

Case Report

Enterocutaneous fistula secondary to mesh erosion of bowel: a late complication of polypropylene mesh use in ventral hernia repair

Kartik Saxena¹, Rijul Saini^{2*}

¹Department of Surgery, AIMST University, Bedong, Kedah, Malaysia

²Department of Surgery, Oscar Superspeciality Hospital, Sonapat, Haryana, India

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***Correspondence:**

Dr. Rijul Saini,

E-mail: rijulsaini@gmail.com

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ABSTRACT

Use of mesh for reinforcing hernia defects has become standard procedure but it is associated with a few serious complications like bowel erosion and fistula formation. We present a case of a 62 yrs lady with enterocutaneous fistula due to mesh erosion of small bowel, 10 yrs after open incisional hernia repair using polypropylene mesh who had to undergo laparotomy and resection of eroded bowel. A brief review of literature revealed that very few case reports of such fistulas following open incisional hernioplasty have been reported and that current research on improving the properties of mesh may reduce such complications in future.

Keywords: Mesh erosion, Late complications, Ventral hernia, Incisional hernia, Polypropylene mesh, Enterocutaneous fistula

INTRODUCTION

Use of prosthetic material for reinforcement of abdominal wall defects has revolutionised the treatment of abdominal wall hernias albeit with a few complications. Some of these present as late as 10 years and are very difficult to treat. One of the most dreaded complications is enterocutaneous fistula (ECF) secondary to mesh erosion of bowel.^{1,2}

CASE REPORT

A lady of age 62 years with no known co-morbidities presented with a faeculant discharging sinus over right lower quadrant of her abdomen for the last 3 months. She elaborates that she underwent open cholecystectomy 12 years back after which she developed incisional hernia for which mesh hernioplasty was done 10 years back. 1 year back, the patient developed a painful swelling over right lower quadrant of her abdomen for which drainage

was done at a nearby hospital 6 months back (possibly abscess formed due to infected mesh). Now the purulent discharge has turned to faeculant for the last 3 months. The patient was admitted and investigated. Contrast enhanced computed tomography scan showed adhered small bowel with anterior abdominal wall along with the fistula tract (Figure 1). Pre-operative workup was done and patient was taken up for exploratory laparotomy. Intra-operatively, dense adhesions were noted between proximal ileal loops (3 feet from ileo-colic junction) and anterior abdominal wall in right iliac fossa and right lumbar region (Figure 2). The polypropylene mesh had slowly migrated and eroded the small bowel and was found lying in the bowel lumen (Figure 3 and 4). Adhesiolysis was done along with resection of the eroded ileal segment with primary end to end ileo-ileal anastomosis. Intra-operative period was uneventful. Post operatively patient developed superficial surgical site infection. Wound swab showed culture of *Escherichia coli* sensitive to Meropenem. Patient started tolerating

oral feeds from day 5. Drain was removed on day 7 and patient was discharged in stable condition on day 8. Patient visited for follow up on day 10 for stitch removal. No other intra-operative or post-operative complication was noted.



Figure 1: Contrast enhanced axial computed tomography scan showing bowel adherent with anterior abdominal wall with a communicating tract from bowel lumen to skin (arrow).

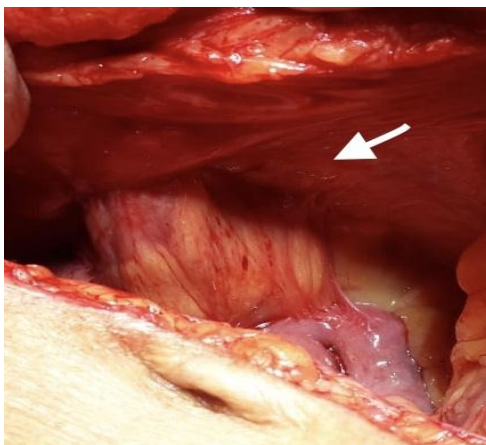


Figure 2: Per-operative picture showing densely adherent small bowel with anterior abdominal wall in right iliac fossa and right lumbar region (arrow).

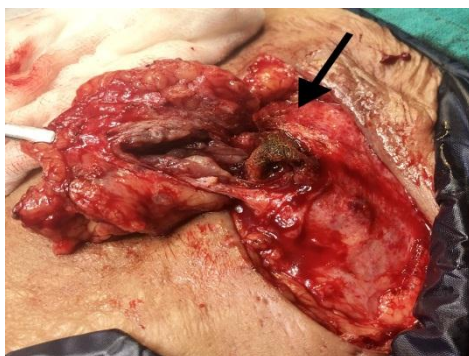


Figure 3: Per-operative picture showing migrated and infected mesh lying in the small bowel lumen (arrow).



Figure 4: Resected specimen of jejunum with migrated mesh lying in the bowel lumen (arrow).

DISCUSSION

Use of synthetic meshes for reinforcement of hernia defects has gained widespread acceptance and popularity since 1958, when Dr. Francis Usher first published his report of using polypropylene mesh.³ Now mesh reinforcement of hernia defects is the standard procedure. The risk of ventral hernia recurrence is found to be reduced from 8.2% to 2.7% with use of mesh.⁴ But this wondrous device has its own shortcomings and disadvantages. Use of mesh is associated with complications like mesh infection, adhesions with bowel, obstruction, enterocutaneous fistulas (ECF) and chronic pain. The complications depend on the characteristics of mesh used and the technique followed. Rate of ECF following mesh implantation is estimated to be between 0-2%.^{5,6}

ECF form due to mesh migration and formation of adhesions between mesh and surrounding tissues. Adhesions are formed due to the inflammatory response against implanted foreign body which occurs in four stages. In first stage, there is formation of coagulum around the mesh due to adsorption of proteins containing albumin, fibrinogen, plasminogen, complements and immunoglobulins. Platelets adhere to the proteins and release chemoattractant factors which recruit polymorphonucleocytes, macrophages, fibroblasts and smooth muscle cells. The second stage of inflammation is the chronic phase in which macrophages are increasingly recruited at the site of foreign body and start phagocytosis of dead and necrotic cells. These macrophages later fuse into foreign body giant cells and are responsible for the third stage of inflammation or foreign body reaction. The fourth stage of inflammation or stage of scar formation is mediated by fibroblasts which proliferate and secrete extracellular matrix and collagen. The peak fibroblastic activity is seen at 2 weeks post surgery. Persistent fibroblastic activity is associated

with faster integration of mesh leading to chronic pain and paresthesias. It further leads to contraction and shrinkage of mesh leading to adhesions, bowel obstruction and fistula formation, and eventually mesh explantation.⁷

Complications following mesh infection are not only dependent on characteristics of mesh like material, pore size, filament structure, coating; but also depends on surgical technique like plane of mesh placement, type of fixation, tissue handling. Patient factors like poor nutritional status and concurrent enterotomy along with mesh use during hernia repair are also associated with increased chances of mesh infection.⁸

There are a few published case reports of fistulas following mesh use in hernioplasty; Manash Ranjan Sahoo et al reported a transverse colon fistula post laparoscopic ventral hernia repair in 2013.⁹ Jad. A Degheili et al reported a sigmoid to scrotal fistula post inguinal hernia repair in 2015.¹⁰ We found just one comparative study about early and late-onset prosthetic mesh infection published in 2015 by Wengcheng Kong et al.¹¹ Very few case reports or research articles were found on ECF following open incisional hernia repair.¹²⁻¹⁴

For prevention of fistulas, Losanoff et al proposed using tissue impervious composite material in close proximity of bowel.¹⁵ It is of general consensus now that composite barrier meshes or strand coated meshes should be used intraperitoneally or in close proximity to bowel in order to minimise adhesions.¹⁶ Development of newer generation of meshes is underway using nanofiber systems, biomimetic scaffolds using 3D printing technology and using newer coating materials for composite meshes like nano crystalline silver, titanium, mesenchymal stem cells, human dermal and rat kidney fibroblasts, collagen, chitosan, etc.⁶ The ongoing research in this field makes the future of hernia repair using meshes bright and will someday be useful in reducing the complication rates

CONCLUSION

This case report emphasises the importance of long term follow up of hernia patients with implanted mesh prosthesis, in order to identify and manage such complications in a timely manner. Such case reports warrant further research for newer and safer next generation prosthetic meshes, that would reduce such dreaded complications in hernia patients.

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