Acute idiopathic necrotizing fasciitis of the chest wall: a case report

Published on 16.06.2015

DOI: 10.1594/EURORAD/CASE.12690
ISSN: 1563-4086
Section: Musculoskeletal system
Area of Interest: Musculoskeletal soft tissue
Procedure: Diagnostic procedure
Imaging Technique: CT
Special Focus: Infection Case Type: Clinical Cases
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Patient: 42 years, male

Clinical History:

A 42-year-old male patient presented to the emergency department at 3:00 a.m. with malaise and right-sided intense chest pain that had occurred during the night. He denied experiencing trauma or recent surgical procedures. His medical history included diabetes mellitus, hypertension, mild chronic renal failure and Non-Hodgkin's lymphoma.

Imaging Findings:

Physical examination revealed fever (38.0°C) with normal vital signs. Laboratory studies showed leukocytosis, high CRP and serum creatinine of 1.8 mg/dL. Chest CT performed at 4:17 a.m. excluded the presence of pneumonia, but showed gas collection in the right pectoralis major muscle with thickening of its fascial planes and increased attenuation of the subcutaneous fat tissue suggesting oedema.

The patient was immediately treated with broad-spectrum antibiotics for a suspected soft-tissue infection but his clinical conditions worsened rapidly: chest pain increased, overlying skin became mottled, swollen and warm. The patient became tachycardic and dyspnoeic.

At 8:00 a.m., he developed a severe shock condition requiring intubation and intensive cares.

At 8:32 a.m. another CT examination showed the extension of the muscular involvement in the chest wall and the shoulder girdles with massive air collection due to the extensive gas gangrene, associated with intramuscular and subcutaneous fluid collection.

Shortly after the patient died in the ICU.

Discussion:

Necrotizing fasciitis (NF) is a rare, life-threatening infection of any layers within the soft tissue compartment (dermis, subcutaneous tissue, superficial fascia, deep fascia and muscle), that progresses rapidly through the fascial planes causing necrosis and destruction of the affected tissues. It is relatively uncommon, with a global prevalence reported to be about 4 cases per 1,000,000 population [1]. It affects all age groups, although it is more frequent in elderly patients, with a M/F ratio of 3:1 and a mortality estimated to be 21.5% [2, 3]. However, without treatment, the mortality reaches 100%. Most common localizations are lower extremities followed by the abdomen and the perineum (Fournier's gangrene). Upper limbs and trunk are rarely involved.

Patients often have a history of trauma, including external injuries or surgical wounds. Common co-morbidities include diabetes mellitus, liver cirrhosis, chronic heart failure, renal failure, cancer, immunodeficiency and alcohol
abuse [3].
The most common type of NF is a polymicrobial infection with both aerobic and anaerobic gas-forming bacteria (Clostridium, Proteus, Enterobacteriaceae) [3]. NF can be difficult to recognize in its early stages. The clinical presentation is often non-specific and causes delay in diagnosis: fever, malaise, tachycardia, tachypnoea, hypotension. Local symptoms and signs include: pain (typically disproportionate to the clinical findings), swelling and erythema of the overlying skin; in the advanced stages it evolves to skin ischaemia with bullae and blisters. In the fulminant form it presents with septic shock and multi-organ failure.

This challenging diagnosis may be facilitated by radiology. Plain radiography has low sensitivity and specificity, but is capable to show gas formation in soft tissues [4]. CT can play a vital role in suggesting the right diagnosis rapidly. The rapidity of CT compared with MRI may be advantageous for an emergent necrotizing fasciitis evaluation. The CT hallmarks are: thickening of nonenhancing fascial layers indicative of NF, air and fluid collection in soft tissues, muscular and fat stranding [5, 6]. CT also shows reactive lymphadenopathy, underlying infection sources and complications of tissue necrosis like vascular rupture [6, 7]. MRI is the modality of choice for detailed evaluation of soft-tissue infection with fluid collection and fascial thickening, but is often not performed for necrotizing fasciitis evaluation because its acquisition is time-consuming and will delay treatment [8]. Prompt diagnosis is mandatory to permit emergency surgical debridement, necrosectomy and fasciotomy of the affected tissues. Surgical intervention is life-saving and must be performed as early as possible. Patients should also be immediately treated with broad-spectrum antibiotics when NF is suspected.

**Differential Diagnosis List:** Necrotizing fasciitis, Nonnecrotizing fasciitis (paraneoplastic, eosinophilic, nodular and proliferative fasciitis), Bacterial myositis, Dermatomyositis, Cellulitis

**Final Diagnosis:** Necrotizing fasciitis

**References:**


**Description:** CT performed at 4:17 am: axial plane images (soft-tissue window) show gas collection in the right pectoralis major muscle, thickening of the fascial planes and increased reticular attenuation of subcutaneous fat tissue. **Origin:** Department of Radiology, Policlinico Tor Vergata, Rome, Italy.
Description: CT performed at 4:17 am: sagittal plane images (lung window A-B; soft-tissue window C-D) show gas dissection of the right pectoralis major muscle. The examination excluded pneumonia. Origin: Department of Radiology, Policlinico Tor Vergata, Rome, Italy.
Description: CT performed at 8:32 am): axial plane images (lung window) show the worsening of radiological features with increase of gas gangrene extended to almost all thoracic and shoulder girdles muscles. **Origin:** Department of Radiology, Policlinico Tor Vergata, Rome, Italy.
**Description:** CT performed at 8:32 am: axial plane images (soft-tissue window). The right major pectoralis muscle is completely replaced by a gas collection. Note the endotracheal tube due to the respiratory failure and shock condition. **Origin:** Department of Radiology, Policlinico Tor Vergata, Rome, Italy.
Description: CT performed at 8:32 am): sagittal plane images (lung window) show the extension to the shoulder girdle with the involvement of the infraspinatus and deltoid muscles. Origin: Department of Radiology, Policlinico Tor Vergata, Rome, Italy.