

A rare presentation of ecthyma gangrenosum-like lesions due to *Staphylococcus Lentus* in an immunocompetent adult

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Abstract

Staphylococcus lentus is a commensal organism commonly isolated from skin of animals and in people working in close contact with animals. However, the role of this organism as a pathogen is less defined. We present a case of 58 year old gentleman who presented to us in sepsis with multiorgan dysfunction, with ecthyma gangrenosum-like-lesions in face and legs. Further evaluation led to isolation of *Staphylococcus lentus* from pus culture swab of the lesion. The culture sensitivity guided antibiotic treatment led to cure of sepsis and resolution of lesions.

Keywords: Ecthyma, sepsis, eschar, neutropenia, immunocompetent.

Introduction

Ecthyma gangrenosum is a well-recognized cutaneous infection mostly associated with *Pseudomonas aeruginosa* bacteremia. Other pathogens like *Staphylococcus aureus*, *Streptococcus pyogenes*, *Citrobacter sp.*, *Klebsiella sp.*, *E.Coli*, *Candida sp.* & other gram-negative bacteria have also been implicated in etiopathogenesis of Ecthyma gangrenosum. Impaired humoral immunity or cellular immunity associated with breakdown of innate immune barriers (skin or mucosal ulcerations) has been implicated for the development of this skin infection [2].

Staphylococcus lentus is gram positive, oxidase positive, coagulase negative bacteria. Ecthyma gangrenosum-like-skin lesions have not been identified with *Staphylococcus lentus* bacteremia or via direct inoculation of *Staphylococcus lentus* into epidermis. Other manifestations of septicemia due to this organism are also less defined [3]. Here we present a very rare case scenario where a patient admitted with *Staphylococcus lentus* induced sepsis with multiorgan dysfunction developed ecthyma gangrenosum-like skin lesions, and hematological findings of initial severe neutropenia which recovered during course of illness that adds on to the rarity of presentation.

Case Presentation

58-year-old male, farmer by occupation with frequent exposure to domestic cows, presented with acute onset, high grade fever associated with chills and rigor of 6 days duration. The fever spikes were followed by development of an erythematous maculopapular lesion in the right cheek. The lesion ulcerated within a period of 24 hours leading to formation of a deep crusted eschar-like lesion by day 3 of fever [Figure 1a]. It was associated with significant perilesional oedema, redness, and deep tenderness. There were multiple similar lesions in chin of face and calves of leg appearing around the same time period [Figure 1b and 1c]. On the 4th day of fever, patient developed altered mental status with reduced word output and drowsiness. Hence the patient was taken to local hospital, treated with intravenous antibiotics, and later referred to our hospital in view of worsening respiratory symptoms.

On arrival in the emergency department, his Glasgow coma score was 12/15 and he had a toxic look. Pulse rate was 140/min, respiration 48 breaths/min, blood pressure 100/50mmHg in right upper arm, and an oxygen saturation of 70 % on pulse oximetry.

On general examination his face appeared erythematous with localized swelling witnessed over right cheek and chin. A large eschar like lesion was noted in left cheek and midline chin of size 3 x 4 cm [Figure 1d] & 2 x 2 cm [Figure 1b] respectively, with surrounding raised indurated erythematous rim around,

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palpable induration and tenderness surrounding the lesion. Multiple macular erythematous lesions with small white cysts at the centre resembling miliaria crystallina were noted over the neck and medial aspect of bilateral upper arms. Another similar ecthyma gangrenosum-like lesion was noted on medial aspect of left calf with surrounding erythematous rim and non-tender. Fine crepitations were appreciated on auscultation of the chest over left infra-axillary area. Rest of the systemic examination was unremarkable.

The patient was admitted in high dependency unit. All routine investigations and cultures were sent. Swab was taken from expressed fluid of the skin lesion of cheek and sent for culture and sensitivity. The initial chest roentgenogram was normal, however subsequent ones divulged a patch with air bronchogram in left lower zone, suspected to be due to aspiration pneumonitis. Routine initial investigations revealed metabolic acidosis with elevated lactate in arterial blood gas analysis. Viral markers were non-reactive. Hemogram was suggestive of severe neutropenia with an absolute neutrophil count (ANC) of 30 cells/microlitre and a reticulocyte index of 0.35. Peripheral blood smear examination showed normocytic normochromic cells with 12 nucleated erythrocytes for every 100 leucocytes, and severe leukopenia with lymphocytic preponderance. Serum procalcitonin was reported to be high (62.3 ng/ml). Investigations also revealed elevated prothrombin time, reversal of A/G ratio and pre-renal azotemia. The patient was administered intermittent continuous positive airway pressure support in view of severe tachypnea and was initiated on broad spectrum antibiotics including meropenem and vancomycin with due regard to severe neutropenia, skin and soft tissue infection and history of prior hospitalization. Doxycycline was also added subsequently in view of eschar-like appearance of skin lesions and high prevalence of scrub typhus in the region. Cultures did not yield any organism. All tropical illness markers like IgM dengue, Dengue NS1, immunochromatography test for malarial parasite, IgM scrub typhus and IgM leptospira

also came back negative. Hence doxycycline was later discontinued. Follow up investigations showed improvement in ANC with development of neutrophilic leukocytosis and then normalization of counts. Local ultrasonography of the lesion was unremarkable for malignant infiltrations. Dermatology consultation was sought in view of skin lesions, which led to the diagnosis of ecthyma gangrenosum. Intraoral pathologies were also ruled out. Meanwhile the pus culture from lesion reported revealed growth of *Staphylococcus lentus* with sensitivity to vancomycin, linezolid and cotrimoxazole. The same antibiotics were continued and patient exhibited clinical improvement. Vital signs returned to normal. The patient was hence shifted to oral antibiotics and finally discharged.

Discussion

Ecthyma gangrenosum (EG) primary cutaneous lesions start out as painless circular erythematous macules but quickly develop into pustules with surrounding erythema. A bulla is formed in the middle by a hemorrhagic focus. The hemorrhagic bulla develops into a gangrenous ulcer with a core black/gray eschar surrounded by an erythematous halo as it extends peripherally [Figure 1a]. A necrotic ulcer can develop from an early lesion in as little as 12 hours. Ecthyma gangrenosum has been classically described in pseudomonas aeruginosa septicemia in patients with immune deficiency. Neutropenia, leukaemia, multiple myeloma, diabetes mellitus, malnutrition, and severe burn wounds are risk factors in its development [2,5].

These lesions are caused by perivascular invasion by bacteria into dermis causing necrotizing vasculitis, as a result of hematogenous seeding of bacteria in bacteremic patients or by direct inoculation into skin in non-bacteremic patients. Likely pathogens involved in pathogenesis as already mentioned includes gram-positive cocci, gram negative bacilli and Fungi [5].



Figure 1: Ecthyma gangrenosum-like lesions (1a) noted over chin (1b), calf (1c) and left cheek (1d).

Staphylococcus lentus a known pathogen and colonizer isolated from various farm animals, pets, wild animals as well as from food products of animal origin, has been rarely reported as a pathogen in humans. In a case series, *S. lentus* has been reported to cause isolated infections in humans with major portal of infections being Urine, blood, wound cultures and rarely found to involve CSF and peritoneal fluids. They have been linked to potentially fatal infections such endocarditis, peritonitis, septic shock, urinary tract infections, endophthalmitis, pelvic inflammatory disease, and, most often, wound infections [3,6]. De novo skin infection caused by this pathogen without a known pre-existing wound has never been reported. Most of the people were reported to have contact with animals or animal-based food products.

In the present case scenario, it is uncertain whether initial staphylococcal bacteremia has led to development of ecthyma gangrenosum-like lesion or if denovo skin infection resulted in systemic sepsis. The risk factor for *S.lentus* exposure, in our case was contact with cows from the patient's farm. The temporal relation of fever with simultaneous appearance of skin manifestations points to contemporaneous occurrence of bacteremia along with or prior to appearance of skin lesions. Adequate response of bacteremia and skin lesions to vancomycin (as per culture-sensitivity) further confirmed *S.lentus* as the culprit organism for the lesions and sepsis.

Ecthyma gangrenosum as classically seen in severely malnourished or immunosuppressed individuals, is distinct in our case as the patient was a normal healthy adult without any prior comorbidities. The question of whether, severe pre-existing neutropenia (as seen during the initial few days of illness) was the cause for development of ecthyma gangrenosum served as source of systemic sepsis or whether neutropenia was a sequelae of *S.lentus* septicemia which in turn favored development of ecthyma gangrenosum-like-skin lesions remains still unanswered in our case. In fact, neutropenia showing temporal association, with severe neutropenic counts observed during peak of clinical illness with subsequent normalization of

counts by after 1st week of vancomycin institution, discloses neutropenia as a critical entity in *S. lentus* sepsis and ecthyma. Perhaps reporting of similar case reports can assist in proper delineation of the pathophysiology of this condition.

Conclusion

S.lentus being a rare pathogen in humans can be associated with severe neutropenia and Ecthyma gangrenosum-like-skin lesions. These clinical indicators can serve as potentially clues for its diagnosis and management in the future.

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