

A Case Report on Gas Gangrene with a Fatal Outcome

PRIYADHARSHINI SRINIVASAN¹, VISHAK MANOJ BHASKAR², NANDITHA PADIKKASU³, PUSHPARANI ANAND⁴

ABSTRACT

Gas gangrene, a life-threatening illness caused by *Clostridium perfringens*, progresses rapidly, resulting in systemic toxicity, multiorgan failure and ultimately death. This case report describes a 19-year-old male patient presenting with dyspnoea, limb oedema, and severe pain following an intramuscular injection. Examination revealed significant oedema, palpable crepitus, absent peripheral pulses, metabolic acidosis and septic shock. The patient underwent emergency surgical debridement under general anaesthesia with inotropic support. Despite aggressive resuscitation, he died seven hours after arrival. Posthumous tissue cultures confirmed *Clostridium perfringens* infection. This case underscores the critical importance of prompt diagnosis, aggressive intervention and the challenges of perioperative management in gas gangrene.

Keywords: *Clostridium perfringens*, Hyperbaric oxygenation, Injections, Intramuscular

CASE REPORT

A 19-year-old male presented to the emergency department with a history of receiving an intramuscular injection in the right gluteal region for fever, two days prior at a nearby clinic (day 1). On day 2, he began experiencing swelling and pain at the injection site. He sought care at another private clinic on day 3, where he received reassurance and was prescribed antibiotics. However, by day 4, he developed shortness of breath and presented to our hospital with progressive swelling and pain. The swelling had worsened, affecting the entire right lower limb and rendering him unable to walk or bear weight.

On arrival, the patient was conscious and oriented but slightly drowsy, tachypnoeic and dehydrated. Examination of the right lower limb revealed diffuse oedema extending from the groin crease to the dorsum of the ankle. Erythema was noted in the upper outer quadrant of the gluteal region, the medial aspect of the thigh, the popliteal fossa, and the calf. A 2×1 cm greyish lesion was observed on the superior-medial part of the leg [Table/Fig-1]. The limb was tense, with palpable crepitus throughout, extending to the groin crease. The leg was cold and clammy, with absent peripheral pulses (capillary refill time >3 seconds). There was no movement at the knee, hip, or toes and sensory perception was impaired.

Despite a Glasgow Coma Scale (GCS) score of 15, the patient's oxygen saturation and blood pressure were unrecordable. He was intubated with 12 mg of IV etomidate and 6 mg of IV vecuronium. A double-strength infusion of noradrenaline was started at 10 mL/hr. Cola-colored urine was drained during catheterisation. Laboratory results showed serum potassium of 5.6 mmol/L, serum creatinine of 2.3 mg/dL, and haemoglobin of 8.2 g/dL. Arterial blood gas analysis revealed severe metabolic acidosis with pH 6.92, PaCO₂ 49.1 mmHg, and HCO₃⁻ 10.3 mmol/L.

A cardiology consult revealed global left ventricular hypokinesia with an ejection fraction of 24%. The nephrology team recommended administering 3-4 liters of fluids per day, along with bicarbonate and potassium correction. Surgical evaluation suggested necrotising fasciitis with compartment syndrome, with a strong suspicion of gas gangrene due to palpable crepitus, complicated by rhabdomyolysis and septic shock.

Given the patient's deteriorating condition, he was immediately taken to the operating room without X-ray or Computed Tomography (CT) imaging. He underwent fasciotomy to relieve compartment

syndrome and debridement of necrotic tissue [Table/Fig-1b]. Postoperatively, he was transferred to the Post-Anaesthesia Care Unit (PACU) for ventilation and stabilisation. Upon arrival in the PACU, his blood pressure was 60/40 mmHg, and inotropic infusion rates were increased, but his condition continued to deteriorate. Despite resuscitation efforts according to Advanced Cardiovascular Life Support (ACLS) guidelines, the patient was declared dead.



[Table/Fig-1]: a) Showing the diffuse oedema of the affected limb extending from the groin crease to the ankle; b) Showing the intraoperative picture.

Posthumous tissue cultures of intraoperative specimens confirmed infection with *Clostridium perfringens*. The total duration from hospital admission to death was seven hours.

DISCUSSION

Gas gangrene is an anaerobic infection caused by *Clostridium*, particularly *Clostridium perfringens* and typically occurs following open fractures, deep wounds and other injuries. *Clostridium* is a gram-positive bacterium that is resilient to extreme temperatures due to its spore-forming ability and is commonly found on human

skin and in the gastrointestinal tract [1]. The infection progresses rapidly, leading to systemic toxicity and potentially death before diagnosis. Shock and organ failure secondary to bacteraemia frequently accompany gas gangrene and classical reports indicate a high mortality rate of approximately 50% [2].

Ismail MS et al., reported a case of a 37-year-old male who developed compartment syndrome and myonecrosis following an intramuscular injection in the right deltoid region [3]. The clinical team suspected gas gangrene and treated the patient with wound debridement, antibacterial therapy, and Negative Pressure Wound Therapy (NPWT). The patient was ultimately discharged after four weeks with a healthy wound. Similarly, in present case, a clinical diagnosis was made based on the patient's presenting signs and symptoms.

In another report, Garcia-Carretero R et al., described a 59-year-old woman with a history of personality disorder and drug abuse who self-injected into the gluteal region, resulting in a gluteal abscess caused by *Clostridium perfringens* [4]. The patient recovered following aggressive surgical intervention and antibacterial treatment.

Jing HD et al., reported a case of gangrene following a poultry bite in an 85-year-old male, which ultimately resulted in death [5]. A whole-body CT scan revealed pneumatosis in the right ventricle, pulmonary artery and occlusion of the right femoral artery. Despite emergency wound debridement, the patient developed septic shock postoperatively. He was placed on a ventilator and received antibacterial therapy and continuous renal replacement therapy. Unfortunately, due to the family's decision to discontinue treatment, the patient was discharged and passed away the following day.

Emergency fasciotomy combined with antimicrobial therapy is considered the gold standard for improving tissue oxygenation and inhibiting bacterial proliferation in gas gangrene. Additional treatment modalities include hyperbaric oxygen therapy, which increases tissue oxygen tension and inhibits clostridial growth and toxin production.

NPWT, along with vacuum-assisted dressing and dermatotraction, can also be effective by reducing oedema and improving tissue perfusion [6]. The use of clostridial antitoxins is limited due to unavailability, though intravenous immunoglobulins may provide benefits by neutralising toxins [4]. The use of gas gangrene serum has declined due to unavailability, potential allergic reactions, and limited efficacy. Therefore, management of gas gangrene requires a multimodal treatment strategy.

CONCLUSION(S)

This case highlights the insidious nature of gas gangrene following intramuscular injections and serves as a stark reminder of the devastating consequences of delayed diagnosis. Early recognition and aggressive treatment are critical in improving patient outcomes and reducing mortality.

REFERENCES

- [1] Murray PR, Rosenthal KS, Pfaller MA. Medical microbiology 6E-book. Elsevier Health Sciences, 2020.
- [2] Takano N, Yatabe MS, Yatabe J, Kato M, Sueoka D, Iguchi S, et al. Fatal Fournier's gangrene caused by *Clostridium ramosum* in a patient with central diabetes insipidus and insulin-dependent diabetes mellitus: A case report. BMC Infect Dis. 2018;18(1):363. Doi: 10.1186/s12879-018-3280-9. PMID: 30071825; PMCID: PMC6090845.
- [3] Ismail MS, Fatima U, Ismail A, Khalid U. Case report on *Clostridium perfringens*-induced gas gangrene following an intramuscular injection: A stark reminder of injection-associated risks. Int J Surg Case Rep. 2025;130:111236.
- [4] Garcia-Carretero R, Gonzalez-Moreno M, Rodriguez-Maya B, Isaba-Ares E. Gas-forming gluteal abscess after intramuscular self-injections due to *Clostridium perfringens*. BMJ Case Rep CP. 2019;12(2):bcr-2018.
- [5] Jing HD, Li L, Tian JY, Jiang DP. *Clostridium septicum*-induced gangrene in the right lower extremity complicating pneumatosis in the right ventricle and the pulmonary artery and occlusion of right femoral artery: A case report. BMC Infect Dis. 2021;21(1):957.
- [6] Ishida K, Noborio M, Nishimura T, Ieki Y, Shimahara Y, Sogabe T, Ehara N, et al. Negative pressure wound therapy-assisted dermatotraction for the closure of large open wounds in a patient with non-clostridial gas gangrene. Acute Med Surg. 2016;3(2):128-31.

PARTICULARS OF CONTRIBUTORS:

1. Postgraduate Student, Department of Anaesthesiology, SRM Medical College Hospital and Research Centre, Chennai, Tamil Nadu, India.
2. Assistant Professor, Department of Anaesthesiology, SRM Medical College Hospital and Research Centre, Chennai, Tamil Nadu, India.
3. Postgraduate Student, Department of Anaesthesiology, SRM Medical College Hospital and Research Centre, Chennai, Tamil Nadu, India.
4. Professor, Department of Anaesthesiology, SRM Medical College Hospital and Research Centre, Chennai, Tamil Nadu, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Pushparani Anand,
Professor, Department of Anaesthesiology, SRM Medical College Hospital and Research Centre, Kattankulathur-603203, Chennai, Tamil Nadu, India.
E-mail: pushpa82_dr@yahoo.com

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

PLAGIARISM CHECKING METHODS: [Jain H et al.]

- Plagiarism X-checker: Mar 05, 2025
- Manual Googling: Jul 26, 2025
- iThenticate Software: Jul 29, 2025 (5%)

ETYMOLOGY: Author Origin

EMENDATIONS: 5

Date of Submission: Feb 25, 2025

Date of Peer Review: Jun 20, 2025

Date of Acceptance: Jul 31, 2025

Date of Publishing: Dec 01, 2025