



## ORIGINAL ARTICLE

# MANAGEMENT OF DEEP POST ANAL SPACE SUPPURATION ASSOCIATED WITH HORSESHOE FISTULA: CONVENTIONAL LAY OPEN METHOD VERSUS POSTERIOR MIDLINE APPROACH

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### Abstract

**Aim:** The aim of this study was to evaluate treatment of anal fistulae with deep post anal space affection using posterior midline approach compared to the conventional lay open method using the lateral approach.

**Methods:** Sixty patients with complex horseshoe fistulas of cryptoglandular origin, diagnosed by clinical examination and preoperative MRI were randomly allocated into 2 groups. Group A were subjected to the conventional lay open method while group B patients were subjected to the posterior midline approach. After the surgery the patients were followed up for a period of one year noting the healing time, effect on continence, and the occurrence of recurrence.

**Results:** The mean healing time for group A was shorter than of group B. Patients of group B showed significant less time to regain their normal activity. Overall patients experienced little or no effect on the continence mechanism compared with their situation before surgery with slightly better results in the group B patients. The recurrence rate was 13.3% % for group A compared to 3.3% for group B with no statistical significance.

**Conclusion:** The posterior midline approach is a good surgical approach for treating complex and horseshoe fistulas giving good results as regard healing time, effect on continence, and recurrence.

**Keywords:** Anal fistula; space of Courtney; Hanley's technique.

### INTRODUCTION

Anorectal suppuration is most commonly cryptoglandular in origin. Surgery is the basic treatment of anal fistula, aiming mainly at healing the fistulous tracts, eradication of infection, and preservation of anal sphincter muscles. The appropriate type of surgery is

dictated by the course of the fistula tract.<sup>(1,2)</sup> Significant potential morbidity, such as incontinence, contributes to the surgeon's reluctance to perform aggressive and invasive procedures. The term Horseshoe fistula describes spread of an abscess originating in the deep posterior anal space to the ischioanal and perianal spaces. Incomplete or semi-horseshoe fistula develops

when one arm of horseshoe abscess spontaneously drains into the skin, while drainage of both arms results in a complete horseshoe fistula.<sup>(3-5)</sup> In the case of operating on a horseshoe fistula, any surgical approach must provide good and complete drainage of the deep postanal space, fistulotomy or seton drainage for the secondary tracks, together with minimal effect on the function of the external sphincter mechanism to preserve continence.

The first description of the deep postanal space and its relation to formation of a horse shoe fistula was provided by Courtney in 1949.<sup>(6)</sup> The space described by Courtney is traditionally described to be located posterior to the external sphincter at the junction of both ischioanal fossae. Based on this description, trials made to treat complex horse shoe fistula found a high incidence of recurrence.<sup>(7)</sup>

In 2006, Kurihara et al.,<sup>(8)</sup> revived studying the anatomy of the postanal space and combined that with operating on a large series of cases. They dissected cadaveric samples and described the posterior anal space in a different way as compared to the conventional description of Courtney. They claimed that the posterior deep space (PDS) is that space which lies in the posterior portion of the central anal region surrounded by the musculature. The anterior border of the PDS is the internal sphincter, the superior border is the inferior surface of the puborectalis, and the inferior and lateral borders are the anterior surfaces of the external sphincter. Thus, according to them the PDS lies within the deep part of the external sphincter in the intersphincteric space.

This study was designed to evaluate treatment of horse shoe anal fistulae with deep post anal space affection, based on the new description by Kurihara,<sup>(8)</sup> using posterior midline approach compared to the conventional lay open method using the lateral approach.

## PATIENTS AND METHODS

The study included 60 patients complaining of perianal fistula, admitted to colorectal surgery unit, Alexandria Main University Hospital during the period December 2007 to September 2010. The sample size was calculated using G-power program 3.1.3 [2010] as alpha error 0.05 beta error (power 90) and assuming effect size 0.5.

Inclusion criteria were; posterior horseshoe complex fistula, defined as fistula having multiple tracts with single or multiple external openings, the deep postanal space affection is demonstrated by bidigital examination and preoperative MRI. Exclusion criteria included patients with low and superficial fistula, patients with no deep postanal space affection, and patients with fistula secondary to other pathology (e.g. Malignancy, IBD, trauma, radiation, etc.).

### Preoperative measures:

All patients were subjected to the following; full history taking, thorough clinical examination, preoperative MRI to demonstrate the deep postanal space affection (Fig. 1). Routine preoperative laboratory investigations and preoperative assessment of incontinence using Wexner score<sup>(9)</sup> were also done. Informed consent was taken from all patients. Preoperative preparation consisted of enema the night before surgery.

### Operative techniques:

Patients were randomly allocated into two groups (group A and group B) using closed envelope technique. A total number of 60 envelopes were divided into two groups: 30 envelopes for conventional lay open technique and 30 envelopes for posterior midline approach. Envelopes are completely sealed and shuffled.

An operative nurse with no clinical involvement in the trial and is blinded to the procedure chooses one envelope just before the surgery and inform the surgeon with the procedure to be done. All patients received general anesthesia and were operated upon in lithotomy position.

### Group A: Patients were subjected to conventional fistulotomy operation as follows:

The procedure starts by identification of the internal opening. This step is augmented by injection of povidone iodine from the external opening. The internal opening is usually palpated in the posterior midline and is located on the lower rim of the puborectalis shelf with some woody sensation of the puborectalis sling. Then, we probe the external opening to determine the direction of the tract going to a high pocket located usually in the ischioanal fossa whether in the high infra levator space or in the lower clinical ischioanal space. The external opening is widened by excising a part of the surrounding skin in lateral direction, and with the probe inside until a finger lies well inside the cavity of the fistula. Thorough curettage is then done to eliminate all granulation tissue inside the cavity. Next step is to insert an anal dilator and to probe the internal opening. The probe in all cases assumes a direction that is described as cranial ward with an angle of 45 to 60 degrees posteriorly. The probe is pushed firmly with caution and usually some resistance is encountered before yielding is attained. The probe will suddenly overcome the resistance and pass a variable distance that is usually about two to three cm before it stops. The probe is manipulated by one hand in order to enable the inserted index finger of other hand to feel its tip. The probe should be delivered around the external sphincter muscle into the ischioanal cavity and thence to outside the wound. We cut through the tissues between the two limbs of the probe in straight line using diathermy accomplishing the lay open procedure. The operation is completed by inspecting the laid open tract and detecting any side tract going into the contralateral side. Any side tract should be curetted, and get its mouth

dilated to insure well drainage. Trimming of the skin wound and hemostasis ends the procedure.

**Group B: patients were subjected to Posterior midline approach.**

This technique entails the initial steps described in the conventional lay open technique (group A patients) till we probe the internal opening. The next step starts here by inserting the anal dilator with its handles located towards the pubis, and a self-retaining mastoid retractor with its handles located towards the coccyx, thus clearing up the posterior midline from the verge to the internal opening with the probe inserted in. Diathermy is used to split the tissues from outside the verge to the probe inside the internal opening. The first layers are the mucosa, the submucosa & the internal sphincter. The fibers of the external component of the external sphincter then appear into the view. Cutting is done in almost a straight line until the operator recognizes the fat joining the two ischio-rectal fossae when the whole muscle bulk is severed. Cutting over the lower aspect of the probe will open the primary lesion from below (Fig. 2) enabling insertion of a curette to evacuate the granulation tissue (Fig. 3). The primary lesion is located just below the puborectalis sling which forms the roof, while the two sides are formed by parts of the deep portion of the external sphincter as is its posterior wall. The floor is formed of the fibers of the superficial component of the external sphincter, now split to enable the cavity to be drained without hindrance to the outside between the two cut lobes of the superficial external sphincter. Then, posterior wound is curetted, scrutinizing for possible side contra lateral tracts or extensions to supra-levator, inter-sphincteric, or para-rectal spaces. Hemostasis and refashioning of the skin wound ends the procedure.(Fig. 4).



**Fig 1. MRI of anal canal showing DPS affection.**



**Fig 2. Primary lesion was opened (povidone iodine drained from it).**



**Fig 3. Curettage of the primary lesion.**



**Fig 4. Final appearance of the operative wound.**

**Outcomes:**

**Primary endpoint:**

- Recurrence which was detected by the surgeon in outpatient clinic at 3,6,9 and 12 months after the operation.

**Secondary endpoints:**

- Healing time (complete wound healing was defined as intact skin with no discharge or clinical signs of infection) detected by the surgeon in outpatient clinic during the monthly visits in the first 3 months.

- Incontinence reassessment in comparison with the preoperative status using Wexner score <sup>(9)</sup> by the surgeon before the surgery (base line) and at 3 and 6 months after the surgery during the outpatient clinic visits.
- Time to regain normal activity (the time when the operative wound no more interferes with the patients' daily routine whether by causing pain or discharge.) as mentioned by the patient and recorded by the surgeon in the outpatient clinic visits.

Data were collected and analysed using SPSS 17.0. Chi square test, Student "t" test and Fisher Exact test that were used as tests of significance at 5% level of significance.

## RESULTS

No significant differences were detected between the

**Table 1. Demographic data of the two groups.**

	Group A "n=30"	Group B "n=30"	P
<b>Age</b>			
Range	19 – 58	22 – 55	
Mean	35.2	37	
SD	11.24	10.44	0.524
<b>Gender</b>			
Male number (%)	24 (80%)	27 (90%)	
Female number (%)	6 (20%)	3 (10%)	0.279

P <0.05 is significant.

**Table 2. Comparison between the two groups regarding the postoperative healing time, time to regain normal activity, Wexner score and recurrence.**

	Group A "n=30"	Group B "n=30"	P
<b>Healing time (weeks)</b>			
Range	6 – 15	10 – 16	
Mean	11.5	12.45	0.106
SD	2.54	1.9	
<b>Time to regain normal activity (days)</b>			
Range	18 – 35	17 – 30	
Mean	24.6	22	0.036
SD	5.13	4.23	
<b>Wexner score after 3 months</b>			
Range	0 – 8	1 - 8	
Mean	3.75	3.90	0.793
SD	2.27	2.13	
<b>Wexner score after 6 months</b>			
Range	0 - 7	0 - 6	
Mean	2.90	2.55	0.493
SD	2.07	1.85	
<b>Recurrence (till one year)</b>			
Number	4	1	
%	13.3%	3.3%	0.152

P <0.05 is significant.

two groups as regards demographic data (Table 1). All studied patients had previous surgical intervention ranging from 1 to 6 operations (mean 2.3± 0.75). Previous surgical interventions included abscess drainage (25%), fistulotomy, fistulectomy and seton placement (75%). All patients suffered from anal fistula for long periods ranging from 3 months up to 90 months. The median disease duration was around 13 months (mean 13 ± 8.5). The number of external openings ranged from 1 to 4 openings. Preoperative continence status was assessed in all patients using Wexner score.<sup>(9)</sup> It ranged from 0 to 5 in group A (mean 1.85 ± 1.6) and from 0 to 5 in group B (mean 2±1.62) with no significant statistical difference between both groups. Patients of group B showed significant less time to regain their normal activity compared to patients of group A. Both groups showed comparable results as regards post-operative healing time, Wexner score and recurrence. Post-operative data are shown in (Table 2).

## DISCUSSION

In 1965, Hanley<sup>(10)</sup> proposed a treatment strategy for horseshoe fistula based on the conventional description of the post anal space of Courtney. This included bilateral para-anal incisions over the ischio-rectal spaces to drain the infralevator lateral extensions of the horseshoe abscess cavity and curettage of the fistula tracts and packing with gauze wicks. Hanley's proposed technique was a less morbid and more successful alternative to complete unroofing, which had been the standard operation at that time. A decade later, Hamilton<sup>(11)</sup> published his experience with a similar technique and reported (6.2%) recurrence. Reports regarding postanal space and horseshoe infections and treatment are sparse and are generally retrospective analyses. Furthermore, some of these studies do not report length of follow-up or any data on postoperative continence, and lack control groups for comparison.<sup>(12-15)</sup>

In this study, the duration of symptoms ranged from 3 to 90 months. The multiplicity of previous interventions (ranging from one to six operations) indicated the difficulty managing this type of fistulae. Furthermore the lack of definite clear method of surgical approach to this type of fistulae contributes to high rates of recurrence.

Diagnosis is believed to be relying on the presence of a characteristic internal opening located in the midline posteriorly close to a fibrotic tough puborectalis sling, with a pocket felt deep posteriorly if bidigital examination is possible. However, it is advised that MRI be used in the evaluation of complex or recurrent disease.<sup>(16)</sup>

Kurihara et al<sup>(8)</sup> assumed that the extension of pus follows the entrance of the blood vessels penetrating the external sphincter. These penetration sites were described to be high between the puborectalis sling and the deep part of the external sphincter or low between the deep part and the superficial part of the external sphincter. According to these authors the first site of penetration leads to a space named infra-levator space, and the second low site of penetration leads to the space named clinical ischio-rectal fossa. These extensions were also found in most of our cases, however, in two cases (5%) there was no extension of pus through the external sphincter. The spread was laterally to the intersphincteric space. In these two cases the external openings were found near the anal verge, the midline incision of the external sphincter became a must to assure drainage of the primary lesion located intra-sphincterically. The laterally located intersphincteric abscess cavities were joined to the primary lesion by dividing the internal sphincter once again over the abscess cavity. This did not jeopardize the continence mechanism.

As regards the time to regain normal activity, the large cavity created laterally during fistulotomy for patients

in group A, may be the cause of longer time to regain normal activity in this group. However, as it is located laterally, the overall healing time was not affected. Group A patients were earlier to heal, although the difference was not statistically significant. The presence of the fibrous tissue tract itself is very important to hold tissues together and lessen the time of healing which when complete will regain the function of the cut external sphincter. The midline incision healed more slowly, yet on complete healing it leaved no keyhole deformity as was expected. Insisting on incising the external sphincter in the median raphe without any excision helped regaining of the shape and function of the sphincter to its original status. This caused better results regarding continence status. A six months period seems to be the appropriate period for evaluating the continence. This is because at a three months period some wounds were not found to be soundly healed in group B.

In group A patients the recurrence rate was higher than group B patients (4:1 respectively). This was not found to be statistically significant. The cause of recurrence in lay open group may be attributed to failure of the surgeon to retrieve the tip of the probe inserted through the internal opening across the ischio-rectal abscess cavity. Many factors can contribute to this; (1) the tight inlet of the abscess cavity due to fibrosis, preventing proper location of the tip of the probe inside the high extension of that cavity where the communication between the PDS and the extension exists, (2) the presence of tight fibrous tissue tract preventing the examining finger from feeling the tip of the probe at the summit of the ischio-rectal extension. Rarely if the internal opening is not passable by the probe, then it is possible to create a false passage and get out of the original tract. Recurrence would then result. Due to the previously described situations, if direct fistulotomy is to be performed, one should insist on demonstrating the whole tract that is usually taking a V shaped (the top of the V is deep in the ischio-rectal fossa) with curettage of its fibrous tissue wall to detect any other missed entries of a side or supralevator pockets. Recurrent cases were re-evaluated and treated but results were not added to the study as they were not randomized.

We suggest that the classical Park's classification of the anal fistula<sup>(17)</sup> should be revised. A new category to be named intra-sphincteric fistulae can be added to the well-known inter and trans-sphincteric ones. These can only occur in the midline posteriorly.

In conclusion the posterior midline approach is a good surgical approach for treating complex and horseshoe fistulas giving good results as regard healing time, effect on continence, and recurrence. The results of this study support Kurihara et al.<sup>(8)</sup> new description of the deep post anal space and its role in forming the horse shoe fistula. However, further studies may be needed to confirm our results.

**Conflict of interests:** None.

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