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# Radiological evidence of subcutaneous emphysema leading to a diagnosis of retroperitoneal perforated diverticulum



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## ABSTRACT

**INTRODUCTION:** This case report outlines the investigation and management of a young patient presenting with left iliac fossa pain and sepsis. A CT was performed which was initially reported as not showing a perforation, however closer analysis provided evidence of subcutaneous emphysema in the anterior abdominal wall. This evidence justified urgent operative intervention. We review the evidence with regard to this presentation.

**PRESENTATION OF CASE:** A previously fit 24-year-old male presented with left iliac fossa pain and features of sepsis. A CT provided subtle but distinctive evidence of retroperitoneal perforation secondary to diverticulitis, in the form of surgical emphysema in the anterior abdominal wall. In view of this, urgent operation was considered justified on suspicion of visceral perforation. A diverticular perforation was confirmed intra-operatively, and a sigmoid colectomy with primary anastomosis was performed, together with a covering ileostomy. The patient made a good post-operative recovery.

**DISCUSSION:** Diverticular disease and its complications are becoming more common in a younger age group, in whom perforation may present late or may not be suspected. In this context special attention must be paid to any radiological evidence of perforation.

**CONCLUSION:** Surgical emphysema in the abdominal wall is an indicator of retroperitoneal perforation, and its presence should be excluded before the possibility of perforation is dismissed. This may be of especial value in younger age groups amongst whom perforation may be less clinically obvious.

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## 1. Introduction

This case report outlines the investigation and management of a young patient presenting with left iliac fossa pain and sepsis. An urgent CT was discussed with the on-call consultant radiologist and initially reported as not showing a perforation, however closer analysis by the clinicians involved provided evidence of subcutaneous emphysema in the anterior abdominal wall. This evidence justified urgent operative intervention. We review the evidence with regard to this presentation.

## 2. Presentation of case

A previously fit 24-year-old male presented with sudden onset of severe left iliac fossa pain with associated pyrexia. His bowels were opening regularly and stool was of a normal nature. He had no urinary symptoms. His only current medical problem was a lumbar

disc prolapse for which he was under investigation, although he had undergone an open appendicectomy 3 years previously.

Clinically he was flushed, sweaty and had a temperature of 38.2 °C. He was tachycardic but normotensive. On abdominal examination he had tenderness and guarding over the left iliac fossa, but with no generalised peritonitis and no clinically appreciable surgical emphysema. Bowel sounds were present and normal. There was no evidence of hernia and external genital examination was normal. Digital rectal examination was also normal.

His initial blood tests showed a leucocytosis of 17. A plain abdominal radiograph was normal with gas visualised in the descending colon and rectum. An erect plain chest radiograph did not show evidence of pneumoperitoneum.

The patient was initially managed with fluid resuscitation and antibiotics and an abdominal CT scan was performed. This demonstrated inflammatory changes around the distal ureter with a suggestion of urological pathology, together with extensive sigmoid diverticular disease. However, on closer inspection of the images a small pocket of gas was identified in the anterior abdominal wall, raising the possibility of a posterior perforation. Notwithstanding the absence of any clinical deterioration, the decision was made to operate.

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The patient underwent a diagnostic laparoscopy which was subsequently converted to an open procedure. Pus was seen immediately in the left iliac fossa. A perforated posterior diverticulum in his sigmoid colon with minimal faecal contamination was noted. A sigmoidectomy with primary anastomosis and covering loop ileostomy was performed. Histology confirmed diverticular disease. He went on to make a full recovery.

**3. Discussion**

Diverticular disease is a common condition of the ageing population of the Western world, occurring in approximately 65% of those aged 85 years, 30% of those aged 60 years and in less than 5% in those aged 40 years.<sup>1</sup> It is, however, becoming increasingly common in a younger population,<sup>2</sup> in whom the disease appears to be more aggressive. Diverticular disease is often asymptomatic. Complications occur in approximately 30%, with diverticulitis (15–25%)

and diverticular bleeding (5–15%) being the most common. Less common complications include abscess formation, strictures, fistula, bowel obstruction and perforation. Although intra-peritoneal perforation is uncommon, it carries a mortality as high as 35%<sup>3</sup> and often presents with localised or generalised peritonitis and free air in the abdominal cavity, evident radiologically. Retroperitoneal perforation is even rarer and has only been reported in a few cases, presenting with pain but none of the typical clinical and radiological features of perforation. In such cases, subcutaneous emphysema over the lower abdomen,<sup>4</sup> groin,<sup>5</sup> legs<sup>6</sup> or neck<sup>7</sup> has been reported as eventually leading to the correct diagnosis. The outcome for such patients has often been poor, presumably because of progressive sepsis before the true diagnosis was apparent. This case report, however, indicates that subcutaneous emphysema can be detected on computerised tomography before it becomes clinically apparent, thus permitting prompt treatment as in our case, with a good recovery. Free gas in the subcutaneous tissue of the antero-lateral abdominal wall is a consequence of the gradient between the pressure in the sigmoid colon and the distensibility of the retroperitoneum, allowing gas from a perforation to diffuse along tissue planes.<sup>8</sup>

As well as this gas arising from the gastro-intestinal tract it is also possible that it may have arose from infection with gas-producing organisms; however this would have been more likely if the emphysema had developed 48 h after the onset of infection (Figs. 1 and 2).<sup>1</sup>

**4. Conclusion**

Diverticular disease is becoming more common in younger people, in whom the disease can be more aggressive but sometimes difficult to diagnose. This case illustrates that radiological evidence of abdominal wall emphysema may lead to early diagnosis and treatment with a better outcome.

**Conflict of interest statement**

No conflicts of interest declared.

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**Ethical approval**

Informed, written consent has been obtained

**Authors' contributions**

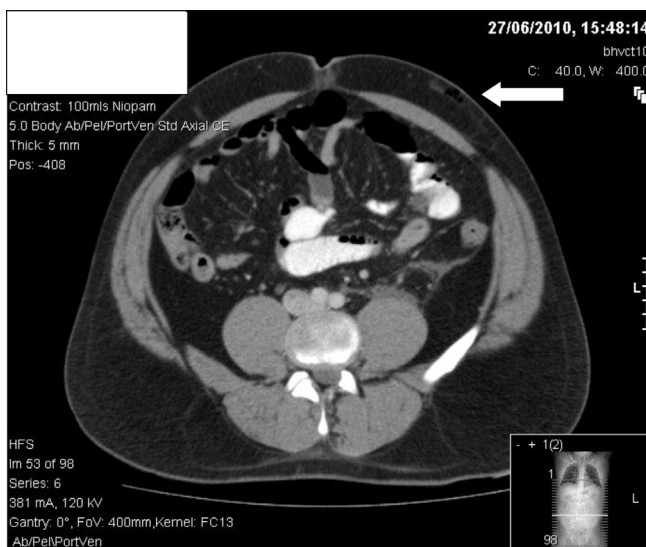
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**Fig. 1.** Peritoneal fat stranding with evidence of inflammatory changes.



**Fig. 2.** Free gas in the tissue of the anterior abdominal wall (arrowed).

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