EDORIUM Journals
www.edoriumjournals.com

CASE SERIES PEER REVIEWED | OPEN ACCESS

Parastomal hernia repair with urinary bladder matrix grafts: A case series

Kent C. Sasse, David L. Warner, Ellen Ackerman, Jared Brandt

ABSTRACT

Introduction: Parastomal hernias are a common complication of ileostomy and colostomy creation. Most are managed non-operatively, but some require surgery because of progressive symptoms and obstruction. Porcine urinary bladder matrix (UBM), utilized in many hernia applications, serves as an effective biologically-derived extracellular matrix scaffold and facilitates a favorable remodeling response with restoration of site-appropriate tissue.
Case Series: Herein, eight cases are presented which describe four different techniques of parastomal hernia repair utilizing porcine UBM. In four cases, repair was performed through open laparotomy; the remaining four were performed laparoscopically. All repairs were reinforced with porcine UBM. Median duration of follow-up is 23 months.
Conclusion: Surgeons may safely employ open and laparoscopic techniques for successful repair of parastomal hernias. In this series of eight cases, repairs with porcine UBM devices have proven durable at two years of follow-up and may serve as an alternative to synthetic mesh.

CASE SERIES

PEER REVIEWED | OPEN ACCESS

Parastomal hernia repair with urinary bladder matrix grafts: A case series

Kent C. Sasse, David L. Warner, Ellen Ackerman, Jared Brandt

ABSTRACT

Introduction: Parastomal hernias are a common complication of ileostomy and colostomy creation. Most are managed non-operatively, but some require surgery because of progressive symptoms and obstruction. Porcine urinary bladder matrix (UBM), utilized in many hernia applications, serves as an effective biologically-derived extracellular matrix scaffold and facilitates a favorable remodeling response with restoration of site-appropriate tissue. Case Series: Herein, eight cases are presented which describe four different techniques of parastomal hernia repair utilizing porcine UBM. In four cases, repair was performed through open laparotomy; the remaining four were performed laparoscopically. All repairs were reinforced with porcine UBM. Median duration of follow-up is 23 months. Conclusion: Surgeons may safely employ open and laparoscopic techniques for successful repair of parastomal hernias. In this series of eight cases, repairs with porcine UBM devices have proven durable at two years of follow-up and may serve as an alternative to synthetic mesh.

Keywords: Hernia repair, Parastomal hernia, Surgery, Urinary bladder matrix

Kent C. Sasse[1], David L. Warner[1], Ellen Ackerman[2], Jared Brandt[2]

Affiliations: [1]University of Nevada School of Medicine; [2]University of Nevada School of Medicine, PA-C.

Corresponding Author: David Warner, BS, University of Nevada School of Medicine, 75 Pringle Way, Suite 804, Reno, NV 89502; Email: dwarner@medicine.nevada.edu

Received: 01 November 2015
Accepted: 26 November 2015
Published: 01 February 2016

How to cite this article

Sasse KC, Warner DL, Ackerman E, Brandt J. Parastomal hernia repair with urinary bladder matrix grafts: A case series. Int J Case Rep Images 2016;7(2):85–91.

doi:10.5348/ijcri-201604-CS-10065

INTRODUCTION

Parastomal hernias are a common late complication of ileostomy and colostomy creation. Most are managed non-operatively, but some require surgery because of progressive symptoms and obstruction. Synthetic mesh reinforcement results in a lower rate of hernia recurrence than native tissue repair alone [1–5]. Biologically-derived materials, proposed as an alternative to minimize synthetic mesh-related complications of erosion and infection, have previously been utilized for parastomal hernia repairs [6–9]. MatriStem® is a unique biologically-derived material, which consists of the epithelial basement membrane and lamina propria of the porcine urinary bladder, referred to as urinary bladder matrix (UBM), (MatriStem® Surgical Matrix Thick, ACell® Inc., Columbia, MD). After decellularization, it retains a diverse biochemical composition, an architecture that is similar to the normal tissue, and robust mechanical behavior [10, 11]. UBM has shown effectiveness in animal studies and human clinical use for management of complex wounds and reinforcement of surgically repaired soft tissue with connective tissue remodeling in anatomic settings as diverse as esophageal, urinary bladder, body wall, and hernia repair [12–14], but it has not yet been reported for reinforcement in human parastomal hernia repairs.

CASE SERIES

Case 1

A 55-year-old male presented with an increasingly symptomatic parastomal hernia and a concomitant midline incisional hernia. A midline laparotomy was performed and both the parastomal and midline incisional hernias were repaired utilizing primary fascial approximation with absorbable suture followed by reinforcement with a 16x20 cm intraperitoneal keyhole graft (MatriStem Surgical Matrix Thick). The generous fascial hernia defect was closed primarily with heavy absorbable sutures. The UBM material was secured with an absorbable fixation device (SecureStrap Tacker, Ethicon Corp.) and absorbable sutures (Figures 1 and 2).

Case 2

A 56-year-old male was presented with a permanent colostomy developed worsening symptoms and underwent repair of an enlarging parastomal hernia. The repair was performed with an open technique via a midline incision. After adhesiolysis and reduction of the hernia contents of omentum and bowel, the fascial defect was approximated with absorbable sutures and reinforced with 16x20 cm MatriStem Surgical Matrix Thick in an intraperitoneal position (Figure 3).

Case 3

A 68-year-old female was presented with a history of both chronic renal failure and chronic liver disease. The patient had a permanent ileostomy related to Crohn's disease. She developed worsening symptoms after a long-period of observation and use of a binder for a parastomal hernia. She underwent open repair. At surgery, a technique was selected that involved takedown of the ileostomy, component separation dissection, placement of a reinforcement graft in the retro rectus position, and re-creation of the ileostomy through the same aperture and through the graft. Her recovery was notable for a slow restoration of full physical function related to her chronic medical conditions, and somewhat prolonged drainage of serous fluid for three weeks. No specific complications occurred, and she went on to recover uneventfully and has had no recurrence of the hernia and no recurrent obstructive symptoms.

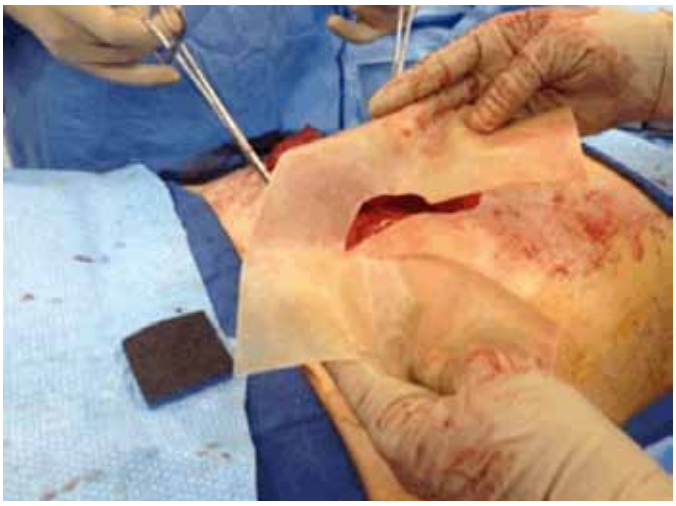

Figure 1: Keyhole configuration of UBM material.

Case 4

A 43-year-old female with a prior history or rectal carcinoma and a permanent colostomy developed a worsening hernia protuberance and progressed to obstructive symptoms and unremitting pain. The skin and soft tissue protuberance was pronounced and created notable abdominal wall asymmetry (Figure 4). The paracolostomy hernia was reduced and repaired with a technique involving excision of the redundant skin and soft tissues, primary closure of the fascial defect, reinforcement with 10x20 cm MatriStem Surgical Matrix Thick device, and relocation of the colostomy to the contralateral abdominal wall (Figure 5).

Case 5

A 67-year-old female was presented with a permanent ileostomy related to Crohn's disease developed increasing pain and an enlarging hernia. She underwent an open

Figure 2: Completed repair after open technique with keyhole UBM intraperitoneal.

repair with intraperitoneal placement of a keyhole 20x10 cm MatriStem Surgical Matrix Thick. She did well initially, but gradually developed a stricture over six months of follow-up. The stricture was treated with surgical fascial release revision via a circumstomal incision, and she has recovered uneventfully with no recurrence of the stricture or the hernia thereafter.

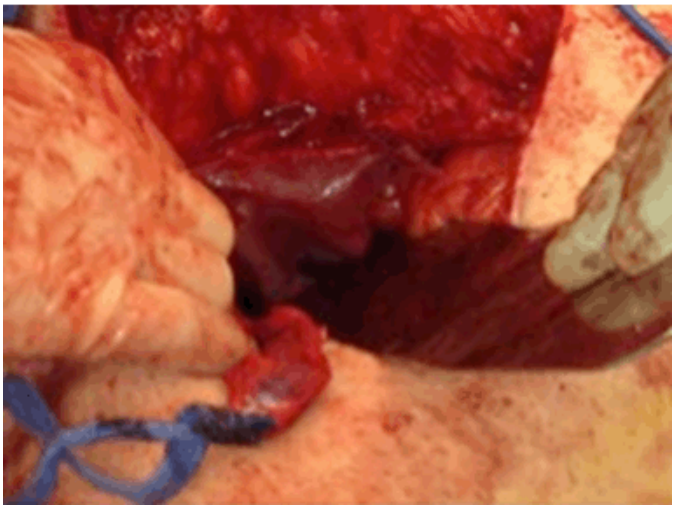

Figure 3: Placing UBM graft in subfascial position as an intraperitoneal repair.

Figure 4: Large parastomal hernia with surrounding pannus.

Figure 5: Completed repair after relocation of colostomy and removal of soft tissues.

Case 6

A 59-year-old male presented with increasing symptoms of pain and bulge that underwent a laparoscopic adhesiolysis with reduction of chronically incarcerated bowel from the hernia defect. The keyhole intraperitoneal 10x20 cm MatriStem Surgical Matrix Thick device was placed after approximation of the fascial defect with absorbable suture, secured with transfascial absorbable sutures and the absorbable fixation device (SecureStrap).

Case 7

A 72-year-old female, presented with coronary artery disease, morbid obesity, and COPD on home oxygen, had a permanent colostomy and an enlarging parastomal hernia was observed non-operatively for more than two years before she developed increasingly severe pain. She underwent a laparoscopic repair, which required a careful lysis of adhesions followed by primary approximation of the fascial defect. Reinforcement was performed with placement of a 16x20 cm graft cut with a keyhole for the colostomy. It was anchored with both transfascial absorbable sutures and absorbable fixation. She recovered uneventfully from surgery, and she has experienced no further recurrence or complication.

Case 8

A 42-year-old female was referred for increasing pain around her permanent colostomy. Several years previously, she had undergone a laparoscopic repair of the parastomal hernia with placement of synthetic mesh material. A laparoscopic repair was performed, and a long segment of colon was reduced from within the hernia sac in the abdominal wall. The hernia defect was approximated with heavy absorbable sutures. The repair was then reinforced with 20x10 cm graft secured with transfascial anchoring sutures and absorbable fixation tacks. She recovered uneventfully and has experienced no recurrence (Figures 6 and 7).

Detailed information regarding individual patients is given in Table 1. In each of the eight cases presented, the hernia was diagnosed and initially managed non-operatively for an average of 1.5 years. Increased pain and bulge, or symptoms of intestinal obstruction were the indications for surgical repair. The average BMI of the eight patients at the time of surgery was 32 kg/m^2. Open repair was performed in five cases utilizing primary fascial repair followed by xenograft device placement (MatriStem Surgical Matrix Thick, ACell Inc., Columbia, MD). One of the open repair cases utilized a component separation technique and placement of the xenograft device in the retrorectus position. In the other cases, the xenograft device was placed in the intraperitoneal position within the abdominal cavity. One case was repaired with relocation of the colostomy to the contralateral side of the abdominal wall to facilitate excision of the excess soft tissue and achieve a satisfactory surgical repair of the hernia. The final three cases were performed laparoscopically, with intraperitoneal placement of a keyhole-shaped hernia device. Each repair was successful. One late stricture required surgical revision six months following an open repair of an obstructing parastomal hernia around a Brooke ileostomy in a Crohn's patient. No other complications occurred. Each patient has an intact repair at a median of 23 months of follow-up.

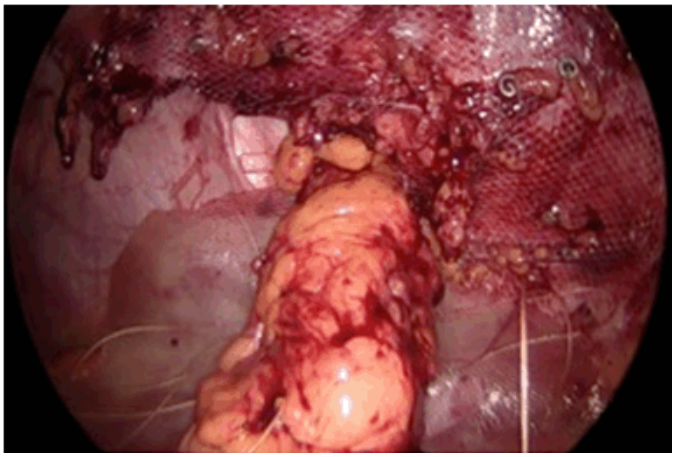

Figure 6: Placing transfascial sutures to anchor new graft. Old mesh and previous metallic tacks visible.

Figure 7: Completed laparoscopic repair of recurrent parastomal hernia.

DISCUSSION

Parastomal hernias are a common problem that can develop after ileostomy or colostomy creation [15]. A minority of such cases progress to involve increasing pain or obstruction and require surgical repair. There is no consensus on a single best method for parastomal hernia repair [2, 3, 5, 8, 16, 17]. The cases presented in this series represent the heterogeneous nature of the disease, and the spectrum of surgical approaches. In this case series, four different techniques were utilized based on the clinical assessment of the abdominal wall, the expected scar tissue present, and the clinical assessment of how to optimally repair the hernia and resolve the symptoms. Five open surgical repairs were performed with primary closure of the defect and intraperitoneal placement of a keyhole xenograft device, one of which involved repair of a concomitant incisional hernia. Similar simultaneous repair of midline incisional hernia and parastomal hernia with xenograft reinforcement and retro rectus reconstruction has been previously reported [8]. In one case, the ileostomy was taken down and a component separation technique was utilized with placement of the UBM in a retro rectus position. In one case, the colostomy was relocated to the opposite side, and open repair was performed that involved removal of excess skin and soft tissue. In three cases, a laparoscopic repair was performed with closure of the fascial defect, placement of an intraperitoneal keyhole hernia device, and fixation using transfascial sutures and an absorbable fixation tacking device.

Biologically-derived materials have previously been utilized for parastomal hernia repairs [6–9]. Parastomal hernia prevention techniques by placement of synthetic or biologically-derived mesh have also been previously reported [1, 4]. A rationale for utilizing biologically-derived grafts is the potentially lower rate of mesh erosion and mesh infection [6, 7]. MatriStem surgical matrix devices employ UBM which retains an intact epithelial basement membrane on one surface and a lamina propria layer on the opposite surface. The material has been utilized widely in hernia repair and

Table 1: Patient information.

Case	Time (Diagnosis to Repair, months)	Ostomy	Recurrent Hernia	BMI (Kg/m2)	Technique	Complication	Follow-up (months)
1	12	C	N	40	O/IP	None	37
2	24	C	N	32	O	None	36
3	36	I	N	24	O/CS	None	30
4	5	I	N	25	O/R	None	14
5	18	C	N	31	O	Stricture	24
6	9	C	N	42	L	None	16
7	48	C	Y	26	L	None	11
8	26	C	N	38	L	None	18

Abbreviations: C Colostomy, I Ileostomy, O Open, L Laparoscopic, IP Intraperitoneal, CS Component Separation, R Relocation of the ostomy

pelvic floor reconstruction and facilitates the deposition of site-appropriate tissue by the body.

Mesh infection remains a reported late complication of parastomal hernia repair reinforced with synthetic mesh, including PTFE [2, 5, 9]. Hansson's review and meta-analysis reported a mesh infection risk of 3% in median follow-up time of 27 months, although only studies with more than 12 months of follow-up were included in the meta-analysis [17]. Synthetic mesh repairs have been found to offer superior rates of durability when compared to primary sutured repair, but have not been measured against biologically-derived graft repairs. In a randomized controlled prospective trial comparing primary repair for parastomal hernias to primary repair with reinforcement with a synthetic mesh, use of mesh was found to significantly reduce the rate of recurrent hernias over native tissue repair alone [1]. The durability of urinary bladder matrix has not been compared to synthetic mesh, so it is unknown whether a lower potential graft erosion risk and infection rate of the UBM would be realized, or whether a corresponding higher rate of recurrence might result from the change to this biologically-derived material. However, the results of the current case series suggest that further study of UBM devices for reinforcement of parastomal hernias is warranted.

Recurrence of parastomal hernia is not uncommon. A recurrence rate of 10.8% was reported in a review of 174 cases of parastomal hernia repair reported by Helgstrand [15]. Published uncontrolled studies on laparoscopic and open repairs show favorable results with a trend towards fewer recurrences and less complications with a laparoscopic approach [17]. When technically feasible, a laparoscopic repair technique offers the possibility of a less invasive surgical intervention. The technique frequently requires a meticulous laparoscopic adhesiolysis, which carries a risk of enterotomy. For high-risk individuals with comorbid conditions such as cardiac and pulmonary disease, and morbid obesity, the laparoscopic repair may offer safety advantages. In recent years, several authors have described techniques for laparoscopic parastomal hernia repair with either a keyhole or a Sugarbaker technique [2, 5]. In a review and meta-analysis published in 2012, Hansson et al. reported superior results with the Sugarbaker technique in comparison to the keyhole technique utilized in this series [17]. Undoubtedly, there are cases in which laparoscopic approach may not be feasible, due primarily to extensive previous surgery and the density of intra-abdominal adhesions.

A large review of the risks of morbidity, mortality, and recurrence after parastomal hernia repairs demonstrated that emergency repairs were associated with higher postoperative complications and mortality risk. One could argue that a judicious approach to timing of surgery that seeks to avoid such emergency repairs might offer the lowest risk of postoperative complications and mortality [16].

CONCLUSION

This is the first reported experience of parastomal hernia repair with urinary bladder matrix devices. At two years of follow-up, there have been no recurrences. Future investigation and long-term follow-up will determine whether MatriStem Surgical Matrix devices offer the potential for hernia repair reinforcement that minimizes the risk of erosion or graft infection while minimizing hernia recurrence.

****

Author Contributions

Kent C. Sasse – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published
David L. Warner – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published
Ellen Ackerman – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published
Jared Brandt – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Dr. Sasse receives speaking honoraria from ACell organization outside the submitted work. All other authors have no conflicts of interest to disclose.

Copyright

REFERENCES

1. Serra-Aracil X, Bombardo-Junca J, Moreno-Matias J, et al. Randomized, controlled, prospective trial of the use of a mesh to prevent parastomal hernia. Ann Surg 2009 Apr;249(4):583–7.
2. Craft RO, Huguet KL, McLemore EC, Harold KL. Laparoscopic parastomal hernia repair. Hernia 2008 Apr;12(2):137–40.
3. Al Shakarchi J, Williams JG. Systematic review of open techniques for parastomal hernia repair. Tech Coloproctol 2014 May;18(5):427–32.
4. López-Cano M, Serra-Aracil X. Parastomal hernia prevention through laparoscopic modified Sugarbaker technique with composite mesh (Physiomesh®). Cir Esp 2013 May;91(5):331–4.
5. Tran H, Turingan I, Zajkowska M, Tran K. Single-port laparoscopic parastomal hernia repair with modified sugarbaker technique. JSLS 2014 Jan-Mar;18(1):34–40.
6. Hammond TM, Huang A, Prosser K, Frye JN, Williams NS. Parastomal hernia prevention using a novel collagen implant: a randomised controlled phase 1 study. Hernia 2008 Oct;12(5):475–81.
7. Greenstein AJ, Aldoroty RA. Parastomal hernia repair using cross-linked porcine dermis: report of a case. Surg Today 2008;38(11):1048–51.
8. Rosen MJ, Reynolds HL, Champagne B, Delaney CP. A novel approach for the simultaneous repair of large midline incisional and parastomal hernias with biological mesh and retrorectus reconstruction. Am J Surg 2010 Mar;199(3):416–20; discussion 420–1.
9. Smart NJ, Marshall M, Daniels IR. Biological meshes: a review of their use in abdominal wall hernia repairs. Surgeon 2012 Jun;10(3):159–71.
10. Brown B, Lindberg K, Reing J, Stolz DB, Badylak SF. The basement membrane component of biologic scaffolds derived from extracellular matrix. Tissue Eng 2006 Mar;12(3):519–26.
11. Gilbert TW, Wognum S, Joyce EM, Freytes DO, Sacks MS, Badylak SF. Collagen fiber alignment and biaxial mechanical behavior of porcine urinary bladder derived extracellular matrix. Biomaterials 2008 Dec;29(36):4775–82.
12. Gilbert TW, Nieponice A, Spievack AR, Holcomb J, Gilbert S, Badylak SF. Repair of the thoracic wall with an extracellular matrix scaffold in a canine model. J Surg Res 2008 Jun 1;147(1):61–7.
13. Badylak SF, Vorp DA, Spievack AR, et al. Esophageal reconstruction with ECM and muscle tissue in a dog model. J Surg Res 2005 Sep;128(1):87–97.
14. Nieponice A, Ciotola FF, Nachman F, et al. Patch esophagoplasty: esophageal reconstruction using biologic scaffolds. Ann Thorac Surg 2014 Jan;97(1):283–8.
15. Helgstrand F, Rosenberg J, Kehlet H, Jorgensen LN, Wara P, Bisgaard T. Risk of morbidity, mortality, and recurrence after parastomal hernia repair: a nationwide study. Dis Colon Rectum 2013 Nov;56(11):1265–72.
16. Shah NR, Craft RO, Harold KL. Parastomal hernia repair. Surg Clin North Am 2013 Oct;93(5):1185–98.
17. Hansson BM, Slater NJ, van der Velden AS, et al. Surgical techniques for parastomal hernia repair: a systematic review of the literature. Ann Surg 2012 Apr;255(4):685–95.

Edorium Journals: An introduction

Edorium Journals Team

About Edorium Journals

Edorium Journals is a publisher of high-quality, open access, international scholarly journals covering subjects in basic sciences and clinical specialties and subspecialties.

Invitation for article submission

We sincerely invite you to submit your valuable research for publication to Edorium Journals.

But why should you publish with Edorium Journals?

In less than 10 words - we give you what no one does.

Vision of being the best

We have the vision of making our journals the best and the most authoritative journals in their respective specialties. We are working towards this goal every day of every week of every month of every year.

Exceptional services

We care for you, your work and your time. Our efficient, personalized and courteous services are a testimony to this.

Editorial Review

All manuscripts submitted to Edorium Journals undergo pre-processing review, first editorial review, peer review, second editorial review and finally third editorial review.

Peer Review

All manuscripts submitted to Edorium Journals undergo anonymous, double-blind, external peer review.

Early View version

Early View version of your manuscript will be published in the journal within 72 hours of final acceptance.

Manuscript status

From submission to publication of your article you will get regular updates (minimum six times) about status of your manuscripts directly in your email.

Our Commitment

Six weeks

You will get first decision on your manuscript within six weeks (42 days) of submission. If we fail to honor this by even one day, we will publish your manuscript free of charge.

Four weeks

After we receive page proofs, your manuscript will be published in the journal within four weeks (31 days). If we fail to honor this by even one day, we will publish your manuscript free of charge and refund you the full article publication charges you paid for your manuscript.

Most Favored Author program

Join this program and publish any number of articles free of charge for one to five years.

Favored Author program

One email is all it takes to become our favored author. You will not only get fee waivers but also get information and insights about scholarly publishing.

Institutional Membership program

Join our Institutional Memberships program and help scholars from your institute make their research accessible to all and save thousands of dollars in fees make their research accessible to all.

Our presence

We have some of the best designed publication formats. Our websites are very user friendly and enable you to do your work very easily with no hassle.

Something more...

We request you to have a look at our website to know more about us and our services.

We welcome you to interact with us, share with us, join us and of course publish with us.

Edorium Journals: On Web

Browse Journals

CONNECT WITH US