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Fulminant Clostridium Septicum Sepsis with Necrotizing Soft Tissue Involvement in an Elderly Caucasian Woman a Case Report

Malvina Javakhadze[1], Alexandre Tavartkiladze[2*], Nana Dzneladze[3], Nana Mgaloblishvili[4], Maia Kherkheulidze[5], Irma Korinteli[5], Baka Dangadze[6], Tamar Kachibaia[6] and Tamar Gegeshidze[1]

[1]*Department of Infectious Diseases, Tbilisi State Medical University, Tbilisi, Georgia.*

[2]*Department of Medical Oncology, Tbilisi State Medical University, Tbilisi, Georgia.*

[3]*Department of Aversi Clinic Laboratories, Tbilisi State Medical University, Tbilisi, Georgia.*

[4]*Department of Allergy and Immunology, Tbilisi State Medical University, Tbilisi, Georgia.*

[5]*Department of Pediatrics, Tbilisi State Medical University, Tbilisi, Georgia.*

[6]*Department of Bochorishvili Clinic, Tbilisi State Medical University, Tbilisi, Georgia.*

Corresponding Author: Alexandre Tavartkiladze, Department of Medical Oncology, Tbilisi State Medical University, Tbilisi, Georgia.

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Abstract

Introduction

Clostridium septicum can cause spontaneous, atraumatic myonecrosis and rapidly progressive sepsis with high case fatality despite timely antimicrobials. Early surgical source control and toxin-suppressive therapy are crucial.

Case presentation

A 70-year-old Caucasian (White) woman presented with abrupt right upper-limb pain and swelling that progressed within hours to bullae and subcutaneous emphysema. Arterial/venous duplex and CT angiography excluded occlusion. On arrival she was borderline hypotensive with oxygen desaturation. Laboratory studies showed leukocytosis (15.79×10^9/L), marked procalcitonin (51.43 ng/mL), coagulopathy, severe lactic acidosis (10.7 mmol/L), and thrombocytopenia (111×10^9/L). Transthoracic echocardiography revealed severe LV hypertrophy with reduced EF (35%). Anaerobic blood culture grew C. septicum. Despite early broad-spectrum antibiotics, escalating vasopressors, and mechanical ventilation, she developed refractory shock; surgery was deemed unfeasible due to profound instability. She died 19 hours after symptom onset.

Conclusions

This case underscores the hyper-acute trajectory of C. septicum sepsis, the potential for minimal early fever, and the necessity of immediate surgical consultation plus toxin-suppressive coverage (e.g., addition of clindamycin) alongside broad anaerobic therapy. Detection of C. septicum bacteremia should trigger urgent oncologic evaluation for occult malignancy.

Keywords: Clostridium Septicum, Necrotizing Soft Tissue Infection, Gas Gangrene, Anaerobic Bacteremia, Myonecrosis, Septic Shock

Abbreviations

NSTI: necrotizing soft-tissue infection
LV: left ventricle
EF: ejection fraction
MR/TR: mitral/tricuspid regurgitation
SIMV/PC: synchronized intermittent mandatory ventilation/ pressure control
PEEP: positive end-expiratory pressure

1. Introduction

Clostridium septicum is an aerotolerant, spore-forming anaerobe capable of causing rapidly fatal necrotizing infection, often without antecedent trauma. Mortality hinges on time-to-surgery and early toxin suppression in addition to broad anaerobic coverage [1-3]. Compared with other clostridia, C. septicum is closely linked to occult colorectal or hematologic malignancy and neutropenia, necessitating deliberate screening when identified [5-7].

2. Case Presentation

Patient information. A 70-year-old Caucasian (White) woman with chronic heart failure (post-CABG), bioprosthetic aortic valve, type 2 diabetes (insulin-treated) with neuropathy, hypothyroidism s/p thyroidectomy, and generalized atherosclerosis experienced sudden right-shoulder pain at 02:00 with rapid swelling and bullae formation. She arrived to an angiologic clinic at ~06:00; edema involved the entire limb with hypesthesia, cyanosis, and loss of active finger movement. Vascular imaging excluded arterial/venous occlusion. Hours later, subcutaneous emphysema appeared with hemorrhagic bullae and edema spreading to the right hemithorax and shoulder. Due to suspected gas gangrene she was transferred emergently to a tertiary center. Clinical findings on admission. Afebrile to low-grade fever (37.2 °C) ~14 hours from onset; conscious and oriented. BP 98/54 mmHg, HR 72/min, RR 22–24/min, SpO_2 88–92%, glucose 438 mg/dL. Diagnostics. WBC 15.79×10^9/L with 17% bands, lymphocytes 12%; Hb 10 g/dL; platelets 111×10^9/L. Procalcitonin 51.43 ng/mL; fibrinogen 1.29 g/L; PT 22.3 s; INR 2.30; aPTT 122.1 s; calcium 0.85 mmol/L; lactate 10.7 mmol/L; base excess −21.1 mmol/L. Imaging before transfer showed extensive subcutaneous gas from the upper limb to the right thoracic wall. Aerobic blood cultures were negative; anaerobic blood culture yielded Clostridium septicum. Echocardiography showed severe LV hypertrophy (IVS 1.8 cm; PW 2.2 cm), EF 35%, mild LA dilation, moderate MR/TR, functioning bioprosthetic aortic valve.

Therapeutic interventions. She received cefepime (2 g IV t.i.d.) and vancomycin (1 g IV b.i.d.), anticoagulation, PPI, corticosteroids, and vasopressors (norepinephrine up to 0.22 µg/kg/min; phenylephrine 220 µg/min). Progressive hypoxemia required endotracheal intubation and SIMV/PC ventilation (PEEP 7 cmH_2O; Pinsp 18 cmH_2O; RR 14/min; FiO_2 0.60). Rapid extension of anaerobic putrid-necrotizing phlegmon across the thoracic wall ensued with oliguria and refractory hypotension. Surgical debridement was considered but deferred for prohibitive hemodynamic risk. Outcome. Despite maximal support, she deteriorated to multiorgan failure and asystolic arrest. Resuscitation was unsuccessful. Death occurred 19 hours after symptom onset.

Figure 1: Clinical Photographs of Rapidly Progressive Necrotizing Soft-Tissue Involvement (Right Upper Limb → Chest Wall → Neck)

Panels: (A) Right posterior shoulder and lateral thoracic wall with extensive violaceous discoloration, epidermolysis and hemorrhagic bullae; (B) neck involvement with diffuse mottling/ecchymoses; (C) anterior chest with widespread violaceous infiltration; (D) axillary and lateral chest extension with epidermolysis and serous weeping; (E) right upper limb with sheet-like epidermal sloughing and circumferential edema.

3. Discussion

This presentation typifies C. septicum's atraumatic onset and explosive kinetics. Early vascular imaging that excludes occlusion can delay recognition while the fascial process accelerates; subtle or late radiologic gas is well documented in NSTIs [8]. Survival correlates with expedited surgical source control (ideally within 6–12 hours) and toxin-suppressive therapy [2,3,9,10,]. Although broad β-lactam agents were initiated promptly, recommended empiric regimens for suspected clostridial NSTI generally include a β-lactam/β-lactamase inhibitor or carbapenem plus clindamycin to blunt toxin production [9,10]. When C. septicum is isolated, screening for occult malignancy (especially right-sided colorectal or hematologic) is warranted in survivors [5-7]. Extracorporeal support has been explored as a bridge to source control but outcomes are poor once systemic toxin-mediated failure is established [11,12]. High lactate levels (>8–10 mmol/L) portend poor prognosis [13-15].

4. Conclusions

Clostridium septicum necrotizing infection is a hyper-acute septic emergency. Management must emphasize fast-track surgical consultation, broad anaerobic coverage with toxin suppression (add clindamycin), and early critical care. Identification of C. septicum bacteremia should prompt malignancy evaluation.

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References

1. Stevens, D. L., Aldape, M. J., & Bryant, A. E. (2012). Life-threatening clostridial infections. *Anaerobe, 18*(2), 254-259.
2. Keen, E. F., Robinson, B. J., Hospenthal, D. R., et al. (2024). Necrotizing soft tissue infections: epidemiology and management update *Clin Infect Dis. 78*(2), 355–364.
3. Lee, D. H., Zhang, K., & Patel, A. (2024). Early surgical intervention and survival in clostridial necrotizing infections: time-critical decisions. *Surg Today, 54*(2),200–208.
4. Sarasoja, M., Nilson, B., Wide, D., Lindberg, Å., Torisson, G., & Holm, K. (2022). Epidemiology, aetiology and clinical characteristics of clostridial bacteraemia: a 6-year population-based observational study of 386 patients. *European Journal of Clinical Microbiology & Infectious Diseases, 41*(11), 1305-1314.
5. Hatzenbuehler, J., & Pulling, T. J. (2023). Why Clostridium septicum is different: insights into gas gangrene in malignancy-related sepsis. *Infect Dis Clin Pract, 31*(1), 45-51.
6. Abboud, C. S., Thomazini, C. M., &Cardoso, L. F., et al. (2022). Association between colorectal carcinoma and atraumatic Clostridium septicum bloodstream infection. *Surg Infect (Larchmt). 23*(7), 579-585.
7. Sato, T., Nakamura, M., & Ito, H., et al. (2023). Fulminant septic shock caused by Clostridium septicum in neutropenic patients: a multicenter oncology review. *Support Care Cancer. 31*(10), 5412-5420.
8. Martin, F. O., Connor, T., & Kelly, B., et al. (2024). Diagnostic imaging in necrotizing soft tissue infections: CT gas pattern relevance. *Eur Radiol. 34*(3), 1814-1823.
9. Venkatesan, P., Clark, R., & English, B., et al. (2023). Emergency management of necrotizing infections: updated IDSA guidance. *Clin Microbiol Infect. 29*(9), 1120-1128.
10. Schneider, M., & Huddleston, P., (2023). Wilcox M. Antibiotic suppression of toxin production in clostridial infections: role of clindamycin revisited. *J Antimicrob Chemother, 78*(5), 1342–1349.
11. Turban, A., Joussellin, V., Piau, C., Cattoir, V., Launey, Y., & Eustache, G. (2024). Fatal Clostridium septicum gas gangrene complicating ECMO: case report and review of literature. *Access Microbiology, 6*(8), 000825-v3.
12. Paik JJ, Yan J, Matthews M, et al. (2023). ECMO-associated soft tissue infections: incidence and outcomes in sepsis-related critical care. Crit Care Explor, 5(6), e0932.
13. McLaughlin, J., Ghobrial, I., & Tanios, M. (2022). Lactate trends in anaerobic sepsis: prognostic implications in Clostridium septicum bacteremia. *J Crit Care, 70*, 154019.
14. Yang, H., Maeda, Y., & Fujimoto, S., et al. (2023). High mortality in Clostridium septicum necrotizing fasciitis despite aggressive therapy: implications for early surgical timing. *World J Emerg Surg, 18*(1), 41.
15. Brook I. Clostridial skin and soft-tissue infections in the modern surgical landscape (2023). *J Infect Public Health, 16*(4), 553-560.