Streptococcus (GAS) as Cause of Necrotizing Fasciitis Associated with Septic Shock and Multiorgan Dysfunction

Corresponding Author:
Dr. Klodiana Shkurti,
Department of Infectious Diseases, University Hospital Center Mother Theresa, Tirana - Albania

Submitting Author:
Dr. Gentian M Vyshka,
Lecturer, Biomedical, Faculty of Medicine, Rr Dibres 371 - Albania

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Streptococcus (GAS) as Cause of Necrotizing Fasciitis Associated with Septic Shock and Multiorgan Dysfunction

Author(s): Shkurti K, Xhepa G, Leka N, Kraja D, Vyshka G, Petrela E

Abstract

Necrotizing fasciitis is a rare infection caused by microorganisms called “flesh eating bacteria”. It is characterized by rapid tissue destruction along superficial fascia, systemic signs of toxicity and high mortality. The most common etiologic agents are gram positive and gram negative species or/and anaerobes. The authors present the successful treatment of a 71 years old woman with necrotizing fasciitis due to Group A Streptococcus (GAS), complicated with severe septic shock in a subject with chronic malnutrition. No skin lesion was found to serve as a portal of entry for infection. The successful outcome was due to the early treatment with antibiotics and massive debridement of necrotic tissue two days after hospitalization.

Introduction

Necrotizing fasciitis is a progressive life-threatening condition associated with a high mortality rate[1]. Bacterial entry in epidermis occurs as a result of small lesions in dermal tissue[2]. It can affect healthy persons, but the risk is increased in such clinical situations as diabetes, obesity, age over 50 years, alcoholism and smoking[3]. Cellulite is easily mistaken for an early-stage necrotizing fasciitis, but the difference is that cellulites responds to antibiotics, whereas necrotizing fasciitis does not. Most authors[1, 2, 4, 5, 6, 7] recommend the use of a broad-spectrum antimicrobial therapy and massive debridement of all necrotic and infected tissue, in order to decrease the bacterial load and the production of bacterial toxins and enzymes.

Case Report(s)

A 71 years old woman was admitted to our Intensive Care Unit (ICU) because of septic shock associated with infection and skin necrosis of the left femoral region. The patient had a two days history of fever, followed six hours later by swelling of her left groin and thigh (Figure 1).

She was febrile 39-40° C with signs of systemic toxicity, facial pallor and alteration of mental status. Her heart beats were 140/min, respiratory rate 32/min, O2 saturation 88%, blood pressure 70/50 mmHg and she had a reduced urine output (500 ml/24 hours).

Treatment with intravenous antibiotics as Piperacillin/Tazobactam and Metronidazol was started immediately after hospitalization, because of the septic shock condition.

About ten hours later, while being on treatment, redness and edema rapidly progressed to central patch of blue-purple area and bulla that became gangrenous in the next 48-72 hours (Figure 2).

Laboratory data are shown in Table 1.

The result of microbiological examination from the secretions and the affected tissue was a pure culture of Group A Streptococcus (GAS).

Twenty hours after admission in ICU, the patient developed Acute Respiratory Distress Syndrome (ARDS) requiring intubation and mechanical ventilation. She developed acute renal failure, too, and was hemodynamically supported with saline solutions, blood transfusion, dopamine, furosemide and bicarbonates because of the metabolic acidosis. Surgical treatment with massive debridement was performed shortly, two days after admittance in ICU.

The patient was discharged from surgical service after three weeks. One month later she performed plastic surgery recovery.

The patient felt better after surgery intervention, but time after time she complained of headache, insomnia and diffuses muscular weakness. The situation two months after plastic surgery is shown in Figure 3.

Discussion

Necrotizing fasciitis is a highly lethal infection characterized by necrosis of the subcutaneous tissue and superficial fascia caused by microorganisms, their toxins and enzymes. The most affected locations are extremities, abdominal wall, pelvis and thoracic wall.[3, 7, 8, 9, 10, 11] Necrotizing fasciitis type I tends to occur in patients with significant co-morbidities (diabetes,
alcohol abuse and malignancy) and usually consists of polymicrobial infections, while type II is most common in healthy individuals with a history of trauma, surgery or malnutrition[8]; its etiologic agent is Group A Streptococcus (GAS).

The initial dermal lesions resemble to cellulites or erysipelas; however the severe toxicity, the septic shock condition and a very rapidly progressive purple edema do not justify the diagnosis of cellulites. The outer appearance of the skin damage of the patient doesn’t correlate with the severity of the deep fascial necrosis (Figure 3). The common symptoms of necrotic fasciitis are an intense pain and the swelling over the affected skin and muscle[12]. The expansion of the necrosis, as it is reported[14], depends on the action of toxins and enzymes produced by streptococcus. When these toxins are released into the systemic circulation, they produce Systemic Inflammatory Response Syndrome (SIRS) which progresses into septic shock, Multiple Organ Dysfunction Syndrome (MODS) and finally, death[13]. Changes in the blood test of the case presented, as anemia and reduced platelets count were as a result of toxic effect in bone marrow. The microbiological examination from affected dermal lesions of the patient identified Group A Streptococcus (GAS). The successful treatment requires appropriate clinical assessment, culture identification, early aggressive debridement of affected tissues, soon after intravenous broad spectrum antibiotics and supportive treatment in the intensive care unit. Penetration of antibiotics into the ischemic and necrotic tissue is poor and thus the antibiotic treatment without surgery is ineffective[11]. The hyperbaric oxygen therapy as a supportive treatment was not an option at the institution. Delay in diagnosis and treatment results in multiple organ system failure[6-14] and fatal outcome. Cases are reported showing that patients survived, when the average time from onset of the disease to diagnosis and treatment was 4 days, while that of those who died was 7 days[18].

The most severe complications of the septic shock are acute renal failure and Acute Respiratory Distress Syndrome (ARDS) [18, 19], as in the present clinical case. Mortality in necrotic fasciitis is approximately 80% in cases associated with sepsis and renal failure[8, 17, 18].

As for the present case, despite the severe septic shock, the acute renal failure and ARDS, the early diagnosis followed by a broad specter antibiotics therapy, supportive treatment, and the early surgical intervention, consisting to massive debridement of the necrotic tissue and superficial fascia, are considered the reasons for the favorable outcome of the patient.

Conclusion

The authors present the successful treatment of a 71 years old woman with necrotizing fasciitis due to Streptococcus GAS complicated with a severe septic shock and multiple organ failure. Early treatment with antibiotics as Piperacillin/Tazobactam, Metronidazol, supportive therapy and the early massive debridement of necrotic and superficial fascia was the reason of the successful outcome.

References

11. Schwartz, MN. Cellulitis and subcutaneous tissue infections. Principles and Practice of Infectious Diseases, 5th edition, Mandell, Bennett,


Illustrations

Illustration 1

Figure 1. Left thigh and lower abdominal region fasciitis, upon admission

Illustration 2

Figure 2. Necrotizing fasciitis spreading over the same areas, three days later
Illustration 3

Figure 3. Same area after debridement and plastic surgery
Illustration 4

Table 1

Laboratory examination data

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