A deadly villain tamed – two cases of spontaneous gas gangrene

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Introduction
Gas gangrene is defined as the fulminant necrotizing infection caused by a bacterium of the genus Clostridium. This condition is extremely dangerous and fatal if not identified and treated immediately. In 1892 Welch and Nuttal were the first to describe accurately the clinical, bacteriological and pathological aspect of gas gangrene. In 1871 Bottini established the bacterial origin. Louis Pasteur was the first to describe Clostridia. Classically the disease was seen in war wounds and roadside contaminated wounds with crush element. The incubation period is hours to days. Reports of non-traumatic or spontaneous gas gangrene were observed after deep intramuscular injections in earlier parts of the twentieth century in continental Europe, the United Kingdom, and Brazil. However, no studies were published due to fear of litigation [1]. Here we are reporting two cases of spontaneous gas gangrene [SGG].

Case study 1
A 32-year-old male admitted with a fever of two days duration. Fever was mild to moderately high grade associated with chills and rigors. There was a positive history of lower abdominal pain which was dull aching and associated with constipation. On clinical examination, the abdomen was soft with no signs of peritonitis. Laboratory investigation revealed Polymorphonuclear Leucocytosis with the presence of toxic granules. His condition deteriorated rapidly over the next few hours. An urgent Contrast-Enhanced CT Scan abdomen revealed extensive anterior abdomen wall fascial plane gas infiltration with large fluid and gas collection in the preperitoneal space. A provisional diagnosis of Gas Gangrene / Hollow viscous Perforation with peritonitis was made. Emergency exploratory laparotomy was done which revealed a collection of whitish purulent fluid with gas bubbles in the extra-peritoneal area. Thorough lavage was done with saline and betadine. The abdomen was kept open over laparostoma bag. Intravenous Meropenem 1 gram thrice daily and Intravenous Clindamycin 600 mg thrice daily were started empirically. Over the next twenty, four hours patient's general condition worsened. He was placed on the ventilator and inotropic support. Pus sent to the microbiology laboratory for culture and antibiotic sensitivity revealed Gram-positive bacillus Clostridium perfringens. Over the next two weeks, the patient further underwent eight revision surgeries with abdominal cavity lavage. He was continued on broad-spectrum injectable antibiotics and supportive management. Total Parenteral nutrition was started for nutritional support. After three weeks, once the prevesical space and the anterior abdominal wall were healthy, the abdomen was closed over interrupted prolene suture. Patient's general condition improved and he recovered. Tissue excised from the preperitoneal space sent for culture and histopathology revealed Gram-positive bacilli in a background of coagulative necrosis and liquefaction of muscle fibres with the peripheral zone of leukocytic infiltration and vascular thrombosis. Colony morphology on Blood agar culture showed areas of target haemolysis [Fig 1].

Case study 2
A 21-year-old male presented with fever of two days duration and pain in the left gluteal region of one-day duration following intramuscular injection of Diclofenac sodium. Fever was mild to moderately high grade. On clinical examination, he was found to have tachycardia, tenderness elicited in the left gluteal region. Laboratory investigations revealed polymorphonuclear leucocytosis. However, USG gluteal region revealed no abscess. The patient was started on Intravenous Augmentin (Amoxicillin 1000 mg and...
Clavulanate potassium 200 mg) 1200 mg twice daily and Intravenous Metronidazole 500 mg thrice daily. Follow up clinical examination after six hours of admission, revealed left the gluteal region as toxic looking associated with variegated skin discolouration. Deep palpation elicited severe tenderness and crepitation. Subsequently, he developed jaundice. Emergency debridement revealed myonecrotic gangrene of the gluteal maximus and medius muscles of the left side with foul-smelling gas bubbles. A thorough debridement and copious lavage with hydrogen peroxide, saline and betadine were done. He was started empirically on Intravenous Meropenem 1000 mg intravenous thrice daily and Intravenous Clindamycin 600 mg intravenous thrice daily. The patient had a stormy course during the next few days and was placed on a ventilator and inotropic support for the next twelve days. He was taken for daily debridement for next one week.

Tissue excised from debrided wound tissue and pus sent for culture and histopathology revealed Gram-positive bacilli in a background of coagulative necrosis and liquefaction of muscle fibres with the peripheral zone of leukocytic infiltration and thrombosis of capillary and veins. Colony morphology on Blood agar culture showed areas of target haemolysis which is in confirmation of Clostridium perfringens. After the initial recovery, he underwent Tensor Fascia Lata based flap reconstruction for the defect after one month of open dressings and debridement. After three months of hospital stay and care, he was discharged to lead a normal life. [Fig 2].

In case of doubtful diagnosis broad spectrum Intravenous antibiotic such as Intravenous Vancomycin 1000mg intravenous twice daily plus either Intravenous Piperacillin-Tazobactam 3375 mg four times a day or Intravenous Ampicillin-Sulbactam 1200 mg twice daily with or without a Carbapenem (Intravenous Meropenem 10-15 mg per kg body weight thrice daily) is recommended [3]. In our case series, the first case may have developed gastrointestinal contamination and in the second case, the infection may be due to inappropriate skin preparation before intramuscular injection. A high index of suspicion with prompt surgical debridement was critical in saving these patients. With adequate antibiotic cover and critical care in intensive care, we were able to prevent the worst outcome. The relatively younger age with no other co-morbidity also contributed heavily to the successful outcome.

**Conclusion**

SGG represents a true surgical emergency occurring in isolation. Early suspicion with prompt surgical intervention saves a life. The importance of early clinical suspicion, prompt diagnosis, urgent intervention is critical for the clinicians to save many lives.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

**References**

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Learning Points:

- Spontaneous gas gangrene needs a very high degree of suspicion as there is no obvious trauma involved.
- Contrary to prior case reports of occurrences in immune-challenged individuals our series prove that it can also affect a healthy fit young individual.
- Untreated it is nearly fatal; however, it can be cured if active aggressive management is started early.

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