Video-assisted preperitoneal repair of parastomal hernia

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Abstract

Parastomal hernia repair is still an unresolved surgical problem, associated with high rate of recurrence and morbidity. Conventional methods with use of a mesh require extensive tissue preparation with significant traumatization. Meanwhile, a substantial problem of the laparoscopic approach is division of intestinal adhesions with risk of their iatrogenic injury. Therefore preperitoneal video-assisted repair seems the best option. This technique, preserving the advantage of minimal tissue traumatization, does not necessitate separation of adhesions in the peritoneum. For a selected group of patients with parastomal hernia it can become a profitable alternative. Video-assisted preperitoneal parastomal hernia repair was performed in a patient with parastomal hernia type IV, according to Devlin's classification, and a history of three laparotomies.

Key words: *colostomy, video-assisted surgery, ventral hernia.*

Introduction

Occurrence of parastomal hernia depends on the type of loop or terminal colostomy and is estimated at 0-38% and 4-78%, respectively. Most of them appear within 2 years from surgery [1, 2]. With regard to the site of herniation, Devlin divided them into four types: I – interstitial, II – subcutaneous, III – intrastomal, and IV – peristomal [3, 4]. Most of them are well tolerated, and – due to substantial recurrence rate and morbidity – only 10-30% are referred for surgical treatment, including 1/3 urgencies. Incarceration, bowel obstruction and intussusception are absolute indications for surgery. Relative indications are: pain (51%), subileus (21%), troubles in care for the stoma and keeping the colostomy bag water-tight, as was the case in the patient described below (8%), prolapsing, ulceration and cosmetic reasons (2%). Despite continuous progress in operative technique, reconstructive surgery-associated mortality remains at 5-7%, complications with classical access occur in 65% and recurrences affect 30-50% of treated patients [5]. Improvement of the results was attained with the introduction of mesh, yet the method of mesh implantation is relentlessly modified with regard to surgical access, size, type, location and relation to the bowel. Laparoscopic intraperitoneal repair is one of the examples and is associated with less extensive tissue traumatization and allows mesh implantation without contact of the operative field with the bowel contents, which limits the infection rate to 10% [6]. However, placement of the mesh within the abdominal cavity needs dissection of adhesions with significant risk of iatrogenic perforation and application of expensive composite meshes with anti-adhesive surface allowing for free contact with bowels. In patients post abdominoperineal resection of the rectum operated through midline incision and after more and more common laparoscopic surgery, a relatively large space free of cicatrices remains at the stoma. This creates an opportunity for preperitoneal parastomal hernia repair with video-assisted technique. This technique permits one to avoid aforementioned risks of open and laparoscopic access, and because of the location of implantation, less

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susceptible to infections polypropylene mesh can be used [6-9].

The aim of the study was to present technical modification of the parastomal hernia repair procedure through lateral access with videoscopy assist.

Case report

A sixty-four year old woman had low anterior resection of the rectum and uterectomy performed via right paramedian incision in 2003 for cancer infiltrating reproductive organs. The patient was administered adjuvant chemo- and radiotherapy. In 2004, a stoma was formed on the descending colon for bowel obstruction from cancer recurrence. A few months later, a fistula from the small bowel to the rectal stump developed and another surgery with small intestine partial resection was necessary. Following this last procedure, significant gain in body weight was noted, which was one of the causes of parastomal hernia type IV according to Devlin's classification. Its evolution resulted in pain and troubles with water-tightness of the colostomy bag, leading to social isolation of the patient in otherwise relatively good clinical condition. For these reasons, the patient was scheduled for another surgery in July 2005. As advancement of primary disease and former adjuvant therapy increased the risk of extensive wound healing disorders after classical access and massive adhesions from surgical interventions could have made laparoscopic access impossible, a dilemma of the procedure technique was raised. Such conditions formed the basis for application of Amin's lateral access rules [10], yet additionally, to decrease the operative wound and diminish the risk of produced flap ischaemia, elements of the technique of Tarnoff, who performed preperitoneal videoscopic semilunar line Spiegel's hernia repair, were also used [11].

First, Hasson's trocar was introduced into the preperitoneal area to create a working space with insufflation. Then, two 5 mm trocars and one 10 mm were placed in planned positions of the remaining three mesh angles. Skin and subcutaneous tissue 4 cm incision was made to enter the space formed on laparoscopy (Figure 1). 12-by-12 cm polypropylene mesh with Surgipro 3-0 suture at each angle, incision and 2 cm wide hole in the middle for the bowel was inserted. After the mesh was comfortably placed around the bowel, the incision in the mesh was closed and directing sutures were pulled through the fascia and tied above it. The wound layers were closed. No complication was noted in the post-operative period and the patient was discharged at day three for further ambulatory follow-up. No hernia recurrence or problems with colostomy bag watertightness were seen on clinical examination of the patient one year after the procedure.

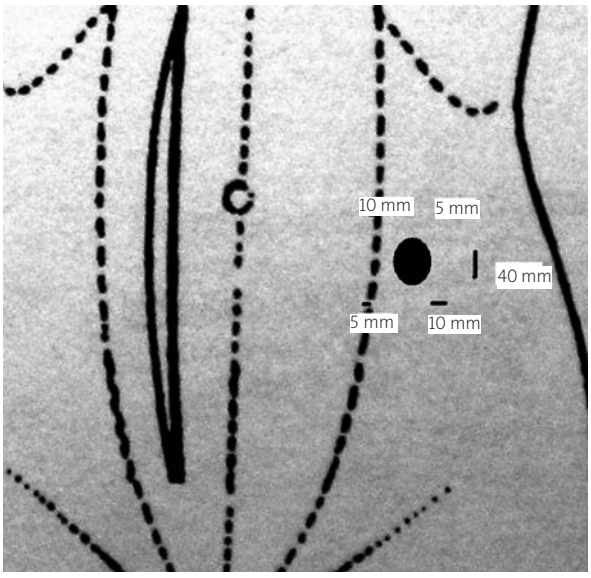

Figure 1. Scheme of trocar localization

Discussion

In 1959 Usher used a mesh in hernia repair for the first time. However, the method was not popular until the seventies and utilization of polypropylene. It decreased hernia recurrence to 10-22% with morbidity as high as 51.2-67% from the need for extensive tissue preparation and initially too small implanted mesh. Retromuscular or intraperitoneal mesh placement is now the recommended hernia repair technique. The size of the mesh ought to cover the lesion in the tegument with at least a 5 cm margin [2]. Traumatization of tissue and contamination with bowel content are disadvantages of open access that increase the risk of infection and need for mesh removal. Localization of the operative incision is another issue. When the incision is made over the hernia sac, the wound can be contaminated with contents of the stoma, and an incision made away from the surface of the stoma bag fastening can

result in necrosis of the mobilized skin flap, which was described by Kanellos et al. [12]. These facts gain additional attention in patients with advanced malignancy after radio- and chemotherapy, with an inhibited immune response, as was the case in the patient presented above [7, 8, 13, 14].

Laparoscopic intraperitoneal mesh implantation introduced by Voikt allows one to avoid these complications [15]. The method prevents operative field contamination with bowel contents and does not need extensive preparation, which results in less than 10% infection frequency. What is more, its tension-free character reduces pain and facilitates faster patient mobilization, effectually decreasing risk of thrombosis and respiratory complications and shortening hospital stay to a mean of 4.7 days. At the same time, observation from the peritoneal side allows recognition of "Swiss cheese" type concomitant hernias. Yet, a severe disadvantage of this method is the necessity of liberation of bowel adhesions with 2.5% risk of iatrogenic injury [16]. This becomes especially important in patients with a history of numerous laparotomies, when the number and expansion of adherent loops can make an operation virtually impossible. The presented patient had had three prior laparotomies. We believed classic laparoscopic access might have put her at significant risk. Therefore, preperitoneal video-assisted mesh implantation seems a much safer option. During the whole procedure, exploration of the peritoneal cavity is avoided and video technique allows for a smaller surgical incision. The magnified operative field is another advantage of this method. Thus, better haemostasis can be achieved and the risk of injury to muscle innervation is smaller. However, the described modification can be performed solely in patients with postoperative scar at least 5 cm from the stoma and hernia border, which allows for creation of an adequate operative space and proper mesh overlap. Good examples are: abdominoperineal resection of the rectum through midline, right paramedian incision or still more popular laparoscopic resection. In the described patient, the distance from the scar to the stoma fulfilled all these conditions as the first and subsequent procedures were performed via right paramedian incision.

Lack of possibility to complete the procedure with videoscopy due to the need for closure of the mesh cut, resulting in substantial total length of the ncisions, is an undisputable disadvantage of this modification. In the relatively flat operative field suturing of the cut made to surround the stoma with mesh seems to be challenging. Probably, as in fixation of the mesh around the testicular cord, protacs could be considered, but unlike in inguinal location, their anchoring solely to soft tissues can result in less effective repair. So, a small skin incision to complete this step of the procedure seems inevitable.

The unusual way of working space creation can be another obstacle and needs some experience. This is due to the relatively infrequent penetration of this site in daily surgical practice. In a stoma located relatively low, the need to dissect tissues below the semilunar line, whose position is very varied, can be another problem. This stage of the procedure is associated with substantial risk of perforation of the peritoneum. In the presented case, the distance from the semilunar line and the stoma (due to its relatively high and lateral location) was big enough not to pass beyond the semilunar line [7, 8, 13, 14].

Type of applied mesh is also an issue of controversy. To decrease the risk of bowel adhesions and erosion in laparoscopic access, composites are recommended. Their construction results in low risk of adhesion formation [17]. According to Franklin, they are inferior to polypropylene in terms of tissue ingrowth resulting in less permanent hernia repair. Susceptibility to infection is another difference: polypropylene mesh is more resistant to infection, and even once infection occurs, it can be controlled with antibiotics without the need of reoperation [18]. When infection affects composite mesh, nearly always it must be removed. In patients with parastomal hernia, when the infection rate is especially high, this fact becomes more significant and preperitoneal videoscopic polypropylene mesh implantation seems to be a superior alternative [1, 19].

The next issue is the fixation technique. When the mesh is placed intraperitoneally, trans-tegumental placement of the sutures with 5 cm intervals is recommended for proper fixation with protacs placed 1-2 cm apart, which prevents formation of "button" hernias. Such a number of fixation elements may result in postoperative pain [20]. To prevent mesh migration, the size of the formed space

should be adequate for the size of the mesh in the preperitoneal technique. In this way, fewer fixations can be left and Egun even suggests leaving the mesh in its position without fixation [19]. Separation from the bowels with the peritoneum prevents the risk of "button" hernias; hence protacs are expendable. In the case presented above, only four directional sutures were tied over the fascia and submerged in the subcutaneous tissue. This technique, when compared to laparoscopic access, can result in less postoperative pain and smaller cost of the procedure [14, 21, 22].

Positioning of the mesh and bowel stump remains an unsolved question. Direct contact of an implant with the stoma is associated with a risk of erosion into the lumen, described by Aldridge and Simson [1]. Therefore, various modifications were tried to prevent it, including folding of the edge of the incised hole, application of two different meshes (polypropylene and e-PTFE), maintaining at least a 2 mm margin, and many others. Yet, these notions come from case reports with insufficient long-term follow-up and assessment of their usefulness is not possible. In our case, an aperture for the bowel was created with a 2 mm margin around. After the mesh was inserted via described lateral incisions, the mesh aperture margin was fixed to the fascia with sutures according to Kald *et al.* technique, to avoid direct contact with the bowel [23]. However, some signs of stoma prolapse were seen, which most likely was the result of the margin left [6, 7].

Conclusions

1. The presented modification of peristomal hernia repair seems to combine the benefits of laparoscopic access with the possibility to avoid exploration of the peritoneal cavity, which is especially important in patients after numerous laparotomies, with malignancy and previous radio- or chemotherapy treatment.
2. The method can be applied solely in a selected group of patients in whom the distance from the postoperative scar and the stoma is large enough to implant the mesh with adequate overlapping on healthy fascia.

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