



University of Nigeria

Virtual Library

Serial No	
Author 1	NWANKWO, O. E
Author 2	
Author 3	
Title	Causes of Gas Gangrene Seen at the University of Nigeria Teaching Hospital, Enugu, Nigeria
Keywords	
Description	Causes of Gas Gangrene Seen at the University of Nigeria Teaching Hospital, Enugu, Nigeria
Category	Health Sciences
Publisher	Orient Journal of Medicine
Publication Date	2008
Signature	

- 13 Akindele JA, Sowunmi A, Abohsweyere AE. Congenital malaria in a hyper endemic area: a preliminary study. *Ann Trop Paediatr* 1993;13:273-6
- 14 Nosten F, Karbwang J, White NJ, et al. Mefloquine anti malarial prophylaxis during pregnancy. Dose finding and pharmacokinetic study. *Br J Clin Pharm* 1990;30:79-85
- 15 Sowunmi A, Hesanni AO, Oduola AMJ, Omitowoju GO, Ojengbade OA. Efficacy of mefloquine in uncomplicated chloroquine-resistant falciparum malaria during pregnancy. *J Obstet Gynecol* 1996;16:362-3
- 16 Asindi AA, Bilal NE, Fatinni YA, Al Shehri MA, Mannan N, Habeeb SM. Neonatal septicaemia. *Saudi Med J* 1999;20:942-6
- 17 McGregor IA, Wilson ME, Billewicz WZ. Malaria infection of placenta in Gambia, West Africa: its incidence and relationship to stillbirth, birth weight and placental weight. *Trans R Soc Trop Med Hyg* 1983;77:332-44
- 18 Sule-Odu AO, Ogundelun A, Olatunji AO. Impact of asymptomatic maternal malaria parasitaemia at parturition on perinatal outcome. *J Obstet Gynecol* 2002;22:25-8
- 19 Weatherall M, Abdalla A. The anaemia of *plasmodium falciparum*. *Br Med Bull* 1982;3:147-51
- 20 Wilson WS. Susceptibility of young red cells to *plasmodium falciparum*. *Br J Haematol* 1997;45:285-96
- 21 Ezedinachi ENU, Ejezie GC, Usanga EA, Umotong AB, Odigwe CO. Status of malaria in Nigeria. *Trop J Appl Sci* 1994;3:1-6
- 22 Antiaobong OF, Alaribe AA, Young MU, Bassey A, Etim BU. Chloroquine-resistant *plasmodium falciparum* in southeastern Nigeria. *Trop Doct* 1997;27:141-9

Causes of gas gangrene seen at the University of Nigeria Teaching Hospital, Enugu, Nigeria

Okechukwu

Emmanuel Nwankwo FMCS(Ortho) FICS

Department of Surgery, University of Nigeria Teaching Hospital, Enugu, Nigeria

Correspondence to: Okechukwu Emmanuel Nwankwo, Consultant Orthopaedic and Trauma Surgeon, Department of Surgery, University of Nigeria Teaching Hospital, Enugu, Nigeria

Email: nwankwooe@yahoo.com

TROPICAL DOCTOR 2008; 38: 76-78

DOI: 10.1258/td.2007.005194

SUMMARY Gas gangrene (clostridial myonecrosis) is rarely seen and this rarity, coupled with its dramatic presentation and often devastating outcome, makes each case of gas gangrene a spectacular and memorable experience. This study analyses the cases managed, the causes and outcome. Gunshot wounds, compounded by late presentation with its accompanying florid infections, were seen as the causes in 14 cases of gas gangrene seen at the University of Nigeria Teaching Hospital, Enugu during the four-year study period from July 2000 to June 2004.

Introduction

Gas gangrene is a necrotizing, gas-forming process of muscle, associated with systemic signs of toxæmia.¹ It is usually seen as a result of wounds obtained in the battlefield and those seen in civilian settings are rare.^{1,2}

Estimates of the annual occurrence in the whole of the USA range from 1000 to 3000.³ In the UK only one case of gas gangrene is said to be seen in a general hospital every two years.¹ To the best of my knowledge, there have been no published estimates of the incidence of gas gangrene in Enugu.

The rarity of gas gangrene and its dramatic presentation, and often devastating outcome, makes each case a spectacular and memorable experience.¹

Patients and methods

This is a prospective study of consecutive patients who had been admitted to an orthopaedic unit at the University of Nigeria Teaching Hospital, Enugu, with suspected gas gangrene as a result of limb wounds over a four-year period from July 2000 to June 2004. The initial diagnosis was based on wounds with associated prostration and toxæmia, tense swelling of the involved limb, pale to darkish skin with multiple bullae on the surface and watery, or any other foul-smelling discharge, emanating from the wound. The presence of gangrene strengthens the initial suspicion.

Each patient on presentation was evaluated and was data collected which included the biodata, the history of the wound, the cause, the time of the incident, previous treatment, the type of treatment received and any other associated complaints. A clinical examination was done with particular attention being paid to the type and extent of the wound, the part of the limb affected and its state, especially the degree of swelling and tenderness, its colour, the fluid discharge and the presence of gangrene. Evidence of liver and renal impairment was also investigated and the general health status of the patient was assessed.

Investigations included X-rays of the involved region, a full blood count, and serum creatinine, urea and electrolytes rates noted. In patients with jaundice, a liver function test was requested. A Gram-stain of the wound discharge was done, and aerobic cultures were taken and sensitivity noted. Anaerobic cultures were not done due to a lack of facilities. The urine output was monitored in all cases.

Treatment included resuscitation, antibiotics and radical surgical debridement. A diagnosis of gas gangrene was based on the clinical features, the presence of Gram-positive rods with few or no inflammatory cells shown on microscopy of wound swab, but, more importantly, on finding myonecrosis with a foul putrefying-flesh smell of the muscle during debridement.

Results

During the four-year period of the study, a total of 416 admissions were made in the unit; 202 had open wounds and 49 were from gunshot. Thirty-two wounds, which were suspected to be complicated by gas gangrene were entered into the study, but only 14 cases met the criteria for the diagnosis.

All the cases were as a result of gunshot wounds to the limbs. Five of the shots were from the police firearms, seven from suspected armed bandits and the remaining two were from accidental discharges during burials.

The shots from the police and the suspected bandits, from the nature of injury and the remains of the bullets, were suspected to be from high velocity firearms; the others were from low velocity shotguns at close range.

The lower limb was involved in 12 cases and the upper limb in two. In the lower limb, the thigh was affected in nine cases and the calf in three. Only the upperarm was involved in the upper limbs. There were 12 men and two women, giving a male:female ratio of 6:1. The age range was 19 to 40 years with a mean of 31 (Figure 1). Injuries sustained were: seven type 3A open fractures; two type 3B; two type 3C; two femoral artery injuries and one brachial artery injury.

None of the patients presented before 24 h. Two presented about 24 h after the injury, five presented after 48 h, three came on the third day, two presented on the fourth, one on the sixth and one on the seventh day.

The seven cases that presented within 48 h had not received any treatment at all. The five that came on days 3 and 4 had only received resuscitation without any reasonable wound care. The wounds of the remaining two had been complicated by traditional bone-setters.

In all the cases, there was a deep entry wound in an extremity of varying size and septic state, with marked tense and tender swelling and bullous eruptions. Eight had exit wounds and the limbs looked cyanotic around the wound, but lower down they looked pale and were less warm, in some cases they were frankly cold.

The two patients who presented on the sixth and seventh days had gangrene of the involved lower limbs. In these two, also, there was oliguria.

In all the cases, there was a foul-smelling fluid discharge of varying consistency and colour, depending on the degree of sepsis and the age of the wound.

Laboratory findings

In all the cases, the microscopy showed Gram-positive rods with a paucity of inflammatory cells. The culture and sensitivity of the wound swab yielded Gram-positive and Gram-negative organisms with no pattern. The two cases with oliguria had severe renal function impairment. All the patients had a haemoglobin level of below 10 g/dL.

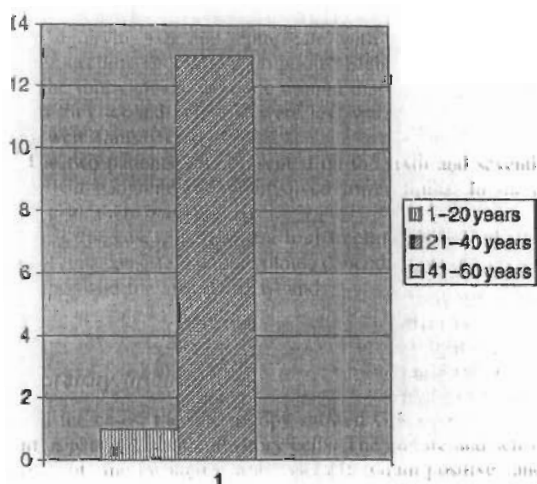


Figure 1 The age distribution of cases of gas gangrene seen in Enugu

Surgical treatment

Radical surgical debridement was done in all cases. Except in one of the cases involving the upperarm where limb salvage was possible, all the cases suffered amputation. The exception was one of the cases that presented within about 24 h of the injury. In all the cases, the wounds were left open. Secondary closure was done later.

Outcome

Twelve patients survived, two died, giving a mortality rate of 14%.

The two who died had presented on the sixth and seventh days after receiving treatment from traditional bone-setters, which had resulted in gangrene and impaired renal function. Of the survivors, one limb was salvaged and the rest had to have the limb amputated.

Discussion

A suspicion of clostridial infections should be aroused when the cause and the circumstances of the wound are such that they are conducive for contamination, germination and the growth of clostridial organisms whose spores are almost ubiquitous. This was the state of all the wounds entered into this study. They were severe wounds with gross tissue damage, and none had received any wound care for up to 24 h after injury. This was what led to the suspicion of gas gangrene and other clostridial infections.

The clinical features and investigations gave further information on the type of clostridial infection. Only those that indicated gas gangrene were studied further.

The diagnosis of gas gangrene is based on its clinical features, the supporting microbiological data and the demonstration of the pathognomonic myonecrosis at surgery.^{1,4,5} This was the case in 14 cases. However, an inability to do an anaerobic culture in order to demonstrate the species of clostridium directly implicated in gas gangrene must be noted. However, this was not enough to invalidate the diagnosis, as the confirmation of gas gangrene is said to rest ultimately on the finding of myonecrosis and a foul putrefying-flesh smell of the muscle during surgery.^{1,4,5} These features were observed in each of the 14 cases.

All the cases occurred as a result of complications caused by gunshot wounds from of high velocity firearms or from bullets fired at close range, which are known to cause severe tissue damage and contamination with foreign and endogenous matter. None of the wounds received appropriate care for periods varying from one to seven days.

The combination of severe tissue damage caused by gunshots and florid aerobic infection following delayed wound care caused by late presentation created a conducive medium of low tissue oxygen tension and other metabolic requirements for germination and growth of *Clostridium welchi* and the other species of gas gangrene.

Fourteen cases over four years approximates to three to four per annum. The general mortality for gas gangrene is in the region of 25%.¹ Survival is related to many factors such as age, its location in the body, etc.¹ Those who survive are the younger patients, those in whom only the extremities are involved, wounds with an incubation period <30 h, patients with an absence of renal failure, etc.¹

A mortality of 14% was recorded in this study. This low mortality must be due to the fact that only the extremities were involved and most of our patients were young (see Figure 1).

Only one limb was salvaged, the rest had to be amputated, giving an amputation rate of 92%. This high rate was because of the severe nature of the injuries, the involvement of the limbs and late presentation with gross sepsis.

It is concluded that severe gunshot injuries compounded by late presentation with accompanying florid sepsis were the causes of the gas gangrene seen in patients included in this study.

References

- 1 Sherwood LG. Gas gangrene and other clostridial skin and soft tissue infections. In: Gorbach SL, Bartlett JG, Blacklow NR, eds. *Infectious Diseases*. HBJ International edn. USA: W B Saunders, 1992:764-8
- 2 MacLennan JD. The histotoxic clostridial infections of man. *Bacteriol Rev* 1962;26:177
- 3 Weinstein L, Barza M. Gas gangrene. *N Engl J Med* 1973;289:1129
- 4 Bennett L. Gas gangrene and other clostridium-associated diseases. In: Mandell GL, Bennett JE, Dolin R, eds. *Principles and Practice of Infectious Diseases*. 4th edn. USA: Churchill Livingstone, 1995:2182-92
- 5 Achampong EQ. Microbial infection in surgery. In: Badoe EA, Achampong EQ, da Rocha-Afodu JT, eds. *Principles and Practice of Surgery in the Tropics*. 3rd edn. Ghana Publishing Corp., 2000:11-40

An overnight sedimentation method: improving the diagnosis of tuberculosis when electrical centrifuge is not available

M U Rasheed MScRM Tsegaye Dechu BSc

School of Medical Laboratory Technology, Jimma University, PO Box 378, Jimma, Oromiya, Ethiopia

Correspondence to: M U Rasheed, School of Medical Laboratory Technology, Jimma University, PO Box 378, Jimma, Oromiya, Ethiopia
Email: mamzrtd@yahoo.co.in

TROPICAL DOCTOR 2008; 38: 78-79
DOI: 10.1258/tid.2007.060037

SUMMARY An experimental comparative study was conducted in order to compare the positivity pattern of sputum microscopy using the direct and overnight sedimentation Ziehl-Neelsen (ZN) smears, direct and NaOCl pretreated centrifuged ZN smears and overnight sedimentation and NaOCl pretreated centrifuged ZN smears methods. We examined 660 sputum smeared slides for the presence of acid-fast bacillus from 220 sputum samples. Compared with the direct microscopy method, positivity increased by 91% after centrifugation ($P < 0.001$, $\chi^2 = 18.27$) and by 71% after overnight sedimentation

($P < 0.001$, $\chi^2 = 11.61$). No statistical significant difference was observed between the results of two different concentration techniques ($P > 0.05$, $\chi^2 = 0.789$).

The application of overnight sedimentation (in a laboratory without electricity) and/or the centrifugation technique could make a positive impact on the effectiveness of national tuberculosis control programmes.

Introduction

More than 90% of tuberculosis (TB) cases and 98% of TB deaths occur in the developing world. The annual risk of TB infection in sub-Saharan Africa is more than 50 times the rate for Western Europe.¹ In Ethiopia, TB is one of the leading causes of outpatient morbidity, ranking eighth in 2000 and fourth in 2003/2004.² Human immunodeficiency virus is the most important factor fuelling the TB epidemic.³

Most developed nations use molecular, serological and rapid drug sensitivity testing methods.⁴ However, in developing countries, these techniques are used for research purposes and not for general use. Cultures are not available in most health institutions in Ethiopia,⁵ and they are therefore cannot be used for primary diagnostic methods. As a result, Ziehl-Neelsen (ZN) staining is often the only primary diagnostic technique available.

Sputum smear microscopy is the most cost-effective technique,² but has only a 30%-40% sensitivity rate using a single sample and 65%-75% with repeated smear examinations.⁶ Different methods were designed to increase the positivity of direct smear microscopy. Liquefaction of sputa with NaOCl followed by centrifugation has recently been evaluated in several developing countries.⁷

The aim of this study was to compare the positivity pattern of sputum microscopy using three different methods - the direct and overnight sedimentation ZN smears method, the direct and NaOCl pretreated centrifuged ZN smears method and the overnight sedimentation and NaOCl pretreated centrifuged ZN smears method.

Materials and methods

Sample collection

An experimental comparative study was conducted for the microscopic examination of sputum of clinically suspected pulmonary TB patients, who visited the Jimma Health Center, Jimma, Ethiopia, during the study period March to June 2006. A convenient sampling technique was used. The standard sample collection procedures were followed strictly. This study is based only on morning sputum samples.

Laboratory procedures

Direct smears were prepared, air dried, heat fixed and stained by the ZN method.⁸ One millilitre of sputum from the same sample was added to two labeled 10 mL screw-capped centrifuge tubes, mixed with 1 mL of 5% sodium hypochlorite, and incubated at room temperature for 10 min which were shaken at regular intervals. Eight millilitres of distilled water was then added and one tube was centrifuged for 15 min at relative centrifugal force (RCF) 3000 g. Another tube was left overnight at room temperature. The supernatant was discarded and the pellet was suspended in a few drops of the remaining fluid. Smears were prepared from the suspended sediment for each method and then dried, fixed and stained with ZN stain.

M U Rasheed MScRM Tsegaye Dechu BSc