

NOT A DVT – A NOVEL CASE OF SURGICAL EMPHYSEMA**Dr. Lucy Watts and Dr. Carey Girling***

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ABSTRACT

Suspected DVT is a common presentation to acute medical assessment units. Though sometimes obvious, many cases show subtle or non-specific signs and require inpatient laboratory testing for diagnostic confirmation or dismissal. One such patient was seen one day post elective laparoscopic ablation for endometriosis. Examination rapidly identified the source of pain as lower limb surgical emphysema, a rare post-operative complication from surgery of this type. Laboratory testing was reassuring, and radiology identified only subcutaneous gas with no evidence of underlying osteomyelitis. The patient was discharged home. The case is discussed and a literature review is undertaken of this uncommon presentation.

KEYWORDS: Surgical emphysema, laparoscopic surgery, post-operative complications, gynaecology, dvt, leg pain.

INTRODUCTION

Surgical, or subcutaneous emphysema is a clinical sign identifying gas or air located under the skin, producing a fine crackling sensation on palpation.^[1] It is most commonly found overlying the chest wall when a gas filled viscera communicates with subcutaneous tissue. Mechanisms include penetrating trauma, perforated viscus and pneumothorax.^[2] Surgical emphysema of the lower limb is a rare sign which may be easily missed, particularly if that patient presents with non-specific pain, discomfort or abdominal or systemic features that are apparently incongruous to any leg complaint.

In of itself subcutaneous emphysema is a self-limiting sign with few associated risks, and it thus receives little attention in the scientific literature. As a clinical finding however, it is valuable in preventing resource-heavy investigations used for conditions such as suspected deep-vein thrombosis. Any presentation of subcutaneous emphysema should be considered in the clinical context, as infectious aetiologies confer significant morbidity and mortality.^[3,4,5]

We describe a unique presentation of unilateral surgical emphysema of the distal portion of the lower limb following recent gynaecological surgery. This case highlights the importance of an open differential in the acute setting and reasoned use of diagnostic tools to refute dangerous alternatives and support safe and early discharge where appropriate.

CASE REPORT

A 31year old lady was admitted to the medical assessment unit overnight from out of hours GP with a 12 hour history of right lower limb pain, isolated lower limb swelling, tenderness and antalgia. Physical examination by primary care colleagues highlighted swelling, saphenous tract tenderness and suspected oedema relative to the left lower limb. On arrival in the department, further history identified that the patient had undergone elective laparoscopic ablation the day prior for moderate endometriosis. Physical examination was conducted which rapidly identified surgical emphysema of the right lower limb. This was most prominent just below the level of the tibial tuberosity and was not readily detectable above the knee. There was generalised below-knee tenderness, though no erythema, trauma, oedema, or isolated saphenous tenderness was identified. Admission bloods did not identify evidence of infection or raised creatinine kinase. The D-Dimer result was <250, warranting effective exclusion of DVT. A plain lateral film of the right lower limb was performed, which showed evidence of subcutaneous emphysema, predominantly affecting the anterolateral aspects of the right lower limb, below the knee (figure 1).



Figure 1: Plain AP and lateral films demonstrating subcutaneous emphysema.

Surgical emphysema as a complication of recent laparoscopic surgery was diagnosed clinically. Reassuring laboratory examinations aided in the exclusion of DVT or gas-forming infection. The patient was reassured, prescribed appropriate analgesia and discharged home. Notification of their attendance and diagnosis was forwarded to the relevant surgical team.

DISCUSSION

The aetiology of lower limb emphysema can be divided into two broad categories. In the first, potentially limb or life-threatening gas-forming infection tracks superior to the fascial plane; this may occur in such infections of the lower limb as gas-gangrene, necrotising fasciitis or cellulitis with crepitant presentation. Documented abdominal sources of this free air include perforations in colonic ischaemia, diverticulitis, hernia, malignancy,^[3] or even intestinal pneumatosis, as outlined in the interesting paediatric case by Garofalo *et al.*^[6] Intra-abdominal gas may use the inguinal canal to enter the lower limb,^[5] while retroperitoneal sources, such as abscess, may spread via obturator foramen to the posterior aspect of the thigh.^[4]

This case study falls into the latter category of benign accumulation of air in the subcutaneous tissue of the lower limb. In this case previous laparoscopic endometrial ablation with insufflation of the abdomen resulted in a rare complication of surgical emphysema of the lower limb below the knee. McLennan and Lefebvre report a similar case following minimally invasive robotic exploration of the abdomen.^[7] The patient described here had a further risk factor as gynaecological surgery of this type is performed with the lower extremities supported in stirrups, allowing gravitation forces to promote migration of air into the distal portion of the lower limb. Further risk factors in the associated literature include presence of cutaneous striae,^[8] and concurrent use of steroids or immunosuppressive agents.^[5,6]

Benign surgical emphysema does not garner much attention as it has few associated risks and usually self-resolves with conservative management. However, the alternate infectious aetiology requires rapid and aggressive systemic and operative management, including debridement and washout under general anaesthetic. Herein lies the balance between misdiagnosis and over investigation.

CONCLUSION

This case displays a valuable lesson in thorough history examination to allow careful consideration of context and formation of a differential diagnosis. A suspected case of DVT was refuted with the details of the patient's surgical history, a satisfying spot diagnosis on examination, reassuring D-dimer result and simple x-ray. Surgical emphysema is a rare clinical sign but one that may be seen more often in acute admissions units with the high proportion of laparoscopic and robotic surgery with insufflation of the abdomen conducted today.^[7]

Specific clinical signs like this should trigger expansive rather than restrictive thought within a newly narrowed differential - it was important to keep potentially life-threatening invasive infection at the forefront in this case and act quickly to gather evidence for or against this possibility. A comprehensive review and careful selection and initiation of the most appropriate tests ruled out sinister aetiologies, allowing the managing clinician to make the best, conservative management decisions for the patient. Suspected DVT is a common trope in emergency departments and admission units requiring bed nights, CT scanning and empirical treatment if thromboembolism cannot be ruled out in the early stages. Inappropriate referral to 'Swollen Leg' clinics could be negated to some extent by awareness of clinicians to subtle signs such as surgical emphysema, which point to alternate diagnoses.

Grant

None.

Conflicts of interest

We the authors of this case report have no conflicts of interest to declare.

REFERENCES

1. Dennis M, Bowen WT, Cho L.: Mechanisms of clinic signs. Australia; Elsevier, 2012; 119-120.
2. McCavert M, O'Donnell ME, Campbell D, et al. Spontaneous lower limb subcutaneous emphysema: a diagnostic dilemma. *British Journal of Hospital Medicine*, 2008; 69(12): 712.
3. Chin-Chuan H, Ping-Yuan C, Chih-Cheng L. Thigh emphysema as the initial presentation of colonic ischaemia. *American Journal of Emergency Medicine*, 2018; 36: 526.e1-526.e3.
4. Amendola L, Tugnoli G, Tigani D, et al. Crackling Thigh. *ANZ J Surg.*, 2017; 87: E216-E217.
5. Wilberg A, Carapeti E, Greig A. Necrotising fasciitis of the thigh secondary to colonic perforation: The femoral canal as a route for infective spread. *Journal of Plastic, Reconstructive & Aesthetic Surgery*, 2012; 65: 1731-1733.
6. Garofalo S, Aidala E, Tetuzzi E, et al. Massive Retro-Pneumoperitoneum and Lower Limb Subcutaneous Emphysema After Pediatric Heart Transplantation: A Case Report. *Transplantation Proceedings*, 2015; 47: 2176-2178.
7. McLennan R, Lefebvre C. Subcutaneous Emphysema in the Lower Extremity-Always an Emergency? Complications From Minimally Invasive Surgery-A Case Report. *The Journal of Emergency Medicine*, 2015; 48(2): e31-e33.
8. Nakajima K, Kai Y, Yasumasa K, et al. Subcutaneous Emphysema Along Cutaneous Striae After Laparoscopic Surgery A Unique Complication. *Surgical Laparoscopy Endoscopy & Percutaneous Techniques*, 2006; 16(2): 119-121.
9. Scottish Intercollegiate Guidelines Network (SIGN). Prevention and management of venous thromboembolism. SIGN, 2010; 122. Available from URL: <http://www.sign.ac.uk/assets/sign122.pdf>.