Rerouting as a minimal sphincter sacrificing procedure for the management of horseshoe perianal fistula: a prospective observational study

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Back
ground Horseshoe fistula is a complex and challenging type of fistula due to the depth and complexity of its associated fistulous track. High rates of recurrence and incontinence after surgical treatment are the dominant issues surrounding the management of this disease.

Aim of the study
The aim of the present study is to assess the feasibility and results of the use of rerouting technique, which the authors previously described in the treatment of simpler fistulas, for the management of the more complex horseshoe fistula.

Patients and methods
This is a prospective, observational study in which 30 patients with horseshoe fistula were operated upon by the staged rerouting operation. Patients were recruited from El Demerdash University Hospital, and Dar Elshefa Hospital, Cairo, Egypt. The operation was completed in three stages: in stage one, all extrasphincteric tracks, including the horseshoe track, were laid open and a seton was left in the main transsphincteric track. In the second stage, the transsphincteric track was rerouted into the intersphincteric space, and in the third stage, fistulotomy of the intersphincteric fistula was done. Twenty-three patients completed all stages of the procedure and were the participants of the present study.

Results
After a minimum follow-up of 7 months, three patients (13%) developed minimal incontinence (Wexner score 2), and none of the patients had fistula recurrence.

Conclusion
Staged fistulotomy for horseshoe fistula with rerouting of the transsphincteric track into intersphincteric position is associated with acceptable results as regards recurrence and incontinence.

Keywords:
fistulotomy, horseshoe perianal fistula, rerouting, sphincter saving fistula surgery

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Introduction

Fistula-in-ano is a common benign colorectal disease that affects patients in the most productive years of life [1,2]. Parks *et al.* [3] defined four types of anal fistula: intersphincteric, transsphincteric, suprasphincteric, and extrasphincteric. Horseshoe perianal fistula is a complex type of transsphincteric fistula, in which infection extends from the 6 o'clock anal gland into the postanal space reaching the ischiorectal fossa on either or both sides before it drains into the perianal skin. This particular extension of infection is the cause of the complex horseshoe track. Surgery is the only curative treatment of anal fistula. The major goals of surgery are complete eradication of sepsis with minimal recurrence and preservation of sphincter function [4]. The aggressive lay open (fistulotomy) operation is known to result in cure of the fistula in the majority of patients with minimal recurrence but with increased risk of postoperative incontinence [5]. Despite the limited success of sphincter-saving procedures in avoiding recurrence of anal fistula, they all depend on dissecting, injecting, or manipulating a simple track that is neither kinked nor obstructed at any point, a prerequisite that is not present in horseshoe fistula [6,7].

Rerouting of the fistula tract is a minimal sphincter sacrificing operation in which transposition of the extrasphincteric portion of the track into an intersphincteric position is done, with fistulotomy of the transposed intersphincteric track done at a later

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date. The lower half of the internal sphincter is thus severed while the external sphincter is preserved [8]. It is presumed that rerouting operation can achieve the minimal recurrence of fistulotomy while preserving an acceptable degree of continence. In a recent study, rerouting operation was used to treat 54 patients with high arching transsphincteric and suprasphincteric fistulae; the recurrence rate was 5.5% and the incontinence rate was 7.4%, all were in the form of minor gas incontinence [9]. The aim of the present study is to assess the feasibility and results of rerouting operation in the treatment of patients with horseshoe perianal fistula.

Patients and methods

This is a prospective observational study in which 30 patients with horseshoe fistula were operated upon by staged rerouting operation. Twenty-three patients completed all stages of the operation and were the participants of the present study. Patients with the following criteria were excluded from the study:

(1) Age less than 18 years.
(2) Presence of synchronous fistula.
(3) Noncryptogenic anal fistula.
(4) Cryptogenic, nonhorseshoe fistula.
(5) Horseshoe fistula in immunocompromised patients.

All patients were subjected to:

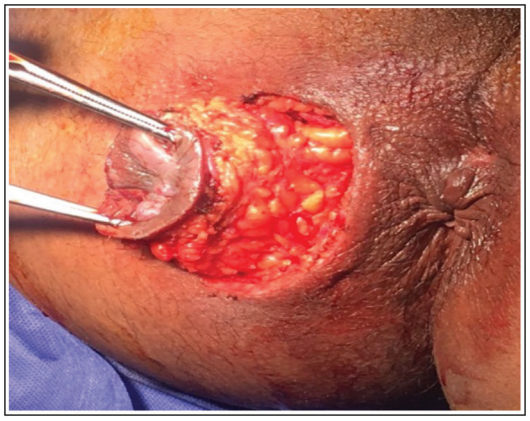
(1) Full clinical assessment with proper clinical examination of the anal region and digital rectal examination.
(2) Assessment of continence by Wexner score.
(3) Routine preoperative laboratory assessment.
(4) Magnetic resonance imaging (MRI) fistulogram.

Surgical technique

First stage

The steps of the first stage have been previously described [10]. Under general or regional anesthesia, the patient was put in the lithotomy position. After skin preparation and draping, anal examination was done to confirm the preoperative diagnosis and to finally road map the anatomy of the fistula with its side tracks and its internal opening. Surgery started by dissection and mobilization of the supralevator track, starting from the external opening until its apex is reached above the level of the pelvic floor muscles (Fig. 1). A posterior circumanal incision was then made and the anal canal was mobilized behind the anal sphincters until the horseshoe track was reached at the level of the anorectal junction (Fig. 2). The supralevator track was laid open, curetted, and irrigated (Fig. 3). The mouth of the horseshoe track was negotiated in the medial wall of the supralevator track, then it was probed, laid open, curetted, and irrigated (Fig. 4).

Figure 1

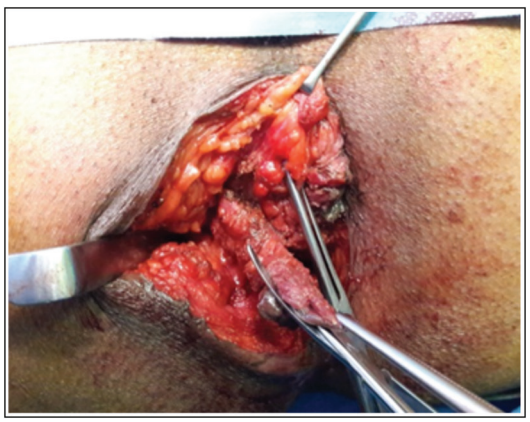


Mobilization of the supralevator track.

Figure 2

Mobilization of the anal canal.

Figure 3

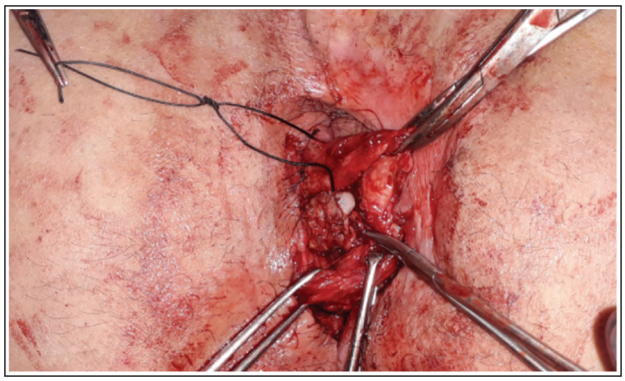


Lay open of supralevator track at the anterolateral wall.

Figure 4

Lay open of horseshoe track.

Figure 5



Rerouting of the fistula in the intersphincteric plane with insertion of loose seton.

An anal speculum was then introduced in the anal canal and gentle probing of the transsphincteric track was done starting from the internal opening of the fistula until it appeared in the middle of the laid open horseshoe track. A loose seton was then inserted in the transsphincteric part of the fistula. The first stage was concluded by excision of the mobilized supralevator track as well as any excess skin or fat to saucerize the wound. Hemostasis was secured, and the wound was packed [10].

Second and third stages

Steps of second and third stages have been previously described [9]. In the second stage, the transsphincteric track was transposed (rerouted) into the intersphincteric space. In the third stage, the rerouted intersphincteric fistula was laid open (Figs. 5 and 6).

Postoperative follow-up

The patients stayed overnight in the hospital. Before discharge, dressing was done to check for hemostasis and proper wound packing. Patients were discharged on pain killers and laxatives; antibiotics were not prescribed routinely. Patients were taught how to do

Figure 6

Intersphincteric fistula ready for lay open.

home dressing, and they were instructed to do the dressing once daily and after every motion.

Follow-up was done in the outpatient clinic weekly for 1 month and monthly for 6 months. At each follow-up visit, the wound was checked for evidence of premature closure or abscess formation. After complete healing, the patients were assessed for fistula recurrence and continence status. Incontinence was assessed using the Wexner scoring system. Recurrence was identified by persistent tracks, persistent external or internal openings, and the presence of anal pain or discharge. MRI and examination under anesthesia was done to confirm recurrence if clinically suspicious.

Results

The demographic data and comorbidities of 23 patients who contributed to the present study are shown in Table 1. Eighteen patients had de-novo horseshoe fistula, whereas five patients had recurrent fistula.

All patients were operated by the same team. The duration between different stages of the procedure ranged between 2 and 3 months. This was guarded by achievement of complete healing of the anal wound. The median duration of follow-up after completing all stages was 24 months (range, 7–45 months).

There were no reported major postoperative complications. One patient developed postoperative abscess due to skin bridging. He was treated by dressing under anaesthesia and the skin bridge was divided. Three patients (13%) developed had transsphincteric, rather than intersphincteric, fistula after complete healing of the anal wound after the second stage of the operation. All those patients had another rerouting in the third stage and all were cured after a four-stage operation.

Table 1 Demographic data of patients (*n*=23)

Age (years)	
Mean±SD	45.35 ± 10.85
Range	28–71
Sex	
Female	0 (0.0%)
Male	23 (100.0%)
HTN	
No	21 (91.3%)
Yes	2 (8.7%)
DM	
No	21 (91.3%)
Yes	2 (8.7%)
Type of fistula	
De-novo HSF	18 (78.3%)
Recurrent HSF	5 (21.7%)

DM, diabetes mellitus; HSF, horse shoe fistula; HTN, hypertension.

Table 2 Wexner incontinence score after each stage of the procedure

After stage	Wexner score	Number of patients (%)
1st stage	0	23 (100.0)
2nd stage	0	22 (95.7)
	2	1 (4.3)
3rd stage	0	20 (87.0)
	2	3 (13.0)a

[a]One patient started developing incontinence after stage II.

After completing all stages of the operation, three patients (13%) developed minor faecal incontinence in the form of minor gas leak (Wexner score 2). In one patient, incontinence was noted after completing the second stage, and in two patients, it was noted after completing the third stage (Table 2). There were no reported cases of recurrence after completing all stages of the operation.

Discussion

Horseshoe perianal fistula is a special type of transsphincteric fistula with a complex extrasphincteric track. Several techniques for the management of horseshoe perianal fistula have been described; however, the literature lacks convincing data for the optimal treatment of this disease. Like surgery for any type of anal fistula, the basic principle of treatment of horseshoe fistula is to eliminate all septic foci with the least amount of functional derangement [11].

John Arderne [12], early in the fourteenth century, described a technique in which he excised the internal opening and unroofed all fistulous tracts. Despite the significant anorectal deformity and fecal incontinence that is caused by Arderne's procedure, his technique predominated until the second half of the twentieth century, when Hanley described a more conservative approach, focusing on the preservation of the anorectal anatomy while eliminating the offending cryptoglandular complex. Despite the lower recurrence rates, Hanley's [13] technique still required transection of relevant components of the posterior sphincter complex, which had the potential for altered anorectal function. Koehler *et al.* [14] treated 42 patients with horseshoe fistula by performing fistulectomy combined with closure of the internal fistula opening and doing counter incisions to drain all lateral extensions. They reported recurrence and incontinence in 26% and 32% of patients, respectively. Tan *et al.* [15], in a retrospective review of 17 patients with horseshoe fistula treated by the ligation of intersphincteric fistula track (LIFT) technique, reported overall success rate of 70.6%, the median follow-up duration was 8 months, incontinence rate was not obtained for those patients. Other studies using LIFT for the treatment of horseshoe fistula reported success rate of less than 60% [16–18].

Rerouting is a procedure that combines the time tested principle of fistula lay open with minimal division of the sphincter complex. The procedure was first described by Mann and Clifton [8], who treated five patients with transsphincteric fistula by the rerouting operation. Since that time, no reports appeared in literature using rerouting in the treatment of anal fistula, until recently Abou-Zeid *et al.* [9] published the results of rerouting operation in the treatment of 54 patients with high arching transsphincteric and suprasphincteric fistulae. They reported 5.5% and 7.4% incidence of recurrence and incontinence, respectively. To our knowledge, the use of rerouting in horseshoe fistula has never been described.

In the present study, we used the rerouting operation for the treatment of 23 patients with horseshoe fistula. None of the patients had fistula recurrence and 13% developed minor incontinence in the form of occasional gas leak. Such good results have never been reported in previous studies concerned with the surgical treatment of horseshoe fistula regardless of the surgical technique used.

Abou-Zeid *et al.* [9] used a two-stage procedure for rerouting of transsphincteric and suprasphincteric fistulas; however, for rerouting of horseshoe fistula, a three-stage procedure is required. This is because, as reported by Abou-Zeid *et al.*, a prerequisite of the success of the procedure is that the rerouted track be intact to avoid recurrence of transsphincteric fistula in the second stage. Mobilization of the extrasphincteric tracks of a horseshoe fistula while keeping it intact is almost impossible because of the depth of the tracks and their proximity to the rectal wall and the anorectal

junction. Thus, in the first stage of the procedure, all extrasphincteric tracks are laid open and a seton was inserted in the original transsphincteric track aiming at converting the complex horseshoe fistula into a simple transsphincteric fistula. The transsphincteric fistula is then rerouted and laid open in extra two stages. Being a three-stage procedure is definitely a limitation of the technique; however, the end result that is achieved defies this limitation.

One patient developed early postoperative abscess due to skin and soft tissue bridging. In horseshoe fistula, the wound, especially of the first stage, is wide and deep, making the postoperative dressing process difficult, thus giving chance for skin and soft tissue bridging. The big wound after surgery for horseshoe fistula is unavoidable if proper deroofing of all the extrasphincteric tracks is to be achieved. It is important that those patients be closely followed up in the early postoperative period until healthy granulation tissue fills the deep wound. At any sign of abscess formation, dressing under anaesthesia should be done to undo any skin bridging and to properly inspect the wound to avoid later recurrence. The big wound after surgery is considered to be another drawback of this operation; however, the scar after complete wound healing is usually minimal.

In the second stage of the operation, the transsphincteric track was inadvertently opened during mobilization in three patients. This unfortunately obliged us to reinsert the seton in the injured transsphincteric track and to add an extra stage to the procedure; thus, we ended up with four stage procedure. Admitting the disappointment that those patients experienced because of adding an extra stage to their operation, yet none of them had recurrence. Every effort should be made not to injure the fistulous track during mobilization.

A weak point of the present study is the limited number of patients; however, a strong point is the long follow-up period. The good result that was achieved encourages us to extend the study to a bigger number of patients, aiming at achieving similar results. We believe that, by using this technique in the treatment of horseshoe fistula, we could avoid the two factors that adversely affect the quality of life after surgical treatment of anal fistula, namely recurrence and major incontinence [19].

Conclusion

Staged fistulotomy for horseshoe fistula with rerouting of transsphincteric track into intersphincteric position is associated with acceptable results regarding recurrence and incontinence.

Acknowledgements

Ethical consideration: ethical approval was obtained from the Research Ethics Committee of the Department of General Surgery, Ain Shams University.

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Conflicts of interest

There are no conflicts of interest.

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