Surgical treatment of perianal and rectal fistula
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Chapter 1

Perianal fistulas: developments in the classification and diagnostic techniques, and a new treatment strategy

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ABSTRACT

The aim of surgical treatment of perianal fistulas is to eradicate the perianal fistula, with low recurrence rates and risk of incontinence. In recent years there were developments regarding imaging and diagnostics of perianal fistulas. Magnetic resonance is the most appropriate diagnostic tool. In the hands of an experienced operator anal endosonography is a suitable, less expensive and readily-available technique.

As a result of developments in fistula surgery it is now recommended to divide perianal fistulas into low or high fistulas, as this has implications for the surgical treatment. Low perianal fistulas are defined as fistulas located in the lower third of the external anal sphincter. High fistulas are fistulas in which the fistula tract is located in the upper two-thirds of the external sphincter muscle. Low perianal fistulas can be treated safely by fistulotomy. Presently, the mucosal advancement flap is the gold standard for the surgical treatment of high transsphincteric perianal fistulas.

The anal fistula plug might be an alternative for the treatment of high transsphincteric perianal fistulas.
INTRODUCTION

A perianal fistula is one of the most frequently encountered anorectal disease 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. The incidence is highest between 30 and 50 years of age.¹ When patients experience minor complaints surgical treatment is not necessary and a wait and see policy can be chosen. The aim of surgical treatment of perianal fistulas is to eradicate the fistula with a surgical treatment that leads to the lowest possible recurrence percentage, without endangering continence.

Historically, all perianal fistulas were treated by fistulotomy or by radical fistulectomy. This resulted in high success percentages, however incontinence was frequently encountered.² In 2001, Schouten et al. described the classification and the imaging options for perianal fistulas.³ In the present article the changes in fistula classification, imaging and surgical treatment options are reviewed. Furthermore, a surgical treatment strategy will be presented.

ETIOLOGY

The majority of the fistulas are of cryptoglandular origin (approximately 90%). These non-specific fistulas originate from infection and abscess development in the intersphincteric anal glands.⁴ Alternative causes are for instance Crohn’s disease and HIV. In the present article only perianal fistulas of cryptoglandular origin will be reviewed.

CLASSIFICATION

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.³⁵ As a result of developments in the surgical treatment of perianal fistulas it is currently advised to divide perianal fistula into low and high perianal fistulas (Figure 1.1). Division of more than 30% of the external sphincter muscle is associated with significantly more incontinence.⁶ 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.

![Diagram of the anal sphincter muscles showing 2/3 and 1/3 divisions.](image)

**Figure 1.1** – 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.

**DIAGNOSTICS AND IMAGING**

It is important to obtain information on the exact location of the internal opening, the route of the fistula tract, the relation of the fistula and anal sphincter muscles, and the presence of abscesses and multiple fistula tracts.

**Fistulography en Computerized Tomography (CT)**

Fistulography is considered obsolete as no information is obtained on the route of the fistula tract in relation to the external sphincter muscle. Secondary fistula tracts are often not filled with contrast, which leads to inaccurate information of the fistula complex. There is currently no role for the CT as result of low contrast resolution. It is also difficult to differentiate between scar tissue and active perianal fistulas. In a prospective study anal endosonography was superior compared to the CT.
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Anal endosonography

Anal endosonography is cheap, quick and easily accessible compared to other kinds of imaging.\textsuperscript{9} The initial results were promising, however in later studies in which the endosonography was compared to the Magnetic Resonance (MR) scan the results were less promising.\textsuperscript{10–13} This discrepancy in the results may be explained by the experience of the radiologist performing the examination. For the identification of the internal opening the anal endosonography is suitable as the internal opening is located close to the transducer. From earlier studies it became clear that the endosonography is capable to successfully locate the internal opening in around 70%.\textsuperscript{14} In a more recent study involving 151 patients in 93% the localization of the internal opening corresponded with the examination under anesthesia.\textsuperscript{15} Furthermore, by injecting hydrogenperoxide into the fistula tract the accuracy was increased in some studies.\textsuperscript{13,16–18} Three-dimensional images can be produced, however the value in fistula imaging should be studied.\textsuperscript{19} With anal endosonography it is possible to assess pre- and postoperatively the presence and the extent of damage to the anal sphincters. A drawback from anal endosonography is the inadequate penetration of the transducer in the perianal fossa and the suprallevatoric area.\textsuperscript{7,20} Secondary extensions of the fistula can be missed for this reason. Furthermore, it is difficult to differentiate between fibrosis and active infection. Hydrogenperoxide can be helpful to differentiate between these two. This makes the anal endosonography less suitable for patients with a history of fistula surgery.

Magnetic Resonance Imaging (MR)

The diagnostic value of the MR became clear in the nineties. Advantages were the correct visualization of secondary fistula tracts, presence of abscesses, and the ability to differentiate between fibrosis and an active fistula.\textsuperscript{21–24} There are two ways to visualize perianal fistulas by MR. The first option is to use an endoanal coil (an internal MR coil) (Figure 1.2b) or by using a body coil (Figure 1.2a). With an endoanal coil it is possible to achieve higher spatial resolution at the level of the anal sphincter compared to the body coil. This results in an anatomically superior image (Figure 1.2b).\textsuperscript{25} The internal fistula opening and small secondary fistula tracts should theoretically be better visible compared to the body coil. There are
however no comparable studies available. Due to the limitation in the field of view, high and/or very extensive fistulas are not always easy to visualise. The MR body coil has no limitations in the field of view in the anorectal area. Furthermore the body coil is less invasive for patients and the technique is readily available.

![Figure 1.2](image.jpg)

**Figure 1.2** – a) MR image (coronal plane) of a female patient using a body coil shows a high transsphincteric fistula b) MR image (sagittal plane) of a male patient using an endoanal coil shows a low intersphincteric fistula with an internal opening.

With the MR it is possible to differentiate between an active infection and scar tissue based on the intensity on the T2-weighted images. Active fistula and abscesses are hyperintense, while scar tissue is hypointense. T1-weighted images enhanced by gadolinium further differentiates between inflammatory tissue (hyperintense) and fluid (hypointens). The clinical value of the MR (with a body coil) for perianal
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fistulas is confirmed by two studies. In a study reporting on 104 patients with the MR lead to the correct diagnosis in 90%. This was significantly higher than examination under anesthesia (61%) and also better than anal endosonography (81%). The diagnosis was related to a reference standard built up from examination under anesthesia, MR and outcome. In the second study of 71 patients with recurrent perianal fistulas the result of the pre-operative MR scan was used to guide the surgical treatment. This reduced the postoperative recurrent fistulas with 75%.

TREATMENT

Low fistula

Submucosal, intersphincteric, and low transsphincteric fistulas, located in the lower one-third of the external sphincter complex can be treated by fistulotomy, with favorable success rates and relatively little impact on fecal continence (Figure 1.3). The recurrence rates of these fistulas are low, ranging from 2-9%. In a recently published study reporting on 109 patients with cryptoglandular fistulas treated by fistulotomy a recurrence rate of 7% at a follow-up duration of 76 months was found. In 40% of these patients soiling was reported. In the literature the reported incontinence following fistulotomy ranges from 0-70%. In a retrospective series consisting of 624 patients, the factors female sex and a ventral fistula location were associated with incontinence. This is probably the result from obstetric damage of the sphincter-complex. Only in selected patients in this group a fistulotomy should be performed.

High fistula

This group consists of patients with perianal fistulas where the fistula tract is located in the upper two-thirds of the external sphincter. The surgical treatment options are the mucosal advancement flap, fibrin glue, seton drainage, and the anal fistula plug.

Mucosal advancement flap

The mucosal advancement flap is currently the gold standard for high transsphincteric fistulas (Figure 1.4). The rationale behind the advancement flap is that the open internal opening is the cause of the persisting fistula tract. By advancing tis-
sue over the internal opening, it is impossible for fecal material to be forced into the fistula tract during defecation. The advancement flap is done according to the following technique. The internal opening is excised followed by mobilization of the mucosa, submucosa, and a small amount of muscular fibers from the internal sphincter complex. A rectal flap with a two to three centimeters broad base is mobilized. The rectal flap is mobilized sufficiently to cover the internal opening with overlap. Hemostasis is performed to prevent a hematoma under the flap. The fistula tract is curetted and the internal opening is closed after advancing the flap over the internal opening. Finally, the flap is sutured in the distal anal canal with interrupted Vicryl 2-0 sutures (Ethicon Endo-Surgery, Cincinnati, OH). Possible complications of the mucosal flap advancement are retraction, hematoma and necrosis of the flap. In case of acute sepsis, patients can be treated with three months of seton drainage before performing the advancement flap. The recurrence rates for the mucosal advancement flap reported in literature vary and are reported ranging from 0-69%.\textsuperscript{31-34} Van Koperen \textit{et al.} reported a series of 70 patients with high transsphincteric fistulas with a recurrence rate of 21\%.\textsuperscript{28} Soiling was reported in 43% of the patients. In the literature problems with continence are reported between zero and 40%.\textsuperscript{29}

\textit{Fibrin glue}

By injecting the fibrin glue the fistula tract and the internal opening are temporary closed. When the glue resolves after a few weeks, fibroblasts activated by the fibrin glue matrix, achieve closure of the fistula tract.\textsuperscript{35} Although the first results were
good, later studies were disappointing. In a recent systematic review, the success percentages of the 19 included studies varied from 0-100%. This large variety is possibly the result of different etiologies, operation technique and perioperative policy.

**Seton drainage**

The seton can be used as cutting or non-cutting (loose) seton. The loose seton is lead through the fistula tract. The seton can serve as a bridge for the definitive procedure. The cutting seton is designed to cut through the sphincter and leads to muscle division. 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 the time to heal. The seton is nowadays primarily used for the temporary or long term drainage of the perianal fistula tracts.

**Anal fistula plug**

Recently there are reports on the anal fistula plug, a bioabsorbable xenograft made of lyophilized porcine intestinal submucosa which resolves in time (Surgisis, Cook Surgical). Through tissue remodelling the plug closes the fistula tract. 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 two sutures. The external opening is left open to allow for drainage of the tract. In a series of 46 patients a success percentage of 83% was found at a follow-up duration of 12 months. A
comparable result was found in a series of 18 patients with a follow-up duration of six months.\textsuperscript{37} Recently, the results of a small series of 17 patients with therapy resistent complex high transsphincteric fistulas was published. A recurrence rate of 41\% was found (follow-up 15 weeks).\textsuperscript{38} An advantage of the plug is the minimally invasive character of the plug. The procedure is repeatable and possibly there is less incontinence and anal scarring.

**Figure 1.5 - Treatment strategy perianal fistulas.**

**Conclusion**

Due to the impact on the chosen treatment it is advisable to divide patients with perianal fistulas in low (lower 1/3) and high (upper 2/3) fistulas. The MR is the treatment of choice for imaging of perianal fistulas. The anal endosonography is a cheap, easy and suitable alternative readily available. The anal endosonography is less useful in patients that have a history of fistula surgery. Low perianal fistulas, situated in the lower 1/3 of the external sphincter muscle can be treated with low recurrence rates by fistulotomy. The mucosal advancement flap is the treatment of choice for high perianal fistulas (Figure 1.5). The anal fistula plug is a potential alternative for high perianal fistulas.
REFERENCES


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