Management of Parastomal Hernias

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Case Presentation

HPI
- 85 y/o male s/p APR in 1978 for rectal cancer, no chemo/RT
- S/p TURP, prostatectomy
- HTN, hypercholesterolemia, gout
- 10/2010 patient presented with large abscess adjacent to ostomy site with fecal drainage and communication with the colostomy
Case Presentation

- Patient underwent incision and drainage of abscess, repair of a colonic perforation above the level of the fascia and construction of diverting transverse loop colostomy

- Postoperatively patient had NSTEMI and underwent cardiac catheterization and subsequent CABG and aortic valve replacement
In 09/2011 patient presented with enlarging, non reducible LLQ parastomal hernia

Patient underwent resection of LLQ end sigmoid colostomy with resection of descending colon and primary repair of LLQ parastomal hernia.
In 2012, patient developed a LUQ parastomal hernia that enlarged, becoming bothersome and difficult to manage.

Patient was scheduled for elective repair of LUQ parastomal hernia.
• PE demonstrated a healthy loop colostomy, with a reducible parastomal hernia located inferior and lateral to the stoma with a fascia defect approximately 8 cm in diameter
Case Presentation

- Patient underwent primary repair of parastomal hernia

- The majority of the hernia was palpable inferior and lateral to the stoma in the LUQ

- A curvilinear incision was made in this area distal to the stoma
Case Presentation

• The hernia sac was identified and dissected away from surrounding tissues down to the level of the fascia

• The sac was opened and its content (omentum) reduced

• The superior aspect of the defect was occupied by the ostomy.
Case Presentation

- The defect measured approximately 8 to 10 cm

- The hernia defect was reapproximated primarily with interrupted #1 Prolene, extending both form the lateral and medial aspect of the hernia defect
Case Presentation
Case Presentation

- There was no constriction of the stoma at the level of the fascia

- The wound was irrigated and a 10 mm Jackson-Pratt drain was placed

- On POD#1 patient was tolerating a diet, with a healthy looking stoma and normal bowel function and was discharged home
Case Presentation

Questions?
• Approximately 120,000 new stomas will be created in the United States each year

• It is estimated that the number of ostomates will continue to increase by 3% annually
Stomas

- Surgically created opening between a hollow organ and the body surface or between any two hollow organs
- It is further named by the organ involved
An ostomy is created:

- When an anastomosis is not possible
- When there is nothing distally to attach to
- For proximal diversion
- The majority of ostomies are created as a temporary measure
Stomas

• Ostomies may be temporary or permanent

  • Temporary stomas divert the fecal stream away from an area of concern
    • High-risk anastomosis
    • Located in a radiated field
    • Low in the rectum
    • After an injury
Stomas

- Permanent ostomies
  - Required when the anorectum has been removed
  - In patients with severe fecal incontinence
  - After complications of trauma or radiation (i.e. rectourethral fistula)
Indications for Stoma Creation

- Cancer
- Diverticular disease
- IBD
- Radiation enteritis
- Complex fistulas
- Trauma
- Obstruction
- Perforation

- Motility and functional disorders
- Infections (necrotizing fasciitis, Fournier’s)
- Congenital disorders
Type of Stomases

- By anatomical location
  - Ileostomy
  - Colostomy
Ileostomy:

- Opening constructed between the small intestine and the abdominal wall, usually by using distal ileum, but sometimes more proximal small intestine.
Types of ileostomies include:
- End (Brook) ileostomy (most common)
- Loop ileostomy
- Loop-end ileostomy
- Continent ileostomy (Kock)
- Urinary conduit
Colostomy:

- Is an opening of the large intestine with no sphincteric control
- It is categorized by the part of the colon used in its construction
- End-sigmoid, end-descending, transverse colostomy, cecostomy
Functions of Colostomy:

- **To provide decompression of the large intestine:**
  - “Blow-hole” decompressing stoma
  - Tube type of cecostomy
  - Loop-transverse colostomy

- **To provide diversion of the feces**
  - Loop colostomy
  - End colostomy
Stoma-related Complications

- The rate of stoma complications in the literature varies quite widely, ranging from 10 to 70%.

- Virtually all ostomates will have at least transient episodes of minor peristomal irritation.
Stoma-related Complications

Metabolic (Medical intervention)
- Peristomal skin irritation
- Leakage
- High output
- Ischemia
- Dehydration, nephrolithiasis, cholelithiasis, bleeding
Stoma-related Complications

Structural etiology (Surgical intervention)

• Early complications
  Necro-sis
  Retraction
  Skin irritation
  Small bowel obstruction
  Surgical wound infection, sepsis
Stoma-related Complications

Structural etiology (Surgical intervention)

• Late complications
  Prolapse
  Skin irritation
  Fecal fistula
  Parastomal hernia
Parastomal Hernia (PSH)

- Type of incisional hernia that occurs at the site of the stoma or immediately adjacent to the stoma

- It forms when the trephine is continually stretched by the tangential forces applied along the circumference of the abdominal wall opening
Parastomal Hernia (PSH)

Incidence:

- PSH is the most frequent structural complication following the construction of a colostomy or an ileostomy

- The reported incidence varies widely:
  - Lack of a standard definition
  - Type of ostomy constructed
  - Variability in the duration of follow-up
Parastomal Hernia (PSH)

Incidence:
• PSH occurs:
  • 1.8 to 28.3 percent of patients with end ileostomies
  • 0 to 6.2 percent with loop ileostomies
  • 4.0 to 48.1 percent with end colostomies
  • 0 to 30.8 percent with loop colostomies
Parastomal Hernia (PSH)

Incidence:

• Most parastomal hernias occur within the first two years from construction.
Parastomal Hernia (PSH)

Classification:

• **Subcutaneous**: Herniation in subcutaneous fat

• **Interstitial**: Herniation into the intermuscular planes

• **Perstomal**: Loops of bowel and/or omentum enter the hernia space produced between the layers of the prolapsed bowel

• **Intrastomal**: Herniation extrudes from the abdomen alongside the bowel for the stoma
Parastomal Hernia (PSH)

A. Subcutaneous
B. Interstitial
C. Perstomal
D. Intrastomal
Parastomal Hernia (PSH)

Risk Factors

Patient variables:
- Smoking status
- Malnutrition
- Age
- Waist circumference (>100 cm)
Parastomal Hernia (PSH)

Risk Factors

Disease processes:
• Obesity (BMI >30 kg/m2)
• COPD
• Diabetes
• Ulcerative colitis
• Raised intra-abdominal pressure
• Postop sepsis
• Perioperative steroid
• Malignancy
Parastomal Hernia (PSH)

Risk Factors

Technical factors:
- Emergency procedures
- When preoperative siting is not possible
- Siting of the stoma outside of the rectus muscle
- Aperture size
Parastomal Hernia (PSH)

Clinical Manifestations:
- Most patients with a PSH are asymptomatic
- Typically present with a bulge at the site of or adjacent to the intestinal stoma (+/- pain)
- Mild abdominal discomfort, back pain, intermittent cramping
- Distention, nausea, vomiting, diarrhea, constipation
- Reducible hernia
In complicated cases:

- Severe abdominal pain, nausea, vomiting, and an unreducible hernia
Diagnosis:

- Based on characteristic findings on physical examination

- Patient is examined in the standing position and asked to perform the Valsalva maneuver

- Diagnostic imaging to evaluate subclinical PSH in patients with a negative physical examination is unnecessary
Parastomal Hernia (PSH)

Indications for Surgical Intervention:

• Low rate of life threatening complications

• Emergent surgical repair is indicated in patients with a high grade obstruction resulting from strangulation or an unreducible hernia
Parastomal Hernia (PSH)

Indications for Elective Surgical Intervention

- Increasing PSH size
- Peristomal skin breakdown
- Intermittent bowel obstructions
- Stoma appliance dysfunction and leakage
- Chronic back and/or abdominal pain
- Psychological distress
- Stoma dysfunction
Parastomal Hernia (PSH)

Non-surgical Management:

- Surgical repair avoided in mild/asymptomatic patients
- Most patients can be managed with an ostomy hernia belt
- Education about signs and symptoms of obstruction, strangulation, and infarction of bowel
Parastomal Hernia (PSH)

Surgical Repair

- Multiple approaches have been reported
- No ideal repair
- All approaches are associated with varying recurrence rates
Parastomal Hernia (PSH)

Surgical Repair:

• Relocation of the stoma
• Direct repair of the fascial defect with or without prosthetic mesh
• Repair using a prosthetic mesh
• Laparoscopic repair
Parastomal Hernia (PSH)

Direct repair of the fascial defect

- Local aponeurotic repair obviates the need for laparotomy and stoma relocation

- Direct repair with fascial defect with suture alone is associated with a recurrence rate in the literature of 50-100%
Relocation of the stoma

- Requires a formal celiotomy
- The risk of a recurrent parastomal hernia at the new site is at least as high as after the primary enterostomy
- If the stoma is relocated a second time, recurrence rates are further increased
Parastomal Hernia (PSH)

Repair using prosthetic mesh

• Most common method of PSH repair

• The overall success rate is relatively high compared with repair without mesh
Parastomal Hernia (PSH)

Repair using prosthetic mesh
- Reports are nonrandomized
- Small patient numbers
- Different techniques
- Variable follow-up
- Complications include contamination of the mesh and fistula formation, while very rare, can be devastating
Parastomal Hernia (PSH)

- Direct fascial repair with mesh
  - An incision is made in the abdominal wall away from the stoma
- Subcutaneous dissection along the rectus and oblique fascia is performed circumferentially around the stoma
Parastomal Hernia (PSH)

- Direct fascial repair with mesh
  - The content of the hernia is reduced into the abdomen and abdominal wall defect is closed using a tension free mesh repair

- Small, non-randomized series report low complication rates and recurrence rates of 0 to 20 percent
Parastomal Hernia (PSH)

- Advantages of direct fascial repair with mesh
  - Avoids the need for a formal laparotomy
  - Does not require relocation of the stoma

- Disadvantages include:
  - Undermining the skin around the stoma with risk of ischemic injury to the skin
  - The risk of infection contaminating the mesh which is higher than intraperitoneal placement of mesh
A. Relocation of the stoma

B. Direct repair of defect
- Rectus abdominis muscle
- Fascia

C. Subcutaneous mesh repair
- External oblique fascia
- Rectus abdominis fascia

D. Extraperitoneal mesh repair
- Posterior fascia, peritoneum
Intraabdominal repair with mesh

- Strategy based on the similarities between incisional hernia and parastomal hernia
- The mesh can be placed in an onlay, an inlay, a sublay, or an intraperitoneal onlay position (IPOM)
Parastomal Hernia (PSH)

Intraabdominal repair with mesh

- **Onlay technique**: mesh is placed on the anterior Aponeurosis

- **Sublay technique**: mesh is placed dorsal to the rectus muscle, anterior to the posterior rectus sheath
Intraabdominal repair with mesh

- **Intraperitoneal onlay position (IPOM) technique**: mesh is placed intra-abdominally on the peritoneum

- **Inlay technique**: mesh is cut to the size of the abdominal wall defect and sutured to wound edges
Parastomal Hernia (PSH)

A
Onlay mesh.  
Placed anterior to the anterior rectus aponeurosis.

B
Inlay mesh.  
Placed in the abdominal wall defect and sutured to wound edges.

C
Sublay mesh.  
Placed dorsal to the rectus muscle and anterior to the posterior rectus sheath.

D
Intra peritoneal onlay mesh.  
Placed on peritoneum from within the abdominal cavity.
Parastomal Hernia (PSH)
Intraabdominal repair with mesh

Common aspect of all of the approaches
- Reduction of the hernia contents into the abdominal cavity
- Closure of the defect by securing a piece of mesh under the defect with wide overlap
- The bowel forming the ostomy is either brought out directly through a defect in the mesh, the "key hole" technique, or around the mesh
Intraabdominal Mesh Repair of Parastomal Hernia
Parastomal Hernia (PSH) Laparoscopy repair of PSH

- Evolving technique
- Avoids second laparotomies and operations in contaminated fields reducing the risk of mesh infection
- Laparoscopic PSH repairs can generally be divided into two groups
  - "Keyhole-techniques"
  - "Sugarbaker techniques"
Laparoscopic mesh repair of Parastomal Hernia
Parastomal Hernia (PSH)

- There are several types of meshes available
- They are classified into 2 broad categories
  - Synthetic
    - Polypropylene, PTFE
  - Biological
    - Human dermis (Alloderm), Porcine dermis (Permacol, Strattice)
Surgical Technique for Parastomal Hernia Repair

A Systematic Review of the Literature

Hansson, B. et al

Objective

- To evaluate and compare the safety and effectiveness of the surgical techniques available for parastomal hernia repair
Methods

• Systematic review
• Subgroups formed for each surgical technique
• Primary outcome: recurrence after at least one year followup
• Secondary outcomes: mortality and morbidity
Results

• 36 studies included
• Suture repair resulted in significantly increased recurrence rate when compared with mesh repair (aprox 70%)
• Recurrence rates for mesh repair ranged from 6.9-17% and did not differ significantly
Results

• In the laparoscopic repair group:
  – The Sugarbaker technique had less recurrences than the keyhole technique (OR 2.3, 95% CI 1.2-4.6; p=0.016)

• Morbidity did not differ between the techniques

• Mesh infection rate
  • Overall low: 3% (95% CI 2)
  • Comparable for each type of mesh repair
Conclusions

• Suture repair of parastomal hernia should be abandoned because of increased recurrence rates

• The use of mesh in parastomal hernia repair significantly reduces recurrence rates and is safe with a low overall rate of mesh infection

• In laparoscopic repair, the Sugarbaker technique is superior over the keyhole technique showing fewer recurrences
Parastomal Hernia Prevention

- Attention to proper surgical technique:
  - Well vascularized
  - Non-traumatized
  - Tension free anastomosis between the skin and intestine

- A stoma should never be brought out through the laparotomy wound
Parastomal Hernia Prevention

- The stoma should be brought through the rectus abdominis muscle
- Higher rates of hernia formation occur when the stoma is brought lateral to the rectus
Parastomal Hernia Prevention

- The opening should be made large enough to allow the bowel to pass.
- Diameter of the opening should be around 2.5 cm, or two to three of the surgeon’s fingers.
- Larger openings in the abdominal wall, may be associated with an increased risk of parastomal herniation.
Parastomal Hernia (PSH)

- There is no need to fixate the mesentery or suture the bowel to the aponeurosis as this has not reduced the rate of herniation.

- Although laparoscopic techniques are commonly used and safe, they have not proven effective in hernia prevention.
Parastomal Hernia (PSH)

- The only method that has reduced the rate of parastomal hernia in a randomized trial is the use of a prophylactic mesh.

- Randomized trials (3), prospective observational studies (5), and descriptive techniques promote a benefit for prophylactic mesh placement.
Parastomal Hernia (PSH)

- At the time of initial stoma creation, onlay or sublay placement of prophylactic mesh

- In studies available:
  - Followup periods ranged from 2 to 68 months
  - Infections and other long-term complications rarely reported
  - Recurrent hernia after prophylactic mesh placement was less than 15% for all studies included
Parastomal Hernia (PSH)

• Randomized, Controlled, Prospective Trial of the Use of a Mesh to Prevent Parastomal Hernia
• Serra-Arucil X et al.
• *Ann Surg* 2009;249:583-587
Randomized, Controlled, Prospective Trial of the Use of a Mesh to Prevent Parastomal Hernia

Objective:
- To reduce the incidence of parastomal hernia by implanting a lightweight mesh in the sublay positions
Randomized, Controlled, Prospective Trial of the Use of a Mesh to Prevent Parastomal Hernia

- Randomized controlled prospective trial
- Patients scheduled for permanent end colostomy to treat cancer of lower third of rectum
- Light weight mesh (Ultrapro) inserted in sublay position in study group (above the peritoneum and the posterior rectus sheath)
- Simple randomization
- Clinical and radiologic followup (abdominal CT) at 1 month and every 6 months after surgery
- Clinician and radiologist were blind to the aims of the study
Randomized, Controlled, Prospective Trial of the Use of a Mesh to Prevent Parastomal Hernia

• Results:
  – Homogeneous groups (clinical and demographics)
  – Surgical time and postoperative morbidity similar in both groups
  – Zero mortality
  – No mesh intolerance
Randomized, Controlled, Prospective Trial of the Use of a Mesh to Prevent Parastomal Hernia

• Clinical follow-up:
  – Median 29 months (13-49)
  – 11/27 (40.7%) hernias in control group
  – 4/27 (14.8%) in study group
  – p=0.03

• Abdominal CT:
  – 14/27 (44.4%) hernias in control group
  – 6/27 (22.2%) in study group
  – p=0.08
Randomized, Controlled, Prospective Trial of the Use of a Mesh to Prevent Parastomal Hernia

• Conclusions:
  – Parastomal placement of a mesh reduces the appearances of parastomal hernia
  – The technique is safe, well tolerated and does not increase morbidity rates

2. Serra-Arucil X et al. Randomized, Controlled, Prospective Trial of the Use of a Mesh to Prevent Parastomal Hernia. *Ann Surg* 2009;249:583-587


Question #1

Based on current evidence, placement of mesh to prevent hernia occurrence is associated with:

a. Decreased hernia rates
b. No increase in morbidity
c. Decreased rate of surgical intervention in order to repair a hernia
d. All of the above
Question #1

Based on current evidence, placement of mesh to prevent hernia occurrence is associated with:

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d. All of the above
Question #2

Which of the following aspects of management has been consistently shown to diminish the risk for stoma-related complications?

a. Preoperative visit by an enterostomal therapist
b. Placement of the stoma through the rectus muscle
c. Closure of the lateral gutter
d. Suture fixation of the stoma to the fascia
e. Use of absorbable sutures to secure the stoma
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Preoperative counseling and marking by an enterostomal therapist improves postoperative quality of life.
Question #3

Which of the following factors is most closely associated with development of parastomal hernia?

a. Obesity  
b. Corticosteroid use  
c. Obstructive pulmonary disease  
d. Ileal stoma  
e. Long term survival
Question #3

Which of the following factors is most closely associated with development of parastomal hernia?

a. Obesity
b. Corticosteroid use
c. Obstructive pulmonary disease
d. Ileal stoma
e. Long term survival
Despite a long list of suggesting predisposing factors for parastomal hernia formation (including obesity, corticosteroid use and obstructive pulmonary disease), few have been studied and found to be truly instrumental in increasing the risk.

One widely noted finding is that the likelihood of parastomal hernia development increases over time.
Thank you!