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Management of Complex Anal Fistula in Recurrent Perianal Abscess: A Case Report

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Patient: Female, 32-year-old
Final Diagnosis: Occult anal fistula
Symptoms: Recurrent perianal abscesses
Clinical Procedure: —
Specialty: Surgery

Objective: Unusual clinical course

Background: Perianal abscesses are acute suppurative infections in perianal soft tissues or spaces, frequently associated with Crohn's disease, malignancies, diabetes, immunosuppression, or prior anorectal procedures. Persistent or recurrent infections following incision and drainage (I&D) with standard wound care may indicate occult anal fistulas, necessitating thorough evaluation.

Case Report: A 32-year-old woman presented with acute right buttock/thigh swelling, pain, and hypotension, initially diagnosed as septic shock. No predisposing factors were identified. Initial management included antibiotics and CT-guided drainage, resolving symptoms temporarily. One month later, she developed recurrent fever, chills, and a subcutaneous abscess. Repeated evaluations revealed no fistula; I&D with vacuum sealing drainage (VSD) and plastic surgery-led wound closure achieved transient improvement. Three months postoperatively, purulent discharge recurred. Persistent symptoms prompted referral to a colorectal hospital. Rectal MRI identified a high complex-type anal fistula, confirmed surgically. Definitive fistula repair led to complete resolution.

Conclusions: Recurrent perianal infections, particularly in diabetics or obese patients, require vigilance for occult fistulas. This case highlights the bidirectional relationship between abscesses and fistulas, emphasizing that negative initial evaluations do not exclude fistula formation. MRI demonstrates superior diagnostic accuracy for complex fistulas and should be prioritized in refractory cases. Repeated drainage without addressing underlying fistulous tracts lacks long-term effectiveness. Early multidisciplinary collaboration and definitive surgical intervention are critical for sustained recovery. Specialized imaging and timely referrals optimize outcomes in diagnostically challenging scenarios.

Keywords: Abscess • Case Reports • Fistula • Recurrence

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Introduction

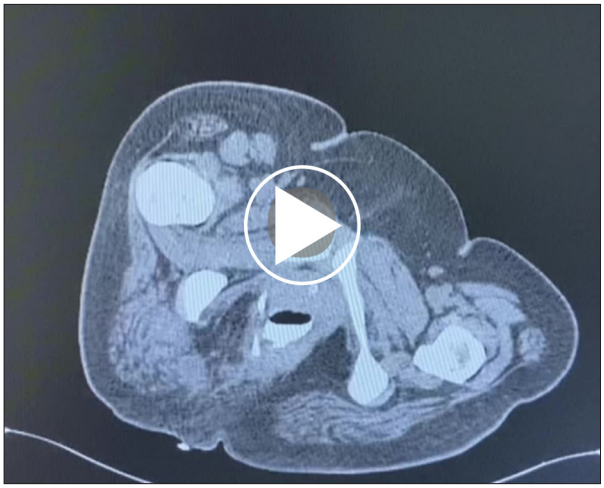
Perianal abscesses primarily result from anal gland infections41]. Bacteria infiltration of perianal tissues through the openings of the anal glands leads to localized abscess formation. Standard treatment involves surgical incision and drainage [2,3]. However, disease progression may be complicated by the formation of an anal fistula, particularly an occult anal fistula, predisposing patients to recurrent abscesses and complicating etiological assessment.

This report presents the case of a 32-year-old woman with recurrent perianal abscesses following incision and drainage. This recurrent perianal abscess may be originated from anal gland infection, evidenced by polymicrobial flora (gram-positive cocci, gram-negative bacilli) [1,4,5]. The patient was overweight (BMI 28.23 kg/m^2) and her diabetes was not well controlled, which may have exacerbated recurrence via impaired immunity and bacterial proliferation [6,7]. MRI confirmed a high complex-type anal fistula undetected by initial imaging, explaining the atypical thigh abscesses [8,9]. The fistula's trajectory through pelvic muscles sustained the chronic infection, while MRI revealed persistent inflammation and fluid signals. Anatomic complexity and intermittent fistula closure can limit early detection, underscoring the need for MRI in refractory cases with atypical presentations. This case provides clinical insights into the diagnostic and therapeutic challenges associated with this condition.

Case Report

A 32-year-old woman (height: 163 cm, weight: 75 kg, BMI: 28.23 kg/m^2) presented on June 15, 2023 with swelling and pain in the right buttock and thigh, without identifiable predisposing factors. Initial treatment with oral amoxicillin (0.5 g, tid) and ibuprofen (0.3 g, bid) proved ineffective. Twelve days after treatment, her symptoms worsened, with the onset of fever, chills, and hypotension (75/52 mmHg). Laboratory evaluation revealed the following: WBC 38.11×10^9/L, RBC 3.08×10^{12}/L, HGB 80 g/L, LY% 1.8%, MONO% 4.2%, NEUT% 93.6%, PLT 361×10^9/L, and hsCRP 141.4 mg/L. Based on these findings, she was diagnosed with septic shock and admitted to the Emergency Department. She had a 5-year history of diabetes and self-administered oral metformin extended-release tablets (0.5 g, bid), with no regular monitoring of blood glucose levels and other significant comorbidities.

Computed tomography (CT) imaging revealed encapsulated fluid and gas collection adjacent to the rectum and right cervix, with mild wall thickening. The infection extended posteriorly to the subcutaneous tissue near the coccyx, the right gluteus maximus, and the posterolateral right thigh muscles. Swelling



Video 1. CT images before the first surgery. Encapsulated fluid and gas collections are present in the lower rectum, anal canal, and right paracervical region. Fluid accumulations are noted in the perineal and paracoccygeal areas, with scant honeycomb-like aerated densities. No significant contrast extravasation is observed surrounding the colorectum. Circumferential enlargement of the right thigh is evident, accompanied by subcutaneous edema in the right gluteal region and proximal thigh.

and multiple gas-density shadows observed in the right gluteus maximus suggested an ongoing infection. Multidisciplinary consultation found no definitive evidence of an anal fistula. CT-guided percutaneous drainage of the abscess was performed, and Gram staining of the aspirate identified numerous gram-positive cocci and a moderate number of gram-negative bacilli. Targeted anti-infective therapy was initiated based on bacterial culture and susceptibility testing, resulting in a gradual decrease in drainage output and resolution of clinical symptoms. The drainage tube was removed on July 14, 2023.

Three days after drainage tube removal, the patient experienced recurrent fever and chills (maximum temperature of 38.9°C) with no apparent cause. Right-thigh tenderness recurred, extending 3 cm below the right knee, with associated redness, induration, and elevated skin temperature. Laboratory tests on July 17, 2023 showed the following: PLT 613×10^9/L, WBC 13.41×10^9/L, NEUT% 86.7%, RBC 3.59×10^{12}/L, HGB 92 g/L, hsCRP 238.10 mg/L, and PCT 0.37 ng/mL. By July 19, 2023, her symptoms had further worsened. CT imaging (**Video 1**) revealed abscess formation in the right thigh, prompting incision and drainage (**Figure 1**). Intraoperative exploration found no definitive rectal or anal fistula. Debridement and vacuum sealing drainage (VSD) were then performed, leading to the patient's recovery and discharge on August 24, 2023.

By October 2023, the incision had properly healed, and a follow-up ultrasound revealed heterogeneous hypoechoic areas

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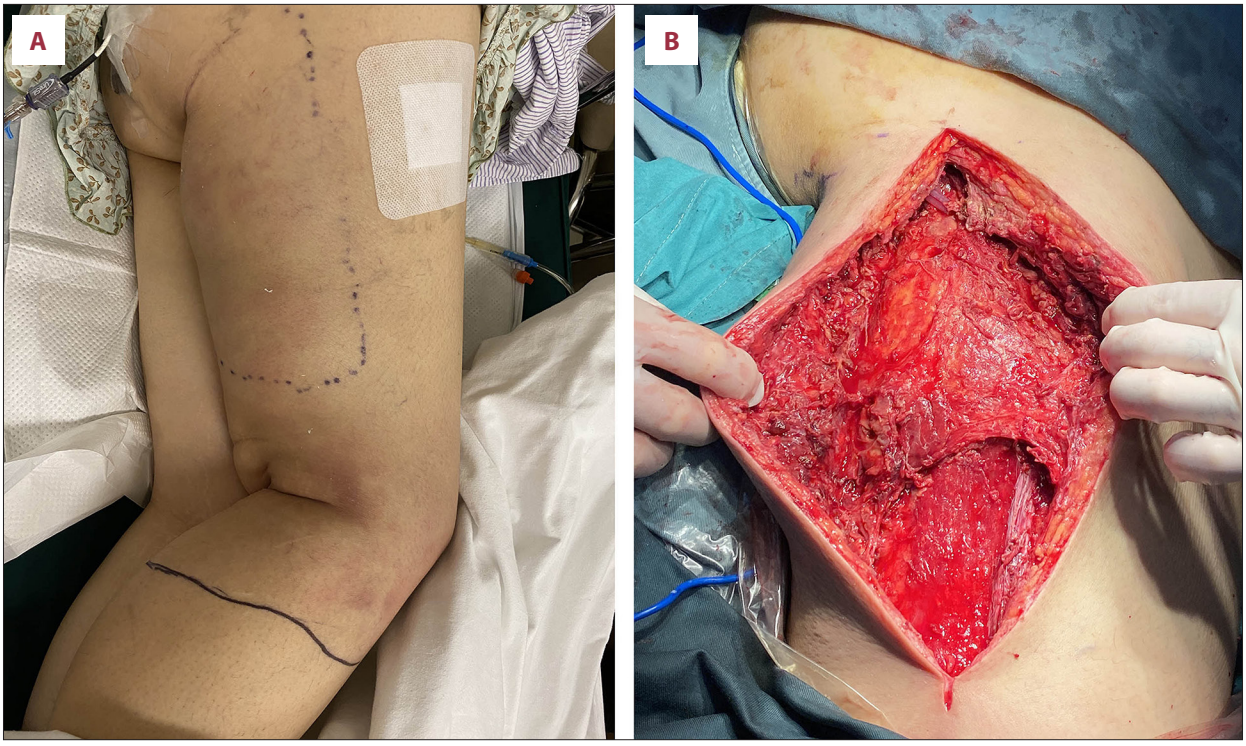


Figure 1. (**A**) Clinical presentation of the patient's right buttock and thigh: the patient presented with classic signs of inflammation-erythema, swelling, warmth, and tenderness in the right thigh, accompanied by palpable fluctuance; (**B**) Right thigh wound after debridement surgery: copious purulent material and necrotic tissue were evacuated, resulting in a wound bed with viable tissue.



Figure 2. Local recurrence of infection at the surgical incision site after the first (**A**) and second (**B**) surgical procedures. Localized swelling with palpable fluctuance was noted over the incisional scar.

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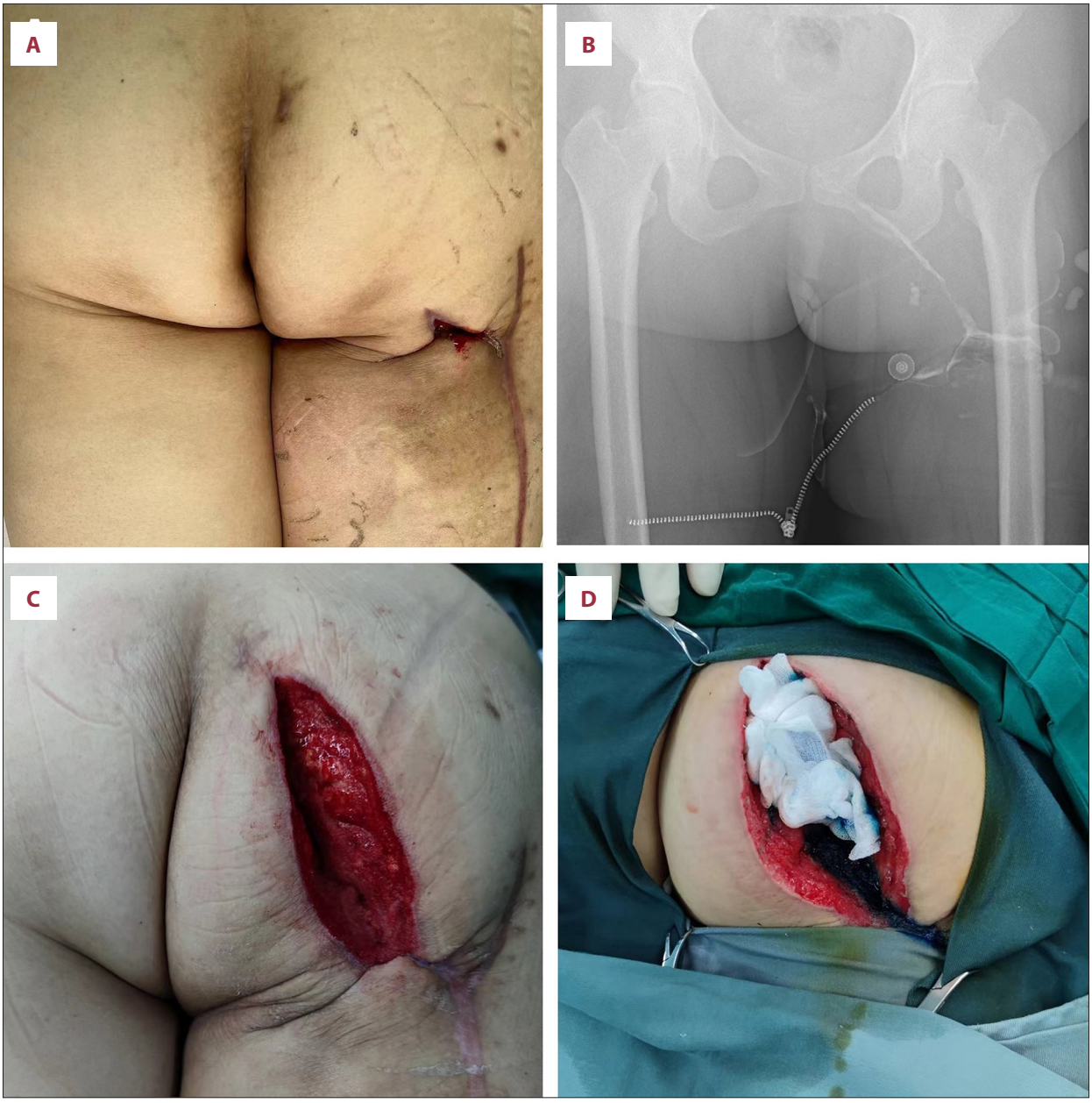


Figure 3. (**A**) Clinical wound appearance before the second surgery: A sinus tract measuring approximately 7 cm in depth was identified; (**B**) Preoperative sinus tract radiography: Sinus tract radiography showing non-communication with the anal canal; (**C**) Clinical wound appearance during the second surgery: necrotic tissue was evacuated; (**D**) Intraoperative methylene blue test during the second surgery: methylene blue was injected through the wound site, with no drainage observed from the anus.

in the right buttock (2.2×1.8 cm) and right gluteal-subcutaneous region (4.6×0.8 cm). However, on November 30, 2023, the incision site became raised and ulcerated (**Figure 2**), with malodorous and purulent discharge. A sinus tract measuring approximately 7 cm in depth was identified, raising suspicion of an anal fistula. A second ultrasound showed a heterogeneous hypoechoic area in the perianal region at the 8-9 o'clock position, measuring 5.8×2.9 cm, with indistinct boundaries relative to the anal canal. Additionally, a cord-like hypoechoic tract measuring 7.1×0.9 cm extended to the surface drainage site. Laboratory tests showed WBC 6.42×10^9/L, NEUT% 70.9%, and hsCRP <0.50 mg/L. Given these findings, the incision was extended to facilitate drainage.

On December 16, 2023, the patient was admitted for surgical wound repair. Sinus tract radiography revealed no clear

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Table 1. Timeline of clinical events of this patient.

Date	Event
2023.06.15	Initial symptoms: swelling and pain in the right buttock and thigh
2023.06.27	Patient was diagnosed with septic shock and transferred to our hospital's emergency department
2023.07.07	Patient underwent CT-guided percutaneous drainage
2023.07.14	The drainage tube was removed
2023.07.17	Patient experienced recurrent fever and chills
2023.07.19	CT imaging revealed abscess formation in the right thigh. Surgical incision and drainage were performed: intraoperative exploration revealed no annal fistula
2023.08.24	Patient recovered well and was discharged
2023.10.15	Ultrasound revealed heterogeneous hypoechoic areas in the right buttock (2.2×1.8 cm) and right gluteal-subcutaneous region (4.6×0.8 cm). No other discomfort was reported
2023.11.30	The incision site became raised and ulcerated, with purulent discharge and a malodor. The incision was extended to facilitate drainage
2023.12.16	Patient was admitted for surgical wound repair: intraoperative exploration revealed no annal fistula
2024.01.22	Patient recovered well and was discharged
2024.02.21	The mid-portion of the incision ruptured again, prompting patient referral to a specialized colorectal hospital for further evaluation
2024.03.21	The patient was diagnosed with high complex-type anal fistula according to rectal MRI
2024.03.29	The patient underwent first-stage of high anal fistulectomy and seton treatment
2024.05.15	The patient underwent second-stage of high anal fistulectomy and seton treatment
2025.04.21	One-year follow-up showed no recurrence and preserved anal function, with no incontinence

communication between the sinus tract and the anal canal. Intraoperative exploration confirmed that the sinus tract terminated approximately 2 cm from the rectum. Digital rectal examination and methylene blue testing showed no evidence of an anal fistula (**Figure 3**). Debridement and sinus tract drainage were successfully performed, resulting in the patient's recovery and discharge on January 22, 2024.

On February 21, 2024, the mid-portion of the incision ruptured again (**Figure 2**), with purulent discharge and a 7-cm-deep sinus tract. These findings raised renewed suspicion of an anal fistula, prompting patient referral to a specialized colorectal hospital for further evaluation. MRI revealed an abnormal signal at the 6 o'clock position of the anal canal at the dentate line (internal opening), approximately 25 mm from the anal verge. The fistula tract extended upward between the sphincter muscles to the right levator ani at the 7-11 o'clock position. The tract traversed the puborectalis muscle at the 5 o'clock position, descending into the right ischiorectal fossa and reaching the right gluteus maximus, with a maximum width of approximately 8 mm. A cord-like T2WI hypointense signal observed in the right gluteus maximus demonstrated high signal intensity on fat-suppressed images, extending downward to the posterior right thigh and connecting with the identified lesions. Fluid signals were observed within the fistula tract, with localized thickening of the right levator ani, external anal sphincter, and puborectalis muscles, while the left levator ani appeared normal. These imaging findings were consistent with a high complex-type anal fistula.

The patient subsequently underwent high anal fistulectomy and seton treatment twice for definitive repair of the anal fistula in March and May in 2024. One-year postoperative follow-up showed no evidence of recurrence, and anal function was well preserved, with no incontinence (**Table 1** shows the timeline of clinical events of this patient).

Discussion

This case provides valuable insights into the diagnostic challenges and clinical implications of managing refractory perianal infections. The patient's clinical course highlights the interplay of anatomical, microbiological, and systemic risk factors, as well as the limitations of standard diagnostic approaches in detecting occult fistulas.

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Initial imaging with CT and ultrasound failed to detect the fistula, demonstrating their limited sensitivity in detecting complex or occult fistulas. In contrast, MRI, with its superior soft-tissue resolution, emerged as the criterion standard for accurately delineating fistula anatomy [10]. This case underscores the importance of early MRI evaluation in recurrent abscesses with atypical presentations, particularly in high-risk individuals such as diabetics. The delayed diagnosis, along with repeated negative results from methylene blue testing and digital rectal examination, shows the limitations of isolated clinical assessments in detecting complex fistulas. This case highlights the need for a multidisciplinary approach involving colorectal surgeons, radiologists, and infectious disease specialists to improve diagnostic accuracy. Early referral to specialized centers with advanced imaging modalities could expedite diagnosis, facilitate timely intervention, and minimize morbidity. The need for 2 definitive fistula surgeries after multiple failed drainage emphasizes the challenges in managing complex perianal infections. Given the suprasphincteric trajectory of the fistula, sphincter-preserving techniques were crucial to prevent incontinence. This case reinforces the principle that definitive surgical repair of fistulas, rather than repeated drainage alone, is essential for preventing recurrence [11]. The patient's obesity (BMI 28.23 kg/m^2) and diabetes potentially contributed to impaired immune responses and delayed tissue repair, exacerbating disease progression [12]. Elevated inflammatory markers, including hsCRP 141.4 mg/L, and WBC 38.11×10^9/L, observed during septic episodes reflected systemic immune activation. However, transient normalization of hsCRP (<0.50 mg/L) during quiescent phases masked ongoing localized infection, reflecting the complexity of monitoring disease progression in immunocompromised individuals.

Recurrent abscess formation after adequate drainage should immediately raise suspicion of an underlying fistula, even in the absence of initial radiological or clinical evidence. This case demonstrates that occult fistulas may only become evident after multiple recurrences or through advanced imaging.

Systemic anti-infective therapy is crucial in early management of complex perianal infections. In this case, conservative treatment without early surgical intervention led to significant improvements in local symptoms and inflammatory markers, highlighting the effectiveness of targeted anti-infective therapy. However, the presence of an occult fistula or inadequate drainage contributed to the disease progression, necessitating surgical intervention. Aggressive glycemic control and weight management are essential for reducing infection risk and improving surgical outcomes in diabetic patients [13].

Conclusions

This report highlights the diagnostic and therapeutic challenges associated with perianal abscesses complicated by occult fistulas, particularly in patients with diabetes and obesity. Key clinical insights include: (1) Occult fistulas should be strongly considered in high-risk individuals; (2) MRI should be prioritized in refractory or anatomically atypical cases; (3) Definitive surgical repair, rather than repeated drainage alone, is essential for long-term resolution; (4) Multidisciplinary collaboration and early referral to specialized centers can optimize patient outcomes.

Future research should focus on identifying biomarkers and refining imaging protocols to predict fistula formation in high-risk patients and to enable preemptive intervention. Clinicians should maintain a high index of suspicion for occult fistulas in recurrent perianal infections, utilizing advanced diagnostics and multidisciplinary approaches to improve diagnostic accuracy and minimize morbidity.

Declaration of Figures' Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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