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Review Article

Review of Postoperative Perineal Hernia and Available Reconstruction Techniques

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ABSTRACT

Postoperative Perineal hernia (PerH) is a recognised rare complication of radical pelvic oncologic procedures for rectal cancer, with a reported prevalence of 0.6-7%. PerH is a swelling in the perineum caused by herniation of abdominal or pelvic viscera through a defect in the pelvic floor. The cause of postoperative PerH is not known, however, wide extent of dissection, wound infection, neoadjuvant radiotherapy, length of small bowel and wider female pelvis, have been identified as risk factors for development of postoperative PerH. Cause of PerH is not known. Universal case definition of PerH does not exist, except it is a bulge in the perineum. Patients who are fit for surgery, have no recurrency, and are bothered or have severe symptoms (perineal swelling, perineal skin necrosis, urinary problems and/or intestinal obstruction) are offered surgical treatment. The aim of surgical repair is to exclude recurrency, closure of the pelvic defect with reconstruction of a new pelvic floor and repair of hernia.

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Introduction

Postoperative Perineal hernia (PerH) is a recognised rare complication of radical pelvic oncologic procedures for rectal cancer such as sacrectomy, coccygectomy, abdominoperineal resection (APR) and pelvic exenteration, with a reported prevalence of 0.6-7% [1-4]. First case of postoperative PerH was reported by Yeoman in 1939 [5]. PerH is a swelling in the perineum caused by herniation of abdominal or pelvic viscera through a defect in the pelvic floor [1-4]. The hernial sac may contain bowel (commonly small bowel), urinary bladder, uterus or omentum. The rates of PerH may be higher than they are quoted in literature, with rates between 3-26% due to perineal wound complications and increased practice of wide and radical oncologic resections, done with the aim to achieve R0 resections and a negative circumferential margin (CRM) [6, 7].

Rectal cancer is already advanced at presentation requiring neoadjuvant radiotherapy, and wide and radicle oncologic resections to achieve the benefit of improved oncologic outcome avoid positive margins and tumor perforation [8-13]. This is the preferred oncologic outcome in the treatment of rectal cancers [14, 15]. These benefits result in longer overall survival and disease-free survival but give rise to wide defects

and wound complications that may consequently end in development of PerH. The postoperative PerH results from damage and/or loss of the pelvic floor and excision of structures that support the rectum, urinary bladder, Vagina and Uterus [1, 14, 16]. Neoadjuvant radiotherapy and wound complications after wide resections have a 59% risk of causing perineal hernia [3, 4, 14]. The postoperative PerH develops between within a year following surgery [17, 18].

The cause of postoperative PerH is not known, however, wide extent of dissection, wound infection, Neoadjuvant radiotherapy, length of small bowel and wider female pelvis, have been identified as risk factors for development of postoperative PerH [14, 16, 17, 19]. Technically, PerH is an incisional hernia because it occurs following surgery and but PerH does not frequently develop in patients with strong risk factors for incisional hernia such as obesity, diabetes mellitus, collagen disorders and wound infection [16]. The aim of this paper is to review the current evidence on management of PerH.

I Diagnosis of PerH

While the cause of PerH is not known, most authors agree that improved oncologic outcomes attained by the practice of oncologic resections in

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the pelvic floor, is the major risk factor for the few postoperative cancer survivors that develop PerH [1, 15]. The true incidence of PerH may be underestimated as currently, no agreed clinical or radiological criteria to diagnose PerH exists [1]. Universal case definition of PerH, clinical or radiological, does not exist, except in the true sense of general hernia definition of development of a recent bulge in the perineum [1].

Risk factors for development of PerH include [1, 4, 18, 20]:

- i. Female gender with a wide pelvis
- ii. Previous hysterectomy
- iii. Radical pelvic surgery such as APR, ELAPE, sacrectomy and coccygectomy
- iv. Neoadjuvant radiotherapy followed by surgery
- v. Postoperative wound infection
- vi. Long small bowel mesentery
- vii. Smoking
- viii. Non-closure of pelvic peritoneum

Clinical features of PerH can be symptomatic or asymptomatic. Majority of patients are asymptomatic and therefore undiagnosed, making the true rate of PerH to be unknown [4, 14, 18]. Symptomatic patients present with a history of developing a postoperative swelling in the perineum that may be accompanied by symptoms related to skin erosion, bladder emptying problems or intestinal obstruction [4, 14, 21]. Some patients may take the perineal swelling as normal and may not report it or it may not be clinically undetectable for the patient who presents with perineal discomfort [17, 18]. Therefore, high suspicion index is required for those that complain of pain, perineal discomfort or dragging sensation when changing position between sitting and standing, even in the absence of visible perineal swelling when they have a history of radical perineal surgery [4]. The diagnosis of perineal hernia is clinical, and maybe supported by appropriate imaging such as abdominal x-ray, barium enema studies, CT scan or MRI [4, 17].

II Management of PerH

Patients with perineal hernia are either symptomatic or asymptomatic [1, 4, 17, 18]. Asymptomatic patients complain of perineal discomfort and secondary symptoms related to urinary problems (urinary retention or incontinence) and bowel obstruction, in the absence of a visible swelling [1, 4, 17, 18].

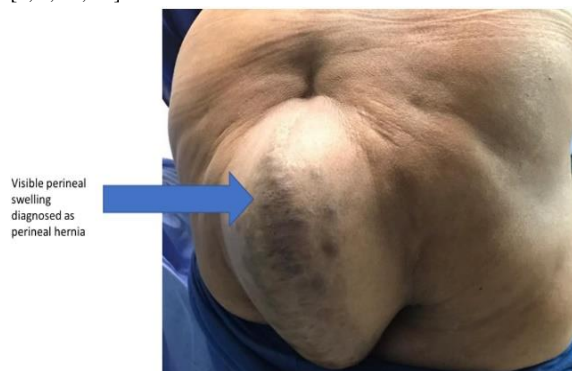


Figure 1: Perineal hernia in a patient who had APR.

Symptomatic patients either complain about local symptoms as shown (Figure 1) or secondary symptoms. Local symptoms of a swelling and/or discomfort, pain and skin changes over the swelling (such as skin necrosis and evisceration) [1, 4, 17, 18]. Secondary symptoms are those

related to urinary problems (retention or incontinence) or bowel obstruction in the presence of a perineal swelling [1, 4, 17, 18]. They may be aware that they have PerH, but it gives mild symptoms they have tolerated and ignored or not bothered about [1, 4, 17, 18]. They may not even be aware that they have PerH, but they have a perineal swelling with perineal discomfort and secondary symptoms [1, 4, 17, 18]. Patients with mildly symptomatic PerH, under conservative management or those that refuse surgical management, may present with strangulated hernia [14, 21, 22].

Recommended definitive management of perineal hernia is unknown [14]. However, the choice of treatment depends on the symptoms and how they affect the day to day life of the patient. Patients who are fit for surgery, have no recurrency, and are bothered or have severe symptoms (perineal swelling, perineal skin necrosis, urinary problems and/or intestinal obstruction) are offered surgical treatment [4, 14, 17, 19].

Patients with mild symptoms which do not affect their daily activities are offered conservative management [4, 14]. Conservative management involves wearing a T-bandage or firm under pants [4, 14, 17]. Surgical repair involves reconstruction of a defect in the perineal floor offered via:

- i. Perineal approach
- ii. Transabdominal approach
- iii. Abdominoperineal approach

Surgical repair of pelvic floor is either offered by use of:

- i. Primary closure
- ii. Use of a mesh which may be synthetic or biological
- iii. Use of autologous tissue such as a myocutaneous flaps
- iv. Combine, mesh with autologous tissue repair

III Aim of PerH Repair

The aim of surgical repair is to exclude recurrency, closure of the pelvic defect with reconstruction of a new pelvic floor and reduction of hernial sac content and/or excision of hernial sac [4, 16, 17, 19, 23]. Imaging with MRI and endoscopy may help exclude recurrency [17]. Before picking any reconstruction method of repair of the defect in the pelvic floor, knowledge of pelvic anatomy is particularly important [16, 24].

IV Approach to PerH Repair

While the approach to repair of PerH maybe abdominal, perineal or both abdominal and perineal, none of these repairs are well established [1, 14, 15]. Reconstruction of the pelvic floor defect can be done by perineal, transabdominal (open or minimally invasive surgery approach) and abdominoperineal approaches [1, 14, 15]. There is no evidence to support a preferred approach from these three [1, 14, 15]. End points of perineal hernia repair are:

- i. Dissection and identification pelvic floor defect
- ii. Reduce the contents
- iii. Mobilise and/or in most cases one may need to excise the hernia sac
- iv. Reconstruct and reinforce the pelvic defect by any of these: primary repair, use of mesh (biological versus synthetic), myocutaneous flaps or combining mesh and myocutaneous flaps.

V Transabdominal Approach

Pelvic floor is approached transabdominal by either open or minimally invasive surgery (laparoscopic or robotic surgery) [1, 16, 17]. Transabdominal approach achieves a wide exposure that allows inspection of abdomen and pelvis to exclude recurrence, dissection and mobilisation hernial content, and reduce risk of injury to pelvic organs [1, 16, 17]. Transabdominal approach allows good access to the pelvis to allow proper placement and fixation of a mesh and is associated with reduced recurrences [16]. Trans abdominal approach is especially indicated if the hernia is irreducible and there is highly likelihood of tumor recurrence that may need to be excised [4, 16, 17].

VI Perineal Approach

Hernial sac dissection is done from the perineum and abdomen is not entered, as a result abdomen cannot be inspected to exclude recurrence and exposure of hernial sac and contents is limited [4, 16, 17]. Perineal approach is associated with high recurrence and usually done for small hernia [4, 16, 17]. Perineal approach is preferred for mild and uncomplicated or reducible PerH though it offers limited exposure [14, 15].

VII Abdominoperineal Approach

Provides the best exposure with advantages of both perineal and transabdominal approach but associated morbidity is highest among the three [17].

VII Reconstruction Methods for the Pelvic Floor Defect

Reconstruction and repair of the pelvic defect is achieved by any of the following [1, 14, 15, 17]:

- i. Primary repair
- ii. Mesh repair
- iii. Use of myocutaneous flaps
- iv. Combination of any of the above listed

VIII Primary Repair

Primary repair involves approximating local tissues by use of sutures. It is widely used on account of low cost, but it has high recurrence of 50% and has major perineal wound complications. Devulapalli *et al.* in their systematic review with meta-analysis found that primary repair had twice the likelihood of major perineal wound complications compared to myocutaneous flap closure which they validated in their study, that it reduces perineal morbidity associated with APR procedure [25].

IX Mesh Repair

Three types of mesh are used for PerH repair include: synthetic (absorbable, non-absorbable and composite mesh, that has absorbable part one side and non-absorbable on the other side) and biological meshes. Synthetic mesh promotes fibroblast activity and foreign body reaction, resulting in formation of rich collagen tissue or scar tissue that supports the reconstructed pelvic floor [1]. The non-absorbable mesh persists in the scaffolding of connective tissue rich in collagen while the absorbable mesh is reabsorbed in 30-90days [1, 15, 17]. Biological mesh

has an acellular collagen matrix that promote fibroblast migration into mesh and neovascularisation with recruitment of neighbouring tissues and is believed to reduce risk of postoperative wound infection [1, 17]. Biological mesh can be used in the presence of wound infection, but synthetic mesh cannot [1, 15, 17]. Due to this, biological mesh has gained popularity in complex repairs over the synthetic mesh [1, 15, 17].

Generally, mesh repair has 20% recurrence compared to 50% recurrence in primary closure [4, 14, 15]. Taek-Gu *et al.* report that recurrence after mesh repair is due inadequate attached of mesh to pelvic side walls in the absence of levator ani muscle, and ventrally mesh should be overlapped over posterior vagina in women or prostate in men [4]. Mjoli *et al.* found that use of perineal mesh resulted in a lower recurrence compared to primary closure [14]. Blok *et al.* reports an overall recurrence of 39% for biological mesh compare to 31% for synthetic mesh [19]. While biological meshes is resistant to infection, they are not commonly used due cost and association with cadaveric tissue [19]. Composite synthetic mesh has a resorbable part in contact with bowel to prevent adhesions and fistula formation and the non-absorbable part is in contact with perineum [1, 15, 17].

X Myocutaneous Flaps

Myocutaneous flaps are commonly used to cover wide irradiated pelvic defects after wide oncologic resections for rectal cancer [1, 26, 27]. Rectus abdominis Muscle is commonly used a myocutaneous flap, followed by Gracilis Muscle flap, due to it long vascular pedicle to cover larger radiated perineal defects after exenteration procedures for rectal cancer [21]. Failure Rectus Abdominis Muscle flap have been reported due to iatrogenic injury to vascular pedicle [28]. In most centers, flap of Myocutaneous flaps are done by reconstruction surgeons to avoid iatrogenic injuries and this may become a limitation in centers that may not have reconstruction surgeon cover. Christensen *et al.* report that fasciocutaneous gluteal flap resulted in unacceptably high rate of PerH [23]. This risk of PerH should be considered before offering a patient the surgery.

XI Combination of Repair Techniques

There being no evidence of a repair method more superior than others, a combination of primary repair with mesh (synthetic or biological mesh) or use of flaps has been reported with good results [14, 18, 19, 29]. Melich *et al.* report no recurrence of perineal hernia with use of mesh and transposition flap, compared to 46% recurrence seen in use of mesh alone [18]. Though in their study, the myocutaneous flap was intended for mesh coverage and not reinforcement of pelvic floor reconstruction [18]. A combination of repair methods has been used to cover large perineal defects and in patients with comorbidities [14, 18, 19].

Conclusion

Postoperative PerH is a rare consequence of radicle and wide oncologic pelvic surgery done to achieve negative resection margins, with high morbidity. PerH may be symptomatic or asymptomatic, but only PerH is offered repair but reconstruction of the defect in pelvic floor. Various techniques have been reported to reconstruct the defect in pelvic floor with various approaches, but none have documented evidence for preference.

Conflicts of Interest

None.

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