Clinical Note

Subcutaneous Emphysema In Advanced Cancer

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Abstract
Spontaneous subcutaneous emphysema is a rare and usually benign entity that may occasionally be symptomatic. We report a case of a patient with advanced cancer who developed extensive but asymptomatic subcutaneous emphysema shortly before death. Perforation of the lower gastrointestinal tract, perhaps as a result of straining due to severe unrelied constipation or due to fistula formation, is suspected to have been the mechanism. The causes, treatment, and implications for management of this condition are discussed. J. Pain Symptom Manage 2000; 19:73–77. © U.S. Cancer Pain Relief Committee, 2000.

Key Words
Subcutaneous emphysema, palliative care, cancer, constipation

Introduction
Subcutaneous emphysema is defined as air or gas in the subcutaneous tissues.1 Gas in this fascial plane is abnormal, but usually benign, and resolves with conservative management. There are many causes of subcutaneous emphysema, all of which involve either the production of gas in that plane, (e.g., gas gangrene), or the presence of a communication between this fascial plane and a structure normally in contact with air (e.g., after a penetrating wound).1,2 Despite its many possible causes, subcutaneous emphysema is an infrequent clinical finding.

Case History
A 54-year-old woman with advanced colon cancer presented to the emergency depart-
cated for 7 days, despite straining hard, and complained of sharp, constant pain around the abdominal surgical scar. Her medications at that time were controlled-release oral morphine 50 mg twice daily, haloperidol, and dexamethasone.

On examination, she was drowsy, but hemodynamically stable. She had a distended abdomen with tenderness around the scar, but no peritoneal signs. She had a significant non-tender hematoma over the site of her Portacath, and subcutaneous crepitus was found at the base of her back and extending over all the trunk and to the elbows and thighs. The rest of the physical examination was unremarkable.

Laboratory investigations were normal apart from mildly abnormal liver function tests consistent with her known liver metastases. On abdominal and chest radiographs (see Figures 1 and 2), the most striking feature was extensive subcutaneous emphysema. No pneumomediastinum or pneumothorax was present. The patient later had a computerized tomography (CT) scan of her head, neck, and chest (see Figure 3). The cerebral CT scan showed no cerebral metastases. The neck and chest CT showed extensive subcutaneous emphysema, up to 3 cm in depth between the subcutaneous tissues, and a small pneumomediastinum, but no pneumothorax. No cause of the emphysema could be found. A sigmoidoscopy was planned, but the patient died before this could be done. A postmortem examination was not permitted by the family.

Discussion

Nontraumatic subcutaneous emphysema is rare in cancer patients. In this patient, a number of etiologies were possible, but the lower gastrointestinal tract (GIT) is the most likely site of communication between an air-filled organ and the subcutaneous tissues. There was no reason to suspect infection with a gas-forming organism. There have been several reports of lower GIT perforation causing subcutaneous emphysema, including iatrogenic and pathological causes.45
The patient had not defecated for 7 days, despite straining. Prolonged straining can produce anorectal fissure, which in turn can cause subcutaneous emphysema, and this condition has also been reported in women straining during labor. The various consequences of unrelieved constipation in cancer patients are well recognized.

The patient also had known local recurrence of the tumor at the site of anastomosis from her previous operation, which could also be the source, as a perforated esophageal carcinoma has recently been reported to cause extensive subcutaneous emphysema. Nonmalignant esophageal perforation is another important cause of subcutaneous emphysema (Boerhaave's syndrome). It involves perforation secondary to violent vomiting, and results in subcutaneous emphysema. However, the typical triad of vomiting, chest pain, and subcutaneous emphysema was not present in this patient. Although the CT scan revealed a pneumomediastinum (an important feature of Boerhaave's syndrome), an esophageal perforation could not be identified.

Another cause is through communication between the respiratory system and the subcutaneous fascial layer. Endodontic treatment is known to cause cervical emphysema, but this patient’s dentition was normal, and there was no evidence of facial bone fracture from her fall prior to admission. Any disruption of the bronchial tree can be a source of air. Blunt trauma of the neck can lead to laryngotracheal disruption, and laryngoceles can spontaneously rupture. The CT scan in this patient excluded the presence of a laryngocoele. Rib fractures can lead to subcutaneous emphysema, usually associated with a pneumothorax. It was thought in this case that the patient’s fall may have placed force on her Portacath and fractured a rib, as evidenced by the large hematoma.

![AXR of patient](image)
in the Portacath region. However, she had little pain locally and rib fracture has not been reported as a complication of Portacath usage.\textsuperscript{15}

As the patient did not complain of chest pain or shortness of breath, the decision was made to treat conservatively, and to attempt to discover and treat a cause for the subcutaneous emphysema in due course. For symptomatic subcutaneous emphysema, treatment involves insertion of a large bore drain.\textsuperscript{16} As an autopsy was not performed, the cause of the subcutaneous emphysema is uncertain. Because it was asymptomatic, we do not believe it contributed directly to her death.

The implications of subcutaneous emphysema for palliative care include the distress associated with symptomatic tension emphysema, and the unavailability of the transdermal and subcutaneous routes for drug administration. The presence of air in the subcutis makes the absorption and bioavailability of medications unpredictable via these routes, and intravenous or intramuscular routes would have to be used if parenteral administration were required.

In conclusion, we report a case of a patient with advanced cancer presenting with the unusual clinical finding of extensive subcutaneous emphysema. The precise cause could not be determined before death and an autopsy was not carried out. Subcutaneous emphysema may produce distressing symptoms if severe, although it did not in this case. Its presence interferes with administration of medications by the subcutaneous and transdermal route. If distressing enough, the release of the air via a subcutaneous drain may be indicated. If it is not causing distress to the patient, it is usually appropriate to observe the patient until the air resorbs back into the body.

\textbf{References}


