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Parostomal Hernia: A More and More Frequent Surgical Challenge

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Abstract

Repairing Paro Stomal Hernias (PSH) can be considered an interesting challenge. Primary closure of those hernias is often not possible. There is little agreement about the most appropriate technique or prosthetic to repair these defects, in spite the fact of the prevalence of them. Moreover, despite being contaminated surgical fields, we are almost always faced to reinforce with prosthetic meshes. PSH is one of the most common complications following stoma creation and its prevalence is only expected to increase. It often leads to a decrease in the quality of life for patients due to discomfort, pain, frequent ostomy appliance leakage, or peristomal skin irritation and can result in significantly increased healthcare costs. Surgical technique for PSH repair has evolved significantly over the past two decades with the introduction of new types of mesh and laparoscopic procedures. The use of prophylactic mesh in high-risk patients at the time of stoma creation has gained attention in lieu of several promising studies that have emerged in the recent days. This review will attempt to provide an overview of the current management and surgical techniques at both preventing and treating PSH hernias. The variety of published techniques itself can be seen as an indicator for the often low level of satisfaction reached with the surgical procedures.

Materials and Methods: We reviewed the records of 60 patients who underwent surgery after having been suffering from PSH from 2011 to 2015. Follow-up (median 37 months) was available for all of them. Of the 60 patients 12 had previously undergone an ileal conduit (Bricker's procedure) diversion, 6 an end ileostomy and the 48 remaining patients a terminal colectomy. Patients were followed with computerized tomography surveillance. Standardized criteria were used to define parostomal and incisional hernias by an expert radiologist. They underwent an eventroplasty with Dynamesh IPST implant (FEG Textiltechnik, Aachen, Germany), which is a 3-dimensional pre shaped, open-pore and monofilament mesh consisting of Poly Vinyli Dene Fluoride (PVDF) and polypropylene.

Results: PSH was diagnosed in 60 patients with a mean age at diagnosis of 66.5 years. Eleven patients had associated an incisional hernia. 66 (54.5%) of patients with PSH were male. Mean body mass index was 35.5kg/m^2. Mean parastomal defect size was 9.88 (range 4-13 cm). In 55 patients (91.66%) PSH were clinically and radiologically evident. Five patients (8.33%) included in this series recurred with PSH; Five patients (8.33%) included in this series recurred with PSH; so far, we have succeeded in folding out and attaching again the mesh we had previously used in order to work those problems out. Those recurrences were diagnosed 12-24 months after the date of the operation.

Conclusion: In this review, we describe the clinical and radiographic definitions of PSH, the clinical impact and risk factors associated with its development, and the use of a 3-dimensional pre-shaped mesh so that we can work these hernias out.

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Introduction

Paro Stomal Hernia (PSH) has been defined as an incisional hernia located at or immediately adjacent to a stoma. It (PSH) develops in up to 78% of patients with a stoma and typically occurs within 2 years of ostomy creation but may develop as long as 20 or 30 years after surgery [1-6]. Goligher even went so far as to state that some degree of parostomal herniation is inevitable given enough follow-up time [7]. The current rate of PSH is difficult to establish, and is probably underestimated. Lack of publications in this regard makes it even more difficult to quantify their impact. This confusion is due, on the one hand, to the inaccuracy in the definition of the concept of PSH, and on the other, to resources used in diagnosis, with an estimate of over 78% when you set radiological criteria (CT). PSH is described in the 10-20% of cases of patients with a stoma; however, the true incidence, is unknown due to the majority of patients remain asymptomatic, paucisymp-

Figure 1: Some parostomal hernias we included in this series.

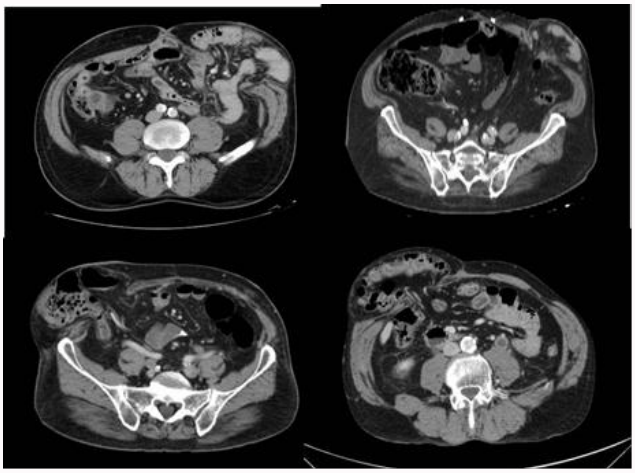

Figure 2: Pre-operative CT scans.

tomatic or they did not consulted. Its incidence increases when you extend the follow-up of the patients, and is, without any doubt, more frequent than is generally thought. In a comprehensive review conducted by Carne [8] communicated PSH rate ranged 4-48% for colostomies and 1.8-28% for ileostomies. According to Aquina the most common classification system describes four subtypes: type 1: interstitial hernia; type 2: subcutaneous hernia; type 3: intra stomal hernia; and type 4: peristomal hernia (stoma prolapse). The interstitial type includes a hernia sac within the muscle and aponeurotic layers, the subcutaneous type contains a subcutaneous hernia sac, the intra stomal type contains a hernia sac between the intestinal wall and the everted intestinal layer, and the peristomal type results in the prolapse of bowel through a circumferential hernia sac surrounding the stoma [9]. However, these four subtypes are difficult to differentiate on clinical exam and, therefore, have not been useful for clinical studies or in clinical decision making. PSH is the most frequent problem consecutive to the creation of a stoma; so frequent, that this kind of complication could be considered a natural and evolutionary consequence itself. As a result of performing a stoma, the intestinal loop must go through the abdominal wall, immediately creating a weak area. Although there are factors involved in any way helping the formation of PSH (obesity, advanced age, chronic obstructive pulmonary disease) the evidence on their impact on the formation of hernia are usually anecdotal. A frequent observation is that about a permanent colostomy will develop a PSH more often than in the case of a urostomy or ileostomy. Goligher [7] proposed an explanation for this observation based on patients' old age and its association with pro-gressive weakness of the wall of the abdomen.

DeRuiter [10] offered us a detailed explanation of the forces involved in the formation of PSH. In accordance with the law of Laplace, there is a radial force on the abdominal wall which is related to the pressure inside of the abdominal cavity and the diameter of the abdomen. Any opening in the abdominal wall will be subjected to a tangential force which tends to expand it. Up to a third of patients require surgical intervention, most commonly due to discomfort, poor fit of the ostomy appliance, or rarely due to obstruction, bowel perforation, or strangulation.

There are basically two options at the time of PSH repair:

- Repair the abdominal wall defect without changing the place the stoma (local service).

- Closure of the defect abdominal wall and repositioning of the stoma in a healthy place in the abdominal wall. Both can be done with or without reinforcement with prosthetic material; in the case of placing a prosthetic of reinforcement material can be the procedure through an open or laparoscopic approach.

To sum up; PSH is a problem of difficult solution. Regardless of the type of surgical repair has been made, there is a high rate of recurrence.

The high prevalence of PSH, the morbidity of surgical repair, and high recurrence rates has prompted surgeons to attempt to prevent their formation from the time of the initial surgery. This problem is not confined to gastrointestinal or general surgery because ostomy formation at the site of an ileal conduit is quite common. The rate of herniation at a urostomy site is similar to that of an end ileostomy with a range of 5 to 28% [2,14-19]. According to our experience, the use of CT-scan can sometimes detect smaller PSH that are not apparent on clinical exam. Both patient and operative technical factors have been implicated in the subsequent risk of PSH. Comorbidities that seem to favour the emergence of a PSH include obesity [1-2,5,7,13,17-20], diabetes [3], ulcerative colitis, the existence of other abdominal hernias [1], the elevation of the intra abdominal pressure (prostatism, constipation, ascites [17], chronic obstruction to the air flow [3]), postsurgical sepsis [21], the use of corticosteroids and cancer [3]. Technical aspects related to ostomy creation that have been suggested as risk factors for PSH include bringing the stoma out through the resection site [19], an intra peritoneal route as opposed to an extra peritoneal one [1,18,22-24], and increased aperture size [2,10,20,25], or a laparoscopic approach [18], On physical examination, similar to other incisional hernias, a bulging adjacent to the stoma may be apparent upon Valsalva manoeuvre in the standing position. Additionally, a fascial defect adjacent to the stoma may be palpable. At our hospital, a CT scan of the abdomen has been the traditional imaging modality in order to confirm the diagnosis or obtain better characterization of the PSH. Patients who are symptomatic from a PSH often suffer from poor quality of life [26-30]. Studies evaluating the effects of peristomal bulging and subsequent quality of life, patients have usually reported significant impairment in quality of life regarding symptom load, worry, and general sense of well-being. In comparison to patients without bulging, patients with parastomal bulging had significantly higher rates of needing to know where the nearest toilet was, concern that the pouch would loosen, worry that their family would feel awkward around them, and fatigue symptoms

[30].

Materials and Methods

From January 2012 to July 2015, 60 consecutive PSH (Figure 1 and 2) were repaired at our Abdominal Wall Surgical Unit by means of eventroplasties using an intra peritoneal mesh. Our patients had previously undergone from at least one up to 11 surgical procedures in order to get their PSH hernias repaired, with an average of 4.5. The choice of mesh is important, since bowel contents will be in direct contact with the foreign body and the nonreactive side should be oriented toward the visceral contents. One mesh designed for this approach is the Dynamesh IPST implant (FEG Textiltechnik, Aachen, Germany), which is a 3-dimensional pre shaped, open-pore and monofilament mesh consisting of Poly Vinyli Dene Fluoride (PVDF) and polypropylene. The PVDF side of the dual-component mesh has a funnel extending from its central aspect through which the bowel is placed and fixed. The funnel is oriented toward the visceral side of the abdomen and encircles the bowel and a portion of its mesentery as it exits the abdominal wall. Surrounding the funnel is a border of mesh that is fixed to the anterior abdominal wall peritoneum. The polypropylene layer of the mesh is oriented away from the abdominal contents to reduce the risk of adhesions or erosion. All surgeries were performed uneventfully. The mean operative time was 157 (range 120-210) minutes. Nasogastric tubes were not routinely employed, only if necessary. When used, gastric tube was removed within a mean of 2(range 1-4) days. Drainage tube was removed within a mean of 4 (range 3 -10) days. The mean hospital stay was 6 (range 4-10) days. The placement and length of the skin incision was determined by prior incisions. So they were specific for each hernia in order to allow an adequate exposure of the fascial defect. After having made the skin incision, the sac was liberated and the abdominal cavity was explored, adhesiolysis was performed and the size of the fascial defect was measured. The bowel was placed and fixed through the funnel (Figure 3) by means two 4-stitcht crowns with Vicryl® 2/0 (Ethicon, Somerville, NJ, USA). The underlay reinforcement 3-D Dynamesh was fixed using a trans-parietal technique. The size we used was 16x16 x^3 cm. In most cases we performed a 8-stitch single crown with PDS® (Ethicon, Somerville, NJ, USA). These sutures are particularly useful where the combination of an absorbable suture and extended support is desirable. The skin and subcutaneous tissue were then closed over two closed suction drains. At the time of skin closure, generous resection of excessive skin and subcutaneous tissue was performed, only leaving the amount necessary for closure. To sum up, we usually re-doostomies without closing the herniary ring so that the loop can be as if it were hanging on a hammock in order to achieve a more efficient result.

Results

Those patients were assigned a number according to the chronological order of intervention. They were reviewed by a member of the Committee on clinical trials of our hospital, a surgeon who is alien to our group of regular work according to a pre-established questionnaire. CT scans were performed every year so that we can check the results (Figure 4). Most of the patients in our series had successful outcomes at a mean follow-up time of 27 months (range, 13 -38 months). Surgical site occurrences were identified in 15 patients (25 %); most commonly (9 patients) from skin necrosis. Seven of these patients were treated with negative pressure dressings for local wound care, and the two other surgical sites improved with antibiotics only. Wounds were then treated with a negative pressure

Figure 3: Placing a 3-D mesh.

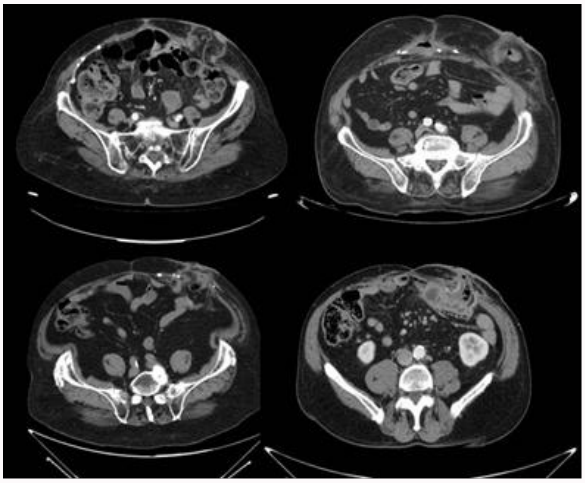

Figure 4: Post-operative CT scans.

dressing until resolution of the infection and none of the patients who experienced a surgical site occurrence were found to have a fascial defect during wound exploration. Six patients had postoperative seromas and were well managed with compression. Despite having a number of wound and infectious complications physically remote from the mesh, there have been no mesh infections, fistulas, or strictures identified and no patient has required removal of mesh to date. Five patients (8.33%) included in this series recurred with PSH; at present, so far, we have succeeding in folding out and attaching again the mesh we had previously used in order to work those problems out. Those recurrences were diagnosed by CT scan 12-24 months after the date of the operation. We think this low rate can be considered as a consequence of having performed a fully tension-free repair. Three of them could be consecutive to respiratory diseases; one of them suffered from pneumonia two months after having been operated and two others suffered from Chronic Obstructive Respiratory Disease (CORD).

Conclusions

PSH represent a clinically significant problem for patients undergoing an ostomy. While many patients are asymptomatic, PSH can negatively impact on quality of life and up to a third of patients

undergo repair due to bothersome symptoms or in the emergent setting. The morbidity of PSH repair and relatively high recurrence rates have prompted surgeons to attempt maneuvers at the time of index surgery to reduce PSH rates. Hernias of the abdominal wall are usually not reversible. With the increase in intra abdominal pressure, the hernia margin and content are also increasing. The aims of abdominal hernia surgery include repair of the abdominal defects, enforcement of the abdominal wall, and prophylaxis of recurrence. The primary repair PSH has unacceptably high recurrence rate. Mesh repair can significantly decrease the abdominal tension and complication rate, and has been the first choice for the repair of abdominal hernias. When repairing concomitant PSH the surgeons are facing large defects and the challenges of prevention of re-currence. In our experience of using sublay for the repair of PSH, this technique had achieved good clinical outcomes. According to Köhler 3D funnel-shaped meshes have been used with the best outcomes for the surgical repair of PSH. We aimed to re-implant the ostomy on the same side in its original location once the diverted bowel segment had been passed through the funnel mesh in order not to create another abdominal wall defect. The PSH has some distinct features that are different from the incisional hernia. The repair of PSH should consider the functions of the stoma. Intra operative manipulation should be gentle to avoid damages to bowels, nerves, and vessels. Damage to the vessels beneath the abdominal wall may cause muscular atrophy and weakness, leading to hernia recurrence. Damage to the vessels of the bowel may cause intestinal necrosis. Excessive manipulation of the bowel may contamination of the surgical area by the bowel contents. Excessive dissection should be avoided intra operatively. And careful hemostasis should be maintained during the surgery. Prophylactic mesh placement appears effective in reducing PSH rates based upon evidence from randomized trials in patients undergoing end-colostomy surgery. Early experience with this technique suggests that placement of prophylactic mesh in patients at high risk for PSH formation appears feasible and safe. The degree to which placement of prophylactic mesh at the time initial operation reduces PSH rates should be established in the setting of a randomized, controlled trial.

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