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Research Article

Open Surgery for Perineal Hernia after Abdominoperineal Resection: A Single Center Experience with a Biological Mesh

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Abstract

Background and Aims: Perineal hernia is a rare condition but the most common late complication after abdomino-perineal resection. The introduction of removing the pelvic floor of oncological reasons by the extralevator abdomino-perineal method may lead further increase in the numbers of perineal hernias. Reconstruction of a perineal hernia with a defect in the pelvic floor can be performed either laparoscopically or open. The reconstruction is challenging to prevent later recurrence.

Methods: In the present study we studied the outcome after performing an open reconstruction transcutaneously and by closing the defect in the pelvic floor with a biological mesh. The method was used in 13 patients in this consecutive, non-randomized observation study. We contacted patients after surgery by a questionary to evaluate the quality of life (QoL).

Results: No infections were observed. The recurrence rate was 15 % (2 out of 13) in the observation period of 70 months (12-109). All patients were satisfied with the cosmetic result. QoL evaluation showed that four (44 %) patients had pain when sitting, and three patients (33%) had sensation of weight/or foreign body object in the perineal area. Twenty-five percentage of the patients would recommend the operation to others. The need for clinical trials are needed to clarify whether reconstruction should be performed primary or secondary, laparoscopic or open, and which type of mesh that should be recommended.

Conclusion: Open repair of a perineal hernia can be performed with a biologic mesh a with low risk of perioperative complications, acceptable patient compliance, but with a recurrence rate on 15%.

Introduction

Conventional Abdominoperineal Excision (APE) for low rectal cancer preserves most of the pelvic floor and makes it possibly to close the pelvic floor primary after removal of the rectum. Primary closure after APE is followed by a risk of infection and dehiscence of the perineal wound [1,2], and the risk is increased after preoperative radiotherapy. Development of a perineal hernia is a rare condition. The risk of developing a perineal hernia was still less than 1% after APE [3] and 3% after pelvic exenteration. After implementation of the Extralevator Abdominoperineal Excision (EAPE) this technique includes resection of the pelvic floor to reduce the risk of tumour involved resection margins [4]. Perineal hernia has been demonstrated to be the most common perineal complication after EAPE and occurred in almost half of patients who had a laparoscopic EAPE [5]. Whether the use of different types of primary reconstruction (mesh reconstruction, omentum plug, different types of transposition flaps, or primary suture) result in higher rate of hernia development is still uncertain. Some recommend primary reconstruction of the pelvic floor to prevent development of a perineal hernia. Different plastic surgical methods have been used, such as the mobilization of the omentum, gluteus maximus flap or a Vertical Rectusabdominis Musculocutaneous Flap (VRAM) [6].

Primary reconstruction of the pelvic floor with a fasciocutaneous gluteal flap is followed of high frequence of perineal hernia within the first year after surgery, and primary reconstruction after EAPE can be performed using a biological mesh [7,8]. The secondary surgical repair of a perineal hernia may be challenging by either transabdominal laparoscopic method or by open techniques. In the present study is shown the results from a transperineal open approach using a biological mesh for repair of a perineal hernia. We focused on perineal healing and the risk of recurrence, and on Quality of Life (QoL) after surgery as a result from patient questionnaire.

Patients and Methods

All patients with a perineal hernia were operated and registered from 2008 to 2018. This is a single center-based study, and all patients were operated by HKC. Data were collected consecutively except for the QoL data. The hernia was described by clinical examination. It was defined as a protrusion of the intraperitoneal contents through the acquired defect in the perineum. MRI of the pelvis was performed before surgery in cases of prior malignancy to ensure no signs of local recurrence. Patient characteristics are listed in Table 1.

	N
Sex	
Male	7
Female	6
Age (years)	
Mean	68 (53-77)
BMI	
Mean	25.96 (17.31-35.92)
Missing	3 (23.1%)
Smoking	
Current	3 (23.1%)
Former	5 (38.5%)
No	4 (30.8%)
Missing	1 (7.7%)
Alkohol	
<7 beverages/week	11 (84.6%)
>7 beverages/week	1 (7.7%)
Missing	1 (7.7%)
Diabetes	
Yes	2 (15.4%)
No	11 (84.6%)
ASA-score	
1	4 (30.8 %)
2	6 (46.2 %)
3	3 (23.1 %)
>3	0
Performance score	
0	6 (46.2 %)
1	6 (46.2 %)
2	7.7 %
>2	0

Table 1: Patient characteristics of 13 patients operated for a perineal hernia after previous removal of rectum.

Reconstruction of the pelvic floor with a biological mesh

The hernia was reconstructed under general anesthesia by one surgeon (HKC) using a biological mesh implant. In jack-knife prone position the access was achieved through the old scar and the size of the defect was defined. A 10 x 10 cm porcine dermal collagen mesh (Permacol, TSL/Covidien, Leeds, UK) was sutured to the cut edges of levator ani muscle at the pelvic side walls and to the ligaments on each side of the coccyges with interrupted, monofilament absorbable sutures (Maxon 2/0, GS-11) (Figure 1). A suction drain was placed superficial to the mesh. The perineal wound was closed in layers. Patients continued with prophylactic antibiotics (Ciprofloxacin 1,5 g x 3 and Metronidazole 0.5 g x 2 intraveneously) for 3 days. Drains were removed after maximum 7 days regardless drain output or when production was less than 25 ml per day. Patients were mobilized day 1 after surgery with no restrictions. The time for hospital stay was documented. Sutures were removed after 12 days.

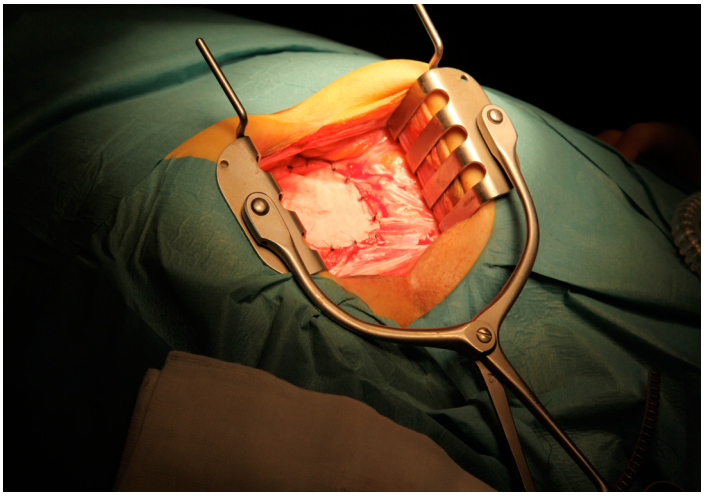

Figure 1: Open reconstruction of a perineal hernia using a biological mesh.

Follow up

After discharge from hospital all patients were seen at day 12 for removal of sutures and in the out-patient clinic after 3 and 12 months. All complications and perineal morbidity were registered. Perineal wound infection was defined as an infection requiring surgical intervention by operative irrigation and/or debridement, or vacuum assisted therapy [6]. Any clinical signs of recurrence were followed by a CT scan with the Vasalva method to confirm or invalidate the suspicion. To measure the Quality of life the patients we used the Carolina Comfort Scale [9], which is a questionnaire made to quantify and evaluate patient symptoms and satisfaction after surgery for hernia. It consists of eight categories in which the patients answered weather they feel sensation of weight/foreign

body part, pain, or reduced movement by using a scale from 0 (no symptoms) to 5 (disabling). An answer 0-1 is considered as asymptomatic while 2-5 is considered as symptomatic. Data are given as median with range in parenthesis.

The study was approved by the local Danish ethics committee. Written informed consent was obtained from all patients for publication and accompanying images according to the World Medical Association Declaration of Helsinki.

Results

A total number of 13 patients were admitted for surgery. Major symptoms of the perineal hernia were bulging and swelling (77%), pain (69 %), sensation of weight (31%), urinary symptoms (23 %), and general discomfort (23 %). Average time from primary surgery for rectal cancer to admission for hernia surgery was 20,8 months (4.3-121.6), and 360 months in one patient with colitis. The primary surgical procedure was EAPE with mesh (Permacol) reconstruction in 3 patients, gluteal flap in 2 patients, conventional APE in 7 patients and intersfincteric APE in 1 patient. The mean operation time was 48 minutes (32-63). No complications were observed during the surgical procedure or during the stay at hospital. No patients had complications of the perineal wound. The median hospital stay was 4.2 days (1-11).

One patient had pain in the perineal region after 3 months but he had the same symptoms as before surgery and had physical performance as before surgery. 73% of the patients had no symptoms at the 3 months postoperative control (1 had pain, 1 had discomfort, and 2 did not answer the questionary). Clavien Dindo postoperative medical complications were observed in two patients: one had an urinary tract infection, and one had dyspnea caused by atrial fibrillation. The follow-up period by QoL questionary was 70.1 months (12.7-109). Two patients (15%) out of 13 patients had a recurrent perineal hernia in the observation period and underwent new surgery, one with re-suturing of the mesh (technical failure) and one with implantation of a new Permacol mesh. The data on QoL after 70.1 months (12.7-109 months) are listed in Table 2. Eleven out of 13 patients (85 %) answered the questionary (1 dead and 1 had loss of memory). As shown, the sensation of weight and/or foreign object in the body was reported to be worst when sitting, while pain was most present when exercising. Reduced movement was most present when doing everyday life activities. Thirty percentage had sensory disturbances in the perineal area. Seventy-five percentage would recommend the procedure to other patients.

	Sensation of weight and/or foreign body	Pain	Reduced movement
When you lay down	4 (40 %)	1 (12.5 %)	
When you bend forward	3 (33.3 %)	3 (37.5 %)	3 (33.3 %)
When you sit	5 (55.6 %)	4 (44.4 %)	1 (12.5 %)
When you do everyday life activities	3 (33.3 %)	3 (33.3%)	4 (44.4 %)
When you cough or take a deep breath	2 (22.2 %)	2 (25 %)	2 (28.6 %)
When you walk	4 (44.4%)	3 (33.3 %)	2 (25 %)
When you walk up stairs	3 (33.3 %)	3 (37.5 %)	3 (37.5 %)
When you exercise	2 (28.6 %)	3 (50 %)	2 (33.3 %)

Table 2: Symptomatic score of quality of life using the Carolina Comfort Scale in patients after open surgery for perineal hernia.

Discussion

The use of more extended surgical procedures for low rectal cancer could result in increasing numbers of perineal hernias, especially after the implementation of EAPE, since this technique includes resection of the pelvic floor to achieve free surgical margins. Implementation of this new operation technique leads to new challenges in primary reconstruction of the pelvic floor. The development of 6-26% perineal hernias after EAPE with mesh reconstruction (Jensen [10]: 6%, Musters [11]: 8%, Han [12]: 14% and Sayers [5]: 26%) rises questions such as: could reconstruction be performed as a primary procedure, or may it be performed secondary if the patient develops a symptomatic perineal hernia? This has not yet been investigated in a randomized trial. Primary closure seems to be logic from a patient point of view. Against this is, that it has economic consequences caused by the price of the mesh. This study shows than secondary reconstruction in patients with a hernia can performed with no major perioperative risk. Flap reconstruction procedures, either primary or secondary, often require the presence of a plastic surgeon. This increases the opportunity costs and with functional drawbacks for the patient according to physical performance, donor site morbidity, and QoL. Since 1997 we have used the VRAM flap as a safe method for reconstruction after salvage surgery for anal cancer in patients having previous irradiation of the pelvis. We have shown low rate of perineal complications after this method [6]. However, we only use this method in patients after wide ischioanal and wide perineal skin resections, and for vaginal reconstruction since it has a high donor-site morbidity [7]. Holm et al. preferred to use the gluteal muscle flap for pelvic floor reconstruction after eAPE [4]. Reconstruction of the perineum with a fasciocutaneous gluteal flap was safe when looking on wound healing whereas the risk of perineal hernia development was unacceptable high (21%). Consequently, if a gluteus flap is used for reconstruction of the perineum, it must be performed as a rotational musculocutaneous flap alone [4,13] , or in combination with a mesh beneath the flap.

When using a mesh for reconstruction the length of hospital stay is reduced [14] and the patients can be mobilized immediately after surgery. One study showed no difference between the frequence of secondary perineal hernias between flap and mesh reconstructed patients [15]. Historical, perineal wound healing problems is a significant problem after primary closure of the pelvic floor and perineum after APE [13]. Infection is a risk of developing a hernia and wound healing complications are increased after implementation of preoperative neoadjuvant irradiation [8]. A Danish study showed 26% wound complications after standard APR without radiotherapy and 71% in patients given preoperative radiotherapy [10]. The incidence of symptomatic perineal hernia following conventional APE is estimated to be from 0.2% to 0.6% and 6% after more extensive surgery on the pelvis, like EAPE. Diminished healing of the perineal wound may also increase the risk of perineal hernia development, and both smoking, and chemo irradiation are shown to be significant factors in hernia development [16,17]. Previous results showed that extensive resection with removal of the pelvic floor in EAPE imposes the need for reconstructive procedures to prevent later development of hernia, and that all hernias was observed within the first 12 months [8]. However, mesh reconstructed patients might develop hernias over time due to weakening or dissolving of the biological mesh [18], and studies with a longer observation period after surgery are needed. There are referrals in the literature with high recurrence rate when using biological mesh in up to half of the patients in different type of hernias. One reason of this differences between our results and other studies on biological mesh for hernia repair might be, that no infections were seen in this relative small study, and in order to have final conclusions about the efficiency of biological meshes, more series are required, preferable in a randomized study. The present method was implemented in our department after having seen two late mesh infections (> 1 year) after laparoscopically repair of a perineal hernia using a conventional mesh type. Randomized studies on trans-perineal versus laparoscopic repair and on the different mesh types are needed. Furthermore, the costs and higher infection rate of primary reconstruction after EAPE could argue to perform studies on primary versus secondary reconstruction.

The optimal surgical technique must minimize complications such as failure of the sutured mesh, which may lead to a hernia. We used interrupted, monofilament absorbable sutures to fix the mesh, both when doing the primary and the secondary reconstruction. Moreover, care was taken to spare skin and to minimize the dead-space between the mesh and the skin. Several advantages were observed: the implantation is easy to learn, it can be performed without plastic surgical assistance [18,19] and the operating time is short. It is useful in patients where laparoscopic repair is technical challenging or contraindicated. Some of the biologic mesh types available have elastin fibers with natural cross-links in the mesh which can be considered beneficial to tissue integration and may preserve the mechanical strength of the mesh after surgery. The risk of infection is significant, but the consequences of infection are not serious when using a biological mesh compared to non-biologic mesh types. The risk of developing a fistula between the mesh and skin is an obvious risk, but this complication was not seen in this study. The disintegration of the biological mesh may lead to reduced tensile strength and higher risk of recurrence compared to a traditional mesh type. One study on 29 patients reconstructed with a high-tension repair of a non-resorbable mesh showing relapse in 5% (1 out of 20 patients) [20], compared with 15 % (2 out of 13 patients) in this paper. Finally, the cost of a biological mech is much higher compared to a traditional mesh.

QoL for the patient is dependent on factors as perioperative morbidity and pain, physical behavior, and possible development of a recurrent perineal hernia. However, approximately half of the patients had reduction in QoL, however 75% still would recommend the operation method to other patients. This could be taken as an important parameter for effect of the procedure. The question: "Will you recommend the operation to other patients with the same disorder?" the answer was yes in 75% of the patients. The 25% who answer no or maybe to the question was not surprisingly linked to the patients with relapse. It is not likely that there are no significant difference in QoL between a biological mech and a traditional mesh type.

Conclusion

This first study is presented on open operation for perineal hernia using a biological mesh. We have demonstrated that open reconstruction of a perineal hernia after prior abdominoperineal resection can performed with a high patient compliance and low risk of infection when using a biological mesh. However, this method has a recurrence rate on 15, and which type of mesh that is recommended for open perineal hernia repair is still controversial.

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