

## Deception of Meleney's gangrene-saving from a potential mortality

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### ABSTRACT

Meleney's Gangrene is an acute, rapidly advancing polymicrobial infection of the anterior abdominal wall, often referred to as 'flesh-eating disease'. This condition is characterised by its unique etiology, a polymicrobial infection involving both aerobic and anaerobic organisms. What makes Meleney's gangrene particularly dangerous is its deceptively slow progression in the initial phase, followed by a rapid, fulminant deterioration, often unresponsive to conventional wound care or empirical antibiotic therapy alone. In this case presentation, we report a 42-year-old patient who developed Meleney's gangrene post-blunt trauma to the anterior abdominal wall. The case highlights the diagnostic challenges, clinical course, management approach, and outcome associated with this unusual but potentially fatal infection. The polymicrobial synergy makes surgical intervention and aggressive debridement essential. Broad-spectrum antibiotic therapy, guided by culture and sensitivity, forms a critical part of management, along with supportive care for sepsis.

**Key words:** Gangrene, Meleney's, Mortality, Muscle necrosis, Polymicrobial

Meleney's Gangrene, also known as Meleney's ulcer or postoperative synergistic bacterial gangrene, was first described in 1926 by Dr. Brewer and Dr. Meleney in New York. It is a rare but serious skin and soft-tissue infection that typically occurs after surgery [1]. This condition is caused by the combined action of hemolytic *Staphylococcus aureus* and non-hemolytic *Streptococcus*, leading to rapidly spreading tissue necrosis. It is a rare type of necrotizing fasciitis (NF) of the anterior abdominal wall. It appears following surgery or moderate trauma. It presents a diagnostic challenge because of its subacute onset, often masquerading initially as a routine postoperative wound infection or cellulitis [2,3]. The clinical course is typically marked by increasing pain out of proportion to physical findings, localized erythema, induration, and the development of necrotic ulceration with undermined edges. Over time, the infection can extend rapidly to involve deeper tissues, leading to systemic toxicity and multi-organ dysfunction if not recognized and treated promptly [4,5].

This case highlights the rare occurrence of Meleney's gangrene following blunt trauma to the anterior abdominal wall, emphasizing the diagnostic challenge due to its initially slow progression. It underscores the critical need for early recognition, aggressive surgical

debridement, and targeted antibiotic therapy to improve patient outcomes in this rapidly fatal infection.

### CASE REPORT

A 42-year-old male presented to the emergency department with complaints of progressively worsening abdominal pain for the past 2 days. The pain was insidious in onset, intermittent, dull aching, initially aggravated on movement with no relieving factors. Upon detailed questioning, he revealed a history of minor trauma sustained 5 days earlier when he fell from his bicycle, hitting his lower abdomen. At the time of the incident, there were no significant external injuries, and he had dismissed the event as trivial. However, in the days that followed, he developed increasing discomfort in the lower abdominal region. The patient was a known case of type II diabetes mellitus for the past 8 years, managed with oral hypoglycemic agents. He admitted to irregular follow-ups and poor adherence to dietary and medication regimens.

On presentation, the patient appeared visibly distressed and was wincing due to severe abdominal pain. Vital signs revealed a fever of 101°F, blood pressure of 90/60 mmHg, and tachycardia. Examination of the abdomen revealed distension, predominantly involving the right lower quadrant and right lumbar region. On

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palpation, the area was exquisitely tender, and crepitus was noted, suggesting the presence of subcutaneous gas. Interestingly, the overlying skin was mostly intact, except for some superficial abrasions from the initial trauma. There were no signs of erythema, blistering, or skin necrosis at that stage.

Given the clinical suspicion of soft tissue infection with gas formation, an abdominal X-ray was performed, which did not show free air under the diaphragm but revealed abnormal gas shadows in the lower abdomen (Fig. 1a). A contrast-enhanced computed tomography scan of the abdomen was ordered for further evaluation (Fig. 1b). It showed air pockets within the anterior abdominal wall musculature, with no breach in the peritoneum and no intraperitoneal-free air. These findings strongly indicated a diagnosis of NF of the abdominal wall.

Laboratory investigations revealed a total leukocyte count of 24,000/mm<sup>3</sup> with marked neutrophilia, indicating a systemic inflammatory response. The random blood sugar was 347 mg/dL, and HbA1c was 9.8%, confirming chronic poor glycemic control. The serum creatinine was elevated at 3.4 mg/dL, and blood urea was 92 mg/dL, suggestive of acute kidney injury (AKI), likely secondary to sepsis.

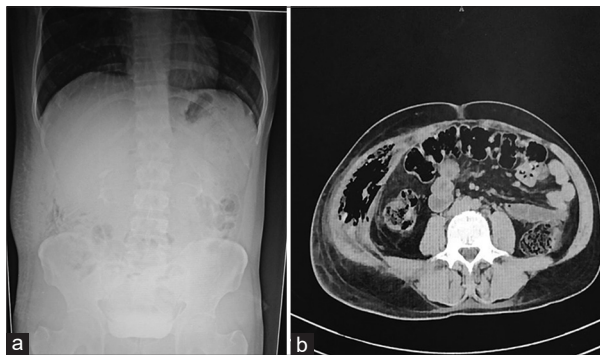
The patient was started on injection noradrenaline infusion 3 mL/h for hypotension, and was diagnosed with sepsis with AKI. Empirical intravenous antibiotics were initiated with injection piperacillin–tazobactam 2.25 g IV BD and injection clindamycin 300 mg IV BD to provide broad coverage against both aerobic

and anaerobic pathogens, consistent with suspected Meleney's gangrene.

Given the severity of the infection, the patient was taken for emergency surgical debridement. An initial transverse incision was made in the right lower quadrant, which released a large amount of foul-smelling purulent fluid from the intermuscular plane (Fig. 2a). Further dissection revealed myonecrosis involving the external and internal oblique muscles, which were thoroughly debrided (Fig. 2b and c). Additional transverse incisions in the right lumbar region were necessary to ensure complete drainage of infected material. The wound was irrigated extensively, and sterile dressings were applied.

Postoperatively, the patient was transferred to the surgical intensive care unit for close monitoring. Twice-daily wound care and aggressive fluid management were continued. On postoperative day 4, an area of persistent necrotic muscle was identified, and the patient was taken for second-look surgery and further debridement (Fig. 3a-c). At this stage, antibiotic therapy was escalated to meropenem, based on the culture sensitivity.

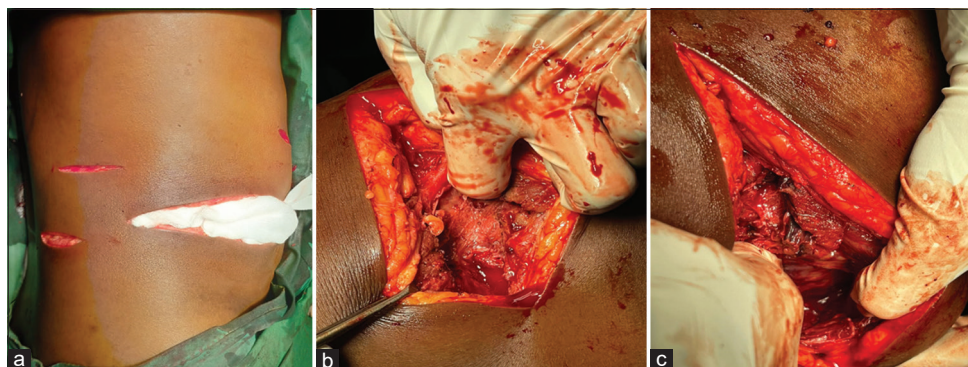
Over the subsequent days, the patient's condition improved. His fever subsided, the muscle tissue began to regain colour, and signs of systemic infection gradually resolved. He was shifted to the general surgical ward as he stabilized. The frequency of dressing changes was reduced, and by day 17 of admission, the wound demonstrated healthy granulation tissue, and the muscular layer appeared viable. Definitive wound closure was performed under intravenous sedation.



**Figure 1:** (a) X-ray erect abdomen showed no signs of pneumoperitoneum, gas shadows in the lower half; (b) computed tomography abdomen showed an air pocket in the intermuscular plane

## DISCUSSION

NF is a rare but life-threatening bacterial infection characterized by the rapid death of soft tissues beneath the skin. It is a surgical emergency that demands prompt recognition and intervention to mitigate its high mortality rate. The initial clinical presentation of NF can be insidious and subtle, often mimicking less severe infections such as cellulitis or erysipelas [6]. This presents a significant challenge for early diagnosis since the cutaneous signs are often nonspecific in the early stages. The condition's aggressive nature often outstrips the efficacy of antibiotics alone, leading to a critical delay in definitive treatment.



**Figure 2:** (a) Patient in the left lateral position, 3 incisions made over the abdomen; (b and c) Muscle necrosis noted in intermuscular plane



Figure 3: (a and b) muscle necrosis noted on POD 5. Patient taken for debridement; (c) post-debridement image

The pathophysiology involves angiothrombosis and occlusion of the perforating nutrient vessels. This results in progressive ischemia of the skin, with the formation of blisters or bullae as an early indicator of skin ischemia. However, the more definitive “hard signs” such as large hemorrhagic bullae, cutaneous gangrene, fluctuance, crepitus, and sensory and motor deficits typically become apparent only at a later stage [7].

Antimicrobial therapy is crucial but insufficient by itself for managing NF, as antibiotics alone do not address the primary site of infection where microbial proliferation continues unabated [8]. Surgical debridement is the cornerstone of treatment, requiring the aggressive removal of all necrotic and infected tissue. This involves excising all necrotic fascia and non-viable tissues, with some experts advocating for extensive removal to ensure complete clearance. Frequent re-examination and debridement every 24–48 h are critical to controlling the infection, along with comprehensive pain management, monitoring for secondary infections, and supportive care. Psychological support, heparin therapy to reduce vasculitis and thrombosis, and hyperbaric oxygen therapy are adjunctive treatments that may be employed, particularly for infections involving anaerobes [5,9,10].

Early recognition of Meleney's gangrene is essential, as the condition can rapidly progress and requires extensive surgical debridement and targeted antibiotic therapy. Studies have identified poor prognostic factors, including elevated white blood cell counts, hyponatremia, hypoalbuminemia, anemia, and increased renal parameters, emphasizing the need for timely and aggressive management [3,11].

Although Meleney's gangrene can occur in immunocompetent individuals, the presence of underlying conditions often exacerbates the severity and complicates treatment. This case underscores the critical importance of early recognition and aggressive management of necrotizing soft-tissue infections, particularly in high-risk patients such as those with uncontrolled diabetes. In our patient, timely surgical intervention, appropriate use of broad-spectrum antibiotics, and intensive supportive care were essential in controlling the infection and preventing systemic deterioration.

## CONCLUSION

The clinical course highlights the need for a high index of suspicion, multidisciplinary involvement, and serial surgical assessments to ensure complete debridement and recovery in Meleney's gangrene. Ultimately, early diagnosis and prompt, coordinated treatment were pivotal in achieving a favourable outcome in what could have otherwise been a life-threatening condition.

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