



Group a Streptococcus Necrotizing Soft Tissue Infection Secondary to Corticosteroid Injection: A Case Report and Literature Review

Ritchard C Rosen¹, Alan C Stuto^{2*} and Keith D Cook³

¹Department of Podiatric Surgery, Holy Name Medical Center, USA

²Department of Podiatric Surgery, University Hospital, Newark NJ, USA

³Department of Podiatry, University Hospital, Newark, NJ, USA

Abstract

The use of corticosteroid injections is a common practice for foot and ankle pathology. The incidence of infection or necrotizing fasciitis following injection therapy is rare. Necrotizing soft tissue infections may be fatal or cause limb loss. The authors present a rare case of group A streptococcus necrotizing fasciitis following corticosteroid injections into a patients bilateral ankle joints. The authors discuss the emergent treatment that prevented limb loss, a review of the literature and recommendations for prevention of infections following corticosteroid injection.

Introduction

Corticosteroid injection therapy is a common treatment modality for many foot and ankle pathologies. Preparation of the skin prior to joint injection widely varies among disciplines and across regional borders, likely due to the paucity of literature on the most effective and efficient methods of preparation [1]. Regardless the incidence of post-injection infection remains low, with the incidence varying from 1:3,000 to 1:50,000 injections [1]. Baima “et al.” report that intra-articular infections post-injection is not common. In the podiatric practice, povidone-iodine or alcohol based solutions are the standard prior to injection of a joint [2].

Group A Streptococcus (GAS; Streptococcus pyogenes) is an aerobic gram-positive coccus organism that causes an array of infections including cutaneous infections such as cellulitis, erysipelas, pyoderma, necrotizing fasciitis, myositis or myonecrosis. In addition pharyngitis, rheumatic fever; acute glomerulonephritis, pneumonia, postpartum endometritis and toxic shock syndrome have been attributed to Group A Streptococcus [3]. The purpose of this paper is to review Group A Streptococcus bacteria and report a rare case of Group A Streptococcus infection following corticosteroid injection into the ankle joint, bilaterally.

Materials and Methods

A 56 y/o female was admitted to the hospital thirty-six h after receiving a corticosteroid injection to her left and right ankles. The patient stated when she got home that night she developed pain and redness to both ankles. Her physician prescribed her amoxicillin/clavulanic acid and oxycodone/acetaminophen. Within hours the pain became “so severe to both ankles” and the redness had progressed proximally up her left leg and thigh. She subsequently presented to the emergency room the following day and was admitted to the hospital.

Upon examination in the emergency department pain was present to her bilateral ankles, left lower leg, thigh and groin. The patient was able to perform active range of motion to both lower extremities with significant pain to left ankle joint. Infectious disease was consulted immediately in the emergency department. Clinically the patient presented with an extremely edematous left foot and ankle and with mild edema noted to her right ankle. Pain was present upon palpation of the right ankle, left foot, left ankle and left groin regions. No crepitus was noted with superficial or deep palpation. The most significant pain upon palpation was present to left ankle joint.

Erythema was present spanning the dorsal left foot/ankle along with the medial aspect of the left leg and thigh. On the right ankle erythema was isolated to the anteromedial aspect of the ankle. There was a large serosanguinous bulla dorsally on the left foot over metatarsals three through

OPEN ACCESS

*Correspondence:

Alan C Stuto, Department of Podiatric Surgery, Holy Name Medical Center, Teaneck, NJ, 07666, USA, E-mail: alan.stuto21@gmail.com

Received Date: 18 Jan 2017

Accepted Date: 18 Apr 2017

Published Date: 25 Apr 2017

Citation:

Rosen RC, Stuto AC, Cook KD. Group a Streptococcus Necrotizing Soft Tissue Infection Secondary to Corticosteroid Injection: A Case Report and Literature Review. Clin Surg. 2017; 2: 1431.

Copyright © 2017 Alan C Stuto. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.



Figure 1: Initial presentation of LE b/l. A) Dorsal edema, erythema, ecchymosis, and serosanguinous bullae noted. B) Ascending cellulitis noted to medial aspect foot, leg and thigh. C/D) Right ankle localized erythema.



Figure 2: S/p day #2 after initial surgery. Necrotic tissue noted to dorsum foot and localized cellulitis remained. (4 incisions from initial surgery are shown: anteromedial ankle, anterolateral ankle, dorsal proximal foot and dorsal distal foot).

five and extending to the lateral aspect of entire heel. (Figure 1) The patient was started on IV vancomycin and ceftriaxone.

Significant labs upon admission: WBC $22,000 \times 10^3/\mu\text{L}$; Absolute neutrophil $20.2 \times 10^3/\mu\text{L}$; Band neutrophils 26%; Lymphocytes 4%; Lactic acid 3.4 mmol/L; CRP 23.9 mg/L; ESR 70 mm/hour, Glucose 102 mg/dL; Temp 102.4°F. On hospital day two, her WBC decreased to $18,000 \times 10^3/\mu\text{L}$ and her temperature remained elevated at 102.2°F. Podiatry was consulted at this time for evaluation and management of the ankles bilaterally. The clinical appearance had not changed as stated above. Foot, ankle, and tibia-fibula X-rays bilaterally were obtained which revealed no soft tissue gas or signs of osteomyelitis. The patient was determined to have a septic left ankle joint and cellulitis to right anterior ankle based upon clinical examination.

The patient was emergently taken to the operating room. An incision and drainage of the patient's left foot and ankle with left ankle arthrotomy was performed. Approximately 60 milliliters of serosanguinous fluid was expressed from the left ankle and dorsal foot



Figure 3: S/p day #7 after 2nd debridement shows that all necrotic/non-viable tissue was removed from left foot and ankle.



Figure 4: Intra operative STSG recipient site, left foot. Applied two weeks after 2nd debridement.



Figure 5: S/p 2 weeks application STSG, left foot. Graft appears to be 100% take.

incisions. No purulence was expressed. Pulse lavage was performed with three liters of normal saline and three liters of normal saline mixed with polymyxin B and bacitracin. Pre and post lavage wound cultures were obtained and sent to microbiology. Pre lavage soft tissue was sent to pathology for evaluation of cells and for cell count.

Results

On hospital day three, the patient's WBC decreased to $14,000 \times 10^3/\mu\text{L}$. The patient was able to move her toes without pain but had mild pain with left ankle joint motion. On hospital day 4, the WBC decreased to $7,000 \times 10^3/\mu\text{L}$ and her clinical exam remained unchanged. At this time, the cellulitis was no longer present to the



Figure 6: S/p 5 weeks application STSG, left foot. Graft appears to be 100% take.

patient's left thigh and leg. The cellulitis to her right ankle had also resolved. Wound cultures from the OR revealed Group A Strep (pre lavage only) and the patient were started on IV penicillin G as per infectious disease recommendations. Normal saline wet to dry dressings were applied to all wounds and changed daily.

A second debridement in the operating room was performed to remove any remaining non-viable tissue (Figure 2). Post lavage wound cultures were again obtained. The wound demonstrated healthy granular tissue following the second surgery and daily wet to dry dressing changes were continued for another week. No clinical signs of infection were noted and finalized post lavage wound cultures were negative (Figure 3).

The patient was subsequently taken to the operating room two weeks after the second debridement for application of a split thickness skin graft. The graft was harvested from the ipsilateral thigh with the assistance of a general surgeon and applied to the dorsum of the left foot and ankle (Figure 4). Following this surgery the patient was discharged from the hospital in stable condition and followed up with the surgeon until complete healing of left foot (Figure 5-7). The patient remained on antibiotics for a total of three weeks; two weeks of IV antibiotics and then converted to oral penicillin for an additional week. The complete healing of the skin graft was eight weeks post operatively and two weeks later the patient resumed normal shoe gear. The patient began physical therapy for mobilization of the graft and adjoining tissue. After two weeks of treatment, she was cleared by physical therapy and resumed full activity.

Discussion

Corticosteroid injection therapy into a joint is common practice for a foot and ankle surgeon. As one can see from the case presented significant complications may arise. Adequate skin preparation is vital, and we recommend utilizing sterile technique before performing a joint injection. Although it is nearly impossible to replicate sterile procedures outside of the operating room, Baima "et al." defines sterile technique for joint injections as utilizing sterile gloves and preparing the skin of the injection site with povidone-iodine or chlorhexidine solution prior to injection. We believe this is vital in the prevention of post injection infection in comparison to "clean technique with non-sterile gloves" [1]. The use of single dose vials of an injectable may be beneficial in the reduction of post injection infections, and should be common practice. In our case report the suggestive cause of infection was the use of a multi-dose vial. It could not be determined the technique for sterility utilized for the injections [4].

Necrotizing soft tissue infections are rare but can be very severe resulting in extremity loss or death. Based on microbiological characteristics necrotizing soft tissue infections are classified into



Figure 7: S/p 10 weeks application STSG, left foot. The skin graft is fully healed.

three types: Type I (Polymicrobial infection), Type II (Group A Streptococcal [GAS] infection), Type III (Clostridium organisms, most commonly Clostridium Perfringens). There are also case reports of monomicrobial necrotizing soft tissue infections due to other organisms, including *Vibrio Vulnificus*, *Aeromonas Hydrophilia*, and *Haemophilus Influenzae* [6].

Treatment of necrotizing soft tissue infection consists of early and aggressive surgical exploration and debridement of necrotic tissue, together with broad-spectrum empiric antibiotic therapy and hemodynamic support. Surgery is indicated in the setting of severe pain, toxicity, fever or an elevated serum creatine kinase (CK) level, with or without radiographic evidence of soft tissue emphysema [7]. Use of antibiotic therapy without debridement is associated with a mortality rate approaching 100 percent [7]. Hemodynamic instability may require aggressive supportive care with fluids and vasopressors.

Necrotizing infections of the skin and fascia are surgical emergencies. Radiographic imaging studies should not delay surgical intervention when there is crepitus on examination or clinical evidence of progressive soft tissue infection. The goal of operative management is to perform aggressive debridement of all necrotic tissue until healthy, viable tissue is reached [6]. Tissue obtained in the operating room should be sent for Gram stain, culture and pathological examination [6]. Subsequently, the wound should be covered with a sterile dressing, reevaluated approximately 24 to 48 hours later, and aggressively debrided again if necrotic tissue is present [6]. The wound may be closed or grafted after all necrotic tissue is completely debrided. In some cases, allografting or myocutaneous tissue reconstruction is required to cover the defect.

Treatment of group a streptococcus infections consists of penicillin G (4 million units intravenously every four hours in patients with normal renal function) [8]. One can add clindamycin (900 mg IV every eight h) to penicillin therapy or use it as an isolated antibiotic therapy if culture sensitivities indicate as an effective treatment option [8]. Although there are no additive, synergistic, or antagonistic effects of penicillin when added to clindamycin in vitro, clindamycin alone has been found to be more effective in invasive infections [8]. Unlike penicillin, the efficacy of clindamycin is unaffected by the size of the inoculum and stage of bacterial growth [8]. In addition, clindamycin inhibits the production of toxin by streptococci.

The optimal duration of antibiotic therapy for GAS bacteremia is uncertain, and data is limited. In general, antibiotics should be

administered for at least 14 days [8]. The clinical approach should be tailored to individual patient circumstances, including the source of infection and clinical response to treatment. In the setting of serious soft tissue infection antibiotic therapy is generally continued for 14 days from the last positive culture obtained during surgical debridement [8]. It is uncertain whether intravenous therapy is required for the entire duration of antibiotic therapy, and data is limited on this as well. Following clearance of bacteremia if present, completion of surgical intervention and resolution of clinical signs of infection, it may be reasonable to complete the course of antibiotic therapy with an oral agent [8].

References

1. Baima J, Isaac Z. "Clean versus sterile technique for common joint injections: a review from the physiatry perspective." *Current Review in Musculoskeletal Medicine*. 2008;1(2):88-91.
2. Southerland J. McGlamry's *Comprehensive Textbook of Foot and Ankle Surgery*, 4th edn. John Schuberth, Jerome Steck, editor. Jeffrey Christensen. Philadelphia: Wolters Kluwer Health, Lippincott Williams & Wilkins. 2012;728.
3. Stevens DL. Invasive group A streptococcus infections. *Clin Infect Dis*. 1992;14(1):2-11.
4. Siegel J, Rhinehart E, Jackson M, Chiarello L. "2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings." *Am J Infect Control*. 2007;35(10):65-164.
5. Kiska DL, Thiede B, Caracciolo J. "Invasive group A streptococcal infections in North Carolina: epidemiology, clinical features, and genetic and serotype analysis of causative organisms." *J Infect Diseases*. 1997;176(4):992-1000.
6. 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.
7. Anaya DA, Dellinger EP. Necrotizing soft-tissue infection: diagnosis and management. *Clin Infect Dis*. 2007;44(5):705-10.
8. Khan ZZ. *Group A Streptococcal Infections Treatment & Management*. Medscape. 2016.