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Pneumoscrotum With Extensive Penile and Abdominal Subcutaneous Emphysema: A Case Report of Uncertain Etiology

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ABSTRACT

Pneumoscrotum and subcutaneous emphysema make for impressive findings on examination and imaging. With ranging etiologies, thorough investigation into the source is essential to rule out potentially life threatening situations. We present a 31-year-old man with pneumoscrotum and extensive subcutaneous emphysema of his penis, abdomen, and perineum. History and physical exam didn't reveal a clear cause and he subsequently underwent surgical exploration showing no soft tissue infection. On post-operative day 1, he remained clinically stable and was discharged. Despite the usual benign nature of pneumoscrotum, full assessment is necessary to identify possible underlying conditions of significant morbidity and mortality.

Introduction

The presence of air within soft tissue is never normal and should be evaluated with attentiveness. Several mechanisms may contribute to the presence of gas within the subcutaneous tissue; the first being related to infection with gas-forming organisms. A second mechanism is due to spread of air from the thorax along Scarpa's and Camper's fascia down to where they fuse forming Colles' fascia at the base of the penis and Dartos fascia of the scrotum. Lastly, air can spread via an intra-abdominal path through the peritoneal cavity and into the scrotum via the processus vaginalis.[1,2] Varying sources for pneumoscrotum have been identified with a distinction made as to whether it is primary or secondary in nature. Primary etiologies derive from the scrotum itself. These include abscess/infection as well as self-inflicted injury or injection of air into the scrotum.[2] Secondary pneumoscrotum is due to an air source elsewhere within the body, tracking via the mechanisms previously described, and commonly involve iatrogenic causes.[2] Examples include blunt chest trauma with resultant pneumothorax and spread of air,[1] visceral perforation due to endoscopic procedures,[3] or medical conditions like diverticulitis.[4] The presence of pneumoscrotum therefore warrants a comprehensive evaluation and work up to rule out perilous causes.

Case presentation

A 31-year-old man presented to the ED with one day of sudden onset scrotal, penile, and inguinal pain and swelling. The pain radiated up his abdomen as well as down his right medial thigh. He denied recent trauma to his genitals or elsewhere. He also denied recent surgery or endoscopic procedures as well as any self-instrumentation of his genitals. His past medical history includes only benign familial hematuria.

On physical exam he was non-toxic appearing, afebrile, with normal vital signs. His penis was circumcised, edematous with palpable crepitus along the shaft. There was minimal scrotal edema and no erythema or necrotic changes of the penile or scrotal skin. A pinpoint opening was noted at the frenulum of his penis which was reportedly the site of a prior piercing. The abdomen was soft, nondistended, with noted tenderness in the right inguinal area and crepitus appreciated along the anterior abdominal wall, again with no skin erythema. The right medial thigh had noted crepitus with no skin changes.

Laboratory studies showed a leukocytosis to 13.7 and urinalysis with microscopic hematuria only. A scrotal ultrasound was obtained initially and was unremarkable except for subcutaneous air limiting evaluation. A CT of the abdomen and pelvis was then obtained which revealed extensive subcutaneous emphysema along

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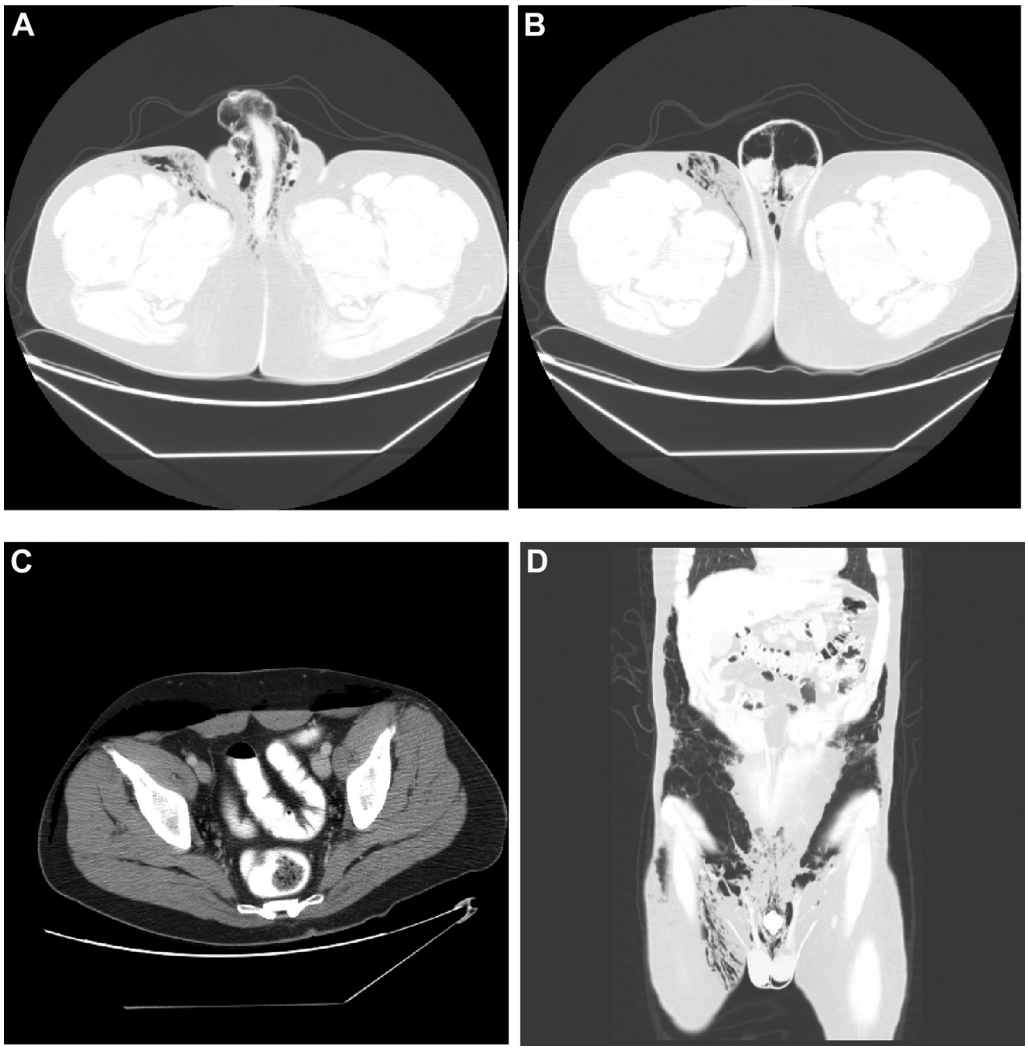

Figure 1. CT images of subcutaneous emphysema in the patient. A. Within the penis and perineum. B. Pneumoscrotum and air along the right medial thigh. C. After rectal contrast showing no evidence of enterocutaneous fistula. D. Extent of air along the abdomen bilaterally.

the anterior abdominal wall to the inguinal canals bilaterally, along the penile shaft, into the scrotum, and along the right medial thigh (Fig. 1). There were no radiographic signs of pneumothorax, intra-abdominal free air, skin thickening, or inflammatory changes. Rectal contrast was also administered and showed no evidence of enterocutaneous fistula.

The patient's overall clinical stability was reassuring but the extent of air with leukocytosis prompted the patient being taken to the OR for abdominal wall exploration to definitively rule out necrotizing infection. Exploration revealed healthy appearing tissue down to the rectus fascia with frozen samples showing viable tissue without evidence of inflammation. Intra-operative cultures and blood cultures all returned negative. He was observed as an inpatient overnight and received antibiotics for 24 h post-op. He remained afebrile, hemodynamically stable, with resolution of the leukocytosis, pain, and swelling and was discharged home on post-operative day 1. A follow up wound check 2 weeks later was normal.

On further review of the medical record, the patient was noted to have other peculiar presentations to the ED with chief complaints related to his genitals. These include burns sustained after his shorts were lit on fire, a reported assault where his penis was cut with a knife, and a subsequent encounter where his penis was stuck in a bottle filled with insulation foam.

Discussion

This young man fortunately was found not to have any concerning underlying conditions to attribute the generalized emphysema to. While the overall clinical suspicion was low for a necrotizing infection with his lack of co-morbidities, reassuring exam, and no signs of soft tissue inflammation on CT, it was felt this entity needed to be definitively ruled out due to its associated high mortality rate.

After more extensive review of the medical record as well as a subsequent ED encounter with the patient, a higher index of suspicion was placed on the air source being from self-instrumentation and some form of auto-injection. Although the patient vehemently denied such actions, a possible point of entry for introduction of air was identified on physical exam at the frenulum piercing site. This, along with having ruled out more common etiologies, left auto-injection as the most likely reason for the extent of emphysema.

Few cases describing self-injection of air into the scrotum leading to widespread emphysema exist in the literature. A recent case report describes a patient self-injecting air into the penis using an air pump for autoerotic purposes, leading to generalized subcutaneous emphysema and neck pain.[5] Similarities between this case and ours are the suspected point of entry at the frenulum, complaints of pain away from the origin site due to air tracking along fascial planes, and overall clinical stability. Their patient was managed conservatively with pain control and antibiotics only. On the contrary, as our patient did not endorse having performed auto-injection of air, surgical exploration was felt to be needed to definitively rule out soft tissue infection.

This case highlights the concern that the presence of subcutaneous emphysema should convey to the clinician. When forming a differential diagnosis, one should always include conditions that are most likely as well as those that are potentially fatal. This requires obtaining an exhaustive history, including associated symptoms of infection, recent procedures, recent trauma, and as indicated, detailed psychiatric and sexual histories. In addition to basic laboratory studies, CT imaging provides a detailed view of the chest and abdomen to assess extent of air in addition to locating possible intrathoracic or intraabdominal sources.

Conclusion

The presence of subcutaneous air should never be taken lightly and the underlying cause should be sought out. A comprehensive evaluation is necessary and surgical exploration may be warranted if the work up is negative, or the patient is not forthcoming, in order to definitively rule out conditions of significant morbidity and mortality.

Conflict of interest

The authors have no disclosures to report.

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