FISTULA IN ANO

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Key Concepts
- Definition of Fistula in Ano
- Anatomy of Anal Canal
- Types of Fistula in Ano
- Treatment of Fistula in Ano

Abstract: Fistula-in-ano is a hollow tract lined with granulation tissue connecting a primary opening inside the anal canal to a secondary opening in the perianal skin. Fistula-in-ano remains a perplexing problem even after 25 centuries. Fistula in ano is an old problem, involving the anorectal region. It is notorious for its chronicity, recurrences and frequent acute exacerbations. An anal fistula usually results from an infection that occurs in the tissue lining the anal canal. These are not performed for routine fistula evaluation. They can be helpful when the primary opening is difficult to identify or in the case of recurrent or multiple fistulae. Therapeutic intervention is indicated for symptomatic patients.

Key words: Fistula, Anal Canal, Coodsalls rule, Intersphincteric Fistula.

Fistula-in-ano is a disease with a very long history which dates back to antiquity. Fistula-in-ano is a hollow tract lined with granulation tissue connecting a primary opening inside the anal canal to a secondary opening in the perianal skin. Secondary tracts may be multiple and communicate through the same primary opening.

A fistula in ano is a tunnel like (pipe like) track developed in the peri-anal region, usually having one or more external openings around the anus leading to an internal opening in the mucosa of the anal canal or the rectum. Anal fistula, a rare condition, is a chronically inflamed, abnormal tunnel between the anal canal and the outer skin of the anus.

Fistula-in-ano remains a perplexing problem even after 25 centuries. Fistula in ano is an old problem, involving the anorectal region. It is notorious for its chronicity, recurrences and frequent acute exacerbations. Hip-
pocrates described the use of seton to cure fistula in ano. The first surgical lay open of fistula in ano was performed in 13th century.

FREQUENCY
- The prevalence rate is 8.6 cases per 100,000 population.
- The prevalence in men is 12.3 cases per 100,000 population.
- In women, it is 5.6 cases per 100,000 population.
- Male-to-female ratio is 1.8:1.
- Mean age of patients is 38.3 years.

ETIOLOGY
An anal fistula usually results from an infection that occurs in the tissue lining the anal canal. The infection may be caused by spread of bacteria that normally exist in the rectum. Occasionally, it may occur as a result of;
- Healed sore in the rectal area
- Ulcerative colitis, a disease associated with ongoing breakdown of tissues that causes ulcers in the lining of the colon
- Diverticulitis inflammation of the wall of the large intestine
- Crohn’s disease a chronic inflammation of the small intestine
- Tuberculosis
- Gonorrhea
- Cancer of the large intestine

Fistula-in-ano is nearly always caused by a previous anorectal abscess. Anal canal glands situated at the dentate line afford a path for infecting organisms to reach the intramuscular spaces.

Other fistulae develop secondary to trauma, Crohn’s disease, anal fissures, carcinoma, radiation therapy, actinomycoses, tuberculosis, and chlamydial infections.

PATHOPHYSIOLOGY
Infection begins in the anal gland and progresses into the muscular wall of the anal sphincters to cause an anorectal abscess. Occasionally, a granulation tissue lined tract is left behind in the perianal skin following surgical or spontaneous drainage causing recurrent symptoms. Formation of a fistula tract following anorectal abscess occurs in 7-40% of cases.

CLINICAL HISTORY
Patients often provide a reliable history of previous pain, swelling, and spontaneous or planned surgical drainage of an anorectal abscess. It often drains watery pus, which can irritate the outer tissues causing itching and discomfort.

Signs and symptoms (in order of prevalence)
- Perianal discharge
- Pain
- Swelling
- Bleeding
- Diarrhea
- Skin excoriation
- External opening

A patient of fistula in ano often suffers from a recurrent, small or large boil/boils/abscess surrounding the anus, accompanied with pain, discomfort and pus/blood discharge.

The symptoms subside when the boil / abscess bursts spontaneously causing some more discharge for a couple of days. The boil / abscess “heals up” temporarily but almost always reappears after some time.

Itching, discharge of watery pus, irritation of tissue around the anus, discomfort and pain these are the main symptoms of the fistula in ano. A complex fistula is suggested if history
includes;
- Inflammatory bowel disease
- Diverticulitis
- Previous radiation therapy for prostate or rectal cancer
- Tuberculosis
- Steroid therapy
- HIV infection

If a patient of fistula-in-ano has got following symptoms in addition. He/she should be thoroughly investigated for possible malignancy;
- Abdominal pain
- Weight loss
- Change in bowel habits

Following information is obtained preoperatively to achieve better outcome.
- Decreased tone observed during preoperative evaluation

If decreased, surgical division of any portion of the sphincter mechanism should be avoided.
- History of previous fistulotomy
- History of obstetrical trauma
- High transsphincteric or suprasphincteric fistula (if known)
- Very elderly patients

**PHYSICAL EXAMINATION**

Physical examination findings remain the mainstay of diagnosis. The examiner should observe the entire perineum, looking for an external opening that appears as an open sinus or elevation of granulation tissue. Spontaneous discharge via the external opening may be apparent or expressible upon digital rectal examination.

**DIGITAL RECTAL EXAMINATION**

Digital rectal examination may reveal a fibrous tract or cord beneath the skin. It also helps delineate any further acute inflammation that is not yet drained. Lateral or posterior induration suggests deep post-anal or ischiorectal extension.

The examiner should determine the relationship between the anorectal ring and the position of the tract before the patient is relaxed by anesthesia. The sphincter tone and voluntary squeeze pressures should be assessed before any surgical intervention to delineate whether preoperative manometry is indicated. Anoscopy is usually required to identify the internal opening.

**DIFFERENTIAL DIAGNOSIS**

The following conditions have similar presentation but do not communicate with the anal canal;
- Hidradenitis suppurativa
- Infected inclusion cysts
- Pilonidal disease
- Bartholin gland abscess in females

**RELEVANT ANATOMY**

A thorough understanding of the pelvic floor and sphincter anatomy is a prerequisite for clearly understanding the classification system for fistulous disease. The external sphincter muscle is a striated...
muscle under voluntary control by three components. These are submucosal, superficial, and deep muscle. Its deep segment is continuous with the puborectalis muscle and forms the anorectal ring, which is palpable upon digital examination.

The internal sphincter muscle is a smooth muscle under autonomic control and is an extension of the circular muscle of the rectum.

GOODSALL’S RULE
The Goodsall’s rule can help to anticipate the anatomy of fistula-in-ano in simple cases. The rule states that fistulae with an external opening anterior to a plane passing transversely through the center of the anus will follow a straight radial course to the dentate line. Fistulae with their openings posterior to this line will follow a curved course to the posterior midline. Exceptions to this rule are external openings more than 3 cm from the anal verge. These almost always originate as a primary or secondary tract from the posterior midline, consistent with a previous horseshoe abscess.

PARKS CLASSIFICATION SYSTEM
The Parks classification system defines 4 types of fistula-in-ano that result from cryptoglandular infections.

INTERSPHINCTERIC
- Intersphincteric fistulae are confined to the intersphincteric space and internal sphincter. They result from perianal abscesses.
- These account for about 70% of all fistulae.
- Common course - Via internal sphincter to the intersphincteric space and then to the perineum
• Seventy percent of all anal fistulae
• Other possible tracts - No perineal opening; high blind tract; high tract to lower rectum or pelvis.

TRANSSPHINCTERIC
• Transsphincteric fistulae are the result of ischiorectal abscesses, with extension of the tract through the external sphincter.
• These account for about 25% of all fistulae.
• Common course - Low via internal and external sphincters into the ischiorectal fossa and then to the perineum
• Other possible tracts - High tract with perineal opening; high blind tract

SUPRASPHINCTERIC
• Suprasphincteric fistulae are the result of supralelevator abscesses. They pass through the levator ani muscle, over the top of the puborectalis muscle, and into the intersphincteric space.
• These account for about 5% of all fistulae.
• Common course - Via intersphincteric space superiorly to above puborectalis muscle into ischiorectal fossa and then to perineum
• Other possible tracts - High blind tract (ie, palpable through rectal wall above dentate line)

EXTRASPHINCTERIC
• Extrasphincteric fistulae bypass the anal canal and sphincter mechanism, passing through the ischiorectal fossa and levator ani muscle, and open high in the rectum.
• These account for about only 1% of all fistulae.
• Common course - From perianal skin through levator ani muscles to the rectal wall completely outside sphincter mechanism

CLASSIFICATION OF FISTULA -IN-ANO
• Subcutaneous
• Submuscular (intersphincteric, low transsphincteric)
• Complex, recurrent (high transsphincteric, suprasphincteric and extrasphincteric, multiple tracts, recurrent)

Unlike the current procedural terminology coding, the Parks classification system does not include the subcutaneous fistula. These fistulae are not of cryptoglandular origin but are usually caused by unhealed anal fissures following anorectal procedures such as hemorrhoidectomy or sphincterotomy.

INVESTIGATIONS
Lab Studies
No specific laboratory studies are required; the normal preoperative studies are performed based on age and comorbidities.

IMAGING STUDIES
These are not performed for routine fistula evaluation. They can be helpful when the primary opening is difficult to identify or in the case of recurrent or multiple fistulae to identify secondary tracts or missed primary openings.

FISTULOGRAPHY
• This involves injection of contrast via the internal opening, which is followed by anteroposterior, lateral, and oblique x-ray images to outline the course of the fistula tract.
• The accuracy rate is 16-48%.
• The procedure is well tolerated but requires the ability to visualize the internal opening.
• Except in the case of recurrent disease, fistulo-graphy may be only slightly more useful than a careful examination under anesthesia.
• BARIUM ENEMA/SMALL BOWEL SERIES
• This is useful for patients with multiple fistulae or recurrent disease to help rule out inflammatory bowel disease.

ENDOANAL/ENDORECTAL ULTRASOUND
• These studies involve passage of a 7- or 10-MHz transducer into anal canal to help define muscular anatomy differentiating intersphincteric from transsphincteric lesions.
• A standard water-filled balloon transducer can help evaluate the rectal wall for any suprasphincteric extension.
• Studies show that the addition of hydrogen peroxide via the external opening can help outline the fistula tract course. This may be useful to help delineate missed internal openings.
• These studies are reported to be 50% better than physical examination alone to help find an internal opening that is difficult to localize.
• This modality has not been used widely for routine clinical fistula evaluation.
Magnetic Resonance Imaging (MRI) Scan
Findings show 80-90% concordance with operative findings when observing a primary tract course and secondary extensions. MRI is becoming the study of choice when evaluating complex fistulae. It has been shown to achieve lower recurrence rates by providing information on otherwise unknown extensions.

CT Scan
It is not as satisfactory investigation in showing the anatomy of fistula in ano as MRI scan.
- CT scan is more helpful in the setting of perirectal inflammatory disease than in the setting of small fistulae because it is better for delineating fluid pockets that require drainage than for small fistulae.
- CT scan requires administration of oral and rectal contrast.
- Muscular anatomy is not delineated well.

Proctosigmoidoscopy
- Rigid sigmoidoscopy can be performed at the initial evaluation to help rule out any associated disease process in the rectum.

Colonoscopy
- Colonic evaluation is performed only if indicated.

Anal Manometry
- Pressure evaluation of the sphincter mechanism is helpful in certain patients.

Examination Under Anesthesia
Examination of the perineum, digital rectal examination, and anoscopy are performed after the appropriate anesthesia is administered.

This examination is necessary before surgical intervention, especially if outpatient evaluation causes discomfort or has not helped delineate the course of the fistulous process.

Several techniques have been described to help locate the course of the fistula and, more importantly, identify the internal opening.

Inject hydrogen peroxide, milk, or dilute methylene blue is given into the external opening and its excretion is seen at the dentate line. It has been experienced by surgeons that methylene blue often obscures the field more than it helps identify the opening.

Traction (pulling or pushing) on the external opening may also cause a dimpling or protrusion of the involved crypt.
Insertion of a blunt-tipped probe via the external opening may help outline the direction of the tract. If it approaches the dentate line within a few millimeters, a direct extension is likely to be present.

Care should be taken not to use excessive force as it can create false passages.

**TREATMENT**
Little has changed in the understanding of the disease process over years. Parks refined the classification system that is still in widespread use. Over the last 30 years, many surgeons have presented new techniques and in an effort to minimize recurrence rates and incontinence complications.

Therapeutic intervention is indicated for symptomatic patients. Symptoms usually involve recurrent episodes of anorectal sepsis. An abscess develops easily if the external opening on the perianal skin seals itself.

**MEDICAL THERAPY**
No definitive medical therapy is available, long-term antibiotic prophylaxis and anti-inflammatory drugs may have a role in prevention of recurrent fistulae in patients with Crohn’s disease.

**SURGICAL THERAPY**
Surgery should not be performed for definitive repair of the fistula in the setting of anorectal abscess (ie, unless the fistula is superficial and the tract is obvious). Simple incision and drainage of the abscess is sufficient in acute phase. Only 7-40% of patients are likely to develop fistula.

**FISTULOTOMY/FISTULECTOMY**
The laying-open technique (fistulotomy) is useful for 85-95% of primary fistulae (ie, submucosal, intersphincteric, low trans-sphincteric).
- A probe is passed into the tract through the external and internal openings.
- The overlying skin, subcutaneous tissue, and internal sphincter muscle are divided with a knife or electrocautery, thereby opening the entire fibrous tract.
- At low levels in the anus, the internal sphincter and subcutaneous external sphincter can be divided at right angle to the underlying fibers without affecting continence.
- It is not the case if the fistulotomy is performed anteriorly in female patients.
- If the fistula tract courses higher into the sphincter mechanism, seton placement should be performed.

**CURETTAGE**
- Curettage is performed to remove granulation tissue in the tract base.

**FISTULECTOMY**
- Complete fistulectomy creates larger wounds that take longer to heal and offers no recurrence advantage over fistulotomy.
- Opening the wound out on the perianal skin for 1-2 cm adjacent to the external opening with local excision of skin promotes internal healing before external closure.

**MARSUPIALIZATION**
- Some advocate marsupialization of the edges to improve healing time.

**BIOPSY**
- Biopsy is performed on any firm, suspected tissue.
SETON PLACEMENT
A seton can be placed alone, combined with fistulotomy, or in a staged fashion. This technique is useful in patients with the following conditions:
- Complex fistulae (ie, high transsphincteric, supra-sphincteric, extrasphincteric) or multiple fistulae
- Recurrent fistulae after previous fistulotomy
- Anterior fistulae in female patients
- Poor preoperative sphincter pressures
- Patients with Crohn’s disease or patients who are immunosuppressed

Seton has two purposes beyond giving a visual identification of the amount of sphincter muscle involved. These are;
- To drain and promote fibrosis
- To cut through the fistula.
- Setons can be made from large silk suture, silastic vessel markers, or rubber bands that are threaded through the fistula tract.

SINGLE-STAGE SETON (CUTTING)
The seton is passed through the fistula tract around the deep external sphincter after opening the skin, subcutaneous tissue, internal sphincter muscle, and subcutaneous external sphincter muscle.
- The seton is tightened down and secured with a separate silk tie.
- With time, fibrosis occurs above the seton as it gradually cuts through the sphincter muscles and essentially exteriorizes the tract.
- The seton is tightened on subsequent visits until it is pulled through over 6-8 weeks.
- A cutting seton can also be used without associated fistulotomy.

TWO-STAGE SETON (DRAINING/FIBROSING)
- The seton is passed around the deep portion of the external sphincter after opening the skin, subcutaneous tissue, internal sphincter muscle, and subcutaneous external sphincter muscle.
- Unlike the cutting seton, the seton is left loose to drain the intersphincteric space and to promote fibrosis in the deep sphincter muscle.
- Once the superficial wound is healed completely (2-3 mo later), the seton-bound sphincter muscle is divided.
- Once wound healing is complete, the seton is removed without division of the remaining encircled deep external sphincter muscle. It achieves eradication of the fistula tract in about 60-78% of cases.

MUCOSAL ADVANCEMENT FLAP
Mucosal advancement flap is reserved for use in patients with chronic high fistula but is indicated for the same disease process as seton use.
- Advantages include a 1-stage procedure with no additional sphincter damage.
- A disadvantage is poor success in patients with Crohn’s disease or acute infection.
- This procedure involves total fistulectomy, with removal of the primary and secondary tracts and complete excision of the internal opening.
- A rectal mucos muscular flap with a wide proximal base (2 times the apex width) is raised.
- The internal muscle defect is closed with an absorbable suture, and the flap is sewn down over the internal opening so that its suture line does not overlap the muscular repair.
PREOPERATIVE DETAILS
• Rectal irrigation with enemas should be performed on the morning of the operation.
• Anesthesia can be general, local with intravenous sedation, or a regional block.
• Preoperative antibiotics are given.
• Prone jackknife position with buttocks apart is the most advantageous position.

INTRAOPERATIVE DETAILS
• The patient is examined under anesthesia to confirm the extent of the fistula.
• Identifying the internal opening to prevent recurrence is imperative.
• A local anesthetic block at the end of the procedure provides postoperative analgesia.

POSTOPERATIVE DETAILS
Most patients can be treated in an ambulatory setting with discharge instructions and close follow-up care.
Follow-up
• Sitz baths, analgesics, and stool bulking agents (eg, bran, psyllium products) are used in follow-up care.
• Frequent office visits within the first few weeks help ensure proper healing and wound care.
• Importantly, ensure that the internal wound does not close prematurely, causing a recurrent fistula.
• Digital examination findings can help distinguish early fibrosis.
• Wound healing usually occurs within 6 weeks.

COMPLICATIONS
EARLY POSTOPERATIVE
Urinary retention
Bleeding
Fecal impaction
Thrombosed hemorrhoids

DELAYED POSTOPERATIVE
Recurrence
Incontinence (stool)

ANAL STENOSIS
The healing process causes fibrosis of the anal canal. Bulk laxatives for stool help prevent narrowing.

DELAYED WOUND HEALING
Complete healing occurs by 12 weeks unless an underlying disease process is present (ie, recurrence, Crohn’s disease).

OUTCOME AND PROGNOSIS

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<tr>
<th>Description</th>
<th>% Recurrence</th>
<th>% Incontinence</th>
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<tbody>
<tr>
<td>Fistulotomy</td>
<td>0 - 18</td>
<td>3 - 7</td>
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<tr>
<td>Seton use</td>
<td>0 - 17</td>
<td>0 - 17</td>
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<tr>
<td>Mucosal advancement flap</td>
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