CASE STUDY

A deadly villain tamed – two cases of spontaneous gas gangrene

Vipin V Nair, Pawan Sharma, Kamlesh K Singh
Armed Forces Medical College, Pune, India

Keywords: Spontaneous gas gangrene; debridement

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

A32-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 laprostoma bag. Intravenous Meropenem 1 gram thrice daily and

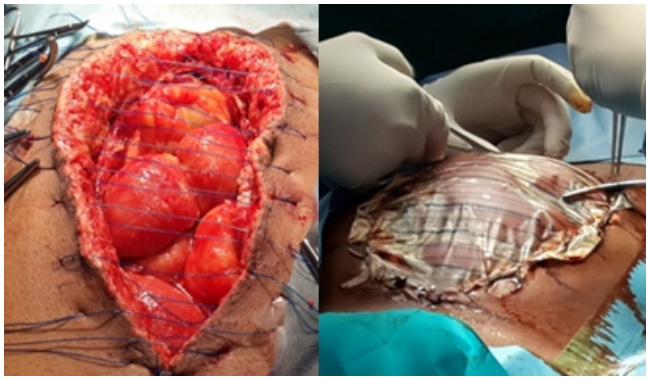

Figure 1. Exposed gut and temp closure with laparostoma bag

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

Correspondence: Vipin V Nair
E-mail:vipinvenugopalnair@gmail.com
Received: 07-07-2019 Accepted: 19-10-2019
https://orcid.org/0000-0001-6903-6368
DOI: http://doi.org/10.4038/sljs.v37i3.8586

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 maximums 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].

Figure 2. Rapidly Spreading gangrene and Post Extensive debridement

Discussion

Gas Gangrene is a fulminant and highly lethal infection. It spreads dangerously fast with multiorgan dysfunction in hours to days. In untreated cases, the mortality is 100 %. In cases admitted to the hospital with a critical care facility, the mortality is 20-30 % for extremity and 60 % for the trunk.

In SGG, the mortality is 67 % because of delayed diagnosis due to absence of trauma history [3]. In their landmark paper, Non-traumatic Gas Gangrene: 150 yrs. review by Vijaykumar et al, rapidly developing gas gangrene due to a simple puncture wound is aptly described [1]. SGG was also reported in colorectal diverticulitis, colonic adenocarcinoma, neutropenic patients, diabetics and many unknown causes. Gracia et al reported SGG in a 43 male with Non-Hodgkin's lymphoma [2]. Temple et al reported the first case of successful treatment of SGG in the 18-year-old boy of lymphoblastic lymphoma [4]. Wang et al landmark paper on earthquake victims of Wenchuan in China in 2008, highlighted the importance of early clinical suspicion and prompt surgical management. They were able to save all 67 suspected and 5 gram-positive cases which are indeed a great achievement [5]. It was the invention of antibiotics which significantly changed the direction of the losing battle and tilted the balance favourably for the patient. Today, the antibiotic of choice is Intravenous Penicillin G 20 million units per day intravenous divided into four to five doses and Intravenous Clindamycin 600-900 mg or 15 mg/kg intravenous thrice daily.

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

1. Vijaykumar GS, Sowmya G.S. Non Traumatic unusual and rare Gas Gangrene following Intramuscular Injection, Hundred and Fifty years review and a fatal case presentation. International Journal Medicine and Medical Sciences, Vol.46, Issue.2 1179-1185.

2. Stevens DL, Bisno AL, Chambers HF, Dellinger EP, Goldstein EJ, Gorbach SL, et al. Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the infectious diseases society of America. Clin Infect Dis. Jul 15 2014;59(2):e10-52. https://doi.org/10.1093/cid/ciu296.
3. García-Suárez J, de Miguel D, Krsnik I, Barr-Alí M, Hernanz N, Burgaleta C. Spontaneous gas gangrene in malignant lymphoma: an underreported complication? Am J Hematol. 2002;70:145–148. https://doi.org/10.3947/ic.2014.46.3.199
4. Temple AM, Thomas NJ. Gas gangrene secondary to Clostridium perfringens in pediatric oncology patients.PediatrEmerg Care. 2004;20:457–459. https://doi.org/10.1097/01.pec.0000132218.42729.97
5. Wang Y, Lu B, Hao P, Yan M N, Dai KR. Comprehensive treatment for gas gangrene of the limbs in earthquakes. Chin Med J (Engl). Oct 2013;126(20):3833-9. Pub Med PMID: 24157141.

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.