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Clinical case

Post-contusion pulmonary pseudocyst: is it a lethal complication? Report of 2 cases

Pseudokyste pulmonaire post-contusion : est-ce une complication mortelle ? Rapport de 2 cas

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Résumé

Le pseudokyste pulmonaire post-traumatique est une manifestation rare d'un traumatisme thoracique grave contondant et/ou pénétrant. Les jeunes adultes et les adolescents sont les plus touchés. Le diagnostic clinique est difficile, en raison de la rareté et du manque de spécificité des données cliniques. La radiographie du thorax est généralement insuffisante pour le diagnostic ; le mode d'imagerie idéal est la tomodensitométrie (TDM). Ses mécanismes physiopathologiques sont incertains.

De même, la prise en charge de cette lésion est généralement conservatrice, car les pseudokystes pulmonaires post-traumatiques sont bénins. Cependant, dans de rares cas, ces lésions peuvent évoluer vers des complications mettant en jeu le pronostic vital.

Nous rapportons ici l'issue favorable d'un pseudokyste pulmonaire post-traumatique contondant dans un cas avec résolution complète, et dans le second cas, une forme compliquée d'un pseudokyste pulmonaire post-traumatique contondant (choc septique avec défaillance multiviscérale) conduisant au décès du patient au 16ème jour d'hospitalisation.

Mots-clés : poitrine ; traumatisme; cavité; pneumatocèle.

Abstract

Post-traumatic pulmonary pseudocyst is a rare manifestation of severe blunt and/or penetrating chest trauma. Young adults and adolescents are most affected. Clinical diagnosis is difficult, due to the paucity and lack of specificity of clinical data. Chest X-rays are generally insufficient for diagnosis; the ideal imaging mode is computed tomography (CT). Its pathophysiological mechanisms are uncertain.

Similarly, management of this lesion is generally conservative, because post-traumatic pulmonary pseudocysts are benign. However, in rare cases, these lesions can develop into life-threatening complications.

We report here the successful outcome of a post-traumatic blunt pulmonary pseudocyst in one case with complete resolution, and in the second case, a

complicated form of a post-traumatic blunt pulmonary pseudocyst (septic shock with multi-organ failure) leading to the patient's death on the 16th day of hospitalization.

Keywords: chest; trauma; cavity; pneumatocele.

Introduction

Pulmonary pseudocysts are uncommon lesions encountered mainly in severe blunt and rarely in penetrating thoracic trauma [1].

Their pathophysiology is unknown. The usual clinical manifestations are chest pain, cough, dyspnea and hemoptysis [2]. Hemoptysis is the most common sign in 40% of cases [3].

Post-traumatic pulmonary pseudocysts can be identified on chest X-ray, but CT-scan is the gold standard, as it is more sensitive in detecting this type of lesion.

Post-traumatic pulmonary pseudocysts are benign lesions that usually require conservative management, as they resolve on their own [1-4], unless complications such as infection, bronchopleural fistula and hemorrhage arise [4, 5, 6], to worsen the patient's vital prognosis.

We report here two cases of pneumatocele with literature review.

Clinical cases

Case n°1:

A 18-years-old man with no medical history was involved in a motor vehicle collision. On arrival at the emergency department, the patient was conscious, his blood pressure was 125 mmHg in systolic and 80 mmHg in diastolic, heart rate 126 beats/min, respiratory rate 20/min, oxygen saturation was 98%. Isolated thoracic lesions were observed, and the chest X-ray showed bilateral pulmonary opacity and a fracture of the fifth right rib. The chest CT-scan showed bilateral pulmonary contusions, and a minimal anterior right pneumothorax. Management consist only in analgesia and observation; follow-up was favourable, and the patient was discharged after 4 days without complications. One month after the initial trauma, we observed on a chest X-ray a paracardiac right cavitary pulmonary lesion (pneumatocele) (figure1). Three months later the chest Xray was normal.

Case n°2:

A 40 years-old man with no medical record was admitted in the emergency department after traffic accident. Chest pain and dyspnea were the functional symptoms, blood pressure was 130 mmHg in systolic and 75 mmHg in diastolic, heart rate 140 beats/min and respiratory rate was 28/min, oxygen saturation was 92%. The initial chest-X ray showed bilateral opacity, and on CT-scan we observed bilateral pulmonary contusions, and a minimal anterior left pneumothorax. Initial management consisted on efficient analgesia and non-invasive ventilation (nasal oxygen). On day 4 of hospitalization, the patient developed a respiratory distress requiring intubation and mechanical ventilation (figure 2a). The CT-scan revealed an extension of the pulmonary contusion and the development of a lung cavity (figure 2b). Evolution was lethal with acute respiratory distress syndrome (ARDS), serious septic complications (infection of the pulmonary contusion and the pulmonary cavity), then the patient developed a severe septic shock, and passed away in day 16 despite an adequate treatment.

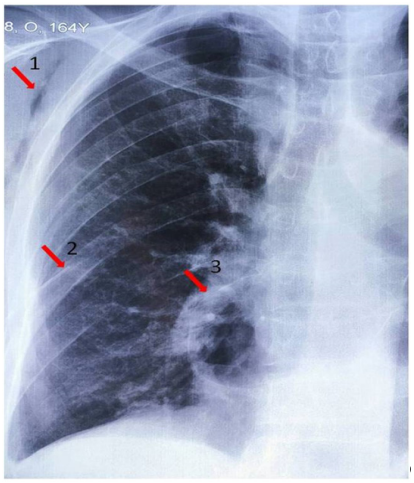
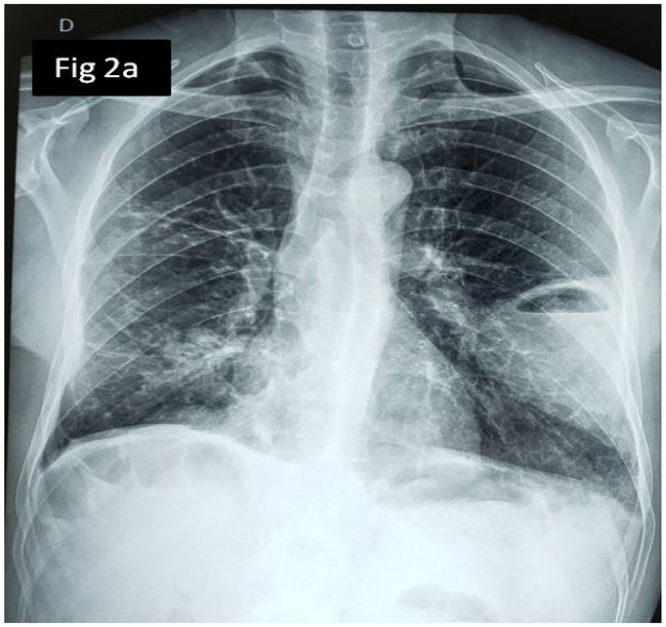


Figure 1: chest radiograph of the right side with 1: subcutaneous emphysema, 2: rib fracture site, 3: pneumatocele.



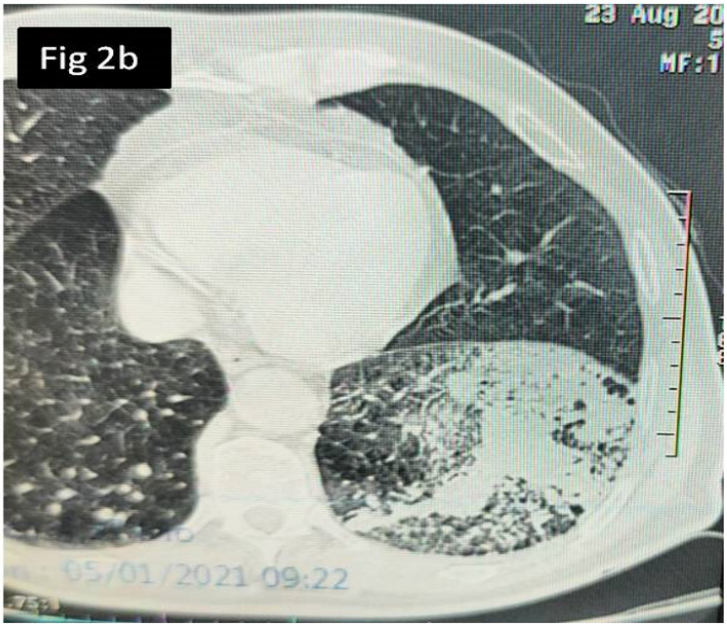


Figure 2:
2a : chest Xray of complicated pseudocyst of the left lung
2b: CT scan showing extending lung contusion and the surinfection

Discussion

Pulmonary post-traumatic pseudocyst or pneumatocele is a rare excavate pulmonary lesion caused by blunt chest trauma, the most common injuries that occur are pulmonary contusions, hematomas or effusions [3–10].

In our context, we conducted a retrospective study of chest trauma from 2002 to 2009 including 995 patients. We found out two patients suffering from pneumatocele (0.2%). Hyun Jin and al. [7] reported 81 cases of pneumatocele among 978 patients (8,3%) treated for chest trauma. However further studies reported 0.1% of all chest lesions [8].

In most recent studies, the prevalence is greater between 5 to 10% [7;9; 11]. Post-traumatic pulmonary pseudocysts are mostly seen in children and young adults [4- 12]. We observed a case in a teenager and a case in an adult. They are often seen in young people because their thorax is immature. The ribcage is elastic, the visceral pleura stays intact and the parenchyma is easily injured.

The pathophysiology is unknown but many theories are raised. Pneumatocele following blunt trauma develops through a mechanism that allows transmission of high compressive forces to the lung parenchyma. The parenchyma and or the intertistium get lacerated in a bursting manner resulting in a cavity formation. Retraction of normal lung elastic tissue from contusion induced cavities permits the escape of air and fluid into it. Resolution of pulmonary hematoma or drainage into a bronchus may result in development of pneumatocele. [13-14].

A pneumatocele may develop or be identified in the assessment of the patient upon admission after the trauma up to 14 days after the accident [5-15]. The lesion was detected for our patients 1 month after the accident (case 1), and after 4 days of admission (case 2).

In the literature, the clinical manifestations range from asymptomatic patients to acute respiratory failure. Chest pain, dyspnea, cough, hemoptysis are often seen [2]. Hemoptysis is the most common symptom, occurring in 40% of cases [3]. In our study, symptoms were due to other lesions.

CT-scan was the most effective imaging for diagnosis. Pneumatocele may appear immediately or within a few hours after the injury and their sizes are variable.

They may be single or multiple and unilateral or bilateral. The CT image is of single or multiple thin-walled cystic lesions with consolidation of airspaces in the surrounding lung parenchyma.

Mediastinal location presents the same aspect but its shape is with a long vertical axis, with a rectilinear internal border and an external convex one towards the outside.

Its upper border corresponds to the subhilar region and its lower border to supradiaphragmatic lung base. Its recognition is essential so as not to confuse it with a possible intrathoracic digestive clarity seen in a diaphragmatic rupture.

On CT, this lesion also appears as an aeric or hydroaeric feature. It is easy to recognize, and remains the most significant test for diagnosis and the search for an infectious complication, showing the increase in volume of the initial finding on CT-scan [3-10].

The management of pneumatocele is mostly conservative using symptomatic treatment. However, according to Chon and al. [16], the conservative management depends on reduction in size of lesion within six weeks after injury. In our study, we used symptomatic therapy based on symptom relief and radio-clinical monitoring.

However, many cases can be treated surgically when conservative therapy fails, otherwise infections and respiratory complications will occur, requiring indications for video-assisted thoracoscopic surgery or open surgery.

These indications include a lobectomy in case of extensive lung abscess surrounded by necrotic tissue, persistent air leak hemothorax due to rupture of the pseudocyst, significant enlargement of the pseudocyst, failure of lung parenchymal expansion, and compression of the surrounding parenchyma [17, 18]. In our study, one of the patients presented respiratory and infectious complications that led to septic shock, leading to the indication for a dangerous intervention.

We proceeded to the administration of broad spectrum antibiotic therapy initially then changed into an adapted antibiotic therapy but the patient deceased after major complications.

According to the literature, more than 38% of patients who have received conservative treatment, develop infected pneumatocele, and their treatment modalities may consist of catheter drainage guided by CT-scan considering that up to 25% of patients do not respond to the antibiotic therapy alone [15, 18].

Conclusion

Post-traumatic pulmonary pseudocyst or pneumatocele is an early post-traumatic lesion, generally recognized by CT-scan with high sensitivity. Conservative therapy is the frequent modality of treatment. However, surgery may be indicated in case of complications. Generally, size reduction and complete resolution are achieved after a few weeks.

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Conflict of interest : None

References

[1] Genna Beattie, MD, Caitlin M. Cohan, MD, Annie Tang, MD, Eric Yasumoto, MD, Gregory P. Victorino, MD FACS. Differences in clinical characteristics and outcomes for blunt versus penetrating traumatic pulmonary pseudocysts. Am J Emerg Med. 2021 jul: 45: 433-438.

[2] Yang PJ, Tsai IT, Liu TH. Traumatic pulmonary

pseudocyst. J Pediatr 2015;167 (3):777.

[3] Mispelaere D, Auquier M-A, Kleinmann PH, Glérant J-CH, Gontier M-F, Jounieaux V. Les pseudokystes pulmonaires traumatiques (mécanismes de formation). Rev Mal Respir 2000 ; 17 : 503-6.

[4] B. Phillips, J. Shaw, L. Turco, D. McDonald, J. Carey, M. Balters, M. Wagner, R. Bertellotti, D.L. Cornell, D.K. Agrawal, J.A. Asensio. Traumatic pulmonary pseudocyst: An underreported entity. Injury Volume 48, Issue 2, February 2017, pages 214-220.

[5] Moore FA, Moore EE, Haenel JB, Waring BJ, Parsons PE. Pos-traumatic pulmonary pseudocyst in the adult: Pathophysiology, recognition, and selective management. J Trauma. 1989;29: 1380-8.

[6] Steinhausen E, Bouillon B, Yucel N, Tjardes T, Rixen D, Paffrath T. Nonoperative management of post-traumatic pulmonary pseudocyst after severe thoracic trauma and hemorrhage by coagulation management, kinetic therapy, and control of secondary infection: a case report. J Trauma, 2007; 63(6): 1391-4.

[7] Hyun Jin Cho, MD, Yang Bin Jeon, MD, PhD, Dae Sung Ma, MD, Jung Nam Lee, MD, PhD, and Min Chung, MD, PhD. Traumatic pulmonary pseudocysts after blunt chest trauma: Prevalence, mechanisms of injury, and computed tomography findings. J Trauma Acute care Surg. 2015;79: 425-430.

[8] Athanassiadi K, Gerazounis M, Kalantzi N, Kazakidis P, Fakou A, Kourousis D. Primary traumatic pulmonary pseudocysts: a rare entity. Eur J Cardiothorac Surg. 2003 ; 23 (1) :43-5.

[9] Luo L, Yin L, Liu Z, Xiang Z. Posttraumatic pulmonary pseudocyst: computed tomography findings and management in 33 patients. J Trauma Actue Care Surg. 2012;73: 1225-1228.

[10] Melloni G, Cremona G, Ciriaco P, Pansera M, Carretta A, Negri G, Zannini P. Diagnosis and treatment of traumatic pulmonary pseudocysts. J Trauma 2003; 54 (4):737-43.

[11] Tsitouridis I, Tsinoglou K, Tsandiris C, Papastergiou C, Bintoudi A. Traumatic pulmonary pseudocysts : CT findings. J Thoracic Imaging. 2007;22:247-251.

[12] Sorsdahl OA, Powell JW. Cavitary pulmonary lesions following non- penetrating chest trauma in children. Am J Roentgenol 1965;95:118–24.

[13] Fagkrezos D, Giannila M, Maniatis P, Papailiou J, Triantopoulou C. Post-traumatic pulmonary pseudocyst with hemopneumothorax following blunt chest trauma: a case report. J Med Case Rep 2012;6:356.

[14] Khan FA, Philips W, Khan A, Seriff NS. Unusual unilateral blunt chest trauma without rib fractures leading to pulmonary laceration requiring pneumonectomy. Chest 1974;66:211–4.

[15] Barbick B, Cothren CC, Zimmerman MA, Moore EE. Posttraumatic pneumatocele. J Am Coll Surg 2005; 200 (2):306-7

[16] Chon SH, Lee CB, Kim H, Chung WS, Kim YH. Diagnosis and prognosis of traumatic pulmonary pseudocysts: a review of 12 cases. Eur J Cardiothorac Surg 2006;29(5):819–23.

[17] Yazkan R, Ozpolat B, Sahinalp S. Diagnosis and management of post-traumatic pulmonary pseudocyst. Respir Care 2009;54(4):538–41.

[18] Gincherman Y, Luketich JD, Kaiser LR. Successful nonoperative management of secondarily infected pulmonary pseudocyst: case report. J Trauma 1995; 38:960–3. .

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