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Preventing and Treating Parastomal Hernia

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Abstract. Parastomal hernia represents a major surgical challenge. There is no uniform definition of parastomal hernia, and the true rate is therefore difficult to establish, although it is probably higher than 30%. Many surgical techniques have been tried to prevent and treat parastomal hernia; but despite these efforts, herniation continues to be a problem. The only method that has reduced the rate of parastomal hernia in a randomized trial is the use of a prophylactic prosthetic mesh. A large-pore low-weight mesh with reduced polypropylene content and a high proportion of absorbable material placed in a sublay position at the primary operation significantly reduces the rate of parastomal hernia. Recurrence rates after surgical treatment of parastomal hernia are high unless mesh is used. Relocation of the stoma, with prophylactic mesh in a sublay position at the new site and sublay mesh repairing the incisional hernia at the primary site, is the standard method for treating parastomal hernia in our department.

Parastomal hernia is a frequent complication, and some degree of paracolostomy herniation has even been considered an inevitable complication of colostomy formation [1]. Parastomal hernia is difficult to treat, and the failure rate after surgical intervention is high [2]. Many surgical techniques to prevent and treat parastomal hernia have been attempted over the years; but despite these efforts, herniation is a continuing surgical problem [2].

Randomized trials have largely been lacking in this field, and information derives mainly from retrospective clinical reports. New prosthetic mesh materials have been developed that offer an opportunity for both prevention and treatment of parastomal hernia. This is a short review of current knowledge on this topic including recent randomized trials and their adaptation in our department.

Incidence

The incidence of parastomal hernia has been reported to be within a wide range (5–50%), which is probably related to the different definitions of hernia used at follow-up [3–17]. Computed tomography (CT) allows detection of small parastomal hernias, which may have contributed to the higher hernia rates reported during the last decade [9, 10, 18]. Parastomal hernia has been classified into four subtypes: interstitial, subcutaneous, intrastomal, perstomal. However, this classification has not found use in clinical studies [19].

A parastomal hernia is an incisional hernia related to an abdominal wall stoma [20]. In congruence with other incisional hernias, the clinical diagnosis should be made 12 months after the index operation and involve any palpable defect or bulge adjacent to the stoma when the patient is supine with elevated legs or erect and coughing or straining [2, 21, 22]. The lack of a uniform definition of parastomal hernia used at follow-up makes it difficult to estimate the true incidence of herniation. Studies on the rate of incisional hernia indicate that the highest rates reported are the most accurate [23]. The incidence of parastomal hernia is probably between 30% and 50% in general surgical practice.

The incidence of parastomal hernias has been suggested to be lower after an ileostomy than after a colostomy, but reports are conflicting [18, 24]. To bring out an enterostoma through the laparotomy wound has produced disastrous results in terms of infection, wound dehiscence, and herniation [25–28]. Extraperitoneal construction of an enterostoma has not been confirmed to prevent herniation [9, 18, 29].

Stomas formed through the rectus abdominis muscle may be associated with a lower incidence of parastomal hernia than if brought out lateral to the muscle [12, 30]. In a study of 130 patients, the hernia incidence was significantly lower with enterostomas formed through the rectus muscle than laterally (3% vs. 22%) [12].

In another study the corresponding figures were 1% and 19% in 93 patients [30]. Four other retrospective studies, however, did not confirm these findings [9, 10, 18, 29]. In the absence of results from randomized studies, it is probably wise to form enterostomas through the rectus abdominis muscle because it is not associated with any disadvantages.

An overlarge opening in the abdominal wall for the enterostoma has been suggested to increase the risk of parastomal hernia [11, 25, 28, 31–33]. Mesenteric fixation has not reduced the rate of herniation [9]. Obesity, wound infection, old age, corticosteroid use, chronic respiratory disorders, and malnutrition are other factors that have been suggested to place patients at risk for the development of a parastomal hernia [19, 25, 29, 34, 35].

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Surgical Treatment

A surgical strategy is chosen in 15% to 70% of patients with a parastomal hernia [4, 12, 18, 31]. The results with local aponeurotic repair have been disappointing, with recurrence rates between 50% and 76%, which is clearly unacceptable [19, 25, 33, 35, 36].

After stoma relocation (requiring a celiotomy to create a new enterostoma in another quadrant of the abdominal wall), the risk of a recurrent parastomal hernia is as at least as high as after the primary enterostomy and recurrence rates between 30% and 45% are reported [19, 35, 37, 38]. Furthermore, the large defect in the abdominal wall at the index enterostoma is, in effect, an incisional hernia demanding additional repair [39].

Because relocation of the stoma or local parastomal hernia repair repeats a procedure with a known high failure rate, a different strategy based on the similarities between incisional hernia and enterostomal hernia has been suggested [40]. Nonabsorbable mesh is placed in either a sublay position [40–43] or an onlay position [32, 34, 44–48], which produces a lower recurrence rate compared with historical controls, although results from randomized studies are not available [33, 35, 40, 44, 49].

Repairing an incisional hernia with prosthetic mesh in a sublay position is theoretically attractive, as it allows good anatomic preparation, and intraabdominal pressure does not displace the mesh. Treating an incisional hernia by the sublay technique produces good results and therefore has been proposed as the most advantageous technique for mesh repair of parastomal hernias [19, 40–43].

Prevention

Prosthetic mesh in proximity to the abdominal contents and intestine may be hazardous, as there is a possibility of fistulas, severe adhesions, or strictures developing [50]. No clinical studies have compared the effect on these complications of using various mesh materials or of different positioning of the mesh. The mesh should be placed in an extraperitoneal position, however, as the rate of complications has been high without peritoneum interposed between the prosthetic mesh and the abdominal visceral contents [50].

There are several types of prosthetic mesh available. A mesh with a large pore size (about 5 mm), reduced polypropylene content, and a high proportion of absorbable material has been available for several years (Vypro; Ethicon, Norderstedt, Germany). The degree of inflammation in the vicinity of this low-weight mesh is low [51]. With such a modest degree of inflammation the tendency of the mesh to erode into bowel has been suggested to be diminished [40]. Large parastomal hernias have been repaired with this mesh with good results, although only small series have been reported [40].

The introduction of this low-weight mesh has offered an opportunity to prevent the development of parastomal hernia. In our department 54 patients were randomized to either conventional enterostomy through the rectus abdominis muscle or to the same procedure with the addition of low-weight mesh placed in a sublay position. The mesh was not associated with infection or other early complications [52]. At the 12-month follow-up, the incidence of parastomal hernia was significantly lower with the low-weight mesh [52, 53].

We access the abdominal cavity through a midline incision. The prosthetic mesh is placed behind the rectus abdominis muscle (retromuscular) and anterior to the posterior rectus sheath (prefascial and preperitoneal). The mesh is cut to 10 × 10 cm, and the bowel is brought out through a cross-cut at its center. An absorbable stitch fixes the lateral corners of the mesh to the posterior rectus sheath. The medial corners of the mesh are grasped with a stitch of the running suture closing the midline incision. To prevent the mesh from coming in contact with visceral abdominal contents, peritoneum on the side of the stoma and the adjacent edge of the mesh is included with the running suture. This procedure is technically easy and does not prolong the operation unduly) (Fig. 1).

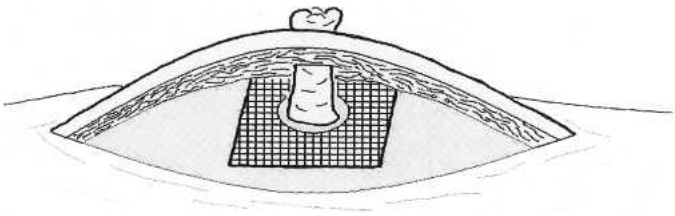

Fig. 1. At the primary operation, prophylactic Vypro mesh is placed in a sublay position. The bowel passes through the peritoneum/posterior rectus sheath and through a cross-cut in the mesh before it is delivered through the remaining layers of the abdominal wall.

No adverse effects were encountered in our series and there was profound effect on the incidence of parastomal hernias. The clinical series was rather small, but it was not considered ethical to continue the study when a major statistically significant difference in hernia rates became apparent [52]. A multicenter study confirming our results is of course desirable. In our department we now use prophylactic mesh for all enterostomas, except loop stomas, and we intend to follow patients for several years. There are also an increasing number of patients with gross peritoneal contamination following emergency surgery who have had prophylactic mesh implanted in our department. The incidence of parastomal herniation is similarly reduced in these patients without an increased rate of infection even under these circumstances.

Placing large-pore mesh with reduced polypropylene content and a high proportion of absorbable material in a sublay position at the primary operation is as yet the only method that has reduced the incidence of parastomal hernias in a randomized study. No adverse effects have been detected so far, but late effects cannot be ruled out before long-term follow-up is completed.

The results in this study clearly indicate that the path toward reducing the incidence of parastomal hernia includes using mesh at the primary operation. This is perhaps not surprising considering the obvious similarities between incisional hernias and enterostomas. Both entities are characterized by protrusion of abdominal contents through a defect in the abdominal wall—in the first case due to defective wound healing and in the second due to an inevitable consequence of stoma formation. If an enterostoma is regarded as a deliberately formed incisional hernia, it follows that it should primarily be treated as an incisional hernia, that is, with a sublay mesh.

Relocation with a Mesh

A difficulty with local mesh repair of the parastomal hernia is that the enterostoma remains at the site of an incisional hernia

Table 1. Parastomal hernias treated by relocation into another quadrant with prophylactic mesh at the new site and mesh repair of the abdominal defect: September 2002 to April 2004

Parameter	No.
Patients	13
Male/female	5/8
Age (years), mean	65
Emergent operation	3
Follow-up time (months)	
Range	3–25
Mean /median	12/11
Wound infection	1
Hernia recurrence	0

repair, albeit reduced in size by the mesh. The repair often requires a large amount of mesh, as the defect in the abdominal wall at the parastomal hernia may be considerable and is often in proximity to herniation of the celiotomy incision as well.

When an enterostoma is relocated into another quadrant of the abdominal wall, the incisional hernia at the primary site can be repaired with mesh in a sublay position [22]. After stoma relocation, the risk of a parastomal hernia developing at the new site seems to be even higher than after the primary enterostoma. However, with prophylactic mesh it is possible to reduce considerably the risk of herniation at the new site. The risk of incisional hernia is increased when an abdominal incision is reentered [54], and parastomal hernias are often in proximity to the midline or a concomitant incisional hernia is present. Thus a much standardized procedure with the potential of producing a low recurrence rate is to treat a parastomal hernia by relocating it into another quadrant with prophylactic mesh at the new site in combination with a sublay mesh repair of the hernia at the primary enterostoma site and the celiotomy.

This method has been used for about 2 years in our department, with 13 patients having been operated on with the technique. All patients had large parastomal hernias with a substantial defect in the abdominal wall at the stoma site, and the defect often reached the midline. Wound infection not demanding surgical intervention developed in one of these patients, but no recurrent parastomal hernia or incisional hernia has been encountered (Table 1).

The abdomen is entered through the previous midline incision. Dissection along the enterostoma stops 3 to 4 cm below the cutis, and the bowel is cut with a linear stapler. In most instances the bowel is long enough to reach the opposite quadrant without further dissection. On both sides of the midline incision the space between the rectus muscle and the posterior rectus sheath is dissected. On the side of the parastomal hernia, dissection is often continued laterally into the space between the tranversus abdominis muscle and the internal oblique muscle to allow a 5 cm overlap of the mesh laterally. At the new stoma site the bowel is brought out through low-weight mesh as previously described. A running suture closes the posterior rectus sheath and peritoneum. Nonabsorbable mesh is placed in the retromuscular space. It crosses the midline and overlaps the defect in the abdominal wall by at least 5 cm on all sides. A U-shape is cut out, preventing it from coming into contact with the bowel. Thus the nonabsorbable mesh is partly on top of the low-weight mesh, and they may be attached with a few stitches. If the anterior rectus sheath cannot be closed without tension, it is sutured onto the nonabsorbable mesh with a running suture. After closing the skin, the bowel remaining at the primary stoma site is excised, and a subcuticular monofilament absorbable purse-string suture reduces the size of the skin defect (Fig. 2).

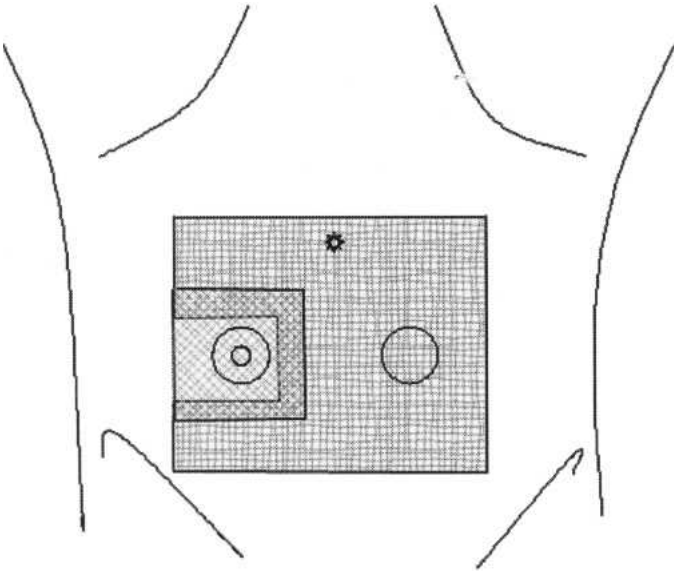

Fig. 2. Stoma relocation with mesh. Low-weight mesh is placed in a sublay position at the new stoma site. Nonabsorbable prosthetic mesh repairs the abdominal wall defects at the parastomal hernia and in the midline. A U-shape is cut from the nonabsorbable mesh, preventing it from coming in contact with the bowel.

Contamination of the wound is minimized by cutting the bowel with a linear stapler. Repair of abdominal wall defects with nonabsorbable mesh in a sublay position is a standardized method that produces well documented satisfactory results [39, 55]. The U-shape cut out of the nonabsorbable mesh ensures that only the low-weight mesh is in contact with the bowel, effectively preventing parastomal hernia at the new stoma site. Because Vypro mesh is rather flaccid and not suitable for suturing to the aponeurosis, it should not be used to cover midline defects when closure cannot be achieved.

Conclusions

Parastomal hernia represents a major surgical problem. There is no uniform definition of parastomal hernia at follow-up, and the true rate in surgical practice is therefore difficult to establish, although it is reportedly at least 30% in most series.

The only method that has reduced the incidence of parastomal hernia in a randomized trial is the use of prophylactic prosthetic mesh. Large-pore low-weight mesh with reduced polypropylene content and a high proportion of absorbable material placed in a sublay position at the primary operation significantly reduces the incidence of parastomal hernia.

Recurrence rates after surgical treatment of parastomal hernia are high unless mesh is used. Relocation of the stoma with prophylactic sublay mesh at the new site and sublay mesh repairing the incisional hernia at the primary site is the standard method for treating of parastomal hernias in our department.

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