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Mini Review

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A Personalized Treatment Algorithm for Patient with Full-Thickness Rectal Prolapse Based on Surgical Risk and Main Aim of Treatment

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ABSTRACT

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Department of Surgery, Aarhus University Hospital, Denmark, Tel: +45 50361500; Email: fgjh530@yahoo.co.jp Full-thickness rectal prolapse is a disabling condition, and has a significant impact on quality of life. Surgery is the only definitive treatment, and there are numerous abdominal and perineal procedures. The ideal procedures should have few complications and cure the prolapse with excellent long-term outcome.

We focus on the five most common surgical procedures performed today including two perineal procedures (Altemeier procedure, Delorme procedure) and three abdominal procedures (ventral mesh rectopexy, sutured rectopexy, sutured rectopexy combined with sigmoid resection). Based on current knowledge, there is no hard evidence for the choice of procedure for individual patients due to the enormous heterogeneity of the patients.

We propose an algorithm-based strategy depending upon the surgical risk, the life expectancy and the main concerns of the individual patient. The strategy is personalized, and tailored for individual patients, based on current knowledge, what patient wants to achieve and patient's related factor. For rectal prolapse there is an urgent need for large multicentre surgical studies.

INTRODUCTION

Full-thickness rectal prolapse (rectal prolapse) is a circumferential, full-thickness intussusceptions of the rectal wall which protrudes outside the anal canal [1]. It has a major negative impact on QOL, and nearly all adult patients are offered surgery [2]. **EPIDEMIOLOGY**

In adults, the incidence of rectal prolapse is about 2.5 per 100,000 inhabitants [3]. Patients with rectal prolapse are very heterogeneous, and cover wide range from old fragile demential patients to very young fit patients with a long life expectancy. It is much more common in females than in males (9:1) [4]. In females, the Incidence of rectal prolapse increase with age, and more than 90% are older than 50 years [5]. In males, the patients are typically much younger (20-40 years), and the incidence

decreases with advancing age [5].

PATHOPHYSIOLOGY AND PREDISPOSING FACTORS

The anatomic basis for rectal prolapse is a defective pelvic floor such as a deep pouch of Douglas, weakness of the pelvic floor muscles including the anal sphincter, through which the rectum prolapses [6]. Therefore, other pelvic organ prolapse could be coexisting.



01

SCIENTIFIC LITERATURE

Several theories have been proposed for the aetiology of rectal prolapse as follows: rectal prolapse starts presumably as a middle rectal intussusceptions [7], although a combination of this theory and Moschcowitz's esophageal hernia theory from 1912 [8] has been proposed by Altemeier [9].

In females, the relationship between birth trauma and occurrence of rectal prolapse is poorly understood. It is said that rectal prolapse could be due to weakness of the pelvic floor from pudendal neuropathy, mobile mesorectum and laxity of the lateral ligament secondary to prolonged labor [10]. However, more than one-third of woman with rectal prolapse have never carried a pregnancy to term [11]. In addition, in a study of 354 women using defecography, eight out of 27 of nulliparous women had a rectal invagination [12]. This demonstrates that other factors including aging and menopause could be involved in increasing weakness of the pelvic floor and rectal supports.

Rectal prolapse is sometimes seen in habitual strainers, patient with a psychiatric background or occasionally those with voiding difficulties who have to strain to pass urine [10]. Furthermore, neurological disease, infectious diseases (TB, schistosomiasis), connective tissue disorders could increase the risk of rectal prolapsed [10][13,14].

Therefore, there must he different underlying pathophysiological reasons for the development of rectal prolapse.

SYMPTOMS

Symptoms are primarily due to the protrusion of the rectum outside the anal canal during defecation. The prolapse may resolve following defecation or should be manually reduced. The prolapse is uncomfortable and sometimes painful. Damage to its mucosa may result in bloody and/or mucous rectal discharge. Difficult evacuation and faecal incontinence are common [3][15,16], and could be due to the prolapse or part of underlying pathophysiology that leads to the prolapse.

SURGICAL OPTIONS

Surgery is the only definitive treatment to rectal prolapse, and should be offered all adult patients except for extreme fragile patients that cannot tolerate any surgical intervention. When deciding which procedure to choose among more than 100 options have been described [15][17]. Surgeons must consider several relevant endpoints for the treatment including surgical

risk, short-term outcome, long-term outcome including risk of recurrence, functional outcome and risk of complications. The main problem is that there is little or poor evidence for the choice of procedure for individual patients. With an aging population, management of the old and fragile patients is going to increase leading to challenging decision for clinician since particularly these patients needs personalized treatment. A conservative strategy should only be used in the very few

cases where no surgical intervention is recommended due to severe comorbidities and patient preference.

We will focus on the five most common surgical procedures performed today including two perineal procedures (Altemeier procedure, Delorme procedure) and three abdominal procedures (ventral mesh rectopexy, sutured rectopexy, sutured rectopexy combined with sigmoid resection).

Perineal procedures

Altemeier procedure (Perianal rectosigmoidectomy) was first described by Mikulicz in 1889, and popularized by Altemeier in the 1970s [18]. The prolapsed rectum and redundant colon are resected, and the colon are anastomosed to the upper anal canal by a hand sewn or stapled anastomosis without a diverting stoma [19]. Altemeier [9] reported recurrence in only 3 patients out of 106 patients. In the literature, the reported recurrence rate is much higher (16-30%) [20-23]. The main short- term concern is risk of anastomotic leakage. Anastomotic leaks are reported to be 1.6 to 3.3%. Interestingly, these rates are much lower than for the coloanal anastomosis for cancer [24-27].

The Delorme procedure was first described in1900. It entails a mucosal sleeve resection, proximal to the dentate line, with longitudinal rectal muscular placation [28,29]. The main advantage of this procedure is that there is no risk of anastomosis leakage since no anastomosis is performed. For larger prolapse, it can be technically more challenging than the Altemeier procedure. The reported recurrence rate is very variable ranging 4-38% [30-34].

In 2012, Fleming et al. found no statistically significant differences between the Altemeier procedure and the Delorme procedure regarding recurrence rate, functional outcome, and postoperative complications [35,36].



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SCIENTIFIC

SCIENTIFIC LITERATURE

Abdominal procedures

Today, abdominal procedures for rectal prolapse are generally performed as minimally invasive procedures (laparoscopic/robotic).

Posterior sutured rectopexy was first described via laparotomy by Sudeck in 1922 [37]. Laparoscopic Posterior Sutured Rectopexy (LPSR) has been widely used because it is a straightforward procedure. The posterior and lateral aspect of the rectum is fully mobilized and sutured to the presacral fascia. "The lateral ligaments" must be divided otherwise there will be very high risk of recurrence according to a prospective randomized trial [38]. The main functional problem is the risk of constipation due to autonomic nerve damage. Reported recurrence rates are 2-9% [39], but after ten years, it might be as high as 20% [40].

Resection rectopexy (Frykman-Goldberg procedure) is adding a sigmoid resection to the posterior sutured rectopexy. It was first described in 1969 to diminish the risk of constipation [41], but, the protecting effect of adding a sigmoid resection is controversial. A recent study could not show an improvement in prolonged colonic transit time in patients after resection rectopexy [42].In contrast, another recent study has shown an improvement of the constipation rate of 78% over-all, reaching 73% in elderly patients (> 75 years) - for all others, de-novo constipation was not reported [43]. The meta-analysis of both open and laparoscopic (suture) resection rectopexy published in 2012 showed no significant improvement in constipation after surgery [44]. The main concern is the risk of anastomotic dehiscence. The early outcome data by the inventors reported a high anastomotic leak rate, with five out of the first 138 cases (3.6%) affected [21]. Although more favorable outcomes have since been published [43][45], these figures discouraged widespread uptake of this technique in Europe. In the USA and Australia, it remains an established alternative.

Ventral Mesh Rectopexy (LVMR) was introduced by D'Hoore et al., in 2004 to improve functional outcome with a low risk of recurrence [46]. It has gained widespread popularity, particularly in Europe. In LVMR, the rectum is mobilized only anteriorly to avoid the risk of autonomic nerve damage and the anterior wall of the rectum is fixed to the sacral promontory with a synthetic mesh. The inventors reported the recurrence rate at ten years follow-up to be 8.2%. In a multicenter study, including more than 2000 patients who underwent LVMR, by Evance C et al., mesh erosion was reported to be 2.0% with a median follow-up of 36 months (range, 0–162months) [41]. The main concern is long-term risk of erosion of the synthetic mesh. Therefore, a biological mesh was introduced. In a systematic review comparing biological and synthetic mesh, there was, however, no difference in the complications and recurrence rate [47].

Which procedure should we choose?

It is still unclear when we should perform a perineal approach and an abdominal approach, and which of the five described procedures that is most optimal.

The PROSPER trial (293 patients (78 abdominal and 213 perineal procedures)) published in 2013, compared only four of the procedures described above, since it did not include LVMR. In this pragmatic randomized trial, they did not find any significant difference in risk of recurrence, functional outcome, and quality of life [48]. The updated Cochrane review published in 2015, looking at the effects of different surgical repairs for rectal prolapse, stated that it was impossible to identify or refute clinically important differences between the alternative surgical operations [49]. The limitations are small size of the studies, and the large heterogeneity of the studies. In 2016, our group has published the only double-blind randomized controlled trial comparing the preoperative-topostoperative functional outcomes for LVMR versus LPSR. After one year, there was no difference in functional outcome between the two procedures [50]. However results at six-year follow up showed that functional outcome after LVMR was significantly better than for LPSR, with a trend toward a lower recurrence rate [27]. The study was a single centre study with a relatively low number of patients, and was not originally powered toward recurrence and risk of complication. Larger multicenter studies are needed to verify this finding, and to study the possible risk of long-term complications including mesh erosions.

PROPOSED SURGICAL ALGORITHM

We propose the following algorithmic approach to treating individual patients even though the evidence is limited (Figure 1). In the relative few patients who are unfit for abdominal surgery, a perineal approach should be preformed. This can be either the Altemeier procedure or the Delorme procedure



03

SCIENTIFIC LITERATURE

depending on personal preference and experience. At our clinic, where two surgeons treat fifty cases per year, we use both procedures. We generally prefer to perform the Delorme procedure for the shorter rectal prolapse (<5cm) because we find it is technically easier. For the longer rectal prolapse, we perform the Altemeier procedure. In the patients who are fit for abdominal surgery, the option and strategy depend on a balance between short-term outcome, long term consequences and functional outcomes and what you and the patient want to achieve.



LPSR:Laparoscopic Posterior Sutured Rectopexy LVMR:Laparoscopic Ventral Mesh Rectopexy

If the focus is only on short-term cure of prolapse (e.g. in the older and fragile case), you can perform either an abdominal approach or a perineal approach, depending on your preference, but we generally perform it abdominally. If we also have focus on long-term outcome, we generally perform an abdominal approach. We do not include resection rectopexy due to the risk of anastomotic dehiscence and no obvious functional benefit compared to the other abdominal procedures. The default abdominal procedure at our clinic is LPSR. However, we include LVMR in our algorithm following our latest observation of superior outcome compared to LPSR at six year. LVMR is suggested on specific indications such as involvement of the middle pelvic compartment in primary cases, and in recurrent cases. In primary cases, we never use it in young patients since we do not know the very long-term risk of mesh complication. Similarly, we do not use it in male patients, in patients with a history of inflammatory bowel disease or former pelvic irradiation. Finally, for LVMR, we must have informed consent about insertion of foreign material. Patient should be given essential information including advantage and disadvantage of each option. Therefore, although the above is our proposed algorithm, patient's preference may change our personalized strategy. In some countries, there are on-going legal aspects regarding use of insertion of foreign material that may prohibit it from being used.

CONCLUSION

Due to the enormous heterogeneity of the patients' population, the surgical strategy must be personalized based on what patient wants to achieve and patient's related factor. Therefore, rectal prolapse surgery should only be performed by colorectal surgeon who has special interest and experience with both abdominal and perineal procedures. We recommend that patients with rectal prolapse are followed up in larger prospective, multicenter studies to get more information, particularly regarding long-term risk of recurrence, functional outcome, and complications. Recurrent cases and cases with a concomitant prolapse of other pelvic organs should only be treated in specialized centers.

CONFLICTS OF INTEREST

The authors have nothing to disclose.

DECLARATIONS OF INTEREST

The authors have nothing to declare **FOUNDING**

None

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04



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SCIENTIFIC LITERATURE



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