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CASE REPORT

PAN-DRUG RESISTANT *ACINETOBACTER BAUMANNII* NECROTIZING FASCIITIS OF THE NOSE FOLLOWING BLUNT TRAUMA: A FATAL CASE

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Abstract

Introduction. Necrotizing soft tissue infections of the face are rare but are associated with high morbidity and mortality rate. Although *Acinetobacter baumannii* is a renowned nosocomial pathogen, known for its drug resistance, it is an uncommon cause of necrotizing fasciitis (NF). We report a case of fatal necrotizing soft tissue infection of the face (nose) following a blunt vehicle trauma in a previously healthy young man.
Case presentation. A 22-year-old male was admitted to a level 3 trauma center after a high-speed motor vehicle accident with multiple traumatic injuries, included cerebral contusion, mandibular fracture, bilateral pneumothorax and traumatic shock. After initial stabilization and mechanical ventilation, it was noted a small necrotic area of black, non-viable tissue in the left naris, initially attributed to localized trauma or pressure necrosis, which rapidly progressed to NF. Microbiology analysis of deep tissue samples identified pan-drug-resistant *Acinetobacter baumannii*. Despite repeated surgical debridement, broad spectrum antibiotics and full intensive care support, the patient developed refractory septic shock and multi-organ failure, dying 30 days after the initial trauma.

Résumé

Fasciite nécrosante nasale à *Acinetobacter baumannii* pandrug-résistant après traumatisme contondant: un cas fatal

Introduction. Les infections nécrosantes des tissus mous du visage sont rares, mais associées à une morbidité et une mortalité élevées. Bien qu'*Acinetobacter baumannii* soit un pathogène nosocomial bien connu pour sa résistance aux antibiotiques, il est rarement impliqué dans la survenue d'une fasciite nécrosante (FN). Nous rapportons le cas d'une infection nécrosante fatale des tissus mous du visage (nez) survenue après un traumatisme crânien contondant chez un jeune homme en bonne santé.
Présentation du cas. Un homme de 22 ans a été admis dans un centre de traumatologie de niveau 3 après un accident de la route à grande vitesse ayant entraîné de multiples traumatismes, notamment une contusion cérébrale, une fracture de la mandibule, un pneumothorax bilatéral et un choc traumatique. Après stabilisation initiale et ventilation mécanique, une petite zone nécrosée de tissu noir non-viable a été observée dans la narine gauche. Initialement attribuée à un traumatisme localisé ou à une nécrose de pression,

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Conclusions. NF type II, caused by monomicrobial *Acinetobacter baumannii*, represents a severe complication in trauma patients. The case presented demonstrates the importance of awareness for early and atypical presentations of this disease; meanwhile, prevention measures for nosocomial infection are crucial. This case shows that even survivable trauma is not safe from pan-drug-resistant organisms.

Keywords: necrotizing fasciitis, *Acinetobacter baumannii*, multidrug resistance, nosocomial infection.

List of abbreviations:
NF – necrotizing fasciitis
ICU – intensive care unit
CRAB – carbapenem-resistant *Acinetobacter baumannii*
GCS – Glasgow Coma Scale
ENT – otorhinolaryngology
PDR – pan-drug-resistant
VAP – ventilation associated pneumonia

Conclusions. La fasciite nécrosante de type II, causée par une bactérie monomicrobienne à Acinetobacter baumannii, représente une complication grave chez les patients traumatisés. Le cas présenté souligne l'importance de la vigilance face aux manifestations précoces et atypiques de cette maladie; par ailleurs, la prévention des infections nosocomiales est cruciale. Ce cas démontre que même les traumatismes généralement évitables ne sont pas à l'abri des bactéries multirésistantes.

Mots-clés: fasciite nécrosante, *Acinetobacter baumannii*, multirésistance, infection nosocomiale.

Introduction

Necrotizing fascitiis (NF) or 'flesh-eating disease' is a life threating bacterial soft tissue infection that requires surgical treatment and intravenous antibiotics and has a mortality rate as high as 20-35% in high income countries and even higher in other ones[1,2]. The disease occurs after major traumatic injuries, as well as after minor breaches of the skin or mucosa[3], immunocompromised patients being at higher risk.

Nosocomial infections are the challenge situation for healthcare systems, and even critical for the intensive care (ICU) units. Despite the use of infection control bundles, carbapenem-resistant *Acinetobacter baumannii* (CRAB), a multidrug-resistant pathogen with high mortality, often persists on environmental surfaces, being one of the highest causes of ICU-acquired infections[4].

Case presentation

A 22-year-old man, previously healthy, was transferred to our Level 3 trauma center following a high-speed motor vehicle collision. Prior to transfer, the patient had been stabilized for 24 hours in the ICU of another hospital. Upon arrival, the patient was intubated and mechanically ventilated, with a pre-intubation Glasgow Coma scale (GCS) of 7. He presented with mild hypotension requiring norepinephrine infusion for support, and bilateral pneumothoraxes drained with chest tubes.

The patient was diagnosed with cerebral contusion, a mandibular fracture, bilateral pneumothorax, facial lacerations and traumatic shock. The initial management included antibiotics, fluid resuscitation, stress ulcers prophylaxis, analgesics, and venous thromboembolism prophylaxis with low molecular weight heparin.

By hospital day 6, the patient had stabilized hemodynamically, was weaned from vasopressors, very alert to voice stimuli, and was successfully extubated. An otorhinolaryngology (ENT) consultation was requested to evaluate a small area of black, eschar-like tissue noted in the left anterior naris (Figure 1). Initially, the lesion, was interpreted as traumatic injury, possibly



Figure 1. Early nasal necrotic lesion (eschar)



Figure 2. Advanced NF with extensive tissue necrosis



Figure 3. Post debridement defect showing tissue lost



Figure 4. Last debridement and wound care (reintubated)

from trauma or passing of nasogastric tube and no immediate intervention was performed.

On day 8, the patient's condition deteriorated, with the onset of high fever and tachycardia. The physical examination revealed that the necrotic tissue had rapidly extended (Figure 2). A clinical diagnosis of NF was made, and the patient was taken urgently to the operating room for surgical debridement (Figure 3).

Deep tissue cultures obtained during the initial debridement grew *Acinetobacter baumannii*. Antimicrobial susceptibility testing revealed a pan-drug-resistant (PDR) profile, with resistance to all tested classes including carbapenems, polymyxins, glycyclines, aminoglycosides, beta lactams, fluoroquinolones.

The patient's antimicrobial regimen evolved as follows:

– Empiric phase: ceftriaxone, metronidazole and levofloxacin;
– Targeted salvage phase: upon identification of the PDR isolate, a multispecialty consultation team initiated combination therapies, including tigecycline/vancomycin/colistin and subsequently imipenem/tigecycline/rifampicin, aiming for synergistic effects despite in vitro resistance.

Despite aggressive management, including four surgical debridements (Figure 4), specialized wound care and maximal supportive measures, the patient progressed to refractory septic shock and multiorgan failure. The management required reintubation, high dose vasopressor support, steroids, continuous renal replacement therapy, etc. The patient's condition

continued to decline and did not survive 30 days after the initial traumatic event.

Discussion

NF remains a surgical emergency characterized by rapid progression, systemic toxicity and high mortality. While polymicrobial infections are more common, there is a surge in monomicrobial NF reports, including *Acinetobacter baumannii* as a spread pathogen in hospitals. This case illustrates a few clinical and epidemiological aspects. First, the patient presented with multiple risk factors for nosocomial infections: mechanical ventilation, invasive procedures, disruption of natural barrier as laceration, use of broad-spectrum antibiotics. These conditions may have served for colonization and then invasive infection by *Acinetobacter baumannii*. Second, the anatomical location of infection, the nasal region, is highly unusual and NF initially may be misinterpreted as pressure injury or minor trauma, contributing to delayed diagnosis and advancement of the disease. Third, the identification of PDR Acinetobacter *baumannii* represents a major treatment challenge. Resistance to all available antimicrobial classes leads to the impossibility of an etiological treatment, and surgical debridement with supportive care were the only interventions left, emphasizing the importance of infection prevention strategies, antimicrobial stewardship and early surgical management. Fourth, this case report focuses one's attention for the evolvement of multidrug resistant organisms, causing severe soft tissue infections.

Acinetobacter baumanii is a pathogen found frequently in the ICU and is one of the main microorganisms causing VAP. Resistance to antibiotics is a feature of this Gram-negative bacteria[5], making the treatment extremely difficult. In our ICU and other hospitals in Albania, the *Acinetobacter baumannii* presence as a microorganism causing nosocomial infections has one of the highest percentages. A novel antibiotic specifically for this pathogen, authorized by the Food and Drug Administration (May 2023) but not the European Medicines Agency (EMA) (as of early 2026) is sulbactam-durlobactam[8].

Finally, this case highlights that early suspicion, even for atypical manifestation of this disease, needs to be checked and multidisciplinary care is needed.

Conclusions

Vigilance for early signs of NF in trauma patients is essential, even when it involves anatomical sites where the condition is rarely encountered.

Strict infection control measures need to be taken in hospitals and particularly in ICUs for eradicating nosocomial pathogens as *Acinetobacter baumannii*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Pseudomonas aeruginosae* etc. These microorganisms represent a persistent threat because of their multidrug and PDR profiles.

There is an urgent need for the development of novel antibiotics capable for targeting PDR microorganisms.

Finally, antimicrobial stewardship must be enforced with use of broad-spectrum antibiotics for clearly indicated case and immediate de-escalation strategy based on microbiological data be applied.

Author Contributions:

S.L. was responsible for study design, data collection, data analysis, literature review, data interpretation, manuscript drafting, and overall coordination. K.P. and E.S. contributed to data collection and data analysis. H.S revised the manuscript for important intellectual content. All authors approved the final version of the manuscript.

Compliance with Ethics Requirements:

"The authors declare no conflict of interest regarding this article"

"The authors declare that all the procedures and experiments of this study respect the ethical standards in the Helsinki Declaration of 1975, as revised in 2008(5), as well as the national law.

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