Surgical treatment of perianal and rectal fistula
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Perianal fistulas

A fistula is an abnormal passage from one surface with epithelium to another. A perianal fistula is a connection between the perianal skin and the anus or the rectum. It is one of the most frequently encountered anorectal diseases in today’s surgical practice. The incidence in females is 5.6 out of 100,000 and 12.3 out of 100,000 in males. Perianal fistulas are predominantly found in patients aged between 30 and 50 years. Patients often complain of perianal pain, discharge of blood, mucous, and pus.

Etiology

The origin of the majority of the fistulas is cryptoglandular (approximately 90%). These fistulas originate from infection and abscess development in the intersphincteric anal glands. There are several other causes, including Crohn’s disease, Human Immunodeficiency Virus (HIV), malignancy, and tuberculosis. The etiology is important because the treatment differs for the different underlying causes, e.g., Crohn’s disease interferes with wound healing and fistula closure. As a result, management of these fistulas is directed towards limiting the amount of collateral surgical damage to prevent recurrent fistulas, anal fibrosis, and incontinence.

Classification

Several classification systems have been proposed in the published literature. In 1976 the Parks’ classification of perianal fistulas was introduced. It is an anatomical classification of perianal fistulas based on the relation of the fistula tract and the
external sphincter muscle (Figure 1). Due to developments in the surgical treatment of perianal fistulas it is currently advised to classify perianal fistula into low and high perianal fistulas. This provides insight into the relation between the primary fistula tract and the sphincter muscle. Studies have shown that division of more than 30% of the external sphincter muscle is associated with significantly more incontinence.\(^5\)

In low perianal fistulas the fistula tract is submucosal, intersphincteric, or located in the lower third of the external anal sphincter. In high perianal fistulas the fistula tract is located in the upper two-thirds of the external sphincter (Figure 1).

![Figure 1](image)

**Figure 1** – Low perianal fistulas are fistulas where the fistula tract transverses the lower 1/3 of the external sphincter complex. High fistulas transverse the upper 2/3 of the external sphincter complex.

**Treatment**

Hippocrates described the treatment of perianal fistulas and the importance of early drainage of perianal abscesses in 460 BC. He also described the use of the fistulotomy and seton using a strip of linen.\(^6\) In the Middle Ages, John of Arderne, an English surgeon, extensively described the fistulotomy.\(^7\) Later in the 17th century King Louis XIV suffered from a perianal fistula. As his first royal surgeon, Charles-François Félix de Tassy performed a fistulotomy in 1686 and the King recovered successfully. This was after he perfected the technique by operating other patients from different hospitals in Paris before treating the King himself. He was generously awarded for his work with an estate, a title and a significant honorarium.\(^8\)

The aim of today’s surgical treatment is to eradicate the fistula without endangering
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continence. When patients experience minor complaints surgical treatment should not be undertaken and a wait and see policy can be chosen. A fistulotomy is performed by laying the fistula tract open from the internal to the external opening. In low perianal fistulas, without significant interference of anal sphincter muscle, it leads to favorable success rates and relatively little impact on fecal continence.\(^9\) The recurrence rates of these fistulas are low, ranging from 2 to 9%.\(^5\) When sphincter muscle is divided in high perianal fistulas this can result in incontinence.\(^10\)

The surgical treatment options that are available and currently widely used for high perianal fistulas include the mucosal advancement flap, fibrin glue, and seton drainage. Currently, the mucosal advancement flap is the treatment of choice for high transsphincteric fistulas. Contra-indications are active proctitis in case of Crohn’s disease, undrained perianal abscesses, anorectal fibrosis or stenosis.\(^9\) By advancing tissue over the internal opening, no fecal material can be forced into the fistula tract during defecation. The internal opening is closed after advancing and suturing the flap over the internal opening. Possible complications of the mucosal flap advancement are flap retraction, hematoma, and necrosis of the flap. The advancement flap is effective in approximately 50-70%.\(^11–14\)

Fibrin glue is an alternative option and can be injected into the fistula tract. By doing this the internal opening is temporary closed. Success rates of the different studies reporting on fibrin glue differ and range from zero to 100%.\(^15–19\)

A seton can be used as cutting or non-cutting (loose) seton. The loose seton is lead through the fistula tract and is tied on the outside. The seton nowadays serves as a bridge to a definitive procedure. A cutting seton is designed to cut through the sphincter and leads to division of the muscle. It is comparable to the fistulotomy, but the seton migrates slowly through the sphincter. The rationale is that the muscle is divided very slowly and has time to heal. The loose seton is nowadays primarily used for the temporary or long term drainage of the perianal fistula tract.\(^9\)

Over the years several new methods to treat high perianal fistulas have been developed. Recently the anal fistula plug was developed to treat these complex high fistulas. The plug is a bioabsorbable xenograft, made of lyophilized porcine intestinal submucosa. The material has inherent resistance to infection. The fistula tract is closed by installing the plug which achieves closures of the fistulas by tissue remod-
The material is fashioned into a conical plug and secured into the primary opening of the fistula tract. The internal end of the plug is sutured in place with at least two sutures. The external opening is left open to allow for drainage of the tract. An advantage of the plug is the minimally invasive character of the plug. The procedure is repeatable and possibly there is less damage to the sphincter resulting in less incontinence and postoperative pain. In a series of 46 patients a success rate of 83% was found at a follow-up duration of 12 months.

Presacral pathology and anastomotic leakage

Anastomotic leakage

In recent decades there are several developments in colorectal surgery. Surgical technique advances through specialized surgery and improvement of anastomotic stapling. Despite these advances anastomotic leakage remains a feared complication following colorectal surgery and an important cause for morbidity and mortality. Morbidity includes abdominal sepsis, intensive care stay, and abdominal wall complications resulting from reinterventions and wound infections. Furthermore, the risk of permanent ostomy is considerable. Ultimately anastomotic leakage is the main cause of postoperative mortality. In the literature anastomotic leakage is reported for low colorectal surgery up to 24%. Reported risk factors for anastomotic leakage include a difficult surgical procedure, low tumour location, adjuvant radiochemotherapy, and poor preoperative patient condition. Anastomotic dehiscence can lead to a presacral abscess or chronic para-anastomotic sinus. This presacral abscess cavity results in continuous drainage of debris and considerable patient discomfort. Prolonged pelvic sepsis and fibrosis is held responsible for impaired long term neorectum function after ileostomy closure in many of those patients. To treat these para-anastomotic sinuses transanal, radiological, or endoscopic placement of drains in the abscess cavity are options. Vacuum sponges are used for closure of several types of wounds. The endo-sponge was developed for the resolution of presacral abscess cavities as a result of anastomotic leakages following colorectal surgery. The sponge is installed transanally after examination and rinsing of the sinus. It facilitates closure by the application of negative pressure ensuring continuous drainage and thereby infection control. An important part of
the mechanism is that suction provides expansion of the neorectum or pouch to occlude the cavity.

Presacral tumours

The presacral space between the rectum and the sacrum derives from embryological fusion of different layers. Tumours in the presacral region are rare with an incidence 1.4 to 6.3 patients per year in a major referral center. Types of tumours that may arise are both congenital and acquired. The majority of these tumours in both adults and children are congenital. The presentation and origin is different for pediatric and adult patients. In children presacral masses reported are mostly sacrococcygeal teratomas (Altman types III and IV) and tumours seen as part of the Currarino syndrome, a rare syndrome which comprises the presence of a typical bony sacral defect, often in combination with a presacral mass or an anorectal malformation. Presacral tumours presenting in adults are more often developmental cysts. In reported series and reviews benign lesions are more common than malignant lesions.

OUTLINE OF THE THESIS

In this thesis, several aspects of anorectal surgery are highlighted. The aim of this thesis is to evaluate the surgical treatment options and strategies of perianal fistulas (part I), to critically appraise the anal fistula plug as a novel method for the definitive closure of perianal fistulas (part II), and to evaluate the presacral pathology and the treatment of presacral abscesses after anastomotic leakage resulting from rectal surgery (part III).

PART I: Surgical treatment of perianal fistulas

In Chapter 1 the various treatment options and changes in fistula classification for the surgical treatment of perianal fistulas and the available diagnostic options are reviewed. Furthermore a surgical treatment strategy is presented. In Chapter 2 the long-term functional outcome and possible risk factors for the development of recurrent or persistent fistulas are assessed for patients surgically treated by fistu-
lotomy or rectal advancement flap according to a standardized treatment protocol. As the recurrence rate and the continence are the most important factors in the treatment of perianal fistulas, these measures are specifically studied. Chapter 3 assesses the recurrence rates and long term functional outcome after surgical treatment of anal fistulas in Crohn’s disease. Only in selected patients without proctitis or active Crohn’s disease definitive closure by surgical intervention was attempted. Patients were treated by fistulotomy in case of low perianal fistulas. Patients where the fistula tract was located in the upper two-third of the sphincter complex were treated by mucosal advancement flap.

In recent decades, fibrin glue has appeared as an alternative treatment for high perianal fistulas. Early results were promising, with high success rates being reported. However, with increasing follow-up, the enthusiasm was tempered because of disappointing results. The aim of the study presented in Chapter 4 is to assess the additional value of fibrin glue in combination with mucosal advancement flap, compared to advancement flap alone, for the treatment of high transsphincteric fistulas of cryptoglandular origin.

In the process in finding reasons for recurrent or persistent fistulas attention is also directed towards epithelialization of the fistula tract. Epithelialization of the fistula tract might prevent closure. A procedure often performed following fistulotomy and advancement flap is curettage of the fistula tract after fistulotomy or after closing the internal opening. In Chapter 5 the incidence and origin of epithelialization of the fistula tract in patients with perianal fistulas undergoing fistulotomy are described.

**PART II: Novel techniques in fistula surgery**

In Chapter 6 the results of the use of the anal fistula plug in patients with complex high perianal fistulas are described in this prospective, two-center, clinical study. In Chapter 7 a randomized controlled multi-center trial is proposed to determine whether the anal fistula plug or the mucosal advancement flap is preferred for the treatment of high transsphincteric fistulas of cryptoglandular origin. The results of this trial proposal are described in Chapter 8. In total sixty patients are included in a trial comparing the anal fistula plug with the mucosal advancement flap. Postoperative pain, quality of life, and continence before and after surgery are assessed.
PART III: Presacral pathology and anastomotic leakage

The objective of Chapter 9 is to assess the incidence, the natural course and outcome of persisting presacral sinuses after anterior resection for rectal malignancy or restorative proctocolectomy for ulcerative colitis or poliposis.

Recently, application of local vacuum sponge treatment has shown to be effective to treat contained anastomotic leakage after low anterior anastomosis in rectal cancer patients. In Chapter 10 the use of the endo-sponge method and the outcome of two patients with presacral abscesses after restorative proctocolectomy for ulcerative colitis is described. In Chapter 11 a series of patients is described in the Netherlands that underwent endo-sponge treatment. The sponge is used in patients following anastomotic leakage after low anterior resections for malignant disease or after restorative proctocolectomy with ileoanal pouch anastomosis for ulcerative colitis.

The presacral space is a potential area surrounding the rectum in which masses can develop. There is also the risk of development of malignant tumours. In Chapter 12, the aim is to survey the spectrum of presacral masses in children and adults with special attention to the type of presentation, the origin and type of the tumour and the risk of development of malignant tumours. Over a 22-year period of January 1987 to 2009 a series of patients was included. Inclusion criterion was the presence of a congenital presacral mass that was surgically treated.

REFERENCES


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