




Original Research

Concurrent hysterectomy and umbilical hernia repair via transvaginal notes among morbidly obese patients

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Abstract

Background: Umbilical hernias are especially common along with overweight, multiparous women. Laparoscopic hernia repair is preferred due to many advantages. On the other hand, the risk of trocar site hernia is disadvantageous. Trocars do not go through the abdominal wall via transvaginal natural orifice transluminal endoscopic surgery (V-NOTES). We investigate the V-NOTES hysterectomy and concomitant umbilical hernia repairment feasibility and outcomes. **Methods:** Six morbidly obese patients underwent V-NOTES hysterectomy and concurrent umbilical hernia repair between April 2020 and January 2021. Demographic features of patients, operating time, hernia size, complications, hospitalization time, recurrence of the hernia, visual analog scale (VAS) at 6th, 12th, and 24th hours, first, fourth, 12th weeks, and sixth months were recorded. **Results:** The average age of patients was 47.667 ± 2.422 (45–52). Mean body mass index (BMI), hernia and operating time size were 44.367 ± 3.217 kg/m² (40.3–48.5), 6.167 ± 1.722 cm (4–9) and 88 ± 12.791 minutes (75–110), respectively. Intraoperative complications did not occur. Seroma was detected in one patient (16.6%). In six month follow-up period, we did not establish a diagnosis of hernia recurrence and postoperative chronic pain. **Conclusion:** Our study offers a novel perspective on V-NOTES umbilical hernia repair and hysterectomy in morbidly obese patients. According to our study, performing V-NOTES umbilical hernia repairment in a risky patient population is feasible and has promising outcomes.

Keywords: Morbidly obese; Postoperative chronic pain; Recurrence; Umbilical hernia; V-NOTES

1. Introduction

Approximately 2% of the population of the world has a clinically demonstrable umbilical hernia [1]. Hernia repairs are the most commonly performed operations, and around 175,000 patients undergo umbilical hernia operations in the United States annually [2]. Women are three to five times more likely to have umbilical hernia than men. The characteristics of an umbilical hernia patient are frequently overweight, multiparous female between her fourth and sixth decade [3].

Not all hernias need to be surgically corrected, and watchful waiting is an alternative for surgery, especially in a population which surgery is thought to have higher mortality and morbidity [4]. On the other hand, in five years of a watchful waiting period, there is a 16% probability of patients with umbilical hernias requiring surgery and a 4% chance of requiring emergency surgery [5]. Besides, there is no clear consensus about the optimal approach for the best surgical outcomes [6–8].

Laparoscopic repair of an umbilical hernia is a pleasant alternative due to less postoperative pain, lower risk of surgical site infections, and shorter hospitalization [9]. However, 10–15 mm sized trocars can incur fascial defects, and after the laparoscopic hernia repairment, these fascial defects can cause a future herniation. Following major la-

paroscopic gynecological procedures, the formation of trocar site hernia for 10 mm and 12 mm trocars were 0.23% and 3.1%, respectively [10]. If the mesh size larger than 10×15 cm is used during laparoscopic hernia repair, the incidence of trocar site hernia rises to 22% [11].

Accessing the surgery area via the body's natural orifices, such as the umbilicus, mouth, anus, urethra, and vagina is an attractive option and has gained popularity among minimal invasive surgeons. Using natural orifices as a gateway for surgery is defined as natural orifice transluminal endoscopic surgery (NOTES). Amongst all possible NOTES, transvaginal natural orifice transluminal endoscopic surgery (V-NOTES) provides easy access, safe entry, and a straight and broad view of the peritoneal cavity [12]. Moreover, the transvaginal route is ergonomic for surgeons [13].

In this present article, we aim to describe the concurrent V-NOTES hysterectomy and umbilical hernia repair technique among morbidly obese patients and present the short- and long-term surgical outcomes of this surgery.

2. Material and methods

Between April 2020 and January 2021, at the Kartal Dr. Lutfi Kirdar Training and Research Hospital, Istanbul, Turkey, six morbidly obese patients were scheduled for hys-



terectomy and concomitant umbilical hernia repair included in this study. The hospital's ethics committee approved the protocol of the trial (Register no. 2020/514/177/36). Written informed consent was obtained from all participants.

Inclusion criteria for patients were: age between 35–70 years, body mass index (BMI) higher than 40 kg/m², hysterectomy planned for benign pathologies, no history of hernia operation, symptomatic umbilical hernia, no mental problems to evaluate the visual analog scale (VAS) and willingness to participate in the study.

If the patient has a clinical diagnosis of renal, hepatic, hematologic, neurologic disease, or malignant tumor or the participant who did not fulfill even one of the inclusion criteria above was excluded from the study.

2.1 Operation technique

15–30 minutes before incision, 3 g Cefazolin was administered intravenously. Patients under general anesthesia were placed in the supine position, and the lower extremities were elevated. The surgical site, including the vagina, was cleaned and disinfected with 10% povidone-iodine. An indwelling catheter was inserted. A system with a wound retractor (Alexis; GelPOINT V-Path Transvaginal Access Platform®, Applied Medical Resources Corp., Rancho Santa Margarita) was utilized to establish a platform. One 10- and two 5-mm trocars were inserted through the platform. The retractor of the system was placed in the mid-vagina, and CO₂ gas was insufflated through the system. After the vagina was dilated, the patient was tilted into Trendelenburg position, and a colpotomy incision was made with an ultrasonic scalpel (Harmonic® HD 1000i shears, 5-mm diameter; Ethicon). The bladder was dissected from the anterior vagina and the lower uterine cervix. The anterior peritoneum was accessed by cutting the uterovesical fold of the peritoneum. The posterior peritoneal fold was located and slit using the ultrasonic scalpel. Subsequently, access to the pouch of Douglas was maintained. The anterior and posterior incisions were transversely broadened and rounded along with the cervix. A pneumoperitoneum was established via these incisions, and the endoscope was introduced to explore abdominal and pelvic cavities. After exploration, hysterectomy was performed as described in the literature [14].

After hysterectomy was performed, the specimen was taken out from the vagina to visualize the peritoneal cavity better. The umbilical hernia on the anterior wall was effortlessly able to detect (Fig. 1). The omentum and preperitoneal tissues inside the hernia sac were extracted to the abdominal cavity, and thereby the hernia sac was emptied. The hernia defect was exposed and measured with a tape measure to ensure to select proper sized mesh. A non-absorbable monofilament polyester textile with absorbable collagen film containing mesh (Symbotex® Composite mesh) was used to coat the defect. The mesh was placed to cover at least 5 cm from the hernia side on the

intraperitoneum. The mesh was fixed with 2-0 polypropylene suture (Prolene®) and absorbable tacksers (Fig. 2). One in each corner, a total of four stitches were made to secure the mesh to the abdominal wall. The mesh was then fixated with a double crown of absorbable tacks (Absorba Tack®).

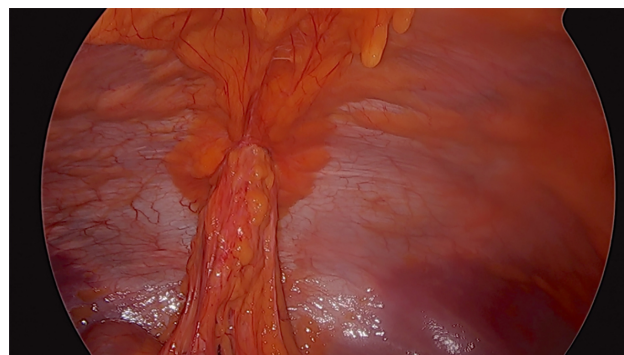


Fig. 1. Umbilical hernia detected on the anterior wall.

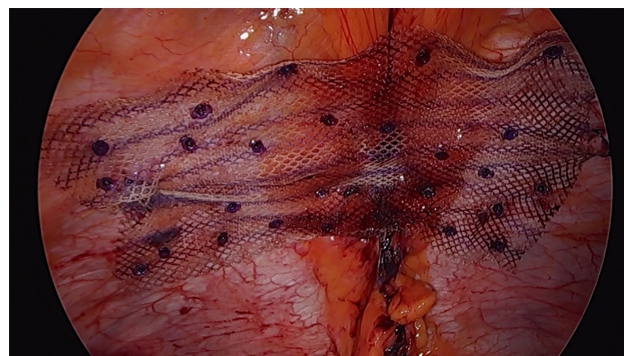


Fig. 2. Final view of the repaired umbilical hernia defect via V-NOTES.

After ensuring hemostasis, the pneumoperitoneum was deflated through a closed suction system, the platform system was removed, and the vaginal cuff was repaired with one coated polyglactin suture (Vicryl®).

2.2 Data collection and analysis

Detailed records, including each patient's age, BMI, hernia size, medical history, operation time, estimated blood loss, pre-and postoperative hemoglobin levels, pain scores [obtained from VAS at 6th, 12th, and 24th hours, first, fourth, 12th weeks and sixth months postoperatively], analgesic doses, complications, postoperative hospital stay, postoperative diagnosis, were collected.

Patients routinely got intramuscular diclofenac sodium at the 8th hour and oral paracetamol and ibuprofen combination as the analgesic at 16th and 24th hours in the postoperative period. The VAS scores were evaluated by another researcher who did not know that patients had a

Table 1. Clinical characteristics of patients.

| Age | Patient 1 | Patient 2 | Patient 3 | Patient 4 | Patient 5 | Patient 6 |
|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| | 45 | 46 | 52 | 47 | 48 | 48 |
| BMI | 45.1 | 48.5 | 47.3 | 40.3 | 41.5 | 43.5 |
| Hernia size (cm) | 4 | 9 | 7 | 5 | 6 | 6 |
| Hospitalization (day) | 1 | 2 | 2 | 1 | 1 | 1 |
| Hemoglobin drops (g/dL) | 0 | 0.7 | 0.6 | 0.3 | 0.2 | 0.4 |
| Operating time (minutes) | 75 | 110 | 93 | 82 | 78 | 90 |

BMI, body mass index.

Table 2. Postoperative pain.

| | Patient 1 | Patient 2 | Patient 3 | Patient 4 | Patient 5 | Patient 6 |
|---------------|-----------|-----------|-----------|-----------|-----------|-----------|
| VAS 8th hour | 2 | 4 | 3 | 3 | 2 | 2 |
| VAS 12th hour | 2 | 3 | 2 | 1 | 1 | 1 |
| VAS 24th hour | 1 | 2 | 1 | 1 | 1 | 1 |
| VAS 1st week | 0 | 1 | 1 | 0 | 0 | 0 |
| VAS 4th week | 0 | 0 | 0 | 0 | 0 | 0 |
| VAS 12th week | 0 | 0 | 0 | 0 | 0 | 0 |
| VAS 6th month | 0 | 0 | 0 | 0 | 0 | 0 |

VAS, visual analog scale.

combined procedure of hysterectomy and umbilical hernia repair at the sixth, 12th, 24th hours. If any patients demand an extra analgesic dose, the same researcher would record it.

All patients were followed up by the same specialist team at first, fourth, 12th weeks, and sixth months.

Continuous variables were presented as mean, standard deviation, and range. Categorical variables were expressed as frequencies and percentages. All statistical analyses were performed with SPSS® version 23.0 software (SPSS®, Chicago, IL, USA).

3. Results

All procedures were completed via V-NOTES, and none of the patients were required to convert to laparotomy.

Clinical characteristics of the patients are shown in Table 1. The mean age was 47.667 ± 2.422 years (45–52). Mean BMI was 44.367 ± 3.217 kg/m² (40.3–48.5). Three patients had previous operations (two patients had Caesarian sections, and one patient had appendectomy). All patients had type II Diabetes Mellitus (D.M.) and two patients were taking oral antidiabetic drugs, and four were using insulin to control blood sugar.

The mean hernia size was 6.167 ± 1.722 cm (4–9). The mean operative time was 88 ± 12.791 minutes (75–110). No complication occurred intraoperatively. Mean hemoglobin drop was 0.367 ± 0.258 g/dL (0–0.7).

The mean VAS scores at the eighth, 12th, 24th hour were 2.667 ± 0.816 (2–4)– 1.667 ± 0.816 (1–3)– 1.167 ± 0.408 (1–2), respectively. The patients did not demand or take extra pain medications. The mean VAS score was 0.333 ± 0.516 (0–1) at the first week of follow-up. After

the fourth week of follow-up, all participants' VAS scores were zero and remained zero until the sixth month of the follow-up (Table 2).

Four patients were discharged on the first day of surgery, while two were discharged on the second day of the surgery due to social indications (one was living in a different city, and the other did not have a companion to look after for her at home).

Seroma was detected in one patient (16.6%) postoperatively, and percutaneous needle aspiration was performed for seroma treatment, and full recovery was achieved in two weeks after the aspiration.

All participants we included in this study completed the six-month follow-up period. Vaginal wound infection, hematoma, chronic pain, and recurrence are not detected in the six months of the follow-up period.

4. Discussion

Drawing on recent advances in V-NOTES, the present article aimed to show the feasibility and the short- and long-term outcomes of V-NOTES hysterectomy and concurrent umbilical hernia correction along with the morbidly obese patients.

Although there is no clear consensus on the technique for ultimate surgical outcomes, the outcome of the umbilical hernia repair is evaluated by recurrence, postoperative chronic pain, and complications [15]. The recurrence rate is doubtlessly the most critical parameter in terms of the quality of the operation. Within a six-month follow-up period, we did not observe any recurrence; in addition, since we did not use any trocar through the abdominal wall, we can assume that we eliminated the risk of trocar site hernia.

The patient-related risks of trocar site hernia and higher recurrence rates after hernia repair are advanced age, high BMI, and D.M. [16–19]. In our study, all participants have high BMI and D.M. Moreover, the same patient population also has a higher risk of wound complications [20]. V-NOTES might be considered as an alternative in this type of risky patient.

Postoperative chronic pain is another significant criterion for qualifying surgical outcomes. It is important to note that after V-NOTES, we did not detect any pain score more than four scaled with VAS, starting from the eighth hour of the operation. In the sixth month, none of the patients had chronic pain after surgery. To the best of our knowledge, there are no studies giving information about long-term pain results after V-NOTES umbilical hernia repair in the literature yet.

Seroma formation is the most frequently reported complication after laparoscopic abdominal hernia repair. The incidence ranges from 1% to 14% [21–23]. Our incidence of seroma after V-NOTES (16.6%) is higher than the seroma formation after laparoscopy. One possible explanation for higher incidence is the small number of patients who participated in the study. We think that by increasing the patient population, we could reach the actual seroma incidence. Despite this high incidence, seroma did not contribute to morbidity and, most of the time spontaneously resolves without intervention.

Another concern about the hernia operation via NOTES is the mesh sterility. Earle *et al.* [24] modified an esophageal stent to prevent mesh contamination for transgastric NOTES hernia repair. Some researches showed that an operation prepared vagina could be superior to a classical skin incision in terms of sterility for performing a biopsy or synthetic mesh placement [25,26]. In our study, prophylactic antibiotics were administered before the operation, and the vagina was disinfected with 10% povidone-iodine solution. Furthermore, we used a transvaginal access platform system and mesh introduced to the peritoneal cavity via the trocars on the platform without contacting any other surfaces.

Gynecologic or non- gynecologic operations for benign or malign pathologies such as ectopic pregnancy management, myomectomy, cholecystectomy, hemicolectomy for colon cancer can be carried out via V-NOTES [13,27–29]. Moreover, uterosacral ligament hysteropexy can be performed for pelvic organ prolapse when uterus conservative treatment is desired [30]. The uterus is a mobile organ and can be manipulated and easily removed from the field of view; the vagina is a flexible and expandable fibromuscular tube [31]. These features of female reproductive organs can provide a broad and clear peritoneal cavity visualization and ergonomics for surgeons even the hysterectomy is not performed during V-NOTES.

Our study has two main limitations. The first of which is the small number of patients who operated with this tech-

nique. The second, the follow-up period, is a brief time to give information about the recurrence rate of umbilical hernia. Most of the hernia studies have a follow-up period of one to five years, but it is known that recurrence time can exceed to 50 years [32].

Although these limitations, our study cannot be ruled out. It is essential to interpret our results together with the findings from previous researches. Precisely, our study focuses on the morbidly obese patients with D.M., which can negatively affect the operation results.

In the present article, we presented our simultaneously V-NOTES hysterectomy and umbilical hernia repair along morbidly obese patients. It is a feasible technique with good surgical outcomes in a risky group.

Future researches may extend this work by increasing the patient population and follow-up period.

5. Conclusions

We performed V-NOTES hysterectomy and umbilical hernia repair among morbidly obese patients. All procedures were completed via the vagina. Recurrence and postoperative chronic pain was not detected.

V-NOTES requires intensive training and experience with a higher level of technical skill. Repairment of umbilical hernia via V-NOTES is feasible and clinically successful. Especially, there are promising results on postoperative pain, wound infection, and recurrence rate.

Author contributions

MMA, SK and AC designed the research study. MMA performed the research. MMA and HFK analyzed the data. BK and EM wrote the manuscript. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript.

Ethics approval and consent to participate

The hospital's ethics committee approved the protocol of the trial (Register no. 2020/514/177/36). Written informed consent was obtained from all participants.

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Conflict of interest

The authors declare no conflict of interest.

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