

FATAL NONCLOSTRIDIAL GAS GANGRENE IN A DIABETIC: A CASE REPORT AND REVIEW OF THE LITERATURE

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SYNOPSIS

A case of nonclostridial gas gangrene, complicating a below knee amputation in a longstanding diabetic patient is described. The onset was insidious with paucity of systemic symptoms. Initially, pure cultures of *Klebsiella Aerogenes* and subsequently mixed cultures of *Klebsiella Aerogenes* and *Proteus Species* were isolated. Repeated cultures showed increasing resistance to antimicrobial drugs. The outcome was fatal inspite of appropriate antimicrobial therapy and surgery. Gram negative, nonclostridial gas gangrene is more difficult to treat than clostridial gas gangrene, since mixed organisms are often found and the sensitivity to antibiotics could change during treatment. Unless diagnosed early and treated appropriately, patients often succumb to septicaemic shock.

CASE HISTORY

C.K.L., a fifty nine year old diabetic Chinese lady, was admitted to this hospital with a history of pain in her left second toe of one week duration. She was found to have dry gangrene of the second left toe. She had hyperglycaemia without ketosis. She had not been taking her oral hypo-glycaemics regularly. One week after admission, the gangrenous toe was excised and primary closure was done, and she was given a course of Ampicillin and Cloxacillin for

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a week post operatively. The sutures were removed on the seventh day, the wound was left open since it had not healed, and daily Eusol dressings applied. The diabetes was inadequately controlled in spite of soluble insulin. Two weeks after admission she was referred to the physicians for control of the diabetes; and was advised below knee amputation since she was developing gangrene of the third and fourth toe too. However, she refused amputation until a week later, when she developed fever, tachycardia and clinical evidence of septicaemia. Patient was started on parenteral Gentamycin 60 mg eight hourly and Cloxacillin 1 gm six hourly. Emergency left below knee amputation was done with primary closure. Swabs and tissue culture grew a moderate growth of *Klebsiella aerogenes*. Blood cultures were negative for aerobic and anaerobic organisms. She was transferred to the Medical ward the next day in order to have a closer check on her diabetes. Her temperature returned to normal in forty eight hours and her general condition improved. But her blood sugar was yet not under control. Five days after transfer to the Medical ward, the physicians noticed crepitus around the knee. The patient was afebrile, and general condition good. The wound was necrotic with odourless mildly turbid discharge from the wound. Crepitus was palpable up to the upper third of the thigh. On the basis of relative lack of systemic signs and purulent odourless exudate a clinical diagnosis of Non-clostridial Gas Gangrene was made. A Gram stained smear of the discharge revealed gram negative rods. Radiology revealed gas in the interfascial planes (Figure 1). Patient was advised immediate above knee amputation — but refused.

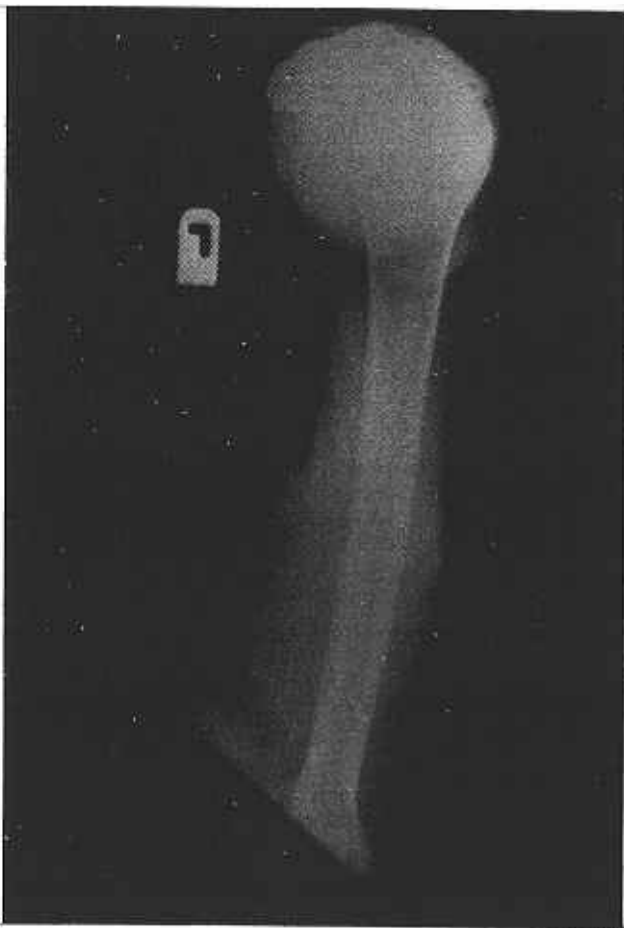


Figure 1 Shows gas in the interfascial planes

The next day she was mildly febrile, and was developing mild pain and tenderness around the knee and agreed for amputation. At operation, the proximal calf muscles were found to be necrotic with frank pus. Above knee amputation was done and the wound left open. The muscles were sent for culture and histology. Her general condition improved, and the wound was clean with no palpable crepitus of the stump or proximal thigh. Secondary closure of the wound was done five days later. The wound was dry until the second inspection a week later, which revealed a slight discharge from one end. She was afebrile. All sutures were removed, swabs taken for culture and Eusol dressing applied. A further debridement was done the next day due to increasing slough locally. All necrotic tissue were sent for culture. The anti-microbial regime was changed, while the patient was on treatment — based on the clinical response and the bacteriological reports. Initially, pure growth of *Klebsiella aerogenes* sensitive to Gentamycin and resistant to Ampicillin was isolated. Gentamycin was added to the antimicrobial therapy, together with Cloxacillin and Ampicillin discontinued. Later in the course of the disease, a mixed growth of *Klebsiella aerogenes* and *Proteus species* was isolated, and the subsequent cultures showed increased resistance as compared with the initial isolates to Gentamycin. They were sensitive to Cefaperazone after discontinuing the other antimicrobials. Two days later, the patient collapsed and expired in spite of attempts at resuscitation.

DISCUSSION

Gas infection in diabetics was first described by Chiari in 1893 (1). Wills and Reece (2) in 1960 documented four cases of Nonclostridial gas infection in elderly diabetics — and all four had fatal outcomes in spite of vigorous treatment. Bessman and Wagner (3) from the diabetes service of Rancho Los Amigos Hospital, California, reviewed the literature upto 1975. In addition to the nineteen cases reported upto 1975 they added forty eight cases of varying degrees of Nonclostridial gas infections. Their low mortality figures may be related to the fact that most of their cases were of varying degrees of Nonclostridial gas infections and not the extreme of gas gangrene with myonecrosis. Majority of the infections were by mixed Gram negative rods. Pure cultures were isolated in only seven of the forty eight cases. Cultures from our patient grew pure cultures of *Klebsiella aerogenes* initially and later on, in the course of the illness *Proteus species* too was isolated. No cases of *Klebsiella aerogenes* or *Proteus species* infection causing gas gangrene had been reported in the literature until 1975. All the cases of *Klebsiella aerogenes* described by Bessman and Wagner were mixed growths.

Unlike in Clostridial gas gangrene, these infections are of insidious onset, without any systemic signs initially. The patients are often not "ill" until late. The local signs are often minimal — non tender crepitations being the only sign usually with odourless purulent discharge initially, which could be foul smelling later. The spectrum of organisms reported in the literature to date include *Escherichia coli*, aerobic and anaerobic streptococci, staphylococci, *Bacteroides*, *Klebsiella species*, *Proteus species* and *Pseudomonas species*.

In this patient, antibiotic sensitivity changed with the later isolates of *Klebsiella aerogenes* being resistant to streptomycin and kanamycin. Hence it is obligatory to do repeated cultures of the tissue of deep swabs during

the management of these patients. Bird, Giddings and Jones (4) reported three cases in 1977, and emphasized that these Nonclostridial gas gangrene in diabetics are invariably fatal unless treated by early surgery. Though it was mentioned that the infection occurred exclusively in diabetics with peripheral neuropathy; it was not so in this case. Only thirty one of the forty eight cases reported by Bessman and Wagner had evidence of peripheral neuropathy. Bird, Giddings and Jones were of the opinion that antibiotic therapy was ineffective in preventing death. There was no mention of repeated cultures being performed in their cases, and the ineffectiveness of the antibiotics could have been due to a change of antibacterial drug sensitivity. More recently, a case of diabetes with Nonclostridial gas gangrene which survived was reported from Japan (5). The lack of awareness leading to delay in diagnosis and treatment may stem from scant mention in most textbooks as first observed by Bessman and Wagner in 1975. Unfortunately, the situation has not changed in the last decade. Perusal of twelve current textbooks (6-17), revealed that only four (7,8,10,11) had scant mention of Nonclostridial gas infections.

Nonclostridial gas gangrene is commoner than Clostridial gas gangrene in diabetics and the diagnosis is often delayed or missed. The Gram stain is an easy and quick way to resolve the aetiology. The decision on appropriate antimicrobials should be based on the Gram stain and could be modified when the culture and sensitivity results are available. Early surgery with the appropriate antimicrobials could prevent death. Since writing this report, we have had a second case of Nonclostridial gas gangrene of the foot and ankle who survived after an above knee amputation and appropriate antimicrobials therapy.

ACKNOWLEDGEMENTS

I wish to thank the Head of the Department of Orthopaedic Surgery and the Director of the University Hospital for granting permission to publish this report and Ms. Sharmini Devi for typing this manuscript.

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