



Contents lists available at ScienceDirect

## International Journal of Surgery Case Reports

journal homepage: [www.casereports.com](http://www.casereports.com)

# Laparoscopic repair of complicated umbilical hernia with Strattice Laparoscopic<sup>TM</sup> reconstructive tissue matrix



Shawn Tsuda\*

University of Nevada School of Medicine, Department of Surgery, 2040 W. Charleston Blvd. Ste. #601, Las Vegas, NV 89102, United States

## ARTICLE INFO

## Article history:

Received 29 July 2014

Received in revised form 15 October 2014

Accepted 2 November 2014

Available online 11 November 2014

## Keywords:

Umbilical hernia

Strattice

Laparoscopic hernia repair

Incarcerated hernia

Recurrent hernia

## ABSTRACT

**INTRODUCTION:** Complex hernias continue to present a challenge. Surgical techniques for repair are carefully considered to reduce risk for complications. Laparoscopic repairs improve postoperative infection rates, and placement of biologic mesh decreases mesh infection rates. However, laparoscopic repairs using biologic mesh is generally challenging due to difficulty with maneuverability.

**PRESENTATION OF CASE:** We present a case of a complex ventral hernia that was laparoscopically repaired using a new FDA cleared laparoscopic biologic graft. The patient had multiple comorbidities, including obesity, hepatitis C, endocarditis secondary to IV drug use, tobacco smoking, bilateral inguinal hernia, and recurrent umbilical hernia. The recurrent hernia was larger, irreducible, and discolored compared to original defect. The patient underwent laparoscopic repair with primary closure and reinforcement with Strattice<sup>TM</sup> Tissue Matrix Laparoscopic (LifeCell Corporation, Branchburg, NJ). At nine months postoperative, the patient had no evidence of recurrence, infection, or chronic pain, demonstrating early success from the surgical management.

**DISCUSSION:** Presence of multiple comorbidities and incarcerated recurrent hernia increase risk for complications during and/or after hernia repair. Considering these factors, laparoscopic repair with Strattice Laparoscopic and defect closure was a reasonable technique for repair.

**CONCLUSION:** Laparoscopic suture repair reinforced with biologic dermal tissue matrix was successfully performed during a complex hernia repair.

© 2014 The Author. Published by Elsevier Ltd. on behalf of Surgical Associates Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/3.0/>).

## 1. Introduction

Although over 350,000 ventral or incisional hernia repairs are performed annually in the United States, complex hernias continue to present a challenge due increased risk for complications. Selection of repair techniques must be carefully considered in complicated settings. Increasing numbers of surgeons perform mesh repairs as the standard approach; however, different types of mesh have their own advantages and disadvantages. Synthetic prostheses have been shown to be durable with lower recurrence rates but are associated with high incidence of infection.<sup>1</sup> Conversely, biologic meshes are designed to promote vascularization and tissue integration and have the ability to resist infection.<sup>2</sup> Thus, placement of biologic grafts are generally recommended for patients at increased risk for wound complications.<sup>1,3</sup>

The outcomes of hernia repairs may also be affected by the surgical approach. Laparoscopic repairs are associated with fewer wound-related complications and recurrences compared to an open repair, which may be beneficial for complicated hernias.<sup>4,5</sup>

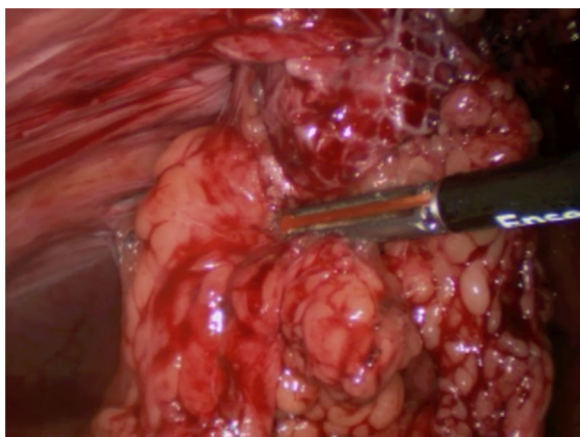
Despite the benefits of the two distinct approaches, there is a paucity of data on the use of biologic mesh in laparoscopic hernia repairs. Anecdotally, placing a biologic mesh laparoscopically can be challenging. Difficulty with fixation, deployment, and handling may be attributed to the thickness and firm nature of biologic mesh. We present a laparoscopic hernia repair using biologic mesh for an incarcerated, recurrent umbilical hernia in a patient at increased risk for complications.

## 2. Presentation of case

The patient is a 33-year old male with a history of obesity, hepatitis C, endocarditis secondary to IV drug use, and tobacco smoking (15 pack years). In addition, he had a history of laparoscopic bilateral inguinal hernia repair through a total extra-peritoneal approach with a concomitant laparoscopic umbilical hernia repair for a 3 cm defect. The umbilical hernia repair was repaired with a prosthetic composite mesh, placed in the underlay position with no primary closure of the defect. His initial post-operative course was unremarkable except for an umbilical seroma which resolved spontaneously by six weeks.

The patient presented 10 months later complaining of new-onset pain and a bulge at the umbilicus larger than his initial defect

\* Tel.: +1 702 671 2369; fax: +1 702 671 2377.  
E-mail address: [stsuda@medicine.nevada.edu](mailto:stsuda@medicine.nevada.edu)



**Fig. 1.** This figure illustrates the incarcerated prosthetic mesh and omentum revealed upon lysis of adhesions.

and that was not easily reducible. On examination, he was afebrile, had a body mass index of 38 kg/m<sup>2</sup>, and had an incarcerated, tender, 3.5 cm umbilical hernia with associated skin changes characterized by underlying venous congestion and ecchymoses of the umbilical skin. The patient was consented for a semi-urgent laparoscopic, possible open umbilical hernia repair, with removal and replacement of mesh, possible resection of omentum and/or bowel, and possible removal of umbilical skin.

During the surgery, incarcerated omentum and prosthetic mesh (Fig. 1) partially within the hernia defect was revealed upon lysis of intra-abdominal adhesions. The omentum and mesh were reduced with some effort, amputated from the rest of the omentum, and removed. Instead of replacing the mesh with a new synthetic mesh, a biologic graft was chosen due to the complexity of surgery and increased risk for wound complications. Prior to implantation of new mesh, the hernia defect was closed primarily with interrupted sutures intra-corporeally and secured with titanium crimps. Then the matrix was prepared by placing sutures extra-corporeally and then deployed through the 12 mm port site. Once carefully advanced into the abdomen, the matrix was fixated with trans-fascial sutures utilizing a suture passer device (Fig. 2). Titanium spiral tacks were used to further secure the matrix, with care being taken to apply manual apposition of the abdominal wall against the tack. The matrix was placed under physiologic tension with the abdomen desufflated to minimum effective pressure (usually 6–10 mm Hg). The 12 mm port site was closed to prevent future incisional hernia. Additionally, intraoperative vascular imaging was



**Fig. 2.** Under “physiologic tension” with abdomen, the matrix was placed intraperitoneally, leaving at least 5 cm overlap around the defect. Matrix was fixated with sutures and secured with titanium spiral tacks.



**Fig. 3.** The umbilical hernia was repaired with minimal wound profile, through which biologic mesh was inserted and also allowing preservation of suspected ischemic skin.

performed on the thin, patchy areas of ecchymoses that were clinically concerning for early ischemic changes on the umbilical skin. Because adequate blood was present, resection of compromised skin was not deemed necessary.

The patient was discharged home the same day of surgery and was followed-up at postoperative week 1 and week 6 in office. He was free of wound complications except for a small, asymptomatic seroma. He has had no evidence of recurrence, infection, or chronic pain at nine months postoperative.

### 3. Discussion

In a patient with an incarcerated hernia with surrounding ischemic skin and multiple comorbidities, retention of a minimally invasive approach is important to minimize the risk of wound complications and maintain the smallest wound profile<sup>4,6</sup> (Fig. 3). In addition, implantation of a biologic matrix is advised to reduce the incidence of mesh infection in patients at increased risk for a negative recognition response to synthetic mesh. Biologic grafts allow conservative management of possible infections and reduces the need for downstream surgical interventions, such as explanation of infected prosthesis.<sup>1,7</sup> Additionally, utilization of biologic matrix requires tissue apposition, which subsequently promotes tissue regeneration and strengthening.

However, laparoscopic placement of biologic mesh can be challenging. Biologic grafts can be too firm, which increases difficulty of handling, or too pliable, which can compromise its integrity. Strattice™ Tissue Matrix Laparoscopic (LifeCell Corporation, Branchburg, NJ) was the graft chosen for this patient's repair. Strattice Laparoscopic is a porcine dermal matrix manufactured for laparoscopic use and was recently FDA cleared. To the best of our knowledge, this is the first report discussing the use of Strattice Laparoscopic. Compared to other biologic mesh, Strattice

Laparoscopic is thinner and more pliable but remains durable while handling with laparoscopic instruments.

Defect closure essential in order to restore dynamic functionality to the abdominal wall. Fewer incidences of recurrence have been reported with reinforced defect closures compared to bridged mesh repairs.<sup>8</sup> Techniques for defect closure include percutaneous closure with a transfascial suture passer, intra-corporeal closure with free suturing, and device-assisted knot-tying. Given the patient's history of hernia recurrence, the defect was closed in addition to implantation of mesh to reduce the risk of additional recurrences. For the duration of the patient's follow up, no recurrence or infection occurred. More importantly, the patient's complex hernia case did not result in further reoperations. Although its long term use has yet to be determined in larger studies, this report suggests satisfactory short term results.

#### 4. Conclusion

Incarcerated hernias are generally repaired with urgency and caution. When further complicated with comorbidities and previous hernia repairs, the risk for infection is increased and the technique for repair becomes more significant. In our case, a laparoscopic approach with primary closure and reinforcement

with porcine dermal matrix was safe and feasible for repair of an incarcerated, recurrent hernia in a patient at high-risk for complications. Clinical studies with variable control should be conducted to explore the full utility and effectiveness of this technique in complex hernias.

#### Conflict of interest statement

Shawn Tsuda, MD, FACS is a consultant for LifeCell Corporation, Branchburg, NJ, USA. No compensation was received for this manuscript.

#### Funding

None declared.

#### Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

#### Key learning points

- Laparoscopic hernia repair with primary closure and reinforcement with laparoscopic biologic tissue was achievable for an incarcerated, recurrent umbilical hernia.
- Laser guided fluorescent imaging may be useful for assessing compromised umbilical skin during laparoscopic repair.

#### References

1. Darezhereshki A, Goldfarb M, Zehetner J, Moazzez A, Lipham JC, Mason RJ, et al. Biologic versus nonbiologic mesh in ventral hernia repair: a systematic review and meta-analysis. *World J Surg* 2014;**38**(January (1)):40–50.
2. Novitsky YW, Rosen MJ. The biology of biologics: basic science and clinical concepts. *Plast Reconstr Surg* 2012;**130**(November (5 Suppl. 2)), 9S–17S.
3. Ventral Hernia Working Group Breuing K, Butler CE, Ferzoco S, Franz M, Hultman CS, et al. Incisional ventral hernias: review of the literature and recommendations regarding the grading and technique of repair. *Surgery* 2010;**148**(September (3)):544–58.
4. Pierce RA, Spittler JA, Frisella MM, Matthews BD, Brunt LM. Pooled data analysis of laparoscopic vs. open ventral hernia repair: 14 years of patient data accrual. *Surg Endosc* 2007;**21**(March (3)):378–86.
5. Liang MK, Berger RL, Li LT, Davila JA, Hicks SC, Kao LS. Outcomes of laparoscopic vs open repair of primary ventral hernias. *JAMA Surg* 2013;**148**(November (11)):1043–8.
6. Forbes SS, Eskicioglu C, McLeod RS, Okrainec A. Meta-analysis of randomized controlled trials comparing open and laparoscopic ventral and incisional hernia repair with mesh. *Br J Surg* 2009;**96**(August (8)):851–8.
7. Ferzoco SJ. A systematic review of outcomes following repair of complex ventral incisional hernias with biologic mesh. *Int Surg* 2013;**98**(December (4)):399–408.
8. Zeichen MS, Lujan HJ, Mata WN, Maciel VH, Lee D, Jorge I, et al. Closure versus non-closure of hernia defect during laparoscopic ventral hernia repair with mesh. *Hernia J Hernias Abdom Wall Surg* 2013;**17**(October (5)):589–96.

#### Open Access

This article is published Open Access at [scimedirect.com](http://scimedirect.com). It is distributed under the [IJSCR Supplemental terms and conditions](#), which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.