ORIGINAL RESEARCH PAPER
Volume - 10 | Issue - 03 | March - 2021 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

USE OF POLYPROPYLENE MESH FOR ABDOMINAL WALL RECONSTRUCTION IN PRESENCE OF ENTERIC CONTAMINATION: HOW SAFE?

Gastroenterology

Dr Mukund P Kulkarni Assistant Professor, Surgical Gastroenterology, Karnataka Institute of Medical Sciences. Hubli. Karnataka.

ABSTRACT

Background: Abdominal wall defects need prosthetic mesh for tensionless repair and reduce recurrence. Contamination from an associated stoma, bowel resection or inadvertent enterotomy during the surgery puts the surgeon into dilemma whether to use mesh or not.
Aim: To evaluate the outcome of surgery in terms of wound infection and its severity, hernia recurrence in a cohort of patients where in use of polypropylene mesh was absolutely necessary to achieve wound and or abdominal closure in presence of enteric contamination.
Patients and methods: Thirty patients undergoing abdominal wall repair with intestinal fluid contamination were identified. Patients with gross peritonitis were excluded.
Results: There were thirty patients who had polypropylene mesh repair in presence of enteric contamination. There were seven wound infections (23.3%). One patient required complete mesh removal. Hernia recurrence was seen in 20% of patients at mean thirty-six months of follow up.
Conclusions: Use of polypropylene mesh in contaminated abdominal wall repairs is safe with acceptable surgical site outcomes.

KEYWORDS

infected hernia repair, hernia repair with enterotomy, open mesh repair, infected mesh removal

INTRODUCTION:

Hernia and abdominal wound dehiscence healed by granulation often require mesh repair. An associated fecal fistula, bowel gangrene, bowel perforation invariably contaminates the wound with risk for mesh infection. Hence surgeons often want to go for tissue repair without mesh or want to use absorbable mesh with increased chance of hernia recurrence [1]. An inadvertent enterotomy during a hernia repair, and consequent inability to use polypropylene mesh defeats the very purpose of surgery and poses a dilemma to the surgeon.

Patients and methods:

This retrospective study was conducted at a tertiary care government medical college hospital 'Karnataka Institute of Medical Sciences, Hubli in Karnataka' using prospectively collected data of patients undergoing mesh repair of abdominal wall defects. The study period was from April 2015 to April 2020.

INCLUSION CRITERIA:

1) patients undergoing surgery for incisional and ventral hernia who had inadvertent enterotomy during repair 2) patients who had strangulated hernia requiring bowel resection anastomosis 3) patients undergoing surgery for fecal fistula, and abdominal wall repair in presence of ileostomy and colostomy were included.

EXCLUSION CRITERIA:

1) Patients with frank peritonitis with abdominal wall defects were excluded.2) patients in whom absorbable mesh was used were excluded.3) patients undergoing laparoscopic repair were excluded.

Procedure:

During surgery every effort was made to limit contamination of the surgical field. Thorough saline wash was given and fascial closure achieved using a mix of the scar tissue, hernial sac and in some cases lateral release incisions and component separation. A flat sheet of polypropylene mesh placed in subcutaneous plane. Closed suction drains placed and subcutaneous tissue and skin closure done.

Postoperative care. The patients were given intravenous hydration and antibiotics. Oral diet started as soon as nausea, vomiting subsided and antibiotics continued for for five to seven days. Wound dressings inspected at regular intervals and changed.

Follow Up:

Patients were followed up initially at one month, and subsequently at three-month intervals.

Statistics:

The prospectively collected was entered into Microsoft excel sheet for analysis. All patients were analyzed with intention to treat basis.

RESULTS:

There were thirty patients who underwent mesh repair for abdominal wall defect and had contamination from intestinal content. Fifteen patients had enterotomy during adhesiolysis during hernia repair, eight were patients who had stoma, either ileostomy or colostomy and seven were patients in whom the hernia sac contained strangulated bowel necessitating bowel resection. The demographic and hernia related parameters are presented in Table 1.

Table 1: The demographic and operative parameters

	Contaminated mesh repair (n-30)
Age Mean (SD)	38 (8.2)
Sex males	14 (46.6 %)
BMI mean (SD)	22.3 (4.1)
COPD	2(6.6 %)
Smoker	3(10 %)
Diabetes Mellitus	7(23.3%)
Recent Chemotherapy	4(13.3%)
Enterotomy during surgery	15(50%)
Ostomy/ fecal fistula at the time of closure	8 (26.6%)
Strangulating hernia requiring bowel resection anastomosis	7(23.3%)
Defect Size (Sq.cm)(SD) Width(cm)	137 (60.2) 9 (4.6)
Operating time(Min) Mean (SD)	240 (45)

Fascial closure was achieved in all patients. A concomitant component separation was done in 18 patients.

Outcomes:

The main outcomes studied were local wound related complications and recurrence and is compared in Table 2. There were 7 (23.3%) infections. The infections were classified as superficial wound infections requiring antibiotic therapy (n=4) or deep infections requiring wound debridement with partial mesh excision (n=2) or organ space infections(n=1). The removal of entire mesh was necessitated in one patient with contaminated repair. The hernia recurred in 20 % of patients at a mean follow up of 36 months.

Table 2: The outcome of surgery

	n=30
Surgical site infections (SSI) (%) Superficial infection Deep infection Organ space infection	7 (23.3) 4 2 1
Flap necrosis	5
Mesh removal	1
Mesh removal	1

Enterocutaneous fistula	0
Hernia Recurrence (%)	6(20)
Average follow up (months) (Range) (SD)	36 (6- 48) (12.6)

DISCUSSION:

In contaminated abdominal wall repairs conventional surgical teaching has been that prosthetic mesh repair is contraindicated as the infection rates are prohibitively high [2]. Use of tissue repairs including component separation techniques have disappointing results with high wound infection rates and recurrence rates. The use of biological mesh or synthetic absorbable mesh still have high infection rates and hernia recurrence [3] apart from higher costs [4].

The studies evaluating outcome of contaminated ventral hernia repair using biological mesh are scarce. The repair of infected and contaminated hernias (RICH) trial is the only multicentric trial evaluating biological mesh in CDC class II to IV wounds. [5]. The RICH trial showed 66% wound occurrence and 28 % hernia recurrence. The Complex Open Bioabsorbable Reconstruction of the Abdominal Wall (COBRA) trial had 18 % wound infection rate and 15.4% hernia recurrence rate [6]. The completion of facial closure and location of mesh intraperitoneal, retro rectus or subcutaneous have influence on recurrence. The reduction in hernia recurrence was partly due to facial closure in all cases and retro rectus mesh placement in 90% of cases. Synthetic mesh cannot be placed intraperitoneally for fear of intestinal erosion. Placing the mesh in retro rectus position is often challenging and technically difficult and cannot be universally used in all cases. Another randomized study using component separation technique to repair clean (CDC class I) or clean-contaminated (CDC class II) ventral hernias reported 53% of patients had development of a major wound complication postoperatively and hernia recurrence at 36 months [7]. The use of synthetic non absorbable mesh for closure of abdominal defects in presence of contamination is generally contraindicated and its use is off label. Regarding the mesh character which should be considered favourable in infected field is monofilament, light weight (less than 40 gm/sq. meter) and macroporous (more than 4 mm wide). Expanded polytetrafluoroethylene (ePTFE) is generally contraindicated in infected environment [8]. There is no reported experience with new generation macroporous ePTFE. Polyester is multifilament mesh and data is conflicting [9,10]. Polypropylene mesh is the most commonly used mesh when placed in a contaminated or infected field. Newer generation mesh is available that are macroporous and thus granulation tissue will grow within its interstices at a rapid rate, as long as infectious source control has been performed. Most studies regarding failure of synthetic mesh in infected fields were performed using microporous and/or heavyweight mesh, thus it is possible that the newer generation mesh will have improved outcome if placed in infected fields. Although biological mesh may be better option, the cost and non-availability makes use of polypropylene mesh essential.

CONCLUSION:

The wound infection rate following mesh insertion in enteric contaminated abdominal wall defects is low and serious infections needing mesh removal is very low . Judicious use of polypropylene mesh in presence of enteric contamination is safe.

REFERENCES:

1 The Ventral Hernia Working Group, Breuing K, Butler CE, Ferzoco S, Franz M, Hultman CS, Kilbridge JF, Rosen M, Silverman RP, Vargo D Incisional ventral hernias: review of the literature and recommendations regarding the grading and technique of repair. Surgery 2010; 148:544–558.

2 Birolini, C., de Miranda, J.S., Tanaka, E.Y. et al. The use of synthetic mesh in contaminated and infected abdominal wall repairs: challenging the dogma—A long-term prospective clinical trial. Hernia 2020; 24**,** 307–323

3 Baillie DR, Stawicki SP, Eustance N, et al. Use of human and porcine dermal-derived bioprostheses in complex abdominal wall reconstructions: a literature review and case report. Ostomy Wound Manage 2007; 53:30–37

4 Reynolds D, Davenport DL, Korosec RL, et al. Financial implications of ventral hernia repair: a hospital cost analysis. J Gastrointest Surg 2013; 17:159–166

5 Itani KM, Rosen M, Vargo D, et al. RICH Study Group. Prospective study of single-stage repair of contaminated hernias using a biologic porcine tissue matrix: the RICH Study. Surgery 2012; 152:498–505.

6 Rosen MJ, Bauer JJ, Harmaty M, et al. Multicenter, Prospective, Longitudinal Study of the Recurrence, Surgical Site Infection, and Quality of Life After Contaminated Ventral Hernia Repair Using Biosynthetic Absorbable Mesh: The COBRA Study. Ann Surg. 2017;265(1):205-211.

7 de Vries Reilingh TS, van Goor H, Charbon JA, et al. Repair of giant midline abdominal wall hernias: "components separation technique" versus prosthetic repair: interim analysis of a randomized controlled trial. World J Surg 2007; 31:756–763

8 Bleichrodt RP, Simmermacher RKJ, Lei B van der, Schakenraad JM Expanded polytetrafluoroethylene patch versus polypropylene mesh for the repair of contaminated defects of the abdominal wall. Surg Gynecol Obstet 1993; 176:18–24.

9 Nagy KK, Fildes JJ, Mahr C, Roberts RR, Frosner SM, Joseph KT, Barrett J Experience with three prosthetic materials in temporary abdominal wall closure. Am Surg 1996;62: 331–335.

10 Carbonell AM, Matthews BD, Dreau D, et al. The susceptibility of prosthetic biomaterials to infection Surg Endosc 2005;19:430–435.