Other full case

Non-traumatic gas gangrene presenting as left buttock and thigh pain in a patient with metastatic non-small cell lung cancer

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Summary

We report a case of *Clostridium septicum* myonecrosis in a patient with metastatic non-small cell lung cancer receiving palliative chemotherapy. This is a rare but important differential diagnosis in patients with known malignancy presenting with acute pain. It is critical that the diagnosis is considered and confirmed promptly due to rapid deterioration and a potentially fatal outcome in the absence of aggressive treatment.

BACKGROUND

Non-traumatic *Clostridium septicum* myonecrosis is a rare but serious complication of malignancy. Mortality can reach 100% within 24 h of presentation.¹ Typically the initial symptom is severe localised pain several hours before any clinical manifestations arise on examination. In contrast, cases of *Clostridium septicum* myonecrosis in subjects with no comorbidities and with evidence of trauma have a good prognosis.² A PubMed search identified 30 case reports concerning *C septicum* myonecrosis or gas gangrene published in English in the last 10 years. Twenty-three cases were related to malignancy and the most common associations were lower gastrointestinal carcinomas, leukaemias and lymphoproliferative diseases. In one case of fatal non-traumatic gas gangrene, a colonic carcinoma was diagnosed postmortem.³ Immunosuppressive treatments such as chemotherapy and radiotherapy have also been implicated.^{4 5} Other predisposing factors include diverticulitis, gastrointestinal surgery and AIDS.^{6–8}

CASE PRESENTATION

We present the case of a 60-year-old female smoker with a medical history of successfully treated ovarian carcinoma. In May 2006 she was diagnosed with a T2N0M0 stage Ib adenocarcinoma of the right lung and underwent a right upper lobectomy. In January 2007 new lung nodules were identified. These remained stable on subsequent CT scans. As the patient was not keen on further chemotherapy, an active monitoring policy was agreed. She noticed lumps around her umbilicus and back in January 2009 a repeat CT scan identified liver and skin metastasis. She remained well enough to receive a trial of palliative chemotherapy that month. She received her first cycle of palliative gemcitabine and carboplatin uneventfully, retaining a performance score of 1. However, a day prior to her second cycle of treatment she was admitted as an emergency with sudden onset of severe left leg and buttock pain which abruptly woke her

from sleep. There was no history of recent trauma. Her general practitioner made a putative diagnosis of severe spinal root pain but due to concern regarding the possible development of cauda equina syndrome referred her for admission. On examination she was afebrile, tachycardic at 100 bpm and hypotensive with a blood pressure of 80/40 mm Hg. The left thigh and buttock were extremely bruised on the posterior and lateral surfaces with diffuse crepitus over this area. Blood tests revealed haemoglobin 10.6 g/dl, white cell count $19.9 \times 10^9/l$, neutrophils $17.4 \times 10^9/l$, platelets $739 \times 10^9/l$, C reactive protein 510 mg/l, creatine kinase 7130 IU/l, urea 11.9 mmol/l and creatinine 216 μ mol/l. Pelvic x-ray revealed extensive gas within the soft tissues consistent with necrotising fasciitis (figure 1). Surgical review confirmed the clinical diagnosis of gas gangrene after demonstration of significant gas excretion with no bleeding on aseptic incision into the left lateral thigh. The patient was unfit for extensive surgical debridement and was therefore managed conservatively with pain control and broad spectrum antibiotics.

OUTCOME AND FOLLOW-UP

The patient died later that day. A postmortem was not requested. Blood cultures subsequently grew an anaerobic organism and *C septicum* was identified on prolonged culture. The positive culture and the symptoms and signs elicited allowed a diagnosis of non-traumatic *C septicum* myonecrosis.^{1 9 10}

DISCUSSION

C septicum myonecrosis can present in a myriad of ways depending on the infected tissue site. Patients may present with chest pain, severe arm pain and non-specific symptoms of malaise and nausea.^{11–13} Non-traumatic gas gangrene is usually associated with gastrointestinal, intra-abdominal and haematological malignancies.¹⁴ There have been only two previous cases occurring in patients with lung cancer, one patient with non-small cell lung cancer

Figure 1 Pelvic x-ray demonstrating extensive gas in the left leg and buttock soft tissue.

following combined modality therapy⁵ and a second patient with small cell lung cancer receiving etoposide chemotherapy.⁴ There are no published reports of gemcitabine and carboplatin associated with *C septicum* infection. Although our patient was not neutropenic, the chemotherapy may have altered functionality of immune cells, contributing to *C septicum*'s access to the bloodstream. *C septicum* is unique in respect to other clostridial group members. It is relatively aerotolerant, allowing multiplication in healthy muscle tissue, unlike *Clostridium perfringens* which requires tissue devoid of oxygen.¹⁵ This is almost certainly why *C septicum* is overwhelmingly found in non-traumatic scenarios.¹⁶ Unlike *C perfringens* which is a gut commensal, in humans *C septicum* is an opportunistic infection suggesting the need for relative immunosuppression as a prerequisite for its presence.¹² Fulminant myonecrosis induced by *C Septicum* relies on the production of a haemolytic, necrotising α -toxin which inhibits neutrophil recruitment to the infected region. This is reflected in histological tissue samples which are shown to be deficient in number and functionality of neutrophils.¹⁷ α -Toxin contributes to septic

shock by increasing capillary permeability.¹⁸ Treatment has to consider the patient's premorbid condition. The mainstays remain surgical debridement with broad spectrum intravenous antibiotics. There is little evidence to support the use of hyperbaric oxygen therapy. Its role is probably limited in *C Septicum* infection as the organism is not fully dependent on an anaerobic environment.¹⁹ However, in theory it could help prevent further bacterial spread through the muscle and allow smaller resection margins.^{1 20} In many cases related to malignancy, major surgery may not be appropriate and therefore a palliative approach, focusing on pain control should be initiated as soon as the diagnosis is made. Both primary and secondary care physicians need to be aware of non-traumatic gas gangrene despite its rarity. Our case illustrates that potentially all cancer patients are susceptible to opportunistic infections such as *C Septicum*. This diagnosis should be considered in patients with known malignancy and inexplicable pain and palpation for crepitus is vital. More rapid diagnosis may allow more aggressive surgical management or rapid institution of good symptom control in the last hours of life.

Learning points

- ▶ Malignancy of all types potentially renders patients susceptible to opportunistic infections such as *Clostridium septicum*.
- ▶ Non-traumatic gas gangrene should be considered in patients with known malignancy with unexplainable pain symptoms in both primary and secondary care settings.
- ▶ More rapid diagnosis may improve survival or at least allow faster initiation of palliative care in the last hours of life
- ▶ When examining the patient it is important to consider palpating for crepitus in the area of severe pain.
- ▶ Survivors of non-traumatic gas gangrene should undergo investigation of the gastrointestinal tract to exclude an underlying gastrointestinal malignancy if a malignancy is not already known.

Competing interests None.

Patient consent Obtained

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