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Laparoscopic Ventral Hernia Repair by New Generation Bilaminar Meshes

Başar Aksoy[1], Erdal Uysal[1], M. Fatih Yüzbaşıoğlu[1], Ahmet Orhan Gürer[1], Hasan Bakır[1], Mehmet Ali İkidağ[2]

[1] Department of General Surgery, Faculty of Medicine, Sanko University, Gaziantep, Turkey
[2] Department of Radiology, Faculty of Medicine, Sanko University, Gaziantep, Turkey

ABSTRACT

Introduction: *The aim of this study was to assess the use of laparoscopic ventral hernia repairment (LVHR) by bilaminary new generation mesh and share our experience. Laparoscopic approaches are preferred in the surgical repairment of ventral hernias due to low postoperative pain and complication rates, quick recovery, and shorttime in returning to work. They can be applied in primary ventral hernias as well as incisional hernias, which are one of the most frequent complications of surgical procedures. The recurrence rates are low unlike open-conventional hernia repairments.*

Materials and Methods: *Fifteen patients who underwent laparoscopic ventral-incisional hernia repairment between 2012 and 2014 were included into the study. A 20 x 15 cm Parietex (optimized composite mesh Covidien, France) polyester mesh, having absorbable collagen film and preplaced sutures, was used. The mesh was fixed to the abdominal wall by transfascial fixation sutures and tacker. The patients were periodically controlled for the evaluation of hernia recurrence, pain, infection and other complications.*

Results: *Fifteen patients (3 male and 12 female) underwent laparoscopic ventral hernia repairment. Mean operation time was 118.75 min (range, 120-250 min). Mean hospitalization time was 2.8 days. One patient had small intestine laceration during surgery. One of the patients had hernia recurrence, one had seroma, and one had prolonged pain.*

Conclusion: *LVHR is an efficient and reliable ventral hernia repairment method. It is easy to perform in midline, small and average size defects. It is possible to perform successful operations with low complication rates by new generation bilaminar meshes. In order to avoid prolonged postoperative pain, redundant use of tacker should be avoided. Transfascial fixation sutures will reduce recurrence rates.*

Key words: *Laparoscopic ventral hernia, bilaminar meshes*

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INTRODUCTION

Since its first introduction in 1993, laparoscopic ventral hernia repairments (LVHR) have been widely used and are getting more popular due to quick recovery time, low postoperative pain, low complication rates and short time in returning to work[(1)]. It can be used in both primary ventral hernias and incisional hernias, which still remain one of the most significant complications of common surgical procedures. Unlike open-conventional hernia repairments, wide dissections are not necessary and recurrence rates are low[(2,3)].

Moreover, with the introduction of the use of bilaminar meshes, risk of significant complications such as adhesions, erosions and fistulas are diminished[(3,4)]. Numerous kinds of synthetic patches are available, but today bilaminar-laminated polypropylene, poly-

Address for Correspondence

Başar Aksoy, MD

Department of General Surgery, Faculty of Medicine, Sanko University, Gaziantep, Turkey

e-mail

mdbasaraksoy@gmail.com

ester meshes are mostly used. The inner-visceral side of these meshes are covered with a thin layer of expanded polytetrafluoroethylene (ePTFE), collagen or seraphim in order to prevent adhesions[5].

The aim of this study was to assess the use of laparoscopic ventral hernia repairments (LVHR) by bilaminary new generation meshes and share our experience.

MATERIALS and METHODS

Fifteen patients who underwent laparoscopic ventral-incisional hernia repairment between 2012 and 2014 were included into the study. The size and locations of the hernias and the presence of intestinal loops were assessed by CT. Demographic knowledge and medical history, such as previous abdominal surgery, were achieved from hospital records and information system retrospectively (Table 1).

A 20 x 15 cm Parietex (optimized composite mesh, Covidien, France) polyester mesh, having absorbable collagen film and preplaced sutures, was used. Patients received general anesthesia in supine position. Prophylactic IV cefazolin 1 g was administered at the beginning of anesthesia. Orogastric cannula was placed to maintain gastric decompression. Three trocars were used during surgery; one 12 mm trocar was placed lateral to rectus sheath and two 5 mm trocars were placed neighboring superior and inferior to the first one. 30° laparoscopy camera was usedunder 13 mmHg pressure.

Table 1. Age, gender, and sizes of the patients

Age	Gender	Defect size	Hernia location	Primary/secondary hernia
59	F	3-4 cm	Epigastric + umbilical	Seconder
74	F	4 cm	Umbilical	Primer
50	F	4 cm	Epigastric	Seconder
66	F	5 cm	Epigastric	Primer
55	M	3 cm	Epigastric	Primer
50	F	6 cm	Midline	Seconder
61	F	7 cm	Umbilical	Primer
62	F	3 cm	Umbilical	Primer
54	F	6 cm	Right inguinal	Seconder
41	F	3 cm	Umbilical	Primer
45	M	5 cm	Midline	Seconder
60	F	4 cm	Umbilical	Seconder
61	F	5 cm	Midline	Primer
55	F	5 cm	Right subcostal	Seconder
51	M	10 cm	Left subcostal	Seconder

F: Female, M: Male

Omental and intestinal adhesions were separated by monopolar diathermy, harmonic scalpel or scissors, and wide abdominal view was achieved. Vessel Sealing system was used to control bleedings and in dissections. Defect margins were delineated by spinal needles and abdominal wall was marked. Parietex mesh, which had four-sided preplaced propylene sutures, was rolled and sent into the abdominal cavity through a 12 mm trocar, and then opened and restored inside the cavity as the upper side would cover the defect. Polypropylene surface was directly placed on the abdominal wall. Corner sutures were taken out of the abdomen by suture taking instrument and tied-connected-attached over the fascia by a small incision. Mesh was fixated to the abdominal wall attaching metal tacker (Ethicon). After last control and hemostasis, abdominal carbon dioxide was evacuated and the operation was terminated. Drainage catheters were not used.

Patients were periodically controlled for the evaluation of hernia recurrence, pain, infection and other complications.

RESULTS

Fifteen patients (3 male and 12 female) underwent laparoscopic ventral hernia repairment. Mean operation duration was 118.75 min (range, 120-250 min). Mean hospitalization time was 2.8 days. Patients were able to return to their jobs and daily routines approximately on the fifteenth day. Parenteral analgesics were administered only on the first three days of the operation, except for one patient who had prolonged severe abdominal pain lasting for nearly one month. One patient was operated for incisional hernia had seroma, which was drained by a syringe. Another patient had a recurrent ventral hernia and was admitted to the emergency department two months after surgery by incarcerated recurrent ventral hernia. This patient underwent urgent open ventral hernia repairment. The largest defect size was 10 cm and the smallest was 3.

Small intestine segments were observed in the hernia sac in a patient with incisional hernia, who had a history of gastric bypass surgery. Dissection was hardly made due to severe adhesions, multiple lacerations occurred in this

segment, and extracorporeal resection anastomosis was performed. There was no need to convert to open procedure in any patient. There were no other complications regarding anesthesia or surgery. The complications encountered in our patients are listed in Table 2.

DISCUSSION

As minimally invasive surgical procedures are popular today, laparoscopic ventral hernia repairments can also be reliably performed. Open surgical repairments and laparoscopic ones have been reported to have similar recurrence rates as some investigators found lower recurrence by laparoscopic surgery[3,6-8].

By using new generation bilaminar meshes, important complications like fistulas are significantly reduced, therefore appropriate mesh selection is substantial. None of our patients developed fistulas.

Pain is an important problem after LVHR. Postoperative pain causes delay in intestinal functions and leads to prolonged hospitalization[9]. It has been reported that chronic pain after LVHR occurrence rate is 1-3%[7-10]. In one of our patients, operated for right subcostal and midline incisional hernia, prolonged abdominal pain developed that lasted forty-five days and responded partially to medications. It was thought that this severe and prolonged pain was due to irritation of costal periostitis by the tacker during fixation of the mesh to the abdominal wall. Jenkins et al. have reported that chronical pain due to tacker is 7.4%[10].

Selection of fixation material and adequate fixation of the mesh to the abdominal wall are important parameters effecting the success rates of LVHR. There are numerous kinds of fixation materials available for this surgery. Mostly, metal tackers and non-absorbable suture materials are used. Metallic non-absorbable tackers may cause life threatening complications like bowel perforation, if not used carefully[1,11]. In addition, tackers should not be dropped into the abdominal cavity. Adequate fixation of the tackers to the abdominal wall must be ensured. None of our patients developed bowel perforation due to tackers.

Table 2. Complications

Complications	number of patient
Prolonged pain	1
Seroma	1
Bowel laceration	1
Recurrence	1

Hernia recurrence is one the most common problems following LVHR. The major causes leading recurrences are inadequate fixation, strained repairment, using tacker without transfascial abdominal fixation sutures, migration, and protrusion of mesh due to technical problems in fixations. One of our patients developed early recurrent hernia, in whom transfascial fixation sutures were not used. In all other patients, transfascial propylene sutures were uses, which were present at four sides of the mesh[11].

Hernia sacs were not resected from the abdominal wall. Furthermore, hernia defects were not sutured. The patients were advised to use elastical abdominal corset during mobilization for six months. Emphasis is given on the mesh to be larger than the defect sizefor tension free repairment. Recurrence rates are known to be higher in non-tension free repairments.

Quick recovery time and short time in returning to work are important parameters regarding the success and feasibility of a surgical procedure. Like other laparoscopic procedures, patients who underwent LVHR can return to their daily routines and works earlier, as they have lower pain, quick recovery and low complication rates.

LVHR is an efficient and reliable ventral hernia repairment method. It is easy to perform in midline, small and average size defects. It is possible to perform successful operations with low complication rates by new generation bilaminar mashes. In order to avoid prolonged postoperative pain, redundant use of tacker should be avoided. Transfascial fixation sutures will reduce recurrence rates.

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ARAŞTIRMA-ÖZET

Yeni Nesil Bilaminer Meshlerle Laparoskopik Ventral Herni Onarımı

Başar Aksoy[1], Erdal Uysal[1], M. Fatih Yüzbaşıoğlu[1], Ahmet Orhan Gürer[1], Hasan Bakır[1], Mehmet Ali İkidağ[2]

[1] Sanko Üniversitesi Tıp Fakültesi, Genel Cerrahi Anabilim Dalı, Gaziantep, Türkiye
[2] Sanko Üniversitesi Tıp Fakültesi, Radyoloji Anabilim Dalı, Gaziantep, Türkiye

Giriş: *Çalışmamızda laparoskopik bilaminer yeni nesil mesh ile yapılan laparoskopik ventral herni onarımlarımızın değerlendirilmesi ve deneyimlerimizi aktarmak amaçlanmıştır. Laparoskopik ventral herni onarımı (LVHO)'nda ameliyat sonrası ağrının az olması, çabuk iyileşme, düşük komplikasyon oranı ve işe dönüş süresinde kısalma nedeniyle ventral herni onarımında daha çok tercih edilir hale gelmiştir. Halen en önemli cerrahi komplikasyonlardan biri olan insizyonel herniler ve primer ventral herniler de uygulanabilmektedir. Açık konvansiyonel herni onarımlarının aksine LVHO nüks oranları daha düşüktür.*

Gereç ve Yöntem: *Çalışmaya 2012-2014 yılları arasında 15 laparoskopik ventral-insizyonel herni onarımı uygulanan hasta dahil edildi. Hastalara Parietex (optimized composite mesh Covidien, France) emilebilir kollajen filmli ve önceden yerleştirilmiş sütüre sahip polyester 20 x 15 cm mesh intraperitoneal olarak uygulandı. Mesh transfasiyal fiksasyon sütürleri ve tacer ile karın duvarına fikse edildi. Hastalar LVHO sonrası belirli aralıklarla kontrole çağrılarak nüks, ağrı, infeksiyon ve diğer komplikasyonlar açısından değerlendirildi.*

Bulgular: *Çalışmamızda toplam 15 hastanın, üçü erkek, 12'si kadındı. Hastaların hepsine LVHO uygulandı. Operasyon süresi ortalama 118.75 dakika (120-250 dakika) olarak bulundu. Ortalama yatış süresi 2.8 gün olarak belirlendi. Hastaların birisinde nüks, birinde seroma birikimi, birinde uzamış ağrı, birisinde ince bağırsak yaralanması gelişti.*

Sonuç: *LVHO güvenli ve etkili bir ventral herni onarım yöntemidir. Orta hatta yer alan geniş olmayan defektlerde uygulanması kolaydır. Yeni nesil bilaminer meshler sayesinde daha az komplikasyonla başarılı ameliyatlar yapılabilmektedir. Postoperatif ağrıdan kaçınmak için derin alanlara fazla miktarda tacer kullanılmamalıdır. Transfasiyal fiksasyon sütürleri nüks oranlarını azaltacaktır.*

Key words: *Laparoskopik ventral herni, bilaminer mesh*

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