

More Than Just A Swollen Leg: The Silent Invasion of Community Associated Methicillin Resistant *Staphylococcus aureus* Infection

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Introduction

- **Rising concern:** CA-MRSA is an emerging global health threat, increasingly affecting young, healthy individuals. Causes not only soft tissue infections but also invasive disease (pneumonia, bacteremia, osteomyelitis, septic arthritis).
- **PVL toxin danger:** PVL-producing strains drive rapid tissue destruction and systemic toxicity.
- **Diagnostic blind spot:** Up to 85% of invasive MRSA cases show prior colonization (nares, axillae, groin). A minority lack colonization—negative swabs can be misleading. In patients without prior colonization or bacteremia, MRSA osteomyelitis prevalence is <10% (often 1–8%, population-dependent).
- **High morbidity:** MRSA osteomyelitis carries greater risk of persistent infection, pathologic fracture, non-union, amputation, and prolonged hospital stay compared with MSSA.
- **Therapeutic pitfall:** Empirical regimens often target MSSA—delayed MRSA coverage risks worse outcomes.

Case Vignette

- A 23-year-old male with no prior medical conditions or recent healthcare exposure, presented with five days of progressive right leg pain and swelling. He denied trauma, insect bites, or wounds despite working in construction.
- Laboratory studies revealed leukocytosis ($35 \times 10^9/L$; normal $4.3\text{--}10 \times 10^9/L$) and elevated C-reactive protein (232 mg/L; normal <5 mg/L). Blood cultures and MRSA screening of nares and axillae and groin were negative. HbA1c and HIV testing were normal.
- MRI revealed a $20 \times 6 \times 2$ cm intramuscular abscess between the medial gastrocnemius and soleus, communicating with the knee joint, and a $2 \times 2.8 \times 4.9$ cm Brodie's abscess in the distal femur (T1RM hyperintense marrow signal and enhancement seen in distal femur). Joint aspirate showed Gram-positive cocci in clusters and eventually preliminary identified as *Staphylococcus aureus*.
- Empiric cefazolin therapy was initiated. He underwent surgical drainage and debridement, and intraoperative cultures confirmed MRSA. Antibiotic therapy was subsequently switched to vancomycin, followed by oral trimethoprim-sulfamethoxazole, completing a 6-week course with a favorable clinical response.

Discussion / Learning Points



- **Diagnostic Blind Spot:** Unilateral limb swelling with pain and erythema can easily mimic cellulitis, risking delayed recognition of deep-seated MRSA infection. Importantly, severe MRSA infections may occur in patients without classical risk factors, highlighting the need for high clinical vigilance.
- **Clinical Assessment and Severity:** Clinicians must recognize that negative MRSA colonization screens do not exclude infection, as carriage may be absent, transient, or present at atypical sites such as the throat or perineum.
- **Imaging & Surgical Intervention:** Early imaging, particularly MRI, is invaluable for detecting deep abscesses, joint involvement, or osteomyelitis. A low threshold for surgical intervention is essential, and intraoperative cultures should be obtained to guide targeted postoperative antibiotic therapy.
- **Therapeutic considerations:** While initial empirical coverage for MSSA may be reasonable, escalation to MRSA-active antibiotics is warranted for invasive presentations or poor response to initial therapy. Prompt surgical debridement in combination with appropriate antibiotics significantly improves outcomes.
- **Pathogen Insight & Take-Home Message:** CA-MRSA, especially PVL-positive strains, can cause aggressive musculoskeletal infections even in immunocompetent hosts. Clinicians should avoid false reassurance from negative colonization screens, maintain vigilance for severe staphylococcal infections, and ensure timely imaging, surgical intervention, and appropriate antibiotic therapy to achieve favorable outcomes.

References

1. DeLeo FR, Otto M, Kreiswirth BN, et al. CA-MRSA has emerged globally, affecting healthy individuals and causing severe invasive disease. *Lancet*. 2010; 375:1557–68.
2. David MZ, Daum RS. Reviews the spread, epidemiology, and clinical consequences of CA-MRSA. *Clin Microbiol Rev*. 2010; 23:616–87.
3. Lina G, Piémont Y, Godail-Gamot F, et al. Demonstrated PVL-producing *S. aureus* strains in necrotizing skin infections and pneumonia. *Clin Infect Dis*. 1999; 29:1128–32.
4. Huang SS, Hinrichsen VL, Datta R, et al. Found 85% of MRSA bloodstream infections in colonized patients, highlighting screening's role and limitations. *Ann Intern Med*. 2006; 144:318–27.
5. Mertz D, Frei R, Jaussi B, et al. Throat swabs improved MRSA carrier detection compared with nasal screening. *Clin Infect Dis*. 2007; 45:475–7.