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Fistulotomy and drainage of deep postanal space abscess in the treatment of posterior horseshoe fistula

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Abstract

Background: Posterior horseshoe fistula with deep postanal space abscess is a complex disease. Most patients have a history of anorectal abscess drainage or surgery for fistula-in-ano.

Methods: Twenty-five patients who underwent surgery for posterior horseshoe fistula with deep postanal space abscess were analyzed retrospectively with respect to age, gender, previous surgery for fistula-in-ano, number of external openings, diagnostic studies, concordance between preoperative studies and operative findings for the extent of disease, operating time, healing time, complications, and recurrence.

Results: There were 22 (88%) men and 3 (12%) women with a median age of 37 (range, 25–58) years. The median duration of disease was 13 (range, 3–96) months. There was one external opening in 12 (48%) patients, 2 in 8 (32%), 3 in 4 (16%), and 4 in 1 (4%). Preoperative diagnosis of horseshoe fistula was made by contrast fistulography in 4 (16%) patients, by ultrasound in 3 (12%), by magnetic resonance imaging in 6 (24%), and by physical examination only in the remainder (48%). The mean ± SD operating time was 47 ± 10 min. The mean ± SD healing time was 12 ± 3 weeks. Three of the 25 patients (12%) had diabetes mellitus type II. Nineteen (76%) patients had undergone previous surgery for fistula-in-ano, while five (20%) had only perianal abscess drainage. Neither morbidity nor mortality developed. All patients were followed up for a median of 35 (range, 6–78) months and no recurrence was observed.

Conclusions: Fistulotomy of the tracts along the arms of horseshoe fistula and drainage of the deep postanal space abscess with posterior midline incision that severs both the lower edge of the internal sphincter and the subcutaneous external sphincter and divides the superficial external sphincter into halves gives excellent results with no recurrence. When it is necessary, severing the halves of the superficial external sphincter unilaterally or even bilaterally in the same session does not result in anal incontinence. Close follow-up of patients until the wounds completely healed is essential in the prevention of premature wound closure and recurrence.

Background

Anorectal abscess fistula disease is most commonly cryptoglandular in origin [1]. However, secondary fistulas may develop due to underlying diseases such as Crohn's disease, hidradenitis suppurativa, tuberculosis or actinomycosis [2]. If the anorectal abscess is not drained

spontaneously or surgically, the infection may spread rapidly and may result in extensive tissue loss. Even if the abscess is drained, a fistula-in-ano may develop subsequently. It is most common in people aged between 20 and 50 years with four-fold male predominance and an annual incidence of 1 in 10.000 [3]. Anorectal fistulas are divided into four distinct types according to the Parks' classification: intersphincteric, transsphincteric, suprasphincteric, and extrasphincteric [4]. These groups can be further subdivided according to the presence and courses of associated secondary tracts. The appropriate type of surgery (simple fistulotomy, fistulectomy, seton placement or advancement flap rotation) is dictated by the course of the fistula tracts. The prognosis of cryptoglandular abscess fistula disease is excellent once the source of infection is identified [2]. On the other hand, patients with a chronic or recurring abscess following adequate surgical drainage often have an undrained deep postanal abscess communicating with the ischiorectal spaces via a horseshoe fistula. Abscess perforating the external anal sphincter anteriorly and posteriorly enter the deep preanal and postanal spaces and may spread extensively into the ischiorectal spaces [3]. This pattern of spread produces anterior and posterior horseshoe abscesses which further result in horseshoe or semi-horseshoe fistulas [5]. Chronic abscess fistulas may become quiescent and may recur as an acute abscess with the formation of a new tract and secondary opening [6]. Treatment should involve opening the deep postanal space by a posterior midline incision which separates the superficial external sphincter muscle into halves, severing the subcutaneous external sphincter and the lower edge of the internal sphincter and unroofing the tracts by fistulotomy as first described by Hanley [7].

In this report, the outcomes of surgical treatment of patients with posterior horseshoe fistula associated with the deep postanal abscess are presented and the significance of deep postanal space is discussed under a brief review of current literature.

Methods

Twenty-five patients who underwent surgery for posterior horseshoe fistula with deep postanal space abscess between January 1997 and December 2002 were analyzed retrospectively with respect to age, gender, previous surgery for fistula-in-ano, number of external openings, diagnostic studies, concordance between preoperative studies and operative findings for the extent of disease, operating time, healing time, complications, and recurrence.

Results

There were 22 (88%) men and 3 (12%) women with a median age of 37 (range, 25–58) years. The median duration of disease was 13 (range, 3–96) months. Nineteen (76%) patients had undergone surgery for fistula-in-ano previously, while the remaining five (24%) had a history of perianal abscess drainage only. Three of 25 patients (12%) had diabetes mellitus type II. Preoperative diagnosis was established by contrast fistulography in 4 (16%) patients (Figure 1), by ultrasound (US) in 3 (12%) (Figure 2), by magnetic resonance imaging (MRI) in 6 (24%) (Figures 3, 4, 5), and by physical examination only in the remainder (48%). There was one external opening in 12 (48%) patients, 2 in 8 (32%), 3 in 4 (16%), and 4 in only one (4%). Operative findings were in accordance with Goodsall's rule, which indicates the most likely position of an internal opening based on the position of identified external openings in relation to a horizontal line transecting the mid anus, in all but one patient with accuracy rate of 96% [3]. Of the five patients who had more than 2 external openings, three underwent preoperative colonoscopy in order to rule out Crohn's disease, while the remaining two had this check some time later in the late postoperative period. In all these patients, the excised tract tissue was sent to histopathologic and microbiologic examinations for rule out any underlying infectious disease such as tuberculosis or actinomycosis, fortunately no associated inflammatory or specific infectious disease was found.

Surgical Technique

Fleet enema was used for preoperative bowel preparation in all cases. All operations were performed by the same team of two surgeons. Patients were operated on under general anesthesia in the jackknife position. Prophylactic antibiotics were not used except in diabetic patients who received ciprofloxacin 500 mg and metronidazole 500 mg twice daily for 5 days. The extent of disease was established by cannulating the fistulas with probes. All the incisions and dissections were made by electrocautery. Once all the tracts and internal opening were identified they were unroofed. The deep postanal space was reached by a posterior midline incision from the internal opening at the dentate line to the coccyx. The lower edge of the internal sphincter and the subcutaneous external sphincter were severed, while the superficial external sphincter muscle was separated into the halves by a vertical incision along the direction of its fibers-a technique which is known as Hanley procedure [7]. Once the deep postanal space was opened, the primary tract and its bifurcation in this space were identified and the extension to the ischiorectal spaces could be seen. When the horseshoe fistula was unilateral or incomplete, the affected arm of the superficial external sphincter was divided along the fistulotomy tract while the other arm was protected. However, in case of bilateral or complete horseshoe fistula, both arms of the superficial external sphincter were severed. Then, all the fistula tracts and the floor of the deep postanal space were curetted. Finally, deep postanal space was packed with povidone iodine-soaked gauze and a

Figure 1
Simple contrast fistulography. **A.** Antero-posterior aspect, the contrast agent was given through the external opening at the right-side of the anal channel, note the course of horseshoe fistula tracts; there was a complete arm at the right side (white arrow), while the left-side arms were blind (yellow arrows), **B.** Oblique aspect, the blind arm of the horseshoe fistula extended into the left gluteal area (arrow), **C.** Lateral aspect, the connection between the fistula tract and the deep postanal space (arrow) was easily shown.

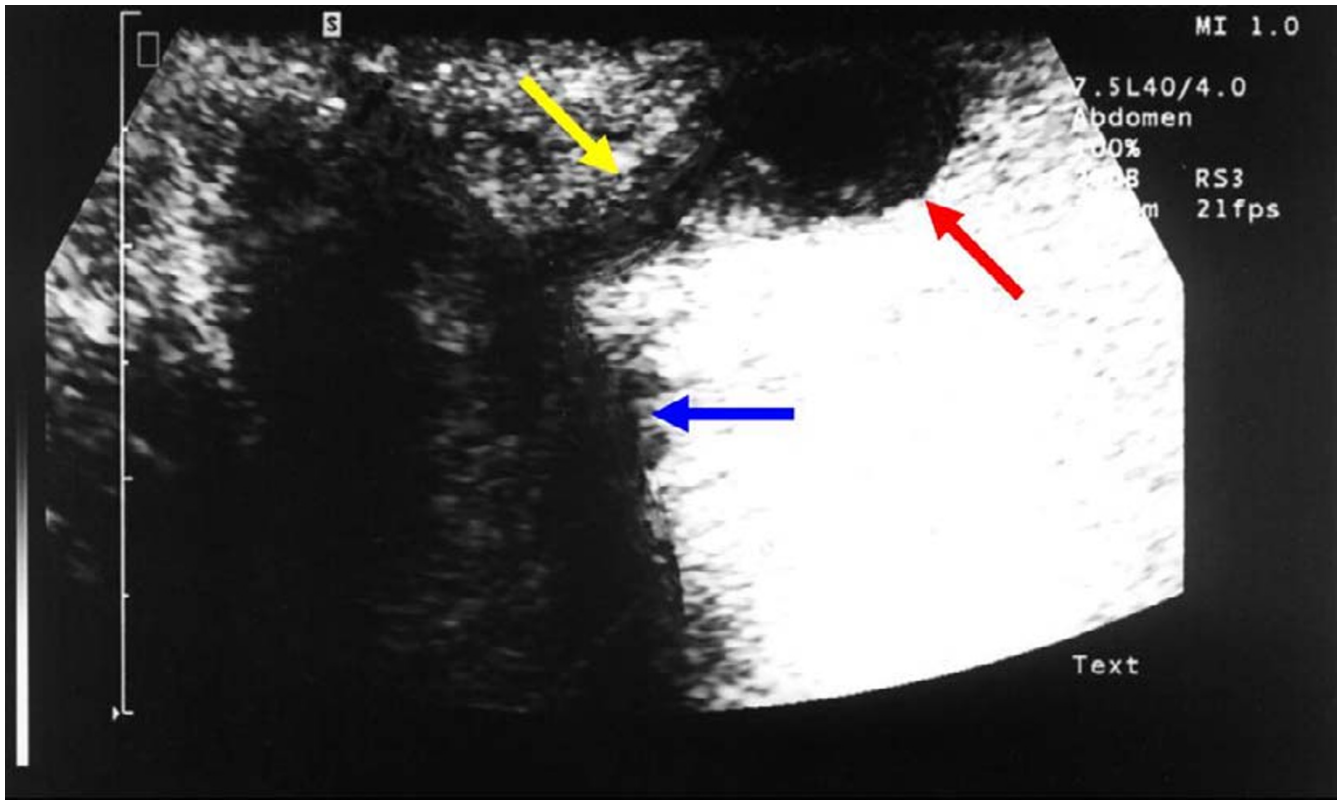

Figure 2
The connection (yellow arrow) between the deep postanal space (red arrow) and the rectum (blue arrow) was shown by ultrasound in a patient with deep postanal space abscess.

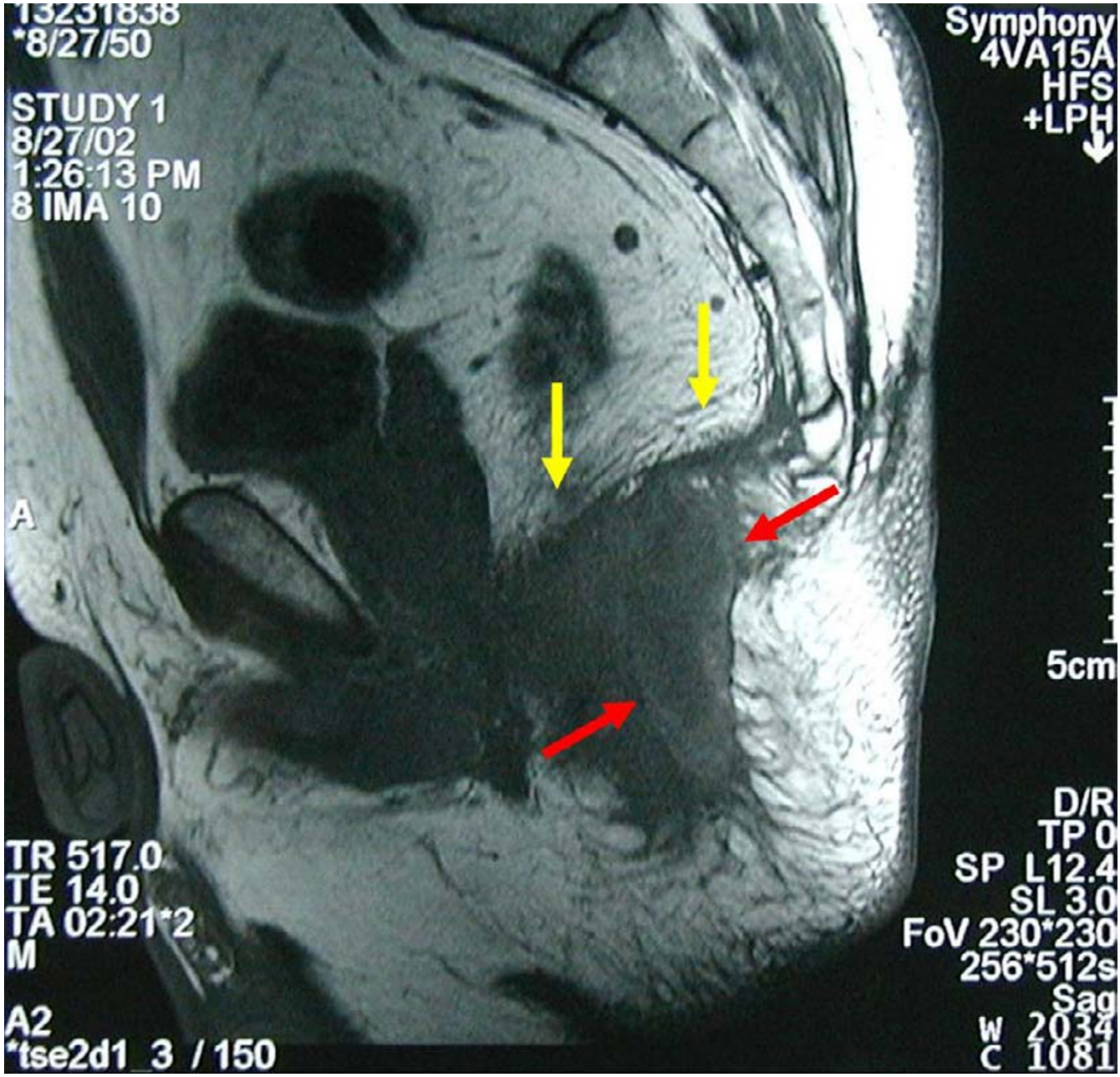

Figure 3
Sagittal T1-weighted MRI shows a hypointense lesion in the deep postanal space (red arrows). Note that the lesion is located under the levator ani muscle (yellow arrows), which indicates that it is in the deep postanal space.

dressing was applied. The mean ± SD operating time was 47 ± 10 min. A blind upward extension of the tract from the deep postanal space into the supralevator space was observed in one patient. The opening in the levator ani muscle in this patient was dilated in order to facilitate the drainage of supralevator abscess through the deep postanal space.

Postoperative Course and Follow-up

The patients were allowed to eat their regular diet after the first postoperative day. All but two patients were

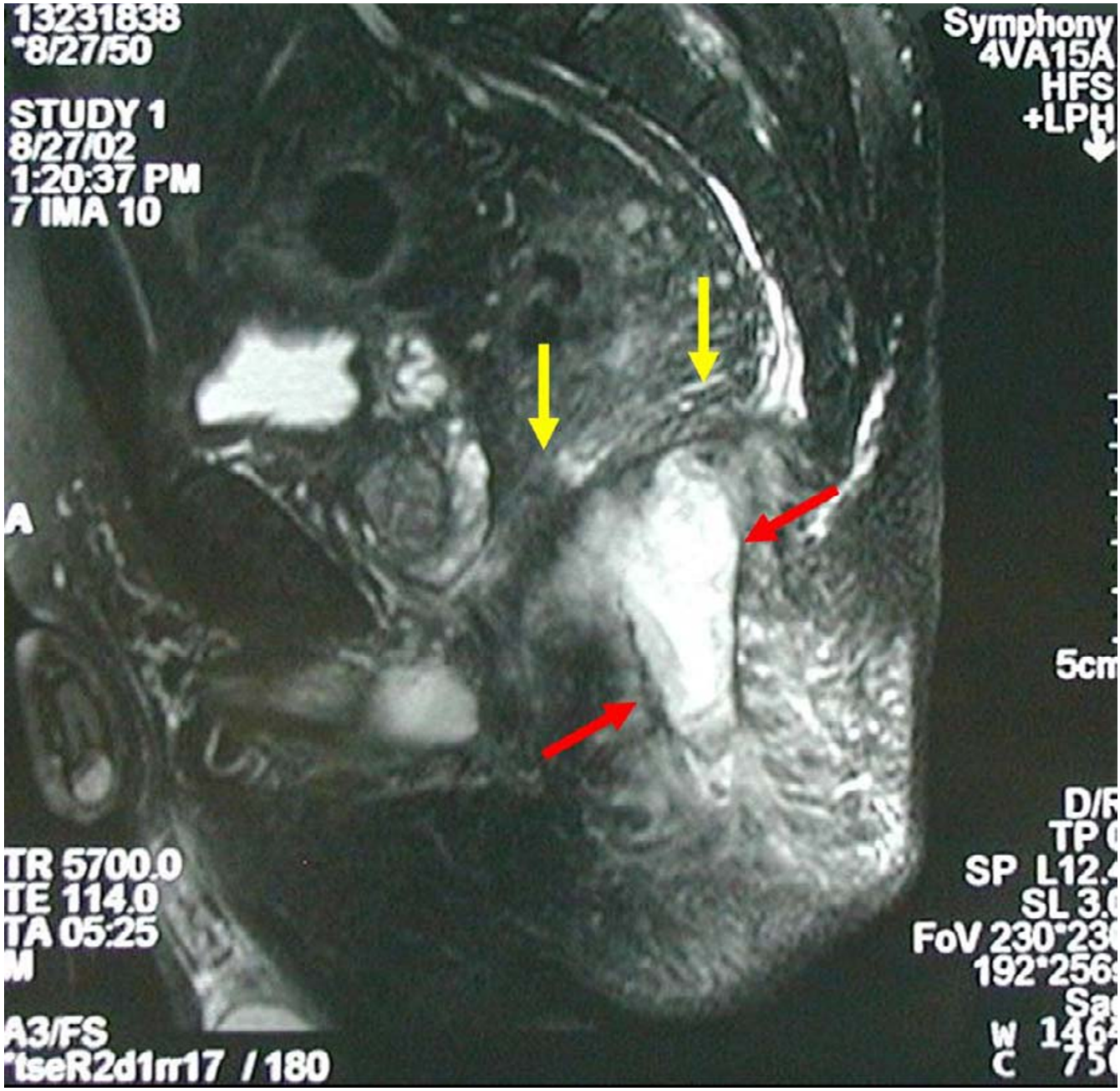

Figure 4
Sagittal T2-weighted MRI shows a well-demarcated abscess (red arrows) in the deep postanal space under the levator ani muscle (yellow arrows).

discharged on the post-operative day 2. These two patients hospitalized for 4 days postoperatively due to the excessive pain during wound care and they received narcotic analgesic and sedation with midazolam in the first 2 days during wound dressing. Stool softeners were prescribed preemptively only in cases with a history of chronic constipation. During the first 7 postoperative days, changing wound dressings twice a day and applying deep packing with povidone iodine-soaked gauze into the wound following sit baths were recommended. The patients were also instructed to run shower water directly into the wound twice a day after the first postoperative week and

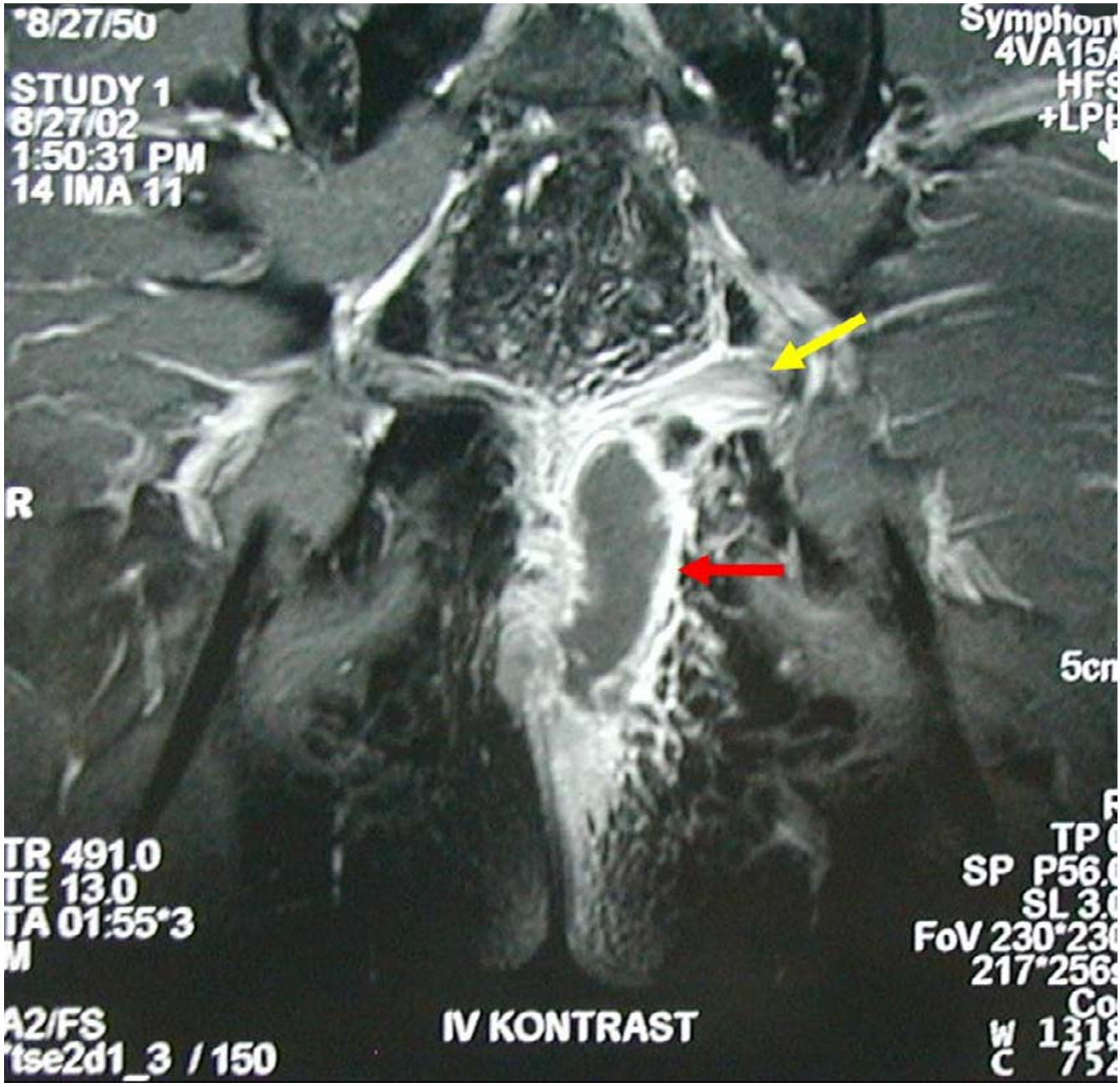

Figure 5
Coronal T2-weighted fat-sat MRI after gadolinium injection shows a semi-horseshoe abscess fistula which extends from the deep postanal space (red arrow) into the left ischiorectal space (yellow arrow).

to wear a pad as needed because of the expected minimal drainage during the healing process. All patients were followed up weekly until a complete wound healing was observed. No premature approximation of edges of the skin was observed. The mean ± SD healing time, which defined as the period from the date of operation to the date of complete healing, was 12 ± 3 weeks. Neither morbidity nor mortality developed. All patients were followed up for a median of 35 (range, 6–78) months and no recurrence was observed.

Discussion

As a general rule, etiopathogenesis of a disease must be well understood in order to achieve a satisfactory response to treatment. Contrary to the general belief that the horseshoe fistula is the cause of posterior deep anal abscess, fistula follows the development of deep postanal space abscess as its complication [5]. The natural history and the developmental steps of anorectal abscess fistula disease are well summarized by Malouf et al. [3]. At first, a cryptoglandular abscess develops in the intersphincteric space which contains the anal glands. Infection may spread via vertical, horizontal or circumferential routes, and this determines the site of the abscess [8]. Circumferential spread may occur in the intersphincteric, ischiorectal or supralevator compartments to form horseshoe fistulas [3]. On the other hand, abscesses perforating the external anal sphincter anteriorly or posteriorly enter the preanal or postanal spaces [3], in which situation the internal opening may be identified on the anterior or posterior midline at the level of dentate line. If the abscesses are not drained either surgically or spontaneously at this stage, they spread extensively into the ischiorectal spaces [6]. This pattern of spread results in anterior and posterior horseshoe abscesses. 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. On the other hand, there may be associated fistulas which are usually transsphincteric. As observed in all patients presented, the presence of internal opening on the posterior midline at the level of dentate line dictates the presence of associating deep postanal space abscess. If this abscess is not drained, the definitive treatment of fistula cannot be achieved [6]. This is the most important point in the surgical treatment of posterior horseshoe fistulas.

Simple anorectal fistulas are usually diagnosed by physical examination only, in patients suffering intermittent pain and purulent, often bloodstained, perianal discharge with a common history of anorectal abscess drainage. While physical examination is usually sufficient for assessment in uncomplicated abscess fistula disease, imaging studies such as contrast fistulography, US or MRI may be useful in the evaluation of complex or recurrent disease [2]. Maier et al. [9] compared prospectively the diagnostic yield of anal endosonography and MRI in the assessment of perianal fistula and abscess in 39 patients and found MRI superior to anal endosonography. Similarly, Beets-Tan et al. [10] evaluated the accuracy of MRI with a guadrature phased-array coil for the detection of anal fistulas and evaluated the additional clinical value of preoperative MRI, as compared with surgery alone and found its sensitivity and specificity for detecting fistula tracts as 100% and 86%, horseshoe fistulas as 100% and 100%, and internal openings as 96% and 90%, respectively. On the other hand, many studies have shown that hydrogen peroxide-enhanced US improves identification of fistula tracts and internal openings, particularly in horseshoe fistulas [11,12]. Ratto et al. [11] reported accuracy rates of clinical examination, endoanal US, and hydrogen peroxide-enhanced US for horseshoe fistulas as 81%, 81%, and 92%, respectively.

We do not perform routine radiologic studies in patients with anorectal abscess fistula disease, since the diagnosis can be established preoperatively by physical examination and intraoperative findings and the course of fistula tracts direct surgeons to choose the appropriate type of operative procedure. However, if patients describe rectal discomfort, fullness or deep pelvic pain which may indicate the presence of an associated condition, we prefer MRI for diagnosis as well as demonstration of the extent of the abscess fistula. In the present series, we needed to employ MRI in 6 patients. The other 7 patients who underwent preoperative contrast fistulography or US were either referred or admitted to our institution following diagnostic studies at other centers. In these patients, MRI was not employed since the previous radiologic documentation was satisfactory.

Several methods can be employed to identify fistula tracts intraoperatively. Passage of a probe from both the external and the internal aspects is the most reliable technique to demonstrate the course of the fistulous tract. However, injection of various substances such as methylene blue, indigo carmine, hydrogen peroxide or even milk has been described and widely used [13]. It should be remembered that when stains are injected, the surgeon may have only one opportunity to visualize the internal opening before the surrounding tissue and the operative field are contaminated by the stain. In order to avoid this, milk has been advocated. However, in patients with a stenosis in the fistula tract these staining techniques may fail. Injecting 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 [13]. We did not encounter this problem during the operations; therefore, we did not need special manoeuvres in any patient. Presence of an anal papilla guarding the internal opening is another way to locate the internal opening. We usually prefer cannulating of the fistula tract by blind-tip probes instead of staining techniques as an essential step of fistula surgery. Probing not only provides the identification of the course of the fistula tracts but also facilitates fistulotomy over the probe. However, probing should be gentle, otherwise it easily results in creation of a false route which may further complicates the operative procedure.

The importance of identifying internal openings and fistula tracts properly during the initial surgery was best shown by Sangwan et al. [14]. The authors evaluated 461 patients who underwent surgery for simple fistula-in-ano retrospectively and found that 30 (6.5%) of them developed recurrent fistulas. The cause was missed internal openings in 16, missed secondary tracts in 6, premature fistulotomy wound closure in 5, and miscellaneous factors in 3. In this report, patients with high transsphincteric fistulas with or without high blind tract, suprasphincteric, extrasphincteric, and horseshoe fistulas as well as fistulas associated with inflammatory bowel disease had been excluded. Therefore, the investigators concluded that all so-called simple fistulas may not have readily detectable primary openings and may behave as complex fistulas due to their secondary tracts. In the present series, six patients were preoperatively considered to have simple fistulas; however, careful intraoperative exploration showed the internal openings at the posterior midline and the tracts of horseshoe fistula by probing them through the external openings. In addition, the connection with the deep postanal space was demonstrated by probing the internal opening at the posterior midline in these cases. Moreover, a blind upward extension of fistula tract from the deep postanal space into the supralevator space was observed in one patient. The opening in the levator ani muscle was dilated in order to facilitate the drainage of supralevator abscess through the deep postanal space. This patient needed an extended hospitalization period due to excess pain during the wound dressing and could be discharged on the postoperative day 4. One of the important points in the management of this case is to prevent premature closure of the wound which can be achieved by deep wound dressing especially in the early postoperative period. This type of wound care sometimes requires narcotic analgesic administration prior to the wound dressing. The wound was completely healed without any wound complication 18 weeks after surgery in our patient.

Fistulotomy and the posterior midline incision to reach the deep postanal space can be made either by traditional knife or electrocautery. We prefer the latter device, because it provides better hemostasis. However, Gupta [15] very recently described a new technique for fistulotomy with the radio frequency surgical device in the treatment of fistula-in-ano. His results are promising since he reported the procedure, which proposed as "sutureless fistulotomy", significantly less time-consuming and more hemostatic.

There is still a debate on the use of seton placement in the treatment of horseshoe fistulas. Ustynoski et al. [16] performed primary fistulotomy and counter drainage in 24 patients with horseshoe fistula and reported recurrence rate of 28.6% with this technique. When they treated 11 patients by seton fistulotomy and counter drainage, they could reduce the recurrence rate down to 18.1%. The authors recommend this method as operative procedure of choice for horseshoe abscess fistula. Similarly, Held et al. [17] treated 69 patients for posterior (n = 59) and anterior (n = 10) horseshoe abscess fistula by different surgical techniques including incision and drainage, incision and drainage with primary fistulotomy, incision and drainage with primary fistulotomy and counter drainage, and incision and drainage with insertion of seton. The authors advocated seton placement in the treatment of horseshoe abscess fistula with its better outcomes. Pezim [18] reported excellent results of 24 patients who underwent unroofing the deep postanal space with division of overlying external sphincter muscle by seton for posterior horseshoe fistula. In his series, the success rate was given 92% with a 3.5-month mean healing time. In the present series, severing the halves of subcutaneous external sphincter instead of seton placement yielded excellent results without anal incontinence.

It is not our routine clinical practice to perform postoperative anal manometry, transanal US or transanal MRI in the assessment of status of the anal sphincters unless the patient describes any symptom relevant to anal incontinence. None of the patients in our series suffered permanent anal soiling or discharge in the close long-term follow-up. On the other hand, patients undergoing internal sphincterotomy and fistulotomy may experience temporary anal soiling and some degree of drainage from open wounds in the early postoperative period. If anal discharge continues after a complete healing of fistulotomy wounds, investigations for anal incontinence should be performed. All patients were questioned regularly for any symptom of anal incontinence at their routine visits and none of them complained of permanent anal discharge. Digital anal examination also revealed satisfactory anal tonus. Therefore, any further investigation was not needed in patients of this series.

Conclusions

Posterior horseshoe fistula with deep postanal space abscess is a complex disease, in which most patients have a history of anorectal abscess drainage or surgery for fistula-in-ano. Posterior midline location of internal fistula opening indicates the presence of associating deep postanal space abscess to horseshoe fistula. Drainage of the deep postanal space abscess is an essential step for the prevention of recurrence. Both the lower edge of the internal sphincter and the subcutaneous external sphincter should be severed during the drainage of deep postanal space abscess by posterior midline incision and the superficial external sphincter should be divided into two halves. Fistulotomy should also be carried out along the tracts of the fistula. The superficial external sphincter can

be divided by either sphincterotomy or seton placement unilaterally or even bilaterally as appropriate. Although good results following the insertion of seton for this step have been reported, we advocate sphincterotomy without reservation because no serious complication such as incontinence has developed during the long-term follow-up.

List of abbreviations

US: Ultrasound

MRI: Magnetic Resonance Imaging

SD: Standard Deviation

Competing interests

None declared.

Authors' contributions

RG planned the study and prepared the manuscript. RI participated in the operations, read and approved the final manuscript.

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