Single port laparoscopically assisted hysterectomy with the TriPort system.

A case report and review of the literature

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Single port laparoscopically assisted hysterectomy with the TriPort system. A case report and review of the literature

AIM: *We report our recent experience with the TriPort® system (trademark of Advanced Surgical Concepts, Wicklow, Ireland) to perform a laparoscopically assisted hysterectomy via a single periumbilical incision.*
CASE REPORT: *A 48-year-old multiparous woman was referred to us on March 2009 because of menometrorrhagia and uterine fibroids.*
RESULTS: *The procedure was performed without intraoperative complications. The weight of the uterus was 360 gr. At the 10 months follow-up the patient did not refer any problem.*
DISCUSSION: *Although our experience represented a potentially difficult surgery because of the size of the uterus, severe adhesions (two previous caesarean sessions) and the lack of experience with the new system, the procedure demonstrated to be feasible. As for our knowledge the present report represents the first case of single port laparoscopically assisted hysterectomy performed with the TriPort system in Italy.*
CONCLUSION: *Single port laparoscopy is feasible and could potentially decrease postoperative pain as well as increase patient satisfaction. Although the early experience with TriPort system is promising, experienced laparoscopic skills are essential for the safe and effective performing of the precedure.*

KEY WORDS: Hysterectomy, Single port, Laparoscopy.

Introduction

The advantages of laparoscopic surgery over open surgery are well established [1,2]. While the laparoscopic approach decreases surgical morbidity, it still requires three to four incisions with punctures. The multiple puncture sites increase the cost of trocars and trocar-associated complications, such as bleeding, hernias, internal organ damage and wound infection. Each incision also decreases the cosmetic satisfaction of patients [3-5]. Single port access surgery may be the next generation of minimally invasive surgery [6-13]. We report our recent experience with the TriPort system (trademark of Advanced Surgical Concepts, Wicklow, Ireland) (Fig. 1), to perform a laparoscopically assisted hysterectomy via a single periumbilical incision.

Our experience

CASE REPORT

A 48-year-old multiparous woman was referred to us on March 2009 because of menometrorrhagia and uterine

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fibroids. The pelvic examination revealed a large uterus like 14 gestational weeks, and no pain. She had history of celiac disease, trombophlebitis and hypertension and had undergone two Caesarian Sections. The patient's BMI was 25.6 kg/m^2.
The laparoscopy revealed an enlarged uterus (14 wg). The weight of the uterus at the end of the procedure was 360 gr. and the haemoglobin had dropped to 3.1 g/dL. No intraoperative complications occurred.
The postoperative therapy was: Mefoxin 1 gr x 2, Ketorolac and Co-efferalgan.
Postoperatively, the patient did well and was discharged on the 2rd post-op day.
At 10 months follow-up the patient did not refer any problem.

Surgery

The procedure was performed under general endotracheal anesthesia. The patient was placed in the dorsal lithotomy position. A Foley catheter was placed in the urine bladder and intrauterine canula with two single tooth tenaculams attached to the cervics were used to manipulate the uterus. A 1.5-cm infraumbilical incision was made, and the tissues were bluntly dissected to the fascia. A 1.5-cm vertical fascial incision was made sharply (Fig. 2). The abdominal wall was elevated with two towel clips applied close to the umbilicus.

Fig. 1

Fig. 2

Fig. 3

Fig. 4

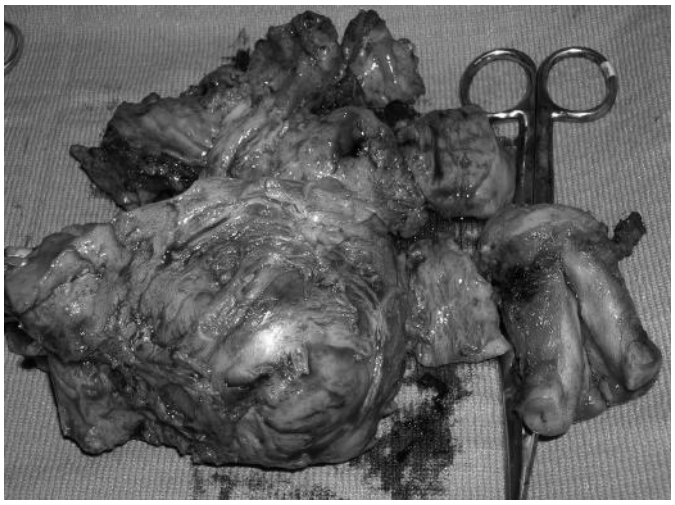

Fig. 5

The TriPort system was placed in its introducer and inserted into the abdomen without difficulty. The internal ring of the TriPort was released from the introducer (Fig. 3), and the outer transparent sleeve was pulled up to tighten the plastic ring against the inner abdominal wall fascia. The establishment of pneumoperitoneum was performed through the insuflation port of the TriPort system (Fig. 4). An 11-mm (KARL STORZ) operative

Fig. 6

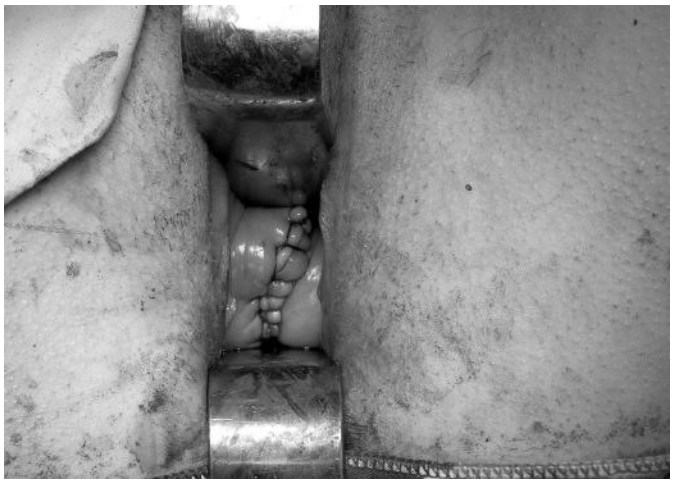

Fig. 7

laparoscope with an operative channel was introduced through the 12-mm gel-capped access site. The patient was placed in deep Trendelenburg position to displace the bowel cranially. Instruments varied and included a grasper and a suction-irrigator inserted through the right and the left 5 mm gel cap access site of the triport system, monopolar hook and bipolar electrocautery forceps introduced through the operative channel of the laparoscope. We started the procedure with exploration of the abdominal and pelvic cavity to assess the extent of the disease. The location of the bladder, uterus, fibroids, colon, rectum and major blood vessels were identified. The direction and location of both ureters were identified from the pelvic brim to the cardinal ligaments.
The adnexa of either side were retracted medially and caudally with the grasper to stretch and outline the infundibulopelvic ligament which was coagulated and cut.
The round ligament was electrocoagulated and cut 2 to 3 cm from the uterus.
After transection of the upper part of the broad ligament the adnexa and the uterine fundus were retracted in the opposite direction.
The posterior leaf of the broad ligament was opened. The anterior leaf of the broad ligament was grasped and a sharp dissection of the vescicouterine fold, using bipolar forceps and monopolar hook was necessary.
After the bladder was dissected from the anterior cervix, the uterine vessels were identified, coagulated and cut to free the lateral borders of the uterus.
The hysterectomy was completed vaginally by using standard technique [14].
The removal of the uterus was performed by morcelation (Figgs. 5, 6), through vagina. The weight of the uterus was 360 gr. To ensure the support of the vaginal vault, the vaginal angles were attached to the uterosacral and cardinal ligaments with 1-0 Vycril suture. The vaginal cuff was closed vertically (Fig. 7). After the completion of the vaginal part of the hysterectomy we resumed the laparoscopic procedure. The pelvic and abdominal cavities were evaluated, irrigated and cleared of blood clots. The pedicles and vaginal cuff were inspected for any bleeding. The vaginal cuff was also examined to ensure that no bowel or omental tissue was included in its closure. Under the visualization of the operative laparoscope the TriPort system was removed through the umbilical incision. A 0-Vicryl suture was used to close the fascia, and the skin was closed using 0 Vicryl suture. The total operating time was 220 minutes.

Discussion

Single-port transumbilical laparoscopy, also known as embryonic natural orifice transumbilical endoscopic surgery (E-NOTES), has emerged as an attempt to further enhance cosmetic benefits and reduce morbidity associated with minimally invasive surgery [13]. The first reported E-NOTES procedures were performed for tubal sterilization in 1969 by Clifford Wheeless [15].
Through a 1-cm, curved infraumbilical incision, he established pneumoperitoneum and inserted a laparoscope with an offset eyepiece. The uterus itself was manipulated externally with a tenaculum inserted through the vagina, bringing the fallopian tubes into view. A biopsy forceps was used to grasp and cauterize each fallopian tube. In 1991, Pelosi et al performed a single port laparoscopic total hysterectomy with bilateral salpingo-oophorectomy (BSO), the first complex extirpative procedure using the single-puncture technique [16]. The following year, supracervical hysterectomy was performed for benign uterine disease in four patients, with application of the term minilaparoscopy [17]. Similar to the technique for tubal sterilization, a laparoscope was used with an offset eyepiece and a 5-mm working channel through which standard laparoscopic.
Instruments were inserted. The uterus was manipulated with a transvaginal cannula.
The quest to make minimally invasive surgery even more "minimal" has generated an impulse in the surgical community to explore novel ways of achieving this. This has

led to surgeons attempting to either decrease the number of trocars placed through the abdominal wall or eliminate them completely The transition from multiple port access surgery to single port access surgery represents a paradigm shift in reconstructive and extirpative surgery and is a testament to the recent advances in surgical technology [18].

To the best of our knowledge our report represents the first case of single port laparoscopically assisted hysterectomy performed with the TriPort system in Italy.

One of the most recognizable limits of the endoscopic approach is the uterine volume because of the physical limit to the space of maneuvers of the instruments and to the angle of vision represented by the space between the distended abdominal wall and the uterus [19]. Another technical difficulty is the presence of myomas depending on their size and localization [19]. A previous caesarean session is also considered to be limiting factor for the laparoscopic dissection of the vesicovaginal space. Moreover, the anatomical relationships among bladder, ureters and uterine vessels may be altered [19]. Other factor that also hamper hysterectomy is the high body mass index [20].

Although our case represented potentially difficult surgery because of the size of the uterus, the uterine fibroids, severe adhesions because of two previous caesarean sessions and the lack of experience with the new system the procedure was feasible. Nevertheless, despite some authors' conclude that all this factors are limiting for vaginal and laparoscopic hysterectomy [21-23], we believe that the procedure can be performed safely and effectively in almost every patient. The procedure was technically successful without the need of any additional skin incisions. The single access with TriPort system enables to perform surgery in cases with severe abdominal and pelvic adhesions where insertion of additional trocars is not possible.

This procedure breaks from the dogmatic concept of instrument triangulation in laparoscopic surgery and gives the potential to push furthermore the frontiers of minimally invasive surgery by enabling the surgeons to perform multi disciplinary and complex procedures through a single port.

As an alternative to the use of single-port devices, Shepherd JA et al. reported five laparoscopic hysterectomies through a single (18 mm) umbilical incision using 3 separate trocars inserted through separate fascial sites. In our case the procedure was technically successful through the TriPort system without the need for additional trocars. All dissecting maneuvers were performed by instruments inserted through the TriPort system. For coagulation we used bipolar forceps introduced through the operative channel of the laparoscope. We highly recommend the use of laparoscope with operative channel because it enables the use of more instruments without additional incisions. One of the current problems with the system was the crowding of instruments at the point of entry into the abdomen. This can be partially avoided by using articulating and bending instrumentation. In our procedure, we used standard straight laparoscopic instruments that we use during conventional laparoscopy. We did not use any articulating or specialized flexible instruments.

Conclusion

Single port laparoscopy is feasible and could potentially decrease postoperative pain as well as increase patient satisfaction. Although the early experience with TriPort system is promising, experienced laparoscopic skills are essential for the safe and effective completion of surgery. The single access with triport enables to start a surgical procedure even in case of severe adhesion and lack of sufficient operative laparoscopic field induced by the pneumoperitoneum.

Riassunto

Riportiamo la nostra Esperienza riguardo un intervento di isterectomia mediante Triport®. Per quanto è di nostra conoscenza, dovrebbe essere la prima isterectomia effettuata con tale tecnica in Italia (marzo 2009). La procedura è stata effettuata su una donna di 48 anni con utero fibromatoso e menometrorragia.

Non abbaimo avuto complicanze intra e post-operatorie. La paziente è stata recentemente contollata ambulatorialmente e non ha riferito problematiche correlabili all'intervento.

Nonostante il caso non fosse ideale, per grandezza dell'utero e per precedenti interventi sulla pelvi, è stato possibile condurlo a termine con successo.

Riteniamo l'isterectomia laparoscopica con singolo accesso un approccio fattibile e sicuro nelle mani di chirurghi con adeguata esperienza nel campo della chirurgia laparoscopica.

References

1) Nezhat C, Nezhat CH, Nezhat F, Ferland R: *Principles of laparoscopy.* In: Nezhat C, Nezhat F, Nezhat CH: *Nezhat's Operative Gynecologic laparoscopy and hysteroscopy.* III Eds. New York: Cambridge University Press 2008; 4.1:40-56.

2) Nezhat CR, Nezhat FR, Metzger DA, Luciano AA: *Adhesion reformation after reproductive surgery by videolaseroscopy.* Fertil Steril, 1990; 53(6):1008-11.

3) Lowry PS, Moon TD, D'Alessandro A, Nakada SY: *Symptomatic port-site hernia associated with a non-bladed trocar after laparoscopic live-donor nephrectomy.* J Endourol, 2003; 17:493-94.

4) Marcovici I: *Significant abdominal wall hematoma from an umbilical port insertion. JSLS,* 2001; 5:293-05.

5) Nezhat F, Nezhat CH, Nezhat C: *Averting complications of laparoscopy: Pearls from 5 patients.* OBG Management, 2007; Vol. 19, No. 08.

6) Kaouk JH, Haber GP, Goel RK, et al.: *Single-port laparoscopic surgery in urology: Initial experience.* Urology, 2008; 71:3-6.

7) Ates O, Hakguder G, Olguner M, Akgur FM: *Single-port laparoscopic appendectomy conducted intracorporeally with the aid of a transabdominal sling suture.* J Pediatr Surg, 2007; 42:1071-74.

8) Varshney S, Sewkani A, Vyas S, et al.: *Single-port transumbilical laparoscopic-assisted appendectomy.* Indian J Gastroenterol, 2007; 26:192.

9) Desai MM, Rao PP, Aron M, et al.: *Scarless single port transumbilical nephrectomy and pyeloplasty: First clinical report.* BJU Int, 2008; 101:83-88.

10) Kagaya T: *Laparoscopic cholecystectomy via two ports, using the "Twin-Port" system.* J Hepatobiliary Pancreat Surg, 2001; 8:76-80.

11) Rao MM, Rao RK: *Two-port and single port laparoscopic appendicectomy.* J Indian Med Assoc; 2004; 102:360-64.

12) Ghezzi F, Cromi A, Fasola M, Bolis P: *One-trocar salpingectomy for the treatment of tubal pregnancy: A 'marionette-like' technique.* BJOG, 2005; 112:1417-419.

13) Canes D, Desai Mihir M, Aron M, Haber GP, Goel RK, Stein RJ, Kaouk JH, Gill IS: *Transumbilical single-port surgery: Evolution and current status.* European Urology, 2008; 54(5):1020-29.

14) Cosson M, Querleu D: *Chirurgie vaginale.* Masson, Issy les Moulineaux, 2004.

15) Wheeless CR: *A rapid, inexpensive and effective method of surgical sterilization by laparoscopy.* J Reprod Med, 1969; 5:255-57.

16) Pelosi MA, Pelosi 3rd MA: *Laparoscopic hysterectomy with bilateral salpingo-oophorectomy using a single umbilical puncture.* N J Med, 1991; 88:721-26.

17) Pelosi MA, Pelosi 3rd MA: *Laparoscopic supracervical hysterectomy using a single-umbilical puncture (minilaparoscopy).* J Reprod Med, 1992; 37:777-84.

18) Kommu Sashi S, Rané: *Devices for laparoendoscopic single-site surgery in urology.* Abhay Source: *Expert Review of Medical Devices,* Vol. 6, N. 1, 2009; 95-103(9).

19) Minelli L, Landi S, Zaccoletti R, Tricolore C, Mattace Raso F: *Overcoming technical limits of laparoscopic hysterectomy.* The Trocar: Online Videojournal of Gynecologic and Surgical Endoscopy, 2002.

20) Yatabe S et al.: *Assessment of previous caesarean section influence on laparoscopic hysterectomy technique.* Einstein. 2008; 6(3):278-81.

21) De Meeus JB, Magnin G: *Indications of laparoscopic hysterectomy.* Eur J Obstet Gynecol Reprod Biol, 1997; 74(1):49-52.

22) Sizzi O, Rossetti A: *Overcaming technical limits to laparoscopia hysterectomy.* The Trocar: Online Videojournal of Gynecologic and Surgical Endoscopy, 2006.

23) Shirlina D, Shirish S, Uterine Volume: *An Aid to determine the route and technique of hysterectomy.* J Obstet Gynecol Ind, Vol. 54, N. 1, 2004; 68-72.