

Case Report

Postoperative Pneumoscotum in a Cardiac Surgery Patient: A Case Report

Tanmoy G¹ and Sandeep Kumar K^{2*}

¹PDT Department of Cardiac Anesthesiology Institute of Postgraduate Medical Education & Research, Kolkata, India

²Assistant Professor, Department of Cardiac Anesthesiology, Institute of Postgraduate Medical Education & Research, Kolkata, India

*Corresponding author: Dr. Sandeep Kumar Kar, Assistant Professor, Department of Cardiac Anesthesiology Institute of Postgraduate Medical Education & Research, Kolkata, India, E-mail: sndpkar@yahoo.co.in

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Abstract

Air in the scrotum or pneumoscotum is a relatively rare presentation and may be found in local disease, intra abdominal disorder, and thoracic disease or as adverse effect of therapeutic procedures. Cases present as painless, soft, trans illuminant, tense swelling often with a feeling of snow in palpating finger. In this case report the authors present a case of postoperative pneumoscotum in a cardiac surgery patient appearing after removal of chest tube.

Keywords: Pneumoscotum, Subcutaneous scrotal emphysema, Chest drain complications,

Introduction

Air in the scrotum or pneumoscotum is a relatively rare presentation and may be found in variety of diseases. The air may originate from the scrotum or may be entrapped from external source like from within the peritoneum or from any skin source through subcutaneous emphysema. In this report the authors present a case of pneumoscotum in a post cardiac surgery patient occurring from air entrapment through chest drain site extending via subcutaneous emphysema.

Case Report

A 35 year male patient previously diagnosed with mitral stenosis and undergone closed mitral commissurotomy 12 years back was admitted to our institute for planned mitral valve replacement under general anesthesia with cardiopulmonary bypass. Echocardiography revealed severe mitral stenosis (Mitral valve area 0.8cm), moderate mitral regurgitation, severe pulmonary hypertension, tricuspid regurgitation, left ventricular dysfunction (ejection fraction 35%) and dilated tricuspid annulus. Mitral valve replacement was done by right atrial approach with 31mm bileaflet mechanical valve along with Dewega's procedure and maze procedure. Two chest drains were placed at the end of surgery, one in mediastinum and another in right thoracic cavity. An intraaortic balloon pump (IABP) was used to assist left ventricular function in postoperative period. Perioperative management incorporated standard on pump surgery protocol

including radial arterial line, jugular venous access, opioid based coinduction technique, cardiopulmonary bypass with moderate hypothermia (28-32°C) and potassium based cold blood cardioplegia. Postoperative recovery was uneventful. Patient was weaned off from mechanical ventilation from 2nd day. Inotropes were gradually declined and IABP was removed on the third day. Chest drains output was minimal and drains were removed on the morning of fourth postoperative day. In the evening of the same day the patient developed gradually progressive painless swelling of scrotum. The swelling was large, soft, irreducible, brilliantly transilluminant and painless. (Figure 1) The testes were palpable at the bottom of the swelling. Immediate pelvic x-ray showed large enlargement of scrotum with air surrounding the testes. The ultrasound probe was placed over the scrotum but testes could not be seen. Needle aspiration was planned for confirmation of diagnosis and an area with maximum distance from the testis and other important structure was chosen. Needle aspiration revealed presence of air in scrotum (Figure 2). 100 ml of air was aspirated from the scrotum but the swelling appeared immediately. Careful palpation revealed presence of subcutaneous emphysema extending from the scrotal sac to the right chest drain site over the skin along to right lateral side. Breath sound from right lung was diminished. No subcutaneous emphysema was palpable in the vicinity of IABP insertion site. A chest drain was put immediately in the right side. X-ray of chest and abdomen revealed presence of subcutaneous emphysema over left side of chest and abdomen without any obvious enteric gas. Patient was managed conservatively with moist oxygen administered nasally; another drain in the left side and other routine postoperative medication and the swelling subsided gradually within the next 2 days (Figure 3). The chest drains were removed after 5 days.



Figure 1: Huge tense, painless scrotal swelling



Figure 2: Needle aspiration revealed air

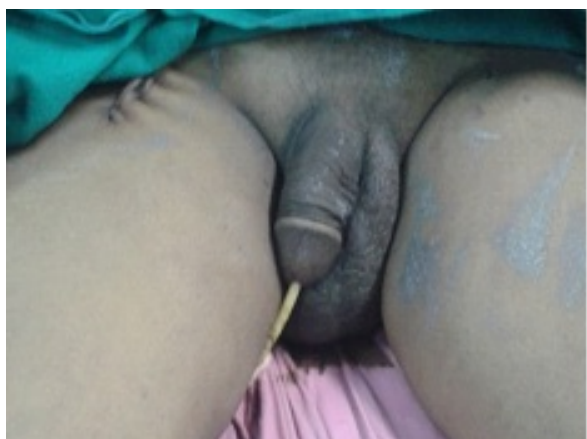


Figure 3: Swelling subsided in next 2 days

Discussion

Subcutaneous scrotal emphysema, also known as pneumosrotum, is an increase in volume caused by air accumulated in the scrotal sac [1]. The first reported case of pneumothorax ages back to 1912 [2]. Pneumosrotum is a relatively rare entity and presence of air in the scrotum may be due to various disease conditions or may follow some diagnostic and therapeutic procedures [3]. Majority of cases are associated with pneumoperitoneum and air leak into scrotum through any opening in peritoneum. In neonates and also adults the process usvaginialis may act as the conduit of air as processusvaginialis may be patent in 15-30% males [4]. Subcutaneous or retroperitoneal air dissecting down the dartos lining of the scrotal cord into the scrotal wall is another attractive hypothesis behind occurrence of pneumosrotum in patients with pneumoperitoneum (Figure 4). In adults another possibility is passage of air retroperitoneally through inguinal canal and superficial to the facial structures of spermatic cord. For schematic overview refer to Figure 5.

- 1. Extraperitoneal source:**
 - **Retroperitoneum:** Retroperitoneal surgery²⁰, Nephrectomy², abscess of the perinephric space¹⁹,
 - **Mediastinum:** Cardiopulmonary resuscitation²¹
 - **Lungs and thoracic cavity:** Mechanical ventilation²², Pneumothorax^{11,19,23-25}
 - **Chest wall:** Chest tube insertion¹⁰
- 2. Intraperitoneal source:** Air filled hollow viscera, e.g., Perforated duodenal ulcer⁷, perforation of Meckel's diverticulum, perforation of ileum secondary to atresia, jejunum⁶
- 3. Local source⁸:**
 - **Gas production,:** Infection by gas producing organism¹⁶, Fournier's gangrene^{15,19}
 - **Gas introduction:** Scrotal trauma, biopsy, inflation of the scrotum due to air ejection for sexual purposes¹⁹,
- 4. Air entrapment due to diagnostic or therapeutic procedure**
 - Peritonoscopy³
 - Open gastrotomy⁵
 - Colon surgery²⁷⁻²⁹
 - Tracheostomy¹⁵
 - Tracheal intubation
 - Liver/ kidney biopsy¹⁹
 - Pacemaker placement¹⁹
 - Artificial pneumoperitoneum¹⁹
- 5. Others:** Rapid decompression after diving¹⁹,

Figure 4: Source of air in pneumosrotum [19]

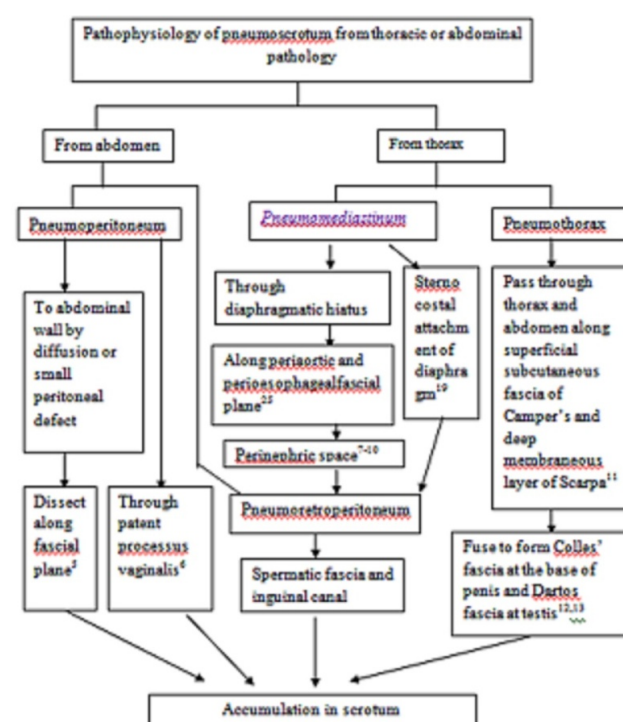


Figure 5: Pathophysiology of pneumosrotum from thoracic or abdominal pathology

The possible origin of pneumosrotum may be air accumulation in thorax, peritoneal cavity or retroperitoneal structure. This accumulated

air may exert high pressure over the surrounding structures and dissect through the high resistance area between different layers of skin, fascia and muscle plane and reach the scrotum. The highly compliant wall of scrotum allows decompression of air from that structure and harbors a large amount of air until the scrotal skin is tensed or major structures are compressed [11-14.] In a post-cardiac surgery patient, like the patient in discussion, where the pleura have been opened during the course of surgery, the pleural and the pericardial compartment fuse to become a single compartment. In such cases building up of large air pressure within the large cavity is less probable and should have precipitated hemodynamic instability before causing translocation of air. In this case the air was entrapped as subcutaneous emphysema in the right hemithorax and then passed along the abdominal wall to reach the scrotum.

Suspicion of pneumoscrotum is essentially from clinical findings. A gradually increasing, non-reducible or reducible but rapidly reappearing swelling of the scrotum in patients with hollow viscus injury or any retroperitoneal procedure or with collection of gas in high pressure anywhere in the body should bring about the suspicion of pneumoscrotum. Some authors have described the feeling of pneumoscrotum as palpating snow [15]. Diagnosis may be aided with CT scan which delineates clearly the areas of air collection and detailed anatomy of the surrounding structures. Ultrasound is of little value. In case of confusion needle aspiration is confirmatory but it is essential to avoid injury to the major structures in vicinity. The authors could not use CT scan as the patient was unable to withstand the procedure at that period. A bedside abdominal sonogram was performed instead to rule out intraperitoneal or retroperitoneal pathology.

Proper diagnosis of pneumoscrotum is crucial because this may be an early sign of a life threatening pathology [8,14,16]. Pneumoscrotum may arise from infection by gas producing organism and may cause death [16]. The air from peritoneum is usually non-infective and such cases may be managed conservatively [17]. Conservative management may be practiced if the vital symptoms of patient are stable; the pneumoscrotum is painless or is caused by pneumoperitoneum [18]. If local infection is suspected, proper antibiotics and surgical consultation is mandatory. In case of pneumoperitoneum the site of leak in peritoneum must be sought out. Intra abdominal emergencies should be treated as necessary. Sometimes subcutaneous emphysema may occur as an uncommon complication of some common disease. Radwan Kassir and co-workers [30] described a case of perforated diverticulitis of the sigmoid colon causing subcutaneous emphysema in an 83 year old man. In case of pneumothorax a chest tube placement is often helpful. For management of pneumo mediastinum a thoracic surgeon must be consulted. Pneumoscrotum usually does not cause compression of urethra or the major structures as scrotal wall is elastic and can be distended to large extent [8,13] but a Foley's catheter may be introduced to assess urine output and for differential diagnosis of oliguria in these patients. The patient in discussion showed no sign of clinical deterioration after development of pneumoscrotum and there was no sign of any intra abdominal pathology on clinical examination and ultrasound, therefore managed conservatively. There was no evidence of exaggerated bleeding or any other complication arising from the pneumoscrotum.

Conclusion

Pneumoscrotum may arise from a variety of conditions. The prime objective of a clinician in this scenario should be to identify the source of air entry. In post cardiac surgery patient, with both pleura as well as

mediastinum opened, associated pneumothorax should be treated by bilateral chest drain. CT scan is best diagnostic modality but not applicable to this patient. Therefore the clinician should rely more on clinical examination, pelvic x-ray and needle aspiration. Ultrasound is helpful to exclude hydrocele and for diagnosis of intra abdominal pathology. Aggressive management is required in case of associated infection, peritoneal leak or deteriorating general condition. In uncomplicated cases conservative management is all that necessary.

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