Synergistic gangrene of the breast in a patient with type 2 diabetes

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DECLARATIONS

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This article aims to highlight the importance of diagnosing serious soft tissue infections and instigating treatment rapidly.

Introduction

Synergistic gangrene is an uncommon soft tissue infection classically occurring at surgical sites. Primary cases are rare but a high index of suspicion is paramount in treating the disease successfully. We present the first case of primary synergistic gangrene affecting the breast which was successfully managed through a combination of resuscitation, parenteral antibiotics and surgery. It is reasonable to suggest that such cases may increase in incidence and all physicians treating soft tissue infections must be aware of this potentially fatal pathology.

Case presentation

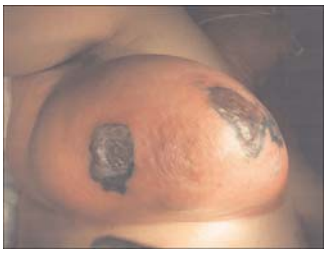
A 39-year-old woman with a history of type 2 diabetes, deep vein thrombosis, gastritis, schizophrenia and self-harm presented to the medical admissions unit with a one-week history of a right sub-mammary abscess followed by spreading cellulitis of the breast. On examination she was septic with a pyrexia of 39.2, blood pressure of 127/65 and tachycardia of 110. Examination of the breast revealed widespread cellulitis involving the nipple and sub-mammary area spreading to the axilla. Initial blood tests showed a white cell count of 23.8 (neutrophils 19.9) and CRP of 428. Simple cellulitis was diagnosed by the admitting physicians and she was commenced on parenteral antibiotics and fluid resuscitation. Her condition worsened despite intravenous benzyl penicillin and flucloxacillin. A surgical opinion was sought on day three when she had evidence of synergistic gangrene. The cellulitis had now spread and there were areas of growing necrotic ulceration (Figure 1). Resuscitation was commenced and antibiotic therapy was adjusted to imipenem and clindamycin based on local necrotizing fasciitis guidelines. She was taken to theatre within a few hours where a partial mastectomy was performed and the wound was left open and packed (Figure 2). Postoperatively she remained stable on intensive care. The following day she returned to theatre for further debridement.

The wound was monitored closely and a vacuum dressing was applied to aid healing. Signs of sepsis improved and she returned to the ward on the fifth postoperative day. Nutritional supplements and adequate hydration were continued during her recovery. Secondary closure was performed on day 13 after the initial operation and there was no further breakdown or compromise of the remaining tissues.

Preoperative cultures taken from the ulcers identified a mixture of gram positive and negative bacteria including *Bacteroides spp* (sensitive to metronidazole, clindamycin and imipenem). Histology confirmed widespread microscopic changes and abscess formation consistent with gangrene. There was no evidence of malignancy. Blood markers of infection progressively improved and there were no signs of secondary organ failure during her recovery.

She was discharged 22 days after her initial admission. Intravenous antibiotics were administered for a total of 10 days after the first debridement which were changed to an extended period of oral antibiotics up until her discharge (co amoxiclav and metronidazole). Follow-up has been arranged where the possibility of reconstruction will be considered.

Figure 1
Preoperative and postoperative images of the right breast. Note the presence of the ulcerative necrotic areas which had rapidly appeared. Radical debridement was performed to eliminate all the diseased tissue and further debridement was performed the following day



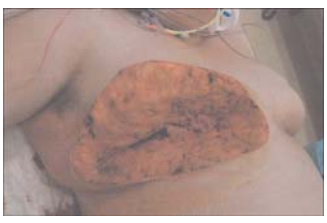
Discussion

Synergistic gangrene is a rare but potentially fatal polymicrobial soft tissue infection involving organisms creating synergistic virulence.[1,2] It is considered a separate entity to necrotizing fasciitis and the course is often more insidious. Inoculation occurs from a surgical incision or drain site and conditions affecting the immune response are risk factors, especially diabetes and obesity.[3–5]

Synergistic gangrene is mostly seen at surgical sites such as the abdomen or back[6,7] but cases involving the peri-anal region and vulva with no proceeding trauma have been reported.[3–5] It is characterized by spreading cellulitis followed by the formation of central ulcerated areas covered with eschar and necrosis which grow relentlessly unless treated.[8] By this time the patient will be toxic with extensive tissue loss having already occurred. There are few reports of synergistic gangrene beyond surgical wounds with no documented cases of the breast as a primary site. A single case of synergistic gangrene with secondary involvement of the breast has been described among a series in the literature.[5] Mastectomy was performed but the patient subsequently died due to septicaemia and uncontrolled diabetes.

Despite there being considerable discrepancy in the agreed diagnostic criteria, the literature is unanimous in the requirement for prompt, aggressive antibiotic therapy and early, radical surgical intervention.[3,7–9] Given these patients may present to a range of non-surgical specialties, early assessment and referral is of vital importance. Outlined below is our management strategy for this case which will serve as a guide for other clinicians treating synergistic gangrene.

Figure 2
After initial debridement. Extensive removal of diseased tissue was performed and is necessary to control the spread of infection. Secondary closure was subsequently performed on day 13 after her initial procedure



- *Resuscitation and supportive treatment*: Large volumes of fluid can become sequestered in tissues and surface appearance may under represent that of underlying tissue damage. Fluid replacement should be guided by local policy. Postoperative complications are likely in these patients including multi-organ dysfunction, myocardial infarction, thrombosis and secondary sources of infection.[3–5] Adequate steps are required to prevent these in addition to meeting nutritional needs to allow an appropriate immune response and adequate wound healing. Hyperbaric wound oxygenation has also been reported as an adjunct, but its efficacy is uncertain;[5,7,9]
- *Broad spectrum antibiotics:* The ideal choice of antibiotics is difficult to ascertain due to significant bacterial heterogeneity and low frequency of this condition. Most follow necrotizing fasciitis guidelines with reasonable effect.[3–5,9] Microbiologists should be involved early. Our regime involved intravenous imipenem 500 mg QDS and clindamycin 600 mg QDS for 10 days followed by co amoxiclav 625 mg QDS and metronidazole 500 mg TDS orally for a further two weeks;

- *Surgical debridement:* The infection can spread quickly causing marked local tissue destruction. Radical and often multiple surgical debridements may be required to remove all the diseased tissue.[3] Secondary closure should only be attempted once tissues are viable and nutritional and physiological state allows. Operative samples should be sent for histological and microbiological analysis.

It is reasonable to expect more cases of synergistic gangrene due to the increase in immunosuppressive conditions. This outline will help guide the professionals these patients may present to and highlights the importance of prompt identification and surgical intervention. The prognosis of synergistic gangrene however, remains poor.[9] Despite aggressive treatment, there is often a delay in diagnosis by which time patients are systemically unwell. Mortality rates have been reported of 12.5% in those debrided within 24 h, in contrast to 72.7% delayed by four days.[5]

This report describes an unusual case of primary synergistic gangrene affecting the breast and explains our strategy for successful treatment which shows that with punctual diagnosis and appropriate intervention that fatality is not inevitable.

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