Annals of Arthritis and Clinical Rheumatology

Case Report
Published: 21 May, 2018

Necrotizing Soft Tissue Infection in a Patient with Bullous Systemic Lupus Erythematosus: Case Report

Hannah P. Leo[1], Elizabeth R. Volkmann[2] and Artin Krekory Ohanian[3]*

[1]Department of Medicine, David Geffen School of Medicine, University of California, USA

[2]Division of Rheumatology and Medicine, David Geffen School of Medicine, University of California, USA

[3]Department of Internal Medicine, UCLA-Olive View Medical Center, USA

Abstract

Introduction: Necrotizing Soft Tissue Infection (NSTI) is an uncommon diagnosis that is often at onset difficult to differentiate from other superficial skin conditions and can be fatal without rapid surgical intervention. Patients with Systemic Lupus Erythematosus (SLE) are noted to have an increased risk of NSTI secondary to an immunocompromised state caused both by the underlying autoimmune disease and immunosuppressive therapy. The bullae seen in bullous SLE, a rare variant with blistering skin, can make diagnosis more challenging.

Case: Presented is a case of NSTI in a patient with bullous lupus that illustrates the rapidly progressive nature of a NSTI due to GAS, the challenges in its diagnosis, and the complications encountered during management.

Conclusion: NSTI in a patient with bullous systemic lupus erythematous may be difficult to diagnosis given the bullae associated with the rheumatologic disease and potential absence of gas on CT imaging in type 2 infections. Complications can include septic shock and need for multiple debridement surgeries.

Keywords: Necrotizing soft tissue infection; Bullous systemic lupus erythematosus

OPEN ACCESS

Correspondence:
Elizabeth R. Volkmann, Division of Rheumatology and Medicine, University of California Los Angeles David Geffen School of Medicine, 12222, Los Angeles, California, USA, E-mail: evolkmann@mednet.ucla.edu

Received Date: *16 Apr 2018*
Accepted Date: *14 May 2018*
Published Date: *21 May 2018*

Citation:
Leo HP, Volkmann ER, Ohanian AK. Necrotizing Soft Tissue Infection in a Patient with Bullous Systemic Lupus Erythematosus: Case Report. Ann Arthritis Clin Rheumatol. 2018; 1(1): 1002.

Background

Necrotizing Soft Tissue Infection (NSTI) is an uncommon diagnosis that is often at onset difficult to differentiate from other superficial skin conditions and can be fatal without rapid surgical intervention. Suggestive signs and symptoms include pain out of proportion to physical examination, bullae, skin necrosis, crepitus, edema beyond the margin of erythema, cutaneous anesthesia, as well as signs of systemic toxicity and rapid spread, even after antibiotic administration [1]. Type 2 (monomicrobial) infections, caused by *Streptococcus pyogenes* or *Staphylococcus aureus*, are less common than type 1 (polymicrobial) infections, involving aerobic and anaerobic bacteria. Type 2 infections are typically found on the limbs of healthy patients with a history of trivial trauma, and can be associated with toxic shock syndrome [2]. In a study of 77 cases of Group A Streptococcal (GAS) necrotizing fasciitis, 47% were associated with toxic shock syndrome with a mortality rate of 67% [3]. Patients with Systemic Lupus Erythematosus (SLE) are noted to have an increased risk of NSTI secondary to an immunocompromised state caused both by the underlying autoimmune disease and immunosuppressive therapy [4]. Although multiple reports of NSTI in a patient with SLE exist, upon literature review none were found involving a patient with bullous SLE, a rare blistering skin condition associated with SLE [4,5]. Presented here is a case of NSTI in a patient with bullous SLE that illustrates the rapidly progressive nature of a NSTI due to GAS, the challenges in its diagnosis, and the complications encountered during management.

Case Presentation

A 23-year-old female with Systemic Lupus Erythematous (SLE) presented to urgent care for an acutely worsening painful rash on her left upper extremity. She reported that the previous night, she popped a small blister that looked like the blisters she routinely develops with bug bites or lupus flares. Overnight, the blister refilled with pustular fluid, which she again drained. Additionally, an erythematous rash developed around the drainage site. The rash continued to worsen after she tried placing frozen water bottles on it. By the time she reached urgent care, the rash had transformed into a large non-pruritic wheal associated with a tight painful burning sensation that was not relieved by

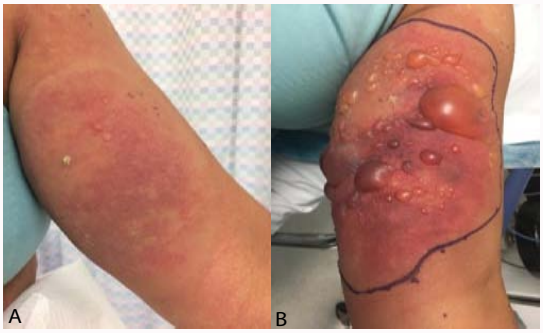

Figure 1: Left upper extremity painful rash in a patient with bullous systemic lupus erythematous. A) Initial presentation in urgent care (1:51 PM). B) Evolution of rash 10 hours later (11:43 PM).

ibuprofen. She reported experiencing subjective fevers and a change in the rash texture from smooth to bumpy while in the waiting room. She also endorsed nausea, which she contributed to being upset and scared. She denied any known allergies, recent travel, new skin products, or outside exposures. Her most recent lupus flare was 9 days prior, for which she was seen in rheumatology clinic. At that visit, she was started on a prednisone taper and hydroxychloroquine 300 mg prior to this visit, she had not had follow up or therapy for her SLE in 3 years. On presentation to urgent care, she was taking 5 mg of prednisone and 300 mg of hydroxychloroquine. On exam, she was afebrile. The rash appeared to be an approximately 13 cm × 6 cm well demarcated raised wheal with patchy violaceous and erythematous areas extending from the antecubital fossa to the axillae (Figure 1A). In the left upper quadrant of the rash was a 0.5 cm crusted over pustule. In the right upper quadrant, there were 3-4 small vesicles, which she reported looked like skin changes seen during her SLE flares.

The initial concern was for urticarial rash complicated by frost bite, given the violaceous patchiness, pain, and history of putting ice on it, versus a cellulitis given the history of skin breakage and presence of a pustule. In urgent care, she was treated with ceftriaxone 1g infusion, diphenhydramine 25 mg IV push and famotidine 20 mg IV push. Morphine was used to control her pain, which she rated as 8/10 in severity. The team became increasingly concerned for cellulitis as the end of an hour neared with no improvement. Given her immunosuppressed state, pain out of proportion to physical examination and increasing concern for a soft tissue infection, the decision was made to transfer her to the emergency department for workup and inpatient admission. This decision was further validated when she spiked a fever to 39.4ºC.

She spent the evening in the emergency department, where pain continued. She required additional morphine and stress dose steroids (hydrocortisone 100 mg/50 mg/50 mg).Within hours, the rash was noted to be acutely changing with expanding erythema and the formation of bullae (Figure 1B). Vancomycin was started for possible gram positive soft tissue skin infection. Lactate was noted to be 2.6 mmol/L and WBC to be 11.5 K. Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score was calculated to be 4 (+2 for sodium of 130 and +2 for hemoglobin of 9.5). While still in the emergency department, the patient developed hypotension with systolic blood pressure in the 80s, unresponsive to 3 L normal saline. The decision was made to transfer the patient to the Medical Intensive Care Unit (MICU). With the addition of norepinephrine titrated to MAP goal of >65 and an additional 1 L normal saline, systolic blood pressure rose to the 100s. Due to concern for necrotizing fasciitis, clindamycin and piperacillin-tazobactam were also given. Surgery was consulted, but after evaluation, the surgical team did not have active concern for necrotizing fasciitis. Computed Topography (CT) scan with IV contrast of the right arm showed cutaneous and subcutaneous in duration and blistering, no walled off fluid collections, and axillary adenopathy. Chest X-ray was unremarkable.

In the MICU, the patient was treated for septic shock with continued norepinephrine, hydrocortisone, vancomycin, clindamycin, piperacillin/tazobactam, and normal saline. Concerned for infection without a clear etiology, the MICU team added ceftriaxone and doxycycline as empiric treatment for *Vibrio vulnificus* given her history of swimming in Hawaii a month prior. Dermatology was consulted and believed the rash was consistent with a lupus flare and *Staphylococcus aureus* cellulitis, with little concern for necrotizing fasciitis. Surgery's suspicion for necrotizing fasciitis also remained low given resolution of pain and no evidence of gas on CT. Dermatology did not believe a biopsy of the bullae was necessary at the time but permitted drainage of the large bulla for comfort. Rheumatology, however, believed the rash was not consistent with lupus flare but still advised to continue hydroxychloroquine 300 mg. In the afternoon, the wound culture collected from the small pustule in urgent care resulted as *Streptococcus pyogenes* prompting a consult to infectious diseases. When infectious diseases evaluated the patient, the patient was noted to have anesthesia at the site of the rash concerning for nerve involvement secondary to necrotizing fasciitis. They advised the primary team to discontinue vancomycin, piperacillin/tazobactam, and doxycycline, continue clindamycin, start penicillin G, and reconsider fasciotomy or debridement emphasizing that necrotizing fasciitis caused by GAS does not form gas, and thus necrotizing fasciitis should not be excluded from the differential. At 8:00 PM, the patient was redlined to the operating room for debridement and for rule out of necrotizing fasciitis. She was found to have 10 cm × 20 cm of devitalized subcutaneous tissue with fluid tracking between intact fascia and intact muscle. Surgical pathology was notable for acute inflammation, focal necrosis, abscesses and focal thrombosed vasculature. The diagnosis of necrotizing soft tissue infection was made.

The patient remained in the MICU for 3.5 more days. The patient appeared well in the morning of post-surgery day 1 with a down-trending white blood cell count. However, by the evening the patient's white blood cell count began to uptrend from 11.9 to 13.1 and a dusky appearance was noted at the lateral aspect of the wound concerning for spreading erythema. The patient was red-lined at 11:00 PM to the operating room for further debridement. Over the following few days in the MICU, the patient continued to have regular wound checks without requirement for further intervention. Wet to dry dressing changes were made twice a day. A chest X-ray was notable for atelectasis. During this time, she also developed an expanding left lateral tongue vesicle, bullae on her right arm in areas of irritation, and an erythematous macular palmar and plantar rash that prompted rheumatology consultation. Considering these findings and low C3/C4, acute lupus flare was suspected, and the patient was started on methylprednisolone IV 10 mg daily for 7 days with subsequent titration. She was also given IVIG 30 g daily for 2 days.

The patient was then transferred to the medical floor, where she spent 4 days before being discharged. During this time, dermatology collected punch biopsies that, post-discharge, were showed immunofluorescent staining consistent with bullous lupus

without vasculitis. She was treated empirically for bullous lupus with triamcinolone 0.1% ointment. A hemorrhagic bulla on the patient's abdomen was also drained. Her time on the medicine floor was only notable for required transfusion of 1 unit packed red blood cells for a down-trending hemoglobin to 7. Otherwise, she continued to improve, a wound Vacuum-Assisted Closure (VAC) was placed, she was transitioned to oral clindamycin and penicillin, and switched from methylprednisoloneto prednisone 10 mg. Arterial evaluation of the upper extremities by ultrasound was unremarkable. The patient was discharged with mycophenolate (500 mg BID) and continued oral clindamycin and penicillin for 8 days.

In the months following, the patient received a soft tissue skin graft from her left thigh to her left arm. She was also diagnosed by biopsy with class III lupus nephritis.

Discussion

The presented case of Necrotizing Soft Tissue Infection (NSTI) in a patient with bullous systemic lupus erythematous demonstrates the difficulty in early identification and diagnosis. This young patient acquired a type 2 NSTI positive for *Streptococcus pyogenes,* and subsequently developed septic shock. She was especially at risk given her immune status secondary to SLE and immunosuppressant medication [4]. Given recent evidence on the effects of non-steroidal anti-inflammatory drugs on the development of NSTI caused by GAS, it is possible her use of ibuprofen contributed to an accelerated disease progression, increased severity, and reduced efficacy of antibiotics seen in her case [6]. The challenges of correctly diagnosing her infection included the appearance of bullae that were not significantly different in appearance from bullae seen in lupus flares and a LRINEC score of only 4. LRINEC scores greater than or equal to 6 are highly suggestive of NSTI [7]. Additionally, there was a misconception that absence of gas on CT suggested a low likelihood of necrotizing fasciitis. In NSTI, subcutaneous emphysema is rarely seen, especially during the early stages of infection when gas has not yet reached detectable levels [7,8]. Furthermore, gas is less likely to be seen in Type 2 infections because they are not caused by the gas-producing anaerobic bacteria seen in type 1 infections [9]. The development of cutaneous anesthesia, as in this case, is not a reassuring sign of a benign process, but rather a red flag for a possible necrotizing infection late in its course [7]. While the bullae associated with necrotizing fasciitis may be easily confused for the bullae of bullous SLE, it is imperative that NSTI still be considered on the differential. As seen with this patient, bullae of NSTI and a lupus flare can even co-occur. Medical teams must view presenting signs and symptoms within the context of the complete clinical picture. Considering this patient's pain out of proportion to physical examination and rapid decompensation leading to septic shock with a worsening rash in her ultimate evaluation in retrospect, a surgical debridement should have been considered sooner. As this is the first documented case of NSTI in a patient with bullous SLE, it emphasizes the importance of clinical presentation, demonstrates potential complications, and shares the management strategy taken so that diagnosis and management may be improved in future cases.

References

1. Stevens DL, Bisno AL, Chambers HF, Dellinger EP, Goldstein EJ, Gorbach SL, et al. Practice guidelines for the diagnosis and management of skin and soft-tissue infections. Clin Infect Dis. 2005;41(10):1373-406.
2. Puvanendran R, Huey JC, Pasupathy S. Necrotizing fasciitis. Can Fam Physician. 2009;55(10):981-7.
3. Kaul R, McGeer A, Low DE, Green K, Schwartz B. Population-based surveillance for group a streptococcal necrotizing fasciitis: Clinical features, prognostic indicators, and microbiologic analysis of seventy-seven cases. Ontario Group A Streptococcal Study. Am J Med. 1997;103(1):18-24.
4. Kamran M, Wachs J, Putterman C. Necrotizing fasciitis in systemic lupus erythematosus. Semin Arthritis Rheum. 2008;37(4):236-42.
5. Tung Chen Y, Isenberg D. Necrotising fasciitis in systemic lupus erythematosus: A case report and literature review. Lupus Sci Med, 2014;1(1):e000008.
6. Bryant AE, Bayer CR, Aldape MJ, Stevens DL. The roles of injury and nonsteroidal anti-inflammatory drugs in the development and outcomes of severe group a streptococcal soft tissue infections. Curr Opin Infect Dis, 2015;28(3):231-9.
7. Hakkarainen TW, Kopari NM, Pham TN, Evans HL. Necrotizing soft tissue infections: Review and current concepts in treatment, systems of care, and outcomes. Curr Probl Surg. 2014;51(8):344-62.
8. Chaudhry AA, Baker KS, Gould ES, Gupta R. Necrotizing fasciitis and its mimics: What radiologists need to know. AJR Am J Roentgenol. 2015;204(1):128-39.
9. Misiakos EP, Bagias G, Patapis P, Sotiropoulos D, Kanavidis P, Machairas A. Current concepts in the management of necrotizing fasciitis. Front Surg. 2014;1:36.