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HOSPITAL CENTRAL DR. IGNACIO MORONES PRIETO

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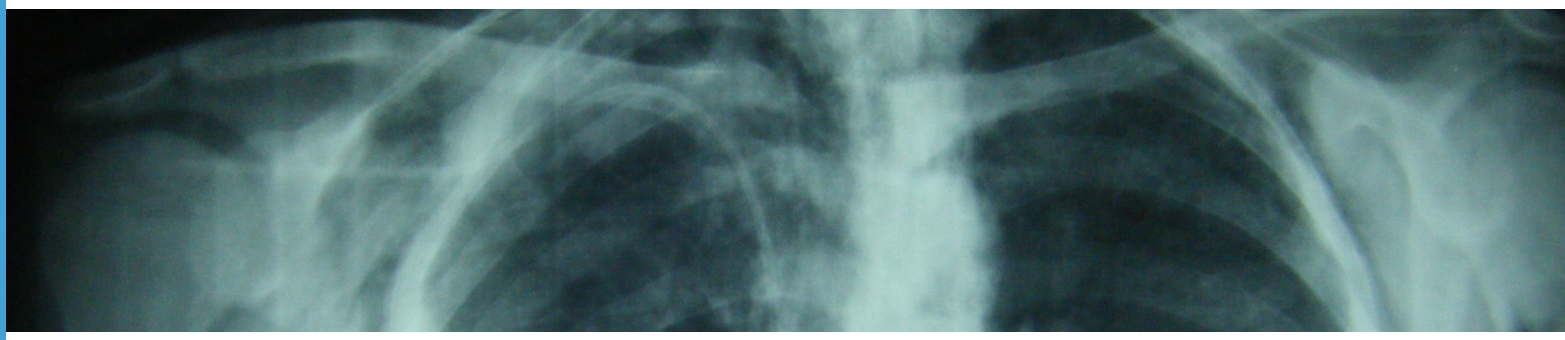

Pneumoscrotum as a Complication of Central Venous Catheterization: Case Report

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ABSTRACT

Pneumoscrotum is an uncommon condition caused by inadvertent entry of air into the scrotum. Although various causes have been described, this complication has never been reported in relation to central venous catheterization (CVC). This case report describes a male patient with pneumothorax, subcutaneous emphysema, and pneumoscrotum as a result of failed CVC placement. After resolution of the subcutaneous emphysema and implementation of conservative measures for the pneumoscrotum without success, an urethroscopy for stricture was performed, during which, thanks to a small incision, resulted in successful resolution of the condition. Although CVC placement is a safe practice, mechanical complications may occur in a small percentage of cases. Pneumoscrotum, although rare, can be a potentially serious complication. It is important to be aware of this possibility and take appropriate measures for its timely diagnosis and management.

Key Words: pneumoscrotum, central venous catheterization, pneumothorax, subcutaneous emphysema.

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INTRODUCTION

Pneumoscrotum is a rare and benign condition caused by the inadvertent entry of air into the scrotum. The first reported case dates back to 1912, since when less than 100 similar events have been reported. Its etiology has been attributed to infectious, traumatic, hernias, among others (1), however, it has never been described in the literature as a complication of central venous catheterization, an indispensable practice in modern medicine in all hospital centers, routinely performed, and relatively safe. We present the case of a male patient with pneumothorax, subcutaneous emphysema, and pneumoscrotum as a consequence of failed central venous catheter (CVC) placement.

CASE REPORT

We describe the case of a 23-year-old male patient with poly-drug addiction (mainly to inhalants and solvents) of 12 years of evolution who has suffered multiple hospitalizations due to drug suppression, electrolyte, and metabolic alterations, and has been treated in the intensive care unit on multiple occasions. For 4 years, he has had clinical data of distal ureteral stenosis, as a consequence of a bad ureteral catheterization that was not resolved due to poor adherence to treatment, which has caused repeated episodes of urinary retention.

In one of his hospitalizations, after an unsuccessful attempt to place a CVC via the right internal jugular vein, a 50% pneumothorax was provoked with extensive subcutaneous emphysema in the neck, axillae, thorax, and abdomen up to the contralateral side, without reaching below the inguinal region. A chest tube was placed conventionally, expanding the lung satisfactorily in four days with the removal of the drainage tube without complications, however, he was kept under observation after noticing pneumomediastinum data in the control chest X-ray (Figure 1).

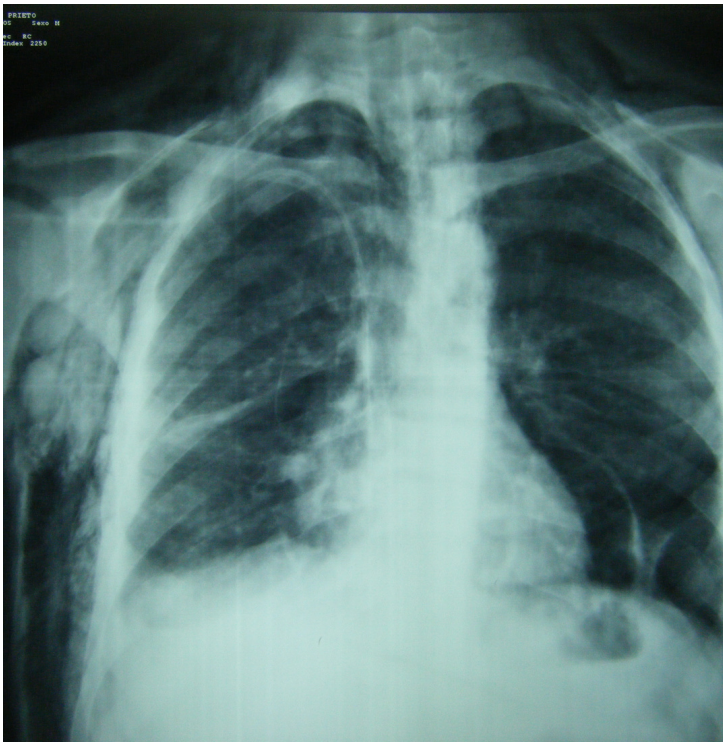

Figure 1. Pneumomediastinum in the control chest X-ray. The imaging study shows the abnormal accumulation of air in the central region of the thorax. A radiolucent shadow can be seen extending above the heart and into the soft tissues surrounding the mediastinum.

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Two days later, a progressive increase in scrotal volume of 14 cm in diameter was observed, uniform and of normal coloration, with no changes in the penis; after palpation of the scrotum, the absence of pain, crepitant sensation, and the impossibility of palpating the testicles, led to the clinical diagnosis of pneumoscrotum pneumothorax (Figures 2 and 3).

There was no evidence of a systemic inflammatory response or repercussions for the patient's general condition.
After the resolution of the subcutaneous emphysema and the implementation of conservative measures for the resolution of the pneumoscrotum for 15 days without success, acute urinary retention was added to the condition, for which reason a urethroscopy was performed in which stenosis of the distal penile urethra of up to 90% was discovered, which was treated with dilatations without causing injury to the rest of the urethra or bladder.

Subsequently, the pneumoscrotum was resolved with the extraction of air through a 1 cm longitudinal incision without complications.
The following day, he was discharged because he presented a good improvement, with ambulatory follow-up and no sequelae due to the condition.

DISCUSSION AND CONCLUSION

It has been described that more than 15% of patients with CVC placement have complications (2) of an infectious, thrombotic, or mechanical nature; mechanical complications occur in 5 to 19% of patients, mainly due to an unfortunate puncture to neighboring anatomical structures during placement, causing complications such as hemorrhage and hematoma, neurological lesions, pneumothorax, hydrothorax, and perforation of cardiac cavities, among others.

Puncture of the subclavian artery, hematoma, and pneumothorax are the most common mechanical complications of insertion, with an incidence of 0.1 to 0.2% for pneumothorax when attempting to access the internal jugular vein.

Most cases of pneumothorax described in the medical literature are usually associated with iatrogenic, therapeutic, and diagnostic processes, with air coming from the lung and digestive organs (lung resection, endotracheal tube and chest tube placement, colonoscopy, ERCP, liver biopsy, among others), although it has also been seen in traumatic pathologies with pneumothorax, soft tissue infections (Fournier's gangrene), or testicular trauma (1, 3 - 11).

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Figure 2. Pneumoscrotum anterior view. Note the increase in size and swelling of the scrotum, with a tense and distended appearance.

Figure 3. Pneumoscrotum, anterolateral view.

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Three possible mechanisms have been proposed to explain the arrival of air to the scrotum: alveolar rupture, which facilitates the passage of air into the mediastinum with consequent subcutaneous emphysema, reaching the abdomen and scrotum; the extension of the emphysema through Scarpa's fascia, and the passage of air through the diaphragmatic hiatus to the pararenal space and through the retroperitoneum to the inguinal canal, following the spermatic fascia to the scrotum (1, 5, 12).

REFERENCES

1. Capua Sacoto C, Bahilo Mateu P, Ramírez Backhaus M, Gimeno Argente V, Pontones Moreno JL, Jiménez Cruz JF. Neumotórax secundario a un neumotórax a tensión bilateral. Actas Urol Esp. 2008;32(7):756-758

2. David C. McGee, M. D., and Michel K. Gould, M. Preventing Complications of Central Venous Catheterization. D. N Engl J Med 2003; 348: 1123-33.

3. Katris F, Woodhall D. Raudat CW. Pneumoscrotum: an unusual complication of pulmonary resection. J Am Osteopath Assoc. 1996 Jun;96 (6):362-3.

4. Redman JF, Pahls WL. Pneumoscrotum following tracheal intubation. J Urol. 1985 Jun;133(6):1056-7.

5. Mateos Colino A, Golpe Gomez R, Gonzalez Rodriguez A, Sousa Escandon A, Gonzalez Uribarri C, Seirulo Salas M: Neumoescroto secundario a enfisema subcutáneo masivo tras el drenaje de un neumotorax espontáneo. Actas Urol Esp 2004:606-609.

6. Kuang-I Fu, Yasushi Sano, Shigeharu Kato, Takahiro Fujii, Masanori Sugito, Masato Ono, Norio Saito, Kiyotaka Kawashima, Shigeaki Yoshida, Takahiro Fujimori. Pneumoscrotum: A rare manifestation of perforation associated with therapeutic colonoscopy. World J Gastroenterol 2005;11(32):5061-5063.

7. Singh S, Thakur M. Pneumoscrotum after colonoscopy. Can J Gastroenterol. 2008 Apr;22(4):411-3.

8. Klimach OE, Defriend DJ, Foster DN. Pneumoscrotum following endoscopic sphincterotomy. Surgical Endoscopy. 4(4):230-1, 1990.

9. Hill TW, Mills LD, Butts CJ. Pneumoscrotum after Jejunal Perforation: A Case Report. Emerg Med. 2009 Feb 5.

10. Engelhard D, Ornoy A, Deckelbaum RJ. Pneumoscrotum complicating percutaneous liver biopsy. Gastroenterology. 80(2):390-2, 1981 Feb.

11. Wakabayashi Y, Bush WH Jr. Pneumoscrotum after blunt chest trauma. J Emerg Med. 1994 Sep-Oct;12(5):603-5.

12. Vasileios Simaioforidis, Stylianos Kontos, Ioannis Fokitis, Georgios Lefakis and Sotirios Koritsiadis. Subcutaneous emphysema of the scrotum (pneumoscrotum) due to traumatic pneumothorax: a case report. Cases Journal 2008, 1:293