

Pneumoscotum: An unusual complication of pulmonary resection

CHARLES W. RAUDAT, DO
FRANCIS KATRIS, MD
DENNIS WOODHALL, MD

Pneumoscotum occurred in a 53-year-old man as a complication after pulmonary resection for carcinoma. Recognition of this entity and its conservative management are crucial to a positive outcome and prevention of unnecessary interventions based on the differential diagnosis. A review of the literature is included with this description of an unusual complication.

(Key words: Pneumoscotum, surgical complication)

Pneumoscotum is an unusual and diagnostically challenging complication. Air can track into the scrotal tissues via subcutaneous, retroperitoneal, or intra-abdominal pathways after most abdominal or thoracic procedures. The differential diagnosis of an enlarged scrotum is vast and all possibilities must be excluded before making the diagnosis of pneumoscotum. Inadvertent surgical intervention can result in serious injury. Pneumoscotum is a benign complication that requires only conservative management.

Report of case

A 53-year-old man was admitted to the hospital for an elective open lung biopsy of suspected carcinoma of the left upper lobe. The patient's past history was significant for smoking one pack of cigarettes per day for 40 years. Physical examination revealed a healthy man with no gross abnormal physical findings, including no evidence of inguinal hernias.

The patient underwent a left minithoracotomy via the third intercostal space. Biopsy of the mass was pos-

itive for carcinoma, and a left upper lobectomy was performed. The patient tolerated the procedure and was returned to the surgical ward. Early in the morning on the following day, the patient noticed scrotal pain with ambulation. Examination at that time revealed no abnormality. Eight hours later, the patient noticed progressive swelling of the scrotum and pain. He was able to void without difficulty.

On examination, the patient's scrotum was massively distended and tense. He had mild tenderness to touch. The scrotum was transilluminated and no fluid levels were seen. The subcutaneous tissues of the pelvis and lower region of the abdomen had no crepitance. The chest tube demonstrated an air leak.

A Foley catheter was inserted. The patient's bed was placed at 30 degrees with the scrotum in the dependent position (*Figure*). Analgesics were supplied. X-ray films of the pelvis demonstrated air in the genitalia. The chest x-ray film showed that the lung was fully inflated.

The chest tube remained in place for 1 week, over which time the size of the pneumoscotum progressively decreased. The patient was discharged from the hospital with minimal scrotal air.

Discussion

Air reaches the scrotum via the path of least resistance. It has been reported to occur with retroperitoneal dissection of air.^{1,2} Children and adults on ventilators have demonstrated air tracking retroperitoneally from the mediastinum through the diaphragmatic hiatus along the pararenal space,⁴ then via the spermatic fascia into the scrotum. Air may track into the scrotum via the peritoneum after colonoscopy⁵ and laparoscopy,⁶ and pneumoscotum has been seen after breakdown of an intestinal anastomosis⁷ and with perforated viscus.⁸ Air enters the scrotum via the inguinal canal through a patent tunica vaginalis testis,⁹ which is still present in 15% of adults⁸ and as many as 60% of infants.¹⁰

Alternatively, pneumoscotum may occur with air dissecting along the tissue planes on the abdominal wall into the subcutaneous space in the scrotum.⁹ Fascia of Camper and Scarpa's fascia create

From the Department of Surgery, Fairview General Hospital, Cleveland, Ohio, where, at the time this article was written, Dr Raudat was a resident and Dr Katris, the senior resident; and Dr Woodhall is a staff surgeon, Division of Cardiovascular and Thoracic Surgery.

Correspondence to Charles Raudat, DO, Department of Surgery, Health Cleveland-Fairview General Hospital, 18101 Lorain Ave, Cleveland, OH 44111.

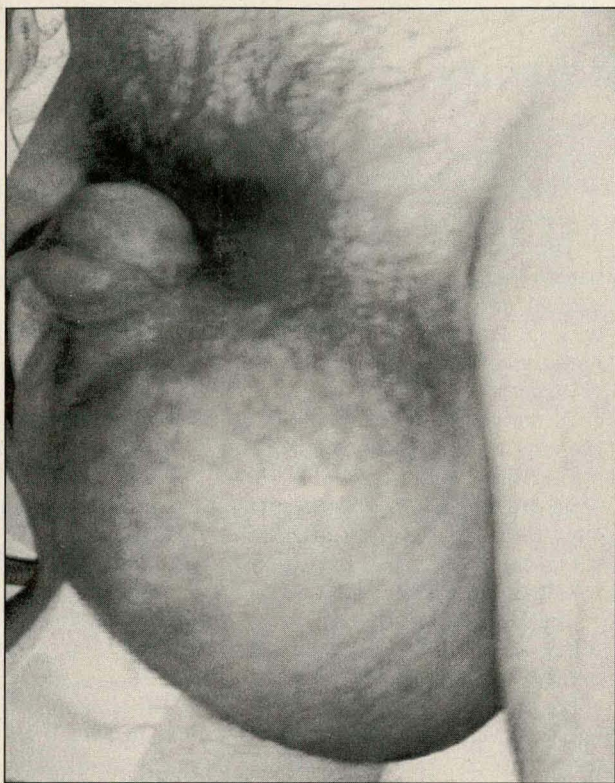


Figure. Massive enlargement of scrotum.

tissue planes in which air may track along the abdominal wall from a pulmonary source. Both of these fascial planes fuse at the base of the penis to form Colles' fascia and tunica dartos.¹¹ Pneumoscrotum has been seen after cardiopulmonary resuscitation,¹² with persistent air leak from the chest tube,^{13,14} and after subcutaneous emphysema secondary to laparoscopy.

Our patient's pneumoscrotum occurred secondarily to a persistent bronchial air leak with retroperitoneal dissection of air. The management of this unusual complication is basically supportive, with treatment of the underlying cause of the air leak. Examination with transillumination is necessary to rule out incarcerated inguinal hernia with scrotal contents; also included in the differential diagnosis is hydrocele, pneumatocele, hematocele, torsion, neoplasm, epididymo-orchitis, and trauma.¹⁵ Further examination should be done to exclude Fournier's gangrene, which has a peak incidence in men between the ages of 50 and 70 years and has a 13% to 45% mortality rate.¹⁶

Radiographic studies can include routine abdominal series, which should be helpful in distinguishing loops of bowel with a hernia. Placement of a Foley catheter is not necessary because of the distensibility of the tissues surrounding the urethra.⁶ Aspiration is not recommended. The air is contained in multiple loculations of tunica dartos and would require multiple perforations of the scrotum to achieve any significant reduction in air content. This intervention increases the risk for introducing an organism into the scrotum and subsequent infection.⁹ Aspiration may be indicated only if the skin appears threatened from pressure necrosis.

References

1. Bush G, Nixon RK: Scrotal inflation: A new cause for subcutaneous mediastinal and retroperitoneal emphysema. *Henry Ford Hosp Med J* 1969;17:225.
2. Castellanos R, Rege PR, Evans AT: Pneumoscrotum: A case report and view of the literature. *J Urol* 1973;110:225-226.
3. Knight PJ, Abdenuer G: Pneumoperitoneum in the ventilated neonate: Respiratory or gastrointestinal origin? 1981;98:972-974.
4. Moore RA, McNicholas KW, Niguidula FN, et al: Scrotal emphysema. *J Med Soc NJ* 1982;11:835-836.
5. Humphreys F, Hewetson KA, Dellipiani AW: Massive subcutaneous emphysema following colonoscopy. *Endoscopy* 1984;16:160-161.
6. Christenson PJ, O'Connell KJ, Albert P, Knuff TE: Pneumoscrotum after diagnostic peritoneoscopy. *Urology* 1980;16:78-79.
7. Decker J: Pneumoscrotum as an early sign of anastomotic leakage after anterior resection of the colon. *Surg Gynecol Obstet* 1972;134:1005.
8. Coppes MJ, Roukema JA, Bax NM: Scrotal pneumatocele: A rare phenomenon. *J Pediatr Surg* 1991;26:1428-1429.
9. Firman R, Heiselman D, Lloyd T, Mardesich P: Pneumoscrotum. *Ann Emerg Med* 1993;22:1353-1355.
10. Bray JF: Pneumoscrotum with testicular delineation—A new sign of pneumoperitoneum. *Br J Radiol* 1982;55:867-868.
11. Glover WL, Rhamy RK, Semerdjian HS, et al: Massive scrotal, subcutaneous and retroperitoneal emphysema following scrotal laceration: A case report. *J Urol* 1974;112:498-499.
12. Menzies D, Noble JG, Dent CM, Cox PJ: Pneumoscrotum—An unusual complication of cardiopulmonary resuscitation. *Br J Urol* 1991;67:440.
13. Nelson JN, Laidig CE: Emphysema: A cause of scrotal enlargement. *J Urol* 1960;87:580-581.
14. Archer GJ: Pneumoscrotum complicating pneumothorax and surgical emphysema. *Br J Urol* 1974;46:343.
15. Engelhard D, Ornoy A, Deckelbaum RJ: Pneumoscrotum complicating percutaneous liver biopsy. *Gastroenterology* 1981;80:390-391.
16. Sharma TC, Kagan HN: Scrotal emphysema. *Am Surg* 1980;46:652-653.