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Trauma Case Reports

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Case Report

Combined approach for intrapelvic abscess drainage among adults

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ARTICLE INFO

Keywords:

OIM abscess
Adductor brevis
Stoppa
Smith Peterson

ABSTRACT

Obturator internus muscle (OIM) and adductor brevis (AB) abscess occurs rarely in adults. This condition mainly affects children experiencing trauma. This paper presents and discusses a unique case of OIM and AB abscess in an adult male that was treated operatively with a combined surgical approach (modified Stoppa and Smith-Peterson) after multiple failed drainage procedures.

Case: A 23-year-old male underwent reduction and fixation of his right tibiae shaft fracture with an intramedullary nail. After several referrals to the emergency room due to recurrent symptoms of fever and groin pain, he was finally admitted and diagnosed with OIM and AB abscess and fulminant MRSA sepsis. The operative treatment was performed by addressing the abscess with an unusual combined surgical approach (Smith-Peterson and modified Stoppa) for abscess drainage.

Methods: Using PubMed, Google scholar and Hadassah Hebrew University search engines, we conducted a literature search using the following keywords: 'pyomyositis', 'obturator abscess', 'pelvic abscess', and 'pelvic osteomyelitis among children and adults'. Twenty case studies were found (14 children and 6 adults). No cases of combined OIM and AB abscess were found and only one OIM case was reported with methicillin-resistant *Staphylococcus* (MRSA).

Introduction

Abscess in the obturator internus muscle (OIM) and adductor brevis (AB) is a rare condition, usually affecting children after trauma or muscular effort. Primary infection of muscles commonly occurs in many parts of Africa and the South Pacific and is often referred to as 'tropical disease'.

Most patients present non-specific symptoms: fever, hip pain, inability to bear weight, elevated C-reactive-protein (CRP) and increased white blood cell (WBC) count. Physical examination also shows a limited range of motion at the hip joint among most of the patients [1–7].

Because of its rarity in non-tropical areas and lack of specific symptoms, OIM diagnosis is often overlooked and delayed, leading to severe complications and difficulty in treatments [1,2,8,9]. Such complications may include extension into and destruction of an adjacent joint, compartment syndrome, sepsis, and even death [10,11].

A history of trauma or intense exercise is the most common presumed aetiology [2,3,12,13]. About 21%–66% of OIM cases have a history of local trauma.

Staphylococcus aureus is the most common cultured microorganism causing a bacterial infection. Besides, *Enterococcus faecalis* and

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Neisseria gonorrhoea have also been reported as infectious agents [4–6].

Initial therapy usually involves systemic antibiotics alone, with an estimated successful outcome of 67%. Antibiotic treatment usually lasts about 2–6 weeks [10]. In refractory cases, open or closed surgical drainage must be considered.

Case presentation

A 23-year-old male with a history of methicillin-resistant *Staphylococcus aureus* (MRSA) impetigo at the forearm and right tibia fracture treated with intramedullary fixation (IMN). A year later, he had his interlocking screws removed due to skin irritation and pain. Two weeks later, he was referred to the emergency room (ER) due to redness and swelling at the surgical site and was diagnosed with stitch abscess. Cultures from the surgical site were positive for MRSA. The patient was prescribed an oral antibiotic treatment and discharged home.

Three months later, he returned to the ER with a fever and right groin pain and then discharged home with the diagnosis of viral infection. A week later, he returned to the ER with a systemic fever (39 °C), myalgia, difficult and painful ambulation, right forearm cellulitis, right sudden onset uveitis, systemic rash, and right hip lymphadenopathy.

Laboratory investigation revealed increased CRP (30 mg/dL, normal <0.5) level and WBC (14,000, normal <10,000) count, indicating an acute infection. Hepatic enzymes, lactic dehydrogenase (LDH), creatine phosphokinase (CPK) levels were also elevated. A radiograph of both hips in anterior-posterior view was unremarkable.

The patient was advised to start the treatment with intravenous (IV) antibiotics that work against MRSA to treat cellulitis. His medical condition continued to deteriorate. Positron emission tomography-computed tomography (PET-CT) scan was conducted and revealed OIM abscess with systemic manifestations [Figs. 1, 2]. Blood cultures were positive for MRSA bacteria. The patient showed signs of hemodynamic deterioration, a clinical picture appropriate for fulminant MRSA sepsis. He was admitted to the intensive care unit (ICU) and underwent ultrasound-guided drainage without improvement. Three days later, he underwent a full-body CT scan, the result showed further enlargement of the abscesses diameter. The patient's general health condition continued to deteriorate with persistent fever, CRP level of 36 mg/dL and WBC count of 20,000.

After consulting the orthopaedic team as a part of a comprehensive multidisciplinary discussion, surgical intervention was considered. A special surgical plan was developed. Based on CT scan findings and the comprehensive surgical planning, a combined approach of Smith-Peterson and modified Stoppa was chosen as the most suitable intervention to access and drain the abscesses [Figs. 3, 4]. This approach is usually used for treating complex fractures of the acetabulum and hips.

Right after surgery, his general condition was improving, and less frequent fever spikes were noticed. Additionally, there was a decrease in CRP and WBC levels after additional antibiotic treatment support for 6 weeks. Two months later, the patient showed signs of almost complete recovery. He was able to ambulate normally without any pain or functional limitations and returned to his daily activities.

Surgical technique

General anaesthesia with muscle relaxant was administered to the patient. He was positioned supine with a bump and the knee to flex the thigh and to relax the iliopsoas muscle. The contralateral pelvic was elevated to 20 degrees.

First, a decision was made to go through the medial side of the abscess by the Stoppa approach then the lateral sides was addressed by the anterior approach of the hip (Smith-Peterson).

Stoppa described his approach first in 1973 as a subperitoneal medial approach for the treatment of groin hernias. In 1994, Cole and Bonhoeffer described the Stoppa approach and directed the surgeon to stand at the opposite side of the involved hip joint during reduction and fixation of the acetabular fractures, allowing for direct visualisation of the medial wall, dome, and quadrilateral plate.

Surgical landmarks are similar to the Pfannenstiel approach. The surgical incision is made 2 cm proximal to the symphysis pubis in transverse fashion with the length extending approximately 4 cm from the external ring on the fractured side to the contralateral side. Then the rectus abdominis muscles are split vertically from inferior to superior with care taken to maintain the proximal portion to be extraperitoneal. A sharp dissection of the rectus abdominis from superior ramps of the pelvic bone is carried out, exposing the

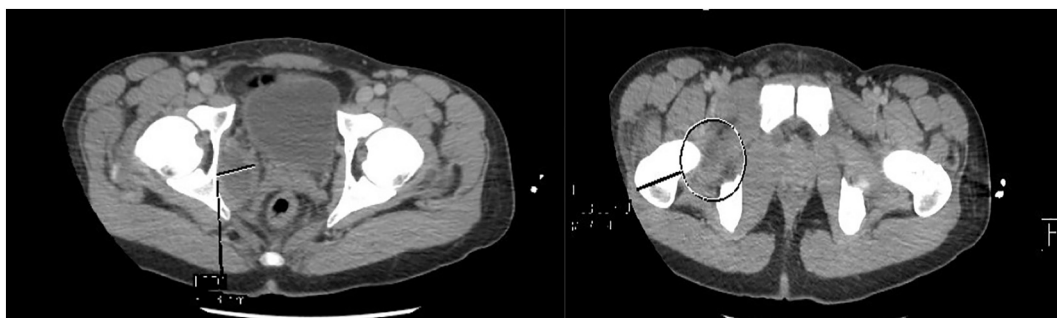


Fig. 1. CT axial scan

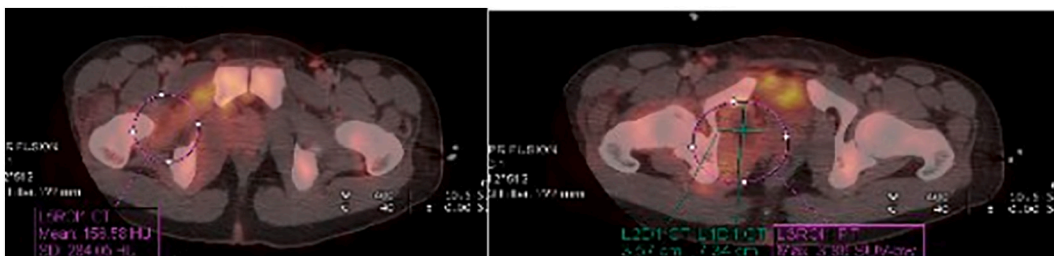


Fig. 2. PET-CT scan

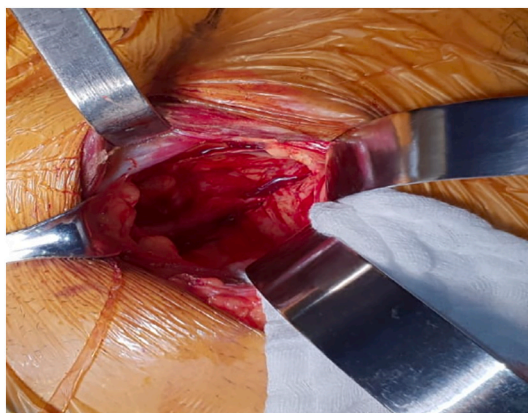


Fig. 3. Stoppa approach, showing the medial wall of the abscess.

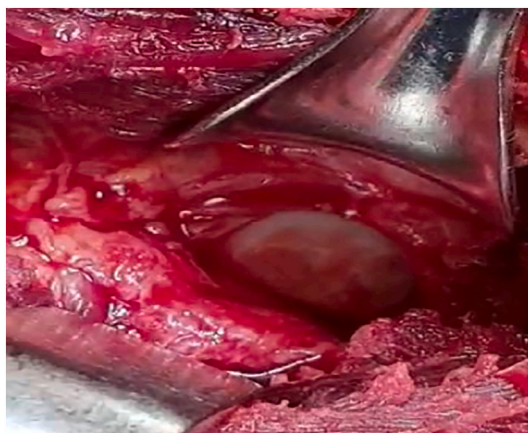


Fig. 4. Smith-Peterson approach, used as a window to reach the lateral wall of the abscess.

symphysis body and pubic ramus. The rectus and the femoral neurovascular structures are subsequently retracted laterally and anteriorly so that they are protected. The iliopsoas fascia is released to enter the true pelvis. Anastomoses between the external iliac and obturator vessels (corona mortis) should be identified along the superior pubic ramus and ligated.

Thereafter, the iliopsoas can be visualised and elevated. A retractor is used to retract the iliopsoas and external iliac vessels. The entire pelvic brim should be visualised at this time. Soon after, the obturator neurovascular bundle will be exposed and protected as the quadrilateral surface and posterior column are dissected [Figs. 2, 5, 6] [14]. This approach allows to fall directly on the medial side of the abscess and to perform drainage and debridement of the OIM and lavage for the pelvic brim.

The Smith-Peterson approach to the hip was first described by Carl Hueter, a German surgeon. Peterson was credited with spreading the use of the anterior approach in the English-speaking world. It is widely used for total hip arthroplasty. As it takes the advantage of an interval between the sartorial muscle and the tensor fascia latae muscle as superficial dissection, then between rectus femoris and gluteus medius as a deep dissection. The rectus femoris is first detached from its both origins. Then, rectus femoris and

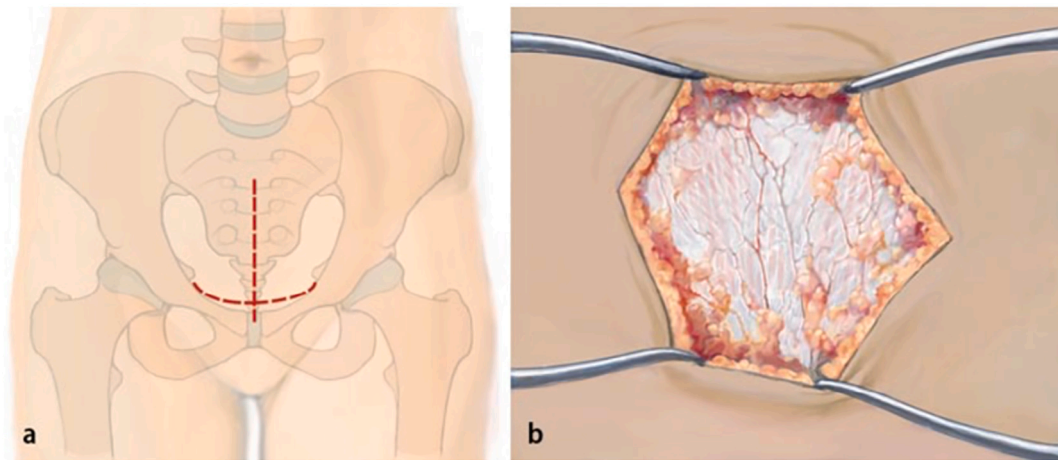


Fig. 5. (a,b): schematic for Stoppa approach:

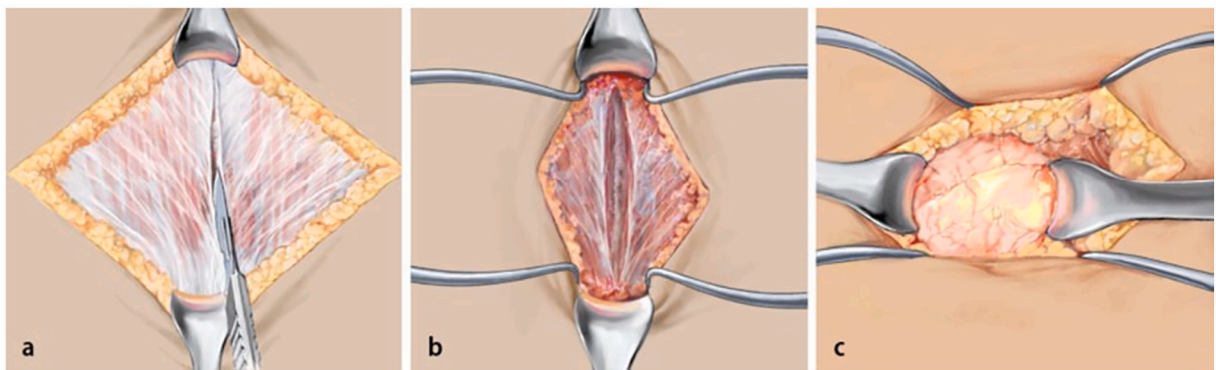


Fig. 6. the superficial dissection for Stoppa approach.

iliopsoas are retracted medially and gluteus medius is retracted laterally to expose the hip capsule [15,16] [Fig. 7]. This approach helps visualise and examine the hip, thus facilitating the drainage of the lateral sided of the abscess and adductor brevis muscle debridement and lavage.

Discussion

OIM abscess and intrapelvic abscess are rare medical conditions. About 80% of OIM abscess cases occur in adolescents [17,18]. Patients with OIM abscess present with symptoms such as fever, hip pain, limp, and limitation in hip motion. Physical examination is characterised by a limited range of motion. The hip is usually flexed, abducted, and externally rotated. Although this presentation suggests the diagnosis of septic arthritis, other entities like pelvic osteomyelitis, retroperitoneal abscess, psoas muscle abscess, and OIM abscesses should be considered in the differential diagnosis [4,13].

Because of its rarity and often non-specific symptoms, OIM abscess is unlikely to be considered during initial diagnosis. Delaying diagnosis may result in severe complications.

Trauma and strenuous exercises are considered a predisposing factor of OIM abscess. Patients often report a history of minor trauma and a potential source of bacteraemia before presenting with OIM abscess [17]. Local trauma has been documented in an estimated 21% to 66% of the reported cases [2]. Local trauma to the muscle that results in inflammation or haematoma is thought to be important for the formation of OIM abscess, in addition to a concurrent transient episode of bacteraemia [12]. *S. aureus* is the most common pathogen of OIM abscess.

In a previous case report for treatment OIM abscess, the main treatment included open biopsy drainage and antibiotics [1]. In our case report, we discuss our successful practice in using a combined approach of modified Stoppa and Smith-Peterson interventions that are used in the treatment of intrapelvic fractures as a method for wide abscess drainage.

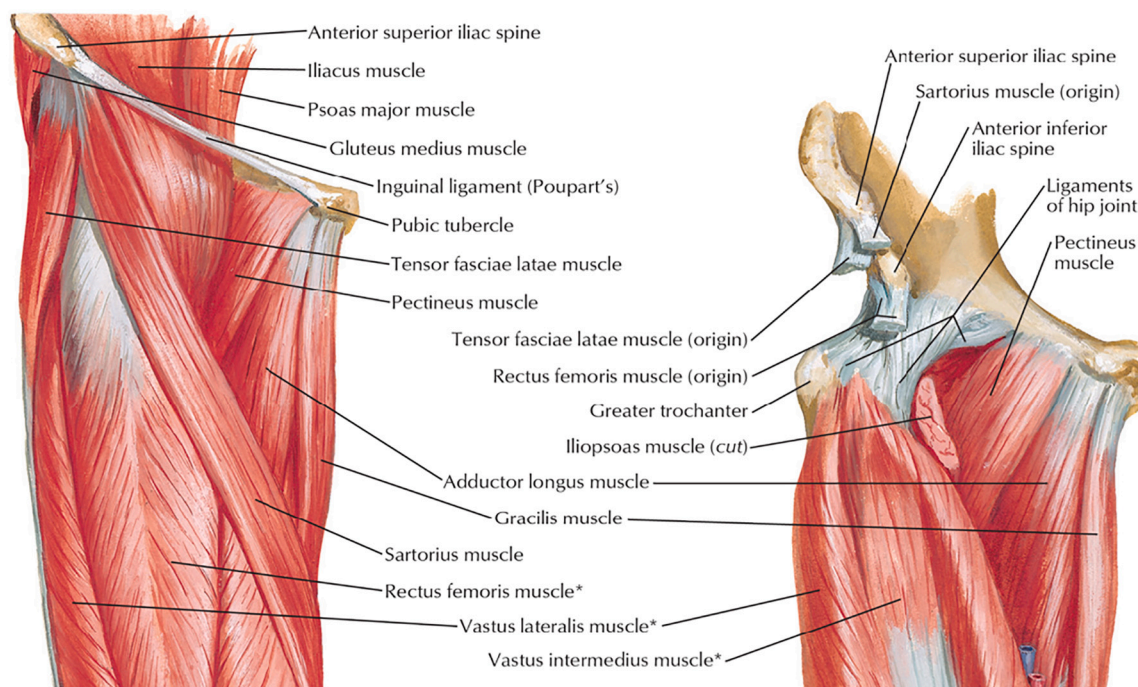


Fig. 7. schematic Smith Peterson approach. (black line, Netter Anatomy Atlas).

Conclusion

This paper presents our successful experience in the management of OIM abscess by using a combined approach that commonly used for treating fractures. The findings of our report highlight that in challenging and recalcitrant cases, a novel method is required to treat an otherwise inaccessible abscess. In our combined approach, the modified Stoppa approach enabled the access of the medial wall of the abscess and allowed deep examination of the pelvic cavity, while the Smith-Peterson approach gave access to the lateral wall of the abscess and allowed meticulous examination of the hip joint.

References

- [1] Akinori Maeda, Isaku Saku, Shotaro Kanda, Kazuo Saita, Toru Akiyama, Obturator internus muscle abscess caused by methicillin resistant *Staphylococcus aureus* in an adult: a case report, *Int. J. Surg. Case Rep.* 44 (2018) 1–3.
- [2] Birkbeck D, Watson JT. Obturator internus pyomyositis. A case report. *Clin Orthop* 1995;316:221–6.
- [3] White BD. Red eyes and red rash with fever: an uncommon initial presentation for staphylococcal obturator abscess with adjacent ischial osteomyelitis. *J Am Osteopath Assoc* 1991;91:807–12.
- [4] A. Hakim, M. Graven, K. Alsaied, E.M. Ayoub, Obturator internus abscess, *Pediatr. Infect. Dis. J.* 12 (1993) 166–168.
- [5] Souid AK, Sadowitz PD, Weiner L, Dubansky AS. Obturator internus muscle abscess: a case report and review of the literature. *Am J Dis Child* 1993;147:1278–9.
- [6] M.E. Snook, J.J. LiPuma, Pelvic muscle abscess an unusual cause of gait disturbance in young children, *Clin Pediatr* 32 (1993) 298–299.
- [7] S.G. Gurbani, C.T. Cho, K.R. Lee, L. Powell, Gonococcal abscess of the obturator internus muscle: use of new diagnostic tools may eliminate the need for surgical intervention, *Clin. Infect. Dis.* 20 (1995) 1384–1386.
- [8] D.D. Nikolopoulos, A. Apostolopoulos, I. Polyzois, S. Liarakapis, I. Michos, Obturator internus pyomyositis in a young adult: a case report and review of the literature, *Cases J* 2 (2009) 8588.
- [9] R.J. King, D. Laugharne, R.W. Kerslake, B.J. Holdsworth, Primary obturator pyomyositis: a diagnostic challenge, *J. Bone Joint Surg. Br* 85 (2003) 895–899.
- [10] K. Khoshhal, H. Abdelmotaal, R. AlArabi, Primary obturator internus and obturator externus pyomyositis, *Am. J. Case Rep.* 14 (2013) 94–98.
- [11] J. Bickels, L. Ben-Sira, A. Kessler, S. Wientroub, Primary pyomyositis, *J. Bone Joint Surg. Am.* 84A (2002) 2277–2286.
- [12] Rolando M. Viani Kenneth Bromberg John S. Bradley, Obturator Internus Muscle Abscess in Children: Report of Seven Cases and Review, *Clinical Infectious Diseases*, Volume 28, Issue 1, 1 January 1999, Pages 117–122, doi:<https://doi.org/10.1086/515080>.
- [13] A.W. March, L.H. Riley, R.A. Robinson, Retroperitoneal abscess and septic obturator externus muscle abscesses. *Arthritis of the hip in children, J. Bone Joint Surg. Am* 54 (1972) 67–74.
- [14] Amal Khoury, Y. Weill, Rami Mosheiff, The Stoppa approach for acetabular fracture, *Operative Orthopädie und Traumatologie* 24 (2012) 439–448, <https://doi.org/10.1007/s00064-011-0093-z>.
- [15] M.N. Smith-Petersen, A new supra-articular subperiosteal approach to the hip joint, *JBJS s2-15* (8) (August 1917) 592–595.
- [16] F. Rachbauer, M.S. Kain, M. Leunig, The history of the anterior approach to the hip, *Orthop Clin North Am* 40 (3) (2009) 311–320, <https://doi.org/10.1016/j.ocl.2009.02.007>.
- [17] G. Yahalom, L. Guranda, E. Meltzer, Internal obturator muscle abscess caused by *Klebsiella pneumoniae*, *J. Inf. Secur.* 54 (2007) e157–e160.
- [18] C. Mukhtyar, A. Bradlow, Primary obturator pyomyositis, *Rheumatology* 44(2005) 408–410.