

Management of Complex Posterior Horseshoe Anal Fistula by The Modified Hanley's Procedure -Clinical Experience and Review of 25 Patients

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Abstract:

This is a prospective study carried out with the aim to document clinical experience in the surgical management of posterior horseshoe fistula of cryptoglandular origin using the modified Hanley procedure as a one-stage procedure.

In this study, A modified Hanley procedure was used in 25 patients (20 males and 5 females) who had presented with posterior horseshoe anal fistula (mean age 41 years) for the period from February 2020 to December 2022, and the results of surgical outcomes were analysed.

In this procedure, after optimization and anaesthesia, a malleable probe is inserted into the primary Fistulous tract and directed toward the posterior anal space. A straight transverse incision is placed at the primary opening, towards the tip of the coccyx and posterior anal space. The anal portion of the fistulous tract is unroofed. The side fistula tracts are unroofed and removed in toto.

It is noted complete healing was achieved in all 25 patients within three months postoperative period. Recurrence was found in only three patients after six-month follow-up period. All patients were discharged on the 5th post-operative day. None required readmission and post-operative pain was mild and bearable. Narcotic analgesics were not needed after discharge. After undergoing the procedure, the patients fully recovered and within 2-3 weeks all patients were able to return to their work and daily activity.

In conclusion, the posterior complex horseshoe anal fistula, though it has a treacherous fistulous tract can be safely and successfully treated using the modified Hanley's procedure.

keywords: trauma; urethra; tomography; 3D reconstruction

Introduction

An anorectal fistula is an abnormal communication lined with granulation tissue between the surface of the anal canal internally and the perianal skin or perineum externally [1]. Secondary tracts may be multiple and can extend from the same primary opening.

There are a few conditions, having sinuses and do not have internal communications with the anal canal and it should be differentiated:

- Hidradenitis suppurativa

- Infected inclusion cysts
- Pilonidal disease
- Bartholin gland abscess in females

Most often it is the sequel of the perianal anal abscess spontaneous internal rupture or inadvertent therapeutic intervention. When the perianal fistulous communication is established as it will cause continuous discharge or wetting of the area, resulting in significant implications and

impacts on the quality of life and effective working pattern. The perianal fistula causes social hygienic embarrassment and also imparts continuous mild to moderate pain and discomfort. In a few individuals especially those who have associated comorbidities and immunocompromise it can result in frank sepsis or septicaemia [2].

The pre-emptive diagnosis and appropriate management of the perianal fistula remains an enigma due to the involved plethora of procedural methods imparted from the ancient era to the modern sophisticated and complicated yet controversial methods in colorectal surgery. Predominantly surgical methods are considered as the prime and mainstay of therapy with an objective of the adequate draining of the local infective materials resulting in eradication of the fistulous tract with the preservation of the effective sphincter mechanism [2,3].

The choice of surgical approach depends on several factors such as the age, sex, etiologic, location, type, and duration of the fistula, expertise of the surgeon as well as previously performed procedure, and preoperative sphincter function [4].

As over 90% result from a crypto glandular abscess originating from the crypts of Morgagni which are located between the anal orifice and the dentate line and most internal openings of the fistula is located around the anal glands surrounding the dentate line are referred to as anal in origin or low type while fistula that originates above the dentate line as high type fistula 5.

The Anorectal fistula are classified and grouped based on the pathway of the fistulous tract and the structures they pass through before they exit in the perianal region as [5].

- Inter sphincteric (45%)
- Trans sphincteric (30%)
- Supra sphincteric (20%)
- Extra sphincteric (5%)

Most often the perianal fistula proceeds after the drainage procedure applied for draining the perianal abscess. Perianal drainage though it helps in the drainage of the pus and thereby reduces the inflammatory process, the patient will be at enhanced risk of either developing recurrent perianal sepsis or Perianal fistula. As per the statistics by Gordon et al, in nearly 35- 50%, perianal fistula occurs in patients after the first episode of the perianal abscess [6].

History of Perianal fistula:

References to fistula-in-ano date to antiquity. Numerous publications and treatises on fistula in ano and its fascination has exerted for more than 2000 years. In 430 BCE, Hippocrates made extensive reference to surgical therapy for the fistulous disease, which is still been practiced and he was credited as the first person to advocate the effective use of a seton (Latin seta bristle).

John Arderne (1307-1390), a prolific English surgeon in 1376, wrote Treatises of Fistula in Ano; Haemorrhoids, and Clysters, which had the full description of the fistulotomy procedure and he also mentioned the seton use. Historical references indicate that Louis XIV was treated for an anal fistula in the 18th century. Salmon established a hospital in London (St. Mark's) devoted to the treatment of fistula-in-ano and other rectal conditions.

In the late 19th and early 20th centuries, prominent physicians/surgeons, such as Goodsall and Miles, Milligan and Morgan, Thompson, and Lockhart-Mummery, made substantial contributions to the treatment of anal fistula. Based on their findings and observations various theories on pathogenesis, progression and treatment options were described. However, in these early years in spite of the publication, there were only

little changes in the anatomical knowledge, pathogenesis, and the natural progression of the disease.

Parks refined the classification system in 1976, which is still in widespread use. Over the past few decades, many authors have presented new techniques and case series in an effort to minimize recurrence rates and incontinence complications. In spite of these and with more than two millennia of rich knowledge and experience, fistula-in-ano remains a mystifying surgical disease.

Pathogenesis of anal rectal fistula:

Fistula-in-ano is predominantly the sequel of a previously occurred caused anorectal abscess. In the dentate line of the anal canal, there are about 8-10, anal cryptoglandular structures, which are arranged in a circumferential pattern. Normally these cryptoglandular structures pierce and penetrate through the internal sphincter and as a result, they will reach the inter sphincteric plane. This is important as these areas of penetration will pave ways for the infective organism from the anal canal can reach the intramuscular spaces. The hypothesis based on the cryptoglandular theory postulates an infection that normally begins in the anal canal glands can penetrate into the muscular wall of the anal sphincters and will lead to the formation of an anorectal abscess.

When these abscesses are dealt with through incision drainage or when they spontaneously rupture and drain, the left behind granulation tissue will persist and lead to the recurrence of the symptoms The incidence of formation of this granulation tissue and resulting in the development of the fistula tract shall vary from 7 to 40%.

Fistula in ano can develop as a consequence secondary to trauma (e.g., recto anal foreign bodies), Inflammatory bowel diseases like Crohn's disease, acute and chronic anal fissures, colorectal carcinoma, following radiation proctitis, systemic infections like actinomycoses, tuberculosis, and lymphogranuloma venereum secondary to chlamydial infection.

Malouf et al, 8. have explained this pathogenesis as the infection and abscess of the crypt gland in the inter sphincteric space, spread vertically, horizontally, or circumferentially and this determines the site of the fistula. When Circumferential spread occurs, through the inter sphincteric, ischioanal, or superelevated compartment results in horseshoe fistula. When the abscess is not drained either surgically or spontaneously adequately, it spread extensively into the ischioanal space. This spread results in anterior and posterior horseshoe abscesses and fistula.

Horseshoe fistula:

Horseshoe fistula is a complex type of trans-sphincteric fistula that is caused by an infection in the perianal gland present in the midline posteriorly. This infection can extend along the deep postanal space to reach the ischioanal fossa on one or either side of the anal canal before it drains into the perianal skin. Perianal fistula is termed a Horseshoe fistula when the fistulous tract encircles the anus partially and exits out on either side of the anus 6.

Because of the depth and complexity of the secondary tracks associated with horseshoe fistula, symptoms are usually severe, and the diagnosis can be difficult The Horseshoe fistula occurs more in males and the average incident male-to-female ratio is [1.8] – [1].

The Horseshoe fistula is of two main types 7

- Anterior type: less common and it originates from the anterior sub-epithelial space
- Posterior type: Most common one and originate from the Post anal space

Contrary to the general belief that the horseshoe fistula is the cause of the posterior deep anal abscess, the fistula follows the development of deep postanal space abscess as its complication.

They are a particularly aggressive form of anorectal abscess and fistula because there is an erratic pattern of spread in a ring-like fashion to the deep post-anal or rarely to the deep preanal space and then to the ischioanal space. Therefore, the typical horseshoe fistula is composed of bilateral external openings joined by a deep post-anal communication in the post midline, resulting in a U or horseshoe-shaped configuration⁹. Patients with horseshoe fistula usually undergo multiple drainages and unsuccessful fistula surgery before they reach to get a definitive diagnosis and treatment. The aggressive nature of this type of fistula is also confirmed by the high rate of Crohn's disease in patients with horseshoe fistula [10,11].

The patients of horseshoe fistula usually advised surgery for their problems. There are several operations like fistulotomy, cutting seton, fibrin glue injection, fistula plug, and endorectal advancement flap [11]. It was found that all these procedures are just temporary solutions as invariably the fistula recurs. Besides, a lot of complications can occur due to surgery like urinary retention, bleeding, thrombosed pile, fecal impaction, incontinence of stool, anal stenosis, and delayed wound healing. Treatment of horseshoe fistula by fecal diversion alone did not resolve horseshoe fistula [12].

Hanley's procedure:

Horseshoe fistula, as it is a complex fistula will lead to potentially morbid conditions. Hanley, 1965 reported his original procedure for horseshoe fistula which involved the complete division of the posterior 12 o'clock sphincter mechanism down to the deep postanal space, counter drains were placed through each lateral extension and were removed several weeks afterward.

Modified Hanley's procedure:

The aggressive management of the Horseshoe fistula by Hanley's procedure obliterated the source of the fistula but at the inevitable price of the high incidence of anorectal incontinence. In 1990 modified Hanley procedure was adopted, in which the posterior sphincter was divided gradually by using a cutting hybrid seton placed around the 6 o'clock sphincter mechanism, this seton was serially tightened until the posterior sphincter was divided and it was tethered by resulting scar tissue¹². Hanley's procedure with drainage of deep postanal space and cutting and drainage hybrid setons proved to be safe, and successful and did not result in fecal incontinence. Complete healing of the fistula may take weeks or several months but patients remain functional even with a seton in place [13].

Single-stage modified Hanley's procedure:

This study presents the effectiveness and the results obtained with single-stage modified Hanley operation in the surgical management of 25 patients presented with a complex horseshoe anal fistula. The Post anal space is reached through a post-anal transverse incision at 6 o'clock position and the post-anal space is thoroughly curared and drained. The connection of secondary tracts was identified and they are encircled externally and deroofed from the surrounding tissues and reached up to the post-anal space without cutting the post-anal sphincter. The tracts were excised in toto along with the post-anal space. The wound is well irrigated and a Penrose drain is kept and continuous dressing and irrigation did in the postoperative period.

The aim of the study was to document our clinical experience in managing patients with horseshoe fistula of cryptoglandular origin with modification of the Hanley procedure using a single-stage approach.

Patients and Method:

This is a prospective study done from the period between February 2020 to December 2022, 25 patients 20 males and 5 females presented with chronic horseshoe fistula. Age ranges from 19-73 years.

The inclusion criteria were,

- Posterior horseshoe complex fistula defined as fistulas that have multiple tracts with single or multiple external openings,
- The deep postanal space affection is demonstrated by digital rectal examination and by preoperative MRI.

Exclusion criteria included:

- Patients with low and superficial fistulas,
- Patients with no deep postanal space affection and patients with fistula secondary to other pathology rather than cryptoglandular anal infection (Carcinoma, IBD, trauma, radiation). Institutional ethical clearance was obtained.

Procedure:

All patients were subjected to the preoperative measures which include: detailed history, a thorough and full clinical examination including PR examination to check for sphincter tone, preoperative MRI to demonstrate the extent of fistula, and to demonstrate deep postanal space affection. Routine preoperative laboratory investigations were done and informed consent was taken from all patients. All patients were prepared preoperatively by fasting and enema the night before surgery. All operations were performed with patients in the lithotomy position and under spinal anaesthesia.

During the operation, the fistulous tract was gently probed with a small blunt-tipped, malleable metal probe. The portion of the tract outside the sphincter was laid open and curetted; in addition to the excision of the superficial segment of the lateral tract ischioanal spaces were curetted as well. The skin and anoderm overlaying the fistulous tract incised.

Postoperative continence was assessed using the classification according to the Wexner score for fecal incontinence and according to Browning and Park's classifications in which category

- a) continent for solid and liquid and flatus (i.e., normal continence),
- b) continent for a solid and liquid stool but not for flatus,
- c) continent for solid stool with no control over and category
- d) with continued fecal leakage.

Patients were in the hospital for a minimum of 5 days and treated with antibiotics, analgesics, and sitz baths. The cases were followed up weekly for the first month and then once in a month for 6 months. Patients were advised to contact us whenever they faced any problems. All the patients had complete healing within 30 days. There was no significant incontinence was reported in our postoperative follow-up.

Patients were able to return to regular work in 3-4 weeks. Incontinence was not in all patients. The recurrent fistula was noted in 2 patients only after a mean follow-up of six months.

Results

Twenty-five patients presented with posterior horseshoe complex anal fistula underwent an anal fistula operation by a single-stage modified Hanley procedure during the study period. Table 1 summarized their characteristic. The median age was 43 years with a predominance of male patients (20 patients, 71.4%). In 16 patients (57.1%) had undergone a previous operation to treat anal sepsis, 21 patients had no previous history

of surgery to treat anal fistula, whereas the rest presented with recurrent fistula. Baseline stool or gas incontinence symptoms did not see in all patients. Seven patients involved in this study were diabetics (25%).

Nearly half of patients had high trans-sphincteric fistula in anal and had internal opening above dentate line.

Complete healing was achieved in 10-12 weeks. All patients were followed up for minimum period of six months. None of the patients had bleeding, wound infection, premature dislodgement or slippage of seton. Recurrence was found in three patients (10.7%). The causes of recurrence as shown in table (2) were high type horseshoe fistula, recurrent fistula and in diabetic patients.

Discussion

Fistula in an is one of the most frequent anorectal pathologies with a spectrum of clinical presentation⁵. The route and extent of the fistulae and the associated acute suppuration are defined by the origin in the crypto glandular complex and the involvement of the anatomically circumscribed perirectal space The superficial and deep post anal space of Courtney located behind the anal canal. Both communicate on either side with ischio rectal fossa providing the pathway for the formation of horseshoe abscess and fistula [8].

Suppurative anorectal disease involving the deep post anal space comprises less than 15% of all type pf anorectal sepsis 12. Horseshoe abscess and fistula with primary opening the posterior midline, a trans-sphincteric extension to the deep post anal space and bilateral involvement of the ischeo rectal fossa represent the most sever manifestation 13. It remains a complex and challenging a clinical entity due to configuration, depth and the degree of the sphincter involvement. The management of the anal fistula in an effective manner has always been a challenge to the surgeon world over. The conventional operative treatment of the anal fistula is to lay open or completely excise the fistula tract and allow healing by open granulation [14]. In high anal fistula included horseshoe type, complete excision is not possible due to the involvement anal sphincters.

In 1965 Hanley proposed a treatment strategy for horseshoe fistula based on conventional description of post anal space of Courtney. This included bilateral para-anal incision over ischio rectal space to drain the infra levator lateral extensions of the horseshoe and packing with gauze wicks. Hanley proposed technique was a less morbid and more successful alternative to complete un-roofing which had been the standard operation at that time [15].

A decade later Hamilton published his experience with similar technique and reported 6.2% recurrence 16. So, the original Hanley procedure associated with high incidence of fecal and flatus incontinence, in 1990 notification of Hanley procedure done for management of horseshoe fistula using a hybrid seton elastic (glove seton) in order to preserve the anal sphincter and prevent the incontinence.

We adapted single stage modified Hanley's procedure, for all our patients included in this study in management their horseshoe fistula and the surgical outcome of using this procedure during the study period from February 2020–December 2022 was analysed.

The ischio rectal space were thoroughly curetted and after draining the pus, irrigated with povidone and hydrogen peroxide solution and later with saline. The space is packed with dressing soaked in 4% povidone iodine solution.

In all our patients included in this study the internal openings were noted in the posterior midline at the level of the dentate line which indicates the presence of associated deep post anal abscess. If this abscess is not drained, the definite treatment of the fistula can be achieved, this is the most important point in the surgical treatment of horseshoe fistula.

The presence of horse shoe fistula in this study is diagnosed by the nature of disease, history of discharge and the physical examination only. The patients had purulent, often blood-stained perianal discharge from the two or more external opening in the ischia rectal fossa and also having intermittent pain. MRI, contrast fistula graph and ultrasound for delineating the collection of pus are used as per the need. MRI is mainly used for patients having recurrence of fistula and the complex course. In our observation the MRI is superior to contrast fistula graphy.

Beets Tan et al^{18,19} evaluated the accuracy of MRI for the detection of anal fistulas and evaluated the additional clinical value of preoperative MRI. He correlated the MRI findings with findings during surgery and found its sensitivity and specificity for detecting horse shoe fistula tract as 100% and 100% respectively.

In our study, for few patients we did not perform routine radiological study using MRI and contrast fistula graphy. However, all had extensive clinical evaluation and on table hydrogen peroxide and probe examination.

On the table the course of the fistula tract is confirmed by injecting hydrogen peroxide into the one of the external openings of the horse shoe fistulas. Although the passage of a probe from both the external and internal aspects is the most reliable technique to identify a fistula tract intra-operatively, injection of various substances such as methylene blue, indigo carmine, hydrogen peroxide or even milk has been described and used widely. Hydrogen peroxide is probably the best mean for identifying the internal opening, since the pressure created by the bubbles, may be sufficient to penetrate even a stenotic tract^{20,21}. In our series, we cannulating the fistula tract by blind –tip probe after injecting the hydrogen peroxide is an essential step of the fistula surgery. Probing not only provide the identification of the course of the fistula tract but also facilitate the fistulotomy over the probe. Probing should be gentle, otherwise it will result in creation of a false route which further complicate the operative procedure.

Partial fistulotomy with counter -drainage of lateral tract and posterior midline incision to reach the deep post anal space is made by electrocautery. We prefer electrocautery because it provides a better homeostasis than the traditional knife.

Conclusion

Although horseshoe fistulas are not common but are challenging due to configuration and sphincter involvement. A modified Hanley procedure with drainage of the deep post anal space and end mass removal of the secondary fistulous tracts without cutting the post anal sphincter proved to be a safe successful method and did not result in fecal incontinence.

So, in this study we confirmed that the modified Hanley operation is effective and conservative surgical procedure that eliminates the disadvantage of keeping the seton for a long period and it is useful method for preservation of the sphincter function.

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