Certainly this was a pioneering operation, but the operating time of 3 hours reflects the problems of this technique. It is difficult to handle a two-channel gastroscope, and many surgeons have no experience in flexible endoscopy. Thus, this kind of cholecystectomy would mostly require the expertise of a gastroenterologist, whereas the gynecological skills required for the approach we describe can easily be learned by a surgeon.

NOTES will continue to evolve in the next few years, as experience and training increase and especially as new instruments

are developed. Meanwhile, the transvaginal approach, using instruments and technique that are both familiar, provides a chance to optimize cholecystectomy in selected cases, without help from other medical specialties.

Competing interests: None

References

- 1 Zornig C, Emmermann A, von Waldenfels HA, Felixmüller C. Die Kolpotomie zur Präparatebergung in der laparoskopischen Chirurgie [Colpotomy for removal of specimen in laparoscopic surgery]. *Chirurg* 1994; 65: 883–885
- 2 Fong DG, Pai RD, Thompson CC. Transcolonic endoscopic abdominal exploration: a NOTES survival study in a porcine model. *Gastrointest Endosc* 2007; 65: 312–318
- 3 Park PO, Bergström M, Ikeda K et al. Experimental studies of transgastric gallbladder surgery: cholecystectomy and cholecystogastric anastomosis [videos]. *Gastrointest Endosc* 2005; 61: 601–606
- 4 Grady D. Testing scarless surgery, doctors remove a gallbladder through the vagina. *New York Times*, 2007 Apr 20
- 5 Le Hir P. Des Français réalisent la première ablation de la vésicule sans cicatrice. *Le Monde*, 2007 Apr 20
- 6 Le Hir P. Bientôt, la chirurgie invisible. *Le Monde*, 2007 Jun 10