



Clinical Study

Spinal epidural abscess with a rapid course in young healthy infantry recruits with multiple skin lacerations



Asaf Honig^{a,b,1}, Omer Or^{c,1}, Yair Barzilay^{c,2}, Shifra Fraifeld^{d,e}, Yoav Y. Pikkel^f, Ruth Eliahou^d, José E. Cohen^{d,e}, Eyal Itshayek^{d,*}

^a Department of Neurology, Hadassah—Hebrew University Medical Center, Jerusalem, Israel

^b Israel Defense Forces Medical Corps, Tel Aviv, Israel

^c Department of Orthopedic Surgery, Hadassah—Hebrew University Medical Center, Jerusalem, Israel

^d Department of Radiology, Hadassah—Hebrew University Medical Center, Department of Neurosurgery, POB 12000, Jerusalem 91120, Israel

^e Department of Neurosurgery, Hadassah—Hebrew University Medical Center, Jerusalem, Israel

^f Tzameret Military Medical Track, Hebrew University—Hadassah School of Medicine, Jerusalem, Israel

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ABSTRACT

In recent years, there has been high prevalence of *Staphylococcus aureus* (*S. aureus*) infection among soldiers in the Israeli military, with devastating sequelae in several cases. Emergency department physicians have developed a high level of suspicion for spinal epidural abscess (SEA) in patients presenting known risk factors; however, SEA is a particularly elusive diagnosis in young healthy adults with no history of drug abuse. We review three cases of SEA secondary to methicillin-sensitive *S. aureus* (MSSA) infection in young healthy soldiers without known risk factors. We retrospectively reviewed clinical files of soldiers treated at our Medical Center from 2004–2015 to identify patients diagnosed with SEA. Those aged less than 30 years with no history of intravenous drug use, spine surgery or spine trauma were included in the study. Three young army recruits met the inclusion criteria. These young men developed SEA through extension of MSSA infection to proximal skin and soft tissue from impetigo secondary to skin scratches sustained during “basic” training. All presented with mild nuchal rigidity and severe persistent unremitting lancinating radicular pain. Although healthy at baseline, they had a severe, rapidly progressive course. Following urgent surgery, two patients recovered after rehabilitation; one remained with paraparesis at late follow-up. Neurological deficits and systemic evidence of *S. aureus* infection progressed rapidly in these young healthy SEA patients with no history of drug abuse, emphasizing the critical role of timely MRI, diagnosis, and surgery.

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1. Introduction

Spinal epidural abscess (SEA) may present initially with a variety of neurological manifestations, both radicular and myelopathic, and with or without nonspecific findings such as back pain, fever, leukocytosis, an elevated erythrocyte sedimentation rate (ESR), and an increased C-reactive protein (CRP) level. It thus poses a diagnostic challenge, which may result in delayed treatment. With 2–3 cases per 10,000 hospital admissions [1,2], a 5% mortality rate, and persistent paralysis in up to 22% of patients [2], SEA is a concern for physicians in the emergency department. Risk factors such

as intravenous drug (IV) abuse, diabetes, hepatitis, known local or systemic infection, and surgical implants are well understood [2–6]; however, SEA is rarely diagnosed in young healthy adults with no history of drug abuse.

In recent years, complications related to *Staphylococcus aureus* (*S. aureus*) infection have been the source of substantial concern in the Israeli military [7]. The most common manifestation of *S. aureus* infection is impetigo; however, hematogenous spread or direct extension of *S. aureus* bacteria from the skin or local soft tissue may lead to full blown septicemia or abscess formation in various locations, including the lung, kidney, and brain. A search in the Israel Defense Forces (IDF) Medical Corps registry from 2004–2014 disclosed an incidence of *S. aureus* infection in 1/20,000 soldiers in the infantry training units compared to none in the rest of the army (unpublished data, IDF) and 1/25,000 in the general population, excluding IV drug users [8]. Three deaths

* Corresponding author. Tel.: +972 2 677 7092; fax: +972 2 641 6281.

E-mail address: eyal.itshayek@gmail.com (E. Itshayek).

¹ These authors have contributed equally to the manuscript.

² Dr Barzilay is currently an attending orthopedic surgeon at the Shaare Zedek Medical Center, Jerusalem, Israel.

of young recruits were attributed to *S. aureus* infections—two from a rapid course of encephalitis, and one following a rapid malignant septic course with encephalitis (unpublished data, IDF).

In the current report, we describe the elusive presentation of *S. aureus* infection secondary to impetigo with hematogenous spread or direct extension leading to SEA in three young healthy soldiers during early field training. The consequences of delayed surgical intervention in a patient with progressive neurological symptoms can be devastating. In the current series, two young men made a good recovery, but one was left with paraplegia (American Spinal Injury Association [ASIA] Impairment Scale [AIS] C) due to his rapid progression and the delay in diagnosis. Our experience emphasizes the possible association of *S. aureus* infection with impetigo in young healthy patients, SEA as a potential consequence, and the importance of an urgent and thorough investigation. When neurological signs are present, urgent MRI examination of the spine and brain is warranted, with emergent surgical intervention upon diagnosis of SEA.

2. Methods

We retrospectively reviewed clinical files of the IDF Medical Corps from 2004–2015, to identify patients diagnosed with SEA. We included patients with radiographic and intraoperative findings consistent with SEA who were treated at the Hadassah-Hebrew University Medical Center, were less than 30 years of age at the time of diagnosis, and had no history of IV drug use, spine surgery, or recent traumatic injury to the spine. We chose to focus

on patients managed at Hadassah since the authors have staff access to all medical files and participated directly in the care of these patients; thus, they have direct experience with their diagnosis and management. The Institutional Review Board authorized the study with a waiver of informed consent. Clinical and imaging files from both army and hospital computerized medical files for patients included in the study were reviewed. Presenting complaints, a full history of prior care for symptoms related to the SEA, and findings at neurological examination, laboratory investigations, and imaging studies were noted. Preliminary diagnoses other than SEA were recorded with details of the initial treatment regimen and the patients' responses. Pre- and postoperative AIS scores, surgical techniques and complications were recorded.

3. Results

Three 18-year-old male patients in the first phase of “basic” field training in the IDF met the inclusion criteria. Their neurological symptoms varied, but all presented with unremitting severe lancinating radicular pain that was not eased by any medication, including a local nerve block in one case. They had no history of IV drug use, but all had multiple partially pustulous skin lesions that had been present for more than 2 weeks prior to onset of neurological symptoms and had been treated with chloramphenicol ointment (Fig. 1). They had fever onset 2–5 days after initial radicular symptoms, severe leukocytosis and neutrophilia, and elevated CRP levels and ESR. Whole-body CT scan was normal in two patients, but MRI revealed SEA in all three young men. Surgery

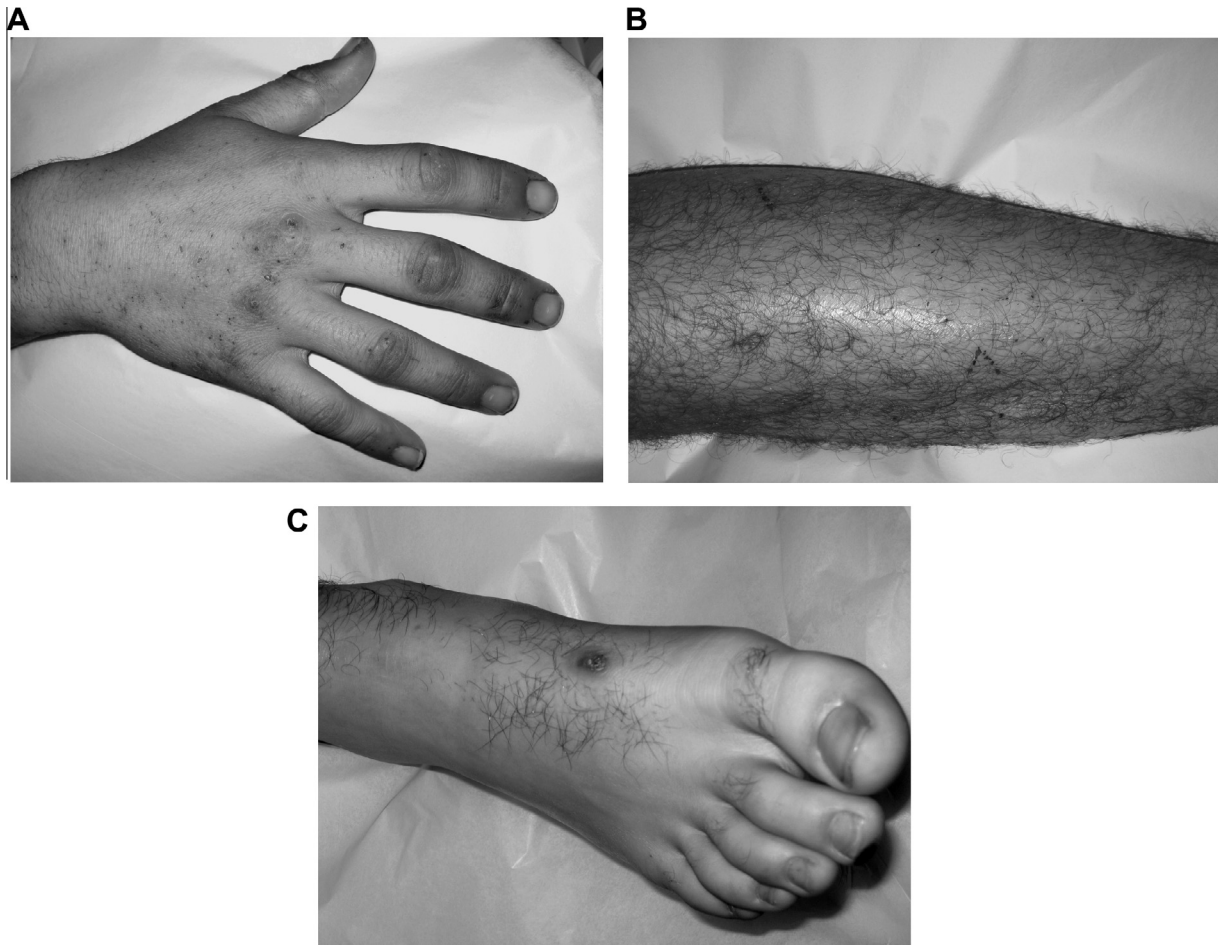


Fig. 1. Extensive scratches on the hands, arms, and legs of Patient 1 that were sustained during field training exercises in this special forces soldier. The scratches served as the point of entry for methicillin-sensitive *Staphylococcus aureus* (*S. aureus*) infection and resulting spinal epidural abscess.

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