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Staphylococcus Aureus-Induced Myositis Of The Iliococcygeus Muscle

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ABSTRACT

Objective : To describe the clinical presentation, diagnostic process, management, and outcome of a rare case of Staphylococcus aureus-induced myositis involving the iliococcygeus muscle in a young female patient, and to highlight the importance of early diagnosis and tailored antibiotic therapy in musculoskeletal infections.

Materials and Methods : A single case report was conducted following Consensus-based clinical case reporting guidelines. Data were collected from a 29-year-old female presenting with left hip pain. Patient history, physical and laboratory examinations, and imaging studies (MRI) were documented. Laboratory investigations included complete blood count, C-reactive protein (CRP), blood cultures, and Xpert MTB/RIF Ultra testing. Empirical antibiotic therapy was initiated and subsequently adjusted based on culture sensitivity results. Clinical response was monitored through symptom resolution, inflammatory marker trends, and follow-up MRI scans. Ethical considerations, including informed patient consent and confidentiality, were maintained throughout the study.

Results : The patient presented with progressive left hip pain. MRI revealed marked inflammatory changes and edema in the iliococcygeus, pectineus, and adductor longus muscles, with early abscess formation. Laboratory findings showed significantly elevated CRP and lymphocyte counts. Microbiological testing identified Staphylococcus aureus as the causative organism, resistant to several antibiotics but susceptible to oxacillin and vancomycin. Initial intravenous broad-spectrum antibiotics were administered, later switched to oral doxycycline and clindamycin based on sensitivity results. The patient completed a 15-day course of antibiotics, resulting in full clinical recovery and normalization of inflammatory markers. No complications were observed during follow-up.

Conclusion : This case underscores the diagnostic challenges and therapeutic strategies in managing deep pelvic myositis due to Staphylococcus aureus. Early imaging, prompt microbiological assessment, and tailored antibiotic therapy were crucial for a favorable outcome. Clinicians should maintain a high index of suspicion for musculoskeletal infections in atypical presentations to enable timely intervention and prevent complications.

Keywords: *Staphylococcus Aureus, Myositis, Inflammatory biomarkers, Iliococcygeus*.

1. INTRODUCTION

Stapylococcus aureus is gram positive bacteria. It's the most relevant pathogen with high versatality and ability to cause variety of infections like bacteremia, sepsis, infective endocarditis and osteomyelitis. There is significant increase in multi drug resistant S.aureus [MRSA] is a major public health concern[1].Bacterial infections of skeletal muscle, particularly pyomyositis and infectious myositis, have gained prominence in recent years, posing significant clinical challenges. Pyomyositis is characterized by the formation of abscesses due to bacterial invasion, with *Staphylococcus aureus* being the predominant pathogen involved[2].Emerging epidemiological trends indicate an increasing incidence of these infections, particularly associated with community-acquired methicillin-resistant *Staphylococcus aureus* (MRSA) strains .At Texas Children's Hospital, a marked rise in cases of pyomyositis and myositis has been noted since 2000, correlating with the emergence of community-acquired MRSA. Notably, *Staphylococcus aureus* was implicated in 57.8% of bacterial cases, highlighting the critical role of this pathogen in pediatric populations . Furthermore, a single-center retrospective study indicated that gram-positive bacteria, predominantly Staphylococcal species, accounted for a substantial proportion of infections in adult patients, with a treatment success rate of 84%[3].The clinical presentation of myositis can often be misleading. For instance, a case report described a 61-year-old female with poorly controlled diabetes whose initial presentation mimicked septic arthritis, ultimately revealing MRSA - induced myositis . This underscores the necessity for a high index of suspicion among clinicians, especially in atypical presentations[4]. In immunocompromised patients, infections can manifest with atypical presentations and may lead to life-threatening complications[5].

Two case reports highlighted the occurrence of pyomyositis due to gram-negative bacteria in immunocompromised hosts, suggesting that such infections should be considered in patients presenting with muscle pain and fever[6].The treatment for *Staphylococcus aureus*-induced myositis begins with intravenous antibiotics, primarily vancomycin, due to the prevalence of methicillin-resistant strains. In early-stage infections without a pus collection, antibiotics may be sufficient. However, stages 2 and 3 require urgent surgical drainage, either via CT- or ultrasound-guided procedures or open surgery. In immunocompromised patients, broad-spectrum antibiotics covering gram-negative and anaerobic organisms are essential. Therapy typically lasts 1 to 2 weeks intravenously, followed by 4 to 6 weeks of oral antibiotics, with adjustments based on culture results. Early diagnosis generally leads to a favorable prognosis [7]. The iliococcygeus muscle, a component of the pelvic floor, has not been frequently reported in the context of myositis. Given the rising incidence of Staphylococcus aureus-induced infections and the importance of early diagnosis and intervention, this case report aims to provide insights into the epidemiology and management of myositis, specifically focusing on the iliococcygeus muscle involvemen[7].

2. MATERIALS AND METHODS

This retrospective case report was conducted in accordance with consensus-based clinical case reporting guidelines to ensure accurate documentation of clinical care. Informed patient consent was obtained prior to data collection and publication. The patient was followed from 25/02/2025 to 15/03/2025.[8]

Patient Information: Data was collected from a single female of 29 year old patient, presented with left hip pain.Past medical history, medication history, physical examination, laboratory examination and symptoms were documented.

Diagnostic assessment: Laboratory investigation include CBC, CRP, blood culture, MRI was utilized to identify inflammation and structural changes in left hip region.

Therapeutic intervention: Patient was prescribed and administered with antibiotic therapy based on sensitivity results. Choice of drug, dosage and duration of antibiotic was recorded.

Follow up and outcomes: Clinical response was monitored through symptom resolution, inflammatory markers and follow up MRI scan. Complications were noted during follow up visit.

Ethical Consideration: Informed written consent was obtained from patient for publication of case report and confidentiality was maintained.

3. RESULTS

A 29-year-old female presented with progressive left hip pain, leading to an MRI of the pelvis focused on the left hip region on February 25, 2024. Imaging revealed marked inflammatory changes predominantly along the left parasymphyseal area. The iliococcygeus muscle was notably bulky and edematous with increased T2 signal intensity, strongly suggesting underlying infectious or inflammatory myositis. Adjacent musculature, including the pectineus and adductor longus, demonstrated similar signal changes and bulkiness, supporting the presence of a diffuse myopathic process.

A focal area measuring approximately 3 mm, characterized by T1 hypointensity and T2 hyperintensity, was noted in the intermuscular plane, raising concern for early abscess formation. Mild reactive edema in the pubic bone was observed,

likely secondary to adjacent muscular inflammation. Notably, osseous structures such as the femoral heads, acetabulae, and other visualized bones showed preserved architecture and signal intensity, with no evidence of osteomyelitis. The pelvic soft tissues, tendons, and neurovascular bundles remained unaffected.

Whole-spine screening identified sacralization of the L5 vertebra and mild disc bulges at C4-C5 and C5-C6 levels, without spinal cord compression. A diffuse L4-L5 disc bulge was present, causing mild bilateral foraminal narrowing.

Laboratory evaluation on the day of imaging (February 25, 2024) revealed a significantly elevated CRP level of 78.18 mg/L, which further escalated to 181.56 mg/L by February 27, indicating a rapidly intensifying inflammatory process. Lymphocyte count was 3060 cells/μL, supporting ongoing immune activation.

A sample aspirated from the suspected levator ani abscess underwent Xpert MTB/RIF Ultra testing, returning negative and excluding mycobacterial infection. Subsequent aerobic culture identified Staphylococcus aureus as the causative organism. The isolate demonstrated resistance to ciprofloxacin, clindamycin, erythromycin, and linezolid but retained susceptibility to oxacillin and vancomycin.

Empirical therapy was initiated on March 3, 2024, using intravenous meropenem (1 g every 8 hours) and amikacin (15 mg/kg once daily). Following the release of culture sensitivity results on March 5, the antibiotic regimen was revised to oral doxycycline (100 mg twice daily) and clindamycin (600 mg every 8 hours) beginning March 7, 2024.

The patient completed a 15-day course of oral antibiotics with excellent clinical response. Symptom resolution and normalization of inflammatory markers were observed. The patient's concurrent diagnosis of asthma was carefully managed throughout the therapeutic period.

This case represents an unusual presentation of bacterial myositis due to Staphylococcus aureus, involving deep pelvic musculature including the iliococcygeus, pectineus, and adductor longus, with early abscess development. The combination of advanced imaging, prompt microbiological assessment, and tailored antibiotic therapy led to favorable patient outcomes and avoided potential complications.

Table1.Investigation [Lab Investigation]

Lab Investigation	Patient Result	Normal Range	Interpretation
C-reactive protein [CRP]	78.18 mg/L [25/02/2024]	< 5 mg/L	Elevated [Indicating active inflammation]
	181.56 mg/L [27/02/2024]	< 5 mg/L	Significant increase [suggesting escalating inflammatory process]
Lymphocyte count	3060 cells/uL	1000-3000 cells/uL	Mild elevated [Consistent with inflammation]
Xpert MTB-RIF Ultra [for TB]	Negative	Negative	No Tuberculosis infection
Aerobic culture [Staphylococcus aureus]	Positive	Negative	Staphylococcus aureus infection identified
Antibiotic Sensitivity Test	Resistance to Ciprofloxacin, Clindamycin, Erythromycin, Linezolid	Susceptibility varies by antibiotic	Resistance observed in several antibiotics
Antibiotic Sensitivity Test	Susceptible to Oxacillin, Vancomycin	Susceptibility varies by antibiotic	Sensitive to oxacillin and vancomycin

The laboratory investigations revealed a significant inflammatory response, as evidenced by a marked rise in C-reactive protein (CRP) levels over a short period, alongside a mildly elevated lymphocyte count. Tuberculosis was effectively excluded with a negative Xpert MTB-RIF Ultra test. Microbiological analysis identified Staphylococcus aureus as the causative pathogen, with antibiotic sensitivity testing showing resistance to several agents but preserved susceptibility to oxacillin and vancomycin. These findings not only confirmed the diagnosis of a severe bacterial infection but also played a crucial role in guiding targeted and effective antibiotic therapy for the patient.

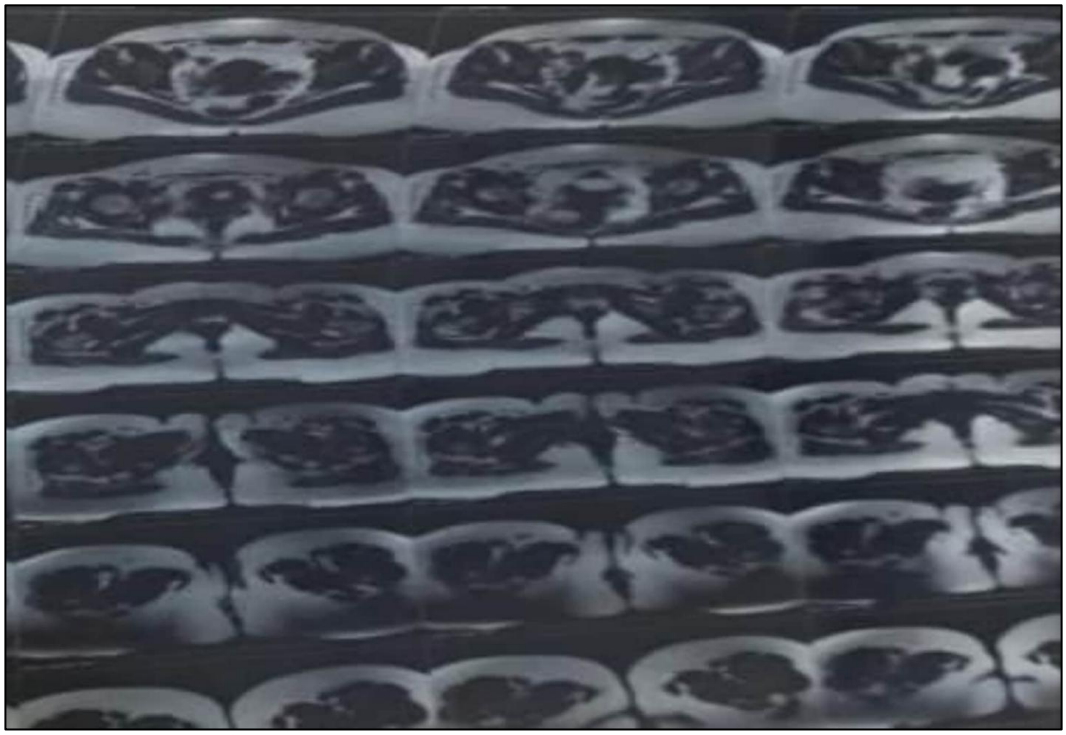

Figure 1. Investigation (MRI Scan)

Table 2. MRI scan display abnormal signals in the muscular tissues or around the bony areas, suggesting inflammation, abscess formation, or soft tissue abnormalities

Timeline

25/02/2025	29 year old female patient presented with left hip pain; referred for MRI of the pelvis.
25/02/2025	MRI findings: ● Bulky and edematous iliococcygeus muscle with inflammatory changes ● Pectineus and adductor longus muscles also involved ● Focal area suggestive of early abscess formation.
25/02/2025	Mild reactive edema noted in the pubic bone [both femoral heads and acetabulae appear normal]
25/02/2025	Laboratory findings: CRP [C-reactive protein]-78.18mg/L [elevated] Lymphocyte count- 3060 cells/uL [elevated]
26/02/2025	Xpert MTB-RIF Ultra test performed on levator ani muscle abscess sample - Results were negative for tuberculosis.
26/02/2025	Aerobic culture and sensitivity test performed- Staphylococcus aureus was identified.
03/03/2025	Patient started on broad spectrum antibiotics- Meropenem 1g IV , every 8 hours and amikacin 15mg/kg IV once daily.
05/03/2025	Culture results confirmed presence of staphylococcus aureus-antibiotic susceptibility profile reviewed.
07/03/2025	Antibiotic regimen adjusted to doxycycline 100 mg orally twice daily and clindamycin 600 mg orally three times daily.
15/03/2025	Patient completed 15 day course of doxycycline and clindamycin following standard treatment for uncomplicated soft tissue infections.

A 29-year-old woman presented with acute left hip pain, and MRI revealed inflammation and early abscess formation in several pelvic muscles. Laboratory findings showed elevated inflammatory markers, and cultures identified Staphylococcus aureus as the cause. After ruling out tuberculosis, she was initially treated with broad-spectrum intravenous antibiotics. Once antibiotic sensitivity results were available, her regimen was switched to targeted oral therapy with doxycycline and clindamycin. Following a 15-day course, her infection resolved, highlighting the importance of early imaging, precise microbiological diagnosis, and timely adjustment of antibiotics in managing deep pelvic infections caused by Staphylococcus aureus.

4. DISCUSSION

Our study demonstrates Staphylococcus aureus-induced myositis, notably involving the deep pelvic musculature, which corresponds with the findings of Pannaraj et al.[3], who reported an increase in community-acquired MRSA infections at Texas Children's Hospital. Likewise, Radcliffe et al.[2] identified Staphylococcus aureus as the causative agent in 46% of pyomyositis cases, further supporting the pathogen's predominant role in musculoskeletal infections.

Clinical Presentation and Diagnostic Challenges: The presentation of hip pain in our case, initially mimicking septic arthritis, parallels the report by Mohammad et al.[4], where a 61-year-old diabetic female presented with similar symptoms but was ultimately diagnosed with MRSA-induced myositis. This emphasizes the diagnostic complexity of musculoskeletal infections and the critical need for advanced imaging modalities such as MRI for accurate diagnosis.

Microbiological Findings and Antibiotic Resistance: The antibiotic susceptibility profile in our case showed resistance to ciprofloxacin, clindamycin, erythromycin, and linezolid, while remaining susceptible to oxacillin and vancomycin. These findings are consistent with Pannaraj et al.[3], who described MRSA strains necessitating multiple drainage procedures due to their aggressive behavior. Additionally, linezolid has been documented as an effective treatment for S. aureus pyomyositis, reinforcing its utility in resistant infections.

Therapeutic Approach and Outcomes: Our case highlights the importance of initiating broad-spectrum empirical therapy, which was subsequently refined based on culture sensitivity results, leading to complete resolution of infection. This approach aligns with recommendations by Nancy FCC [7], advocating early antibiotic intervention followed by surgical drainage in advanced cases. Furthermore, the Gram-negative pyomyositis cases reported by Anne et al.[6] underscore the necessity for broad-spectrum coverage in immunocompromised patients.

This case report contributes valuable insights into Staphylococcus aureus-induced myositis involving the iliococcygeus muscle, a rarely documented site. These findings are in agreement with existing literature, reinforcing the significance of early diagnosis, tailored antibiotic therapy, and interdisciplinary management in musculoskeletal infections.

5. CONCLUSION

This case highlights the diagnostic and therapeutic approach taken for a 29-year-old female patient presenting with left hip pain and associated inflammatory changes. MRI findings revealed significant involvement of the iliococcygeus muscle and surrounding structures, suggesting an infective process likely due to *Staphylococcus aureus*. The effective management commenced with broad-spectrum antibiotics, which were adjusted based on culture and sensitivity results. The targeted antibiotic regimen led to the successful resolution of the infection, emphasizing the importance of timely diagnosis and tailored treatment in managing musculoskeletal infections. This case underscores the necessity for healthcare providers to remain vigilant in identifying similar presentations, facilitating prompt and appropriate interventions to improve patient outcomes.

6. STUDY LIMITATION

Retrospective Design: As a retrospective case report, the study is inherently limited by its reliance on previously documented clinical data.

Single Case and Lack of Generalizability: The report describes only one patient, restricting the ability to generalize findings to broader populations or draw firm conclusions about causality or optimal management strategies.

Short Follow-up Period: The patient was followed for a relatively brief period (from 25/02/2025 to 15/03/2025), which limits the assessment of long-term outcomes, recurrence, or late complications.

7. ACKNOWLEDGEMENT

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8. CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this case report. All authors have contributed equally to the study and preparation of the manuscript without any financial or personal relationships that could have influenced the work presented.

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This research did not receive any specific funding from public, commercial, or not-for-profit agencies.

AUTHOR'S CONTRIBUTION
All authors contributed equally to the conceptualization, drafting, and final approval of the manuscript. Each author participated in reviewing the literature, discussing the findings, and preparing the manuscript.

DATA AVAILABILITY STATEMENT
As this is a case report; no additional data were collected or generated beyond the information provided in the article.

ETHICAL APPROVAL STATEMENT
As this is a retrospective case report; ethical approval was not required for the study.

INFORMED CONSENT STATEMENT
Informed consent was obtained from the patient for the publication of this case report and accompanying images, with all identifying details anonymized.

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