



CASE REPORT

A Spontaneous Tracheal Breach and a Pneumomediastinum in an 18-Month-Old Child: An Extremely Rare Case Report

Othmane Benhoummad¹, Sara Rochd^{2*}, Zineb Sarda², Youssef Rochdi² and Abdelaziz Raji²

¹Otorhinolaryngology and Head and Neck Surgery Department, University Hospital Mohammed VI, Marrakech, Faculty of Medicine and Pharmacy of Agadir, Ibn Zohr University, Morocco

²Otorhinolaryngology and Head and Neck Surgery Department, University Hospital Mohammed VI, Faculty of Medicine and Pharmacy of Marrakech, Cadi Ayyad University, Morocco

*Corresponding author: Sara Rochd, Otorhinolaryngology and Head and Neck Surgery Department, University Hospital Mohammed VI, Marrakech, Morocco, Tel: 00-212-666-034-973



Abstract

Spontaneous pneumomediastinum (SPM) in children was first defined by Hamman in 1939, its association to a posterior tracheal tear is even more uncommon. We report the case of an 18-month-old child that presented a SPM associated to a posterior tracheal tear. The patient had no medical history and presented two days before her admission a dry cough and a shortness of breath. The radiological investigation showed a pneumomediastinum with an extensive subcutaneous emphysema and a posterior tear in the trachea. A conservative approach was adopted with a monitoring and surveillance of the regression of the emphysema, that showed a good evolution of the patient.

The rare cases published in the literature make it hard to understand the features of this presentation, but the conservative approach has shown great results in patients as the prognosis is still favorable.

Keywords

Spontaneous pneumomediastinum, Pediatric, Tracheal breach

and discuss the different treatment management proposed by the authors.

Case Report

We report the case of B.L an 18-month-old child, with no particular medical history; no history of asthma, a cervicothoracic trauma nor any history of intubation; who presented 2 days before her admission a dry cough followed by a sudden onset of a shortness of breath and an extensive oedema.

The patient got admitted to pediatric intensive care as she was instable with a heart rate at 120 bpm, polypnea at 40 cpm and thoracoabdominal balancing and intercostal pulling with 93% oxygen saturation in ambient air.

The clinical examination noted the presence of thoracic, cervical and facial subcutaneous emphysema with subcutaneous crepitation, Hamman's sign. Pulmonary auscultation revealed crackling rales projecting to the cardiac area. The rest of the examination was normal. The initial biological assessment made of Blood cell count, C-reactive protein, ionogram showed no abnormality.

The cervicothoracic CT scan was performed in the emergency room and allowed the individualization of a large pneumomediastinum and an extensive subcutaneous emphysema dissecting the thoracic, cervical and facial tissues. No foreign body was

Introduction

Spontaneous pneumomediastinum (SPM) in children was first defined by Hamman in 1939 [1] as the leak of air in the mediastinum though there are no underlying pulmonary pathologies nor any traumatic event. Its association to a posterior tracheal tear is even more uncommon. We report the case of an 18-month-old child that presented a SPM associated to a posterior tracheal tear, and we review the cases reported in the literature

individualized nor any other sign laryngotracheal obstruction (Figure 1, Figure 2 and Figure 3).

The conservative approach was decided with close monitoring of the patient. Prophylactic antibiotic

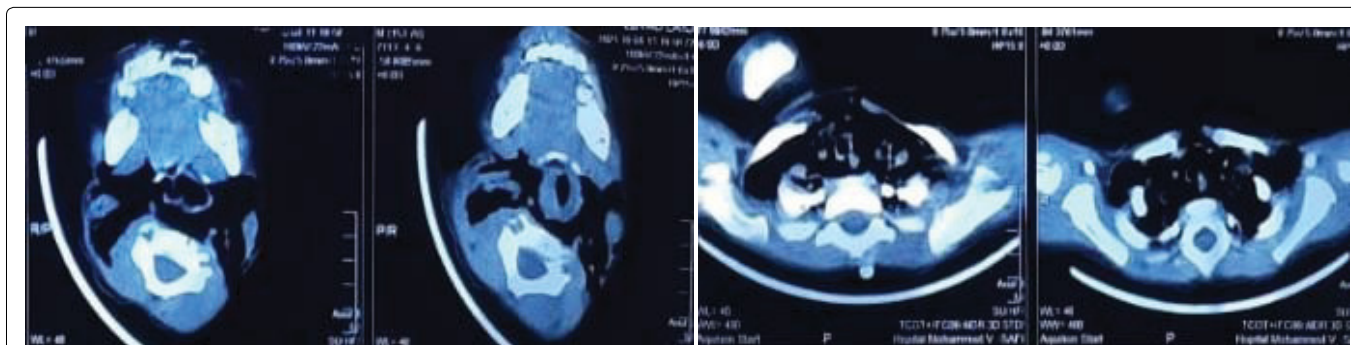


Figure 1

Figure 2

Figure 1: Axial section of cervicothoracic CT scan, showing an extensive subcutaneous emphysema dissecting the face tissues.

Figure 2: Axial section of cervicothoracic CT scan, showing an extensive subcutaneous emphysema dissecting the thoracic tissues.

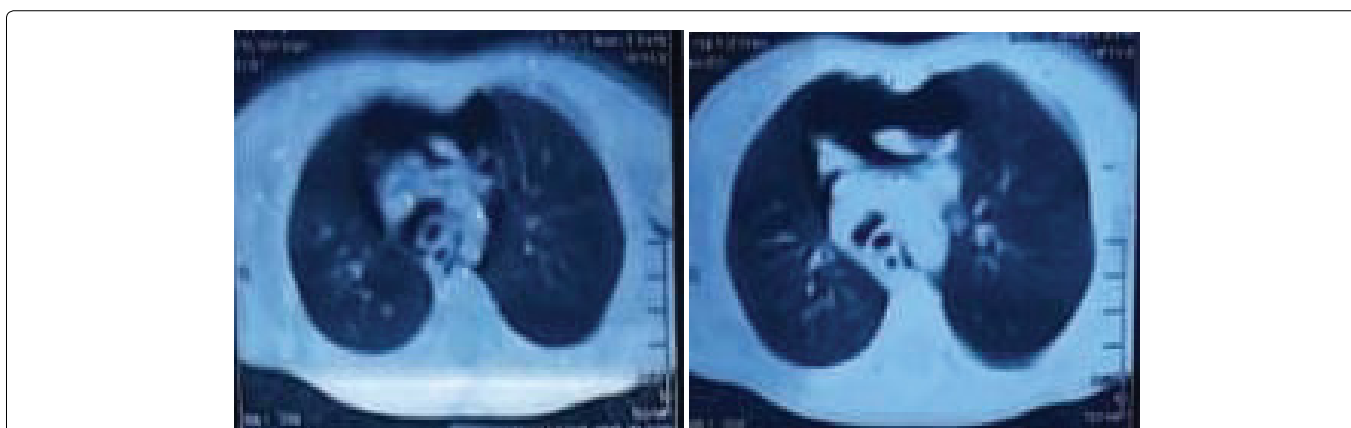


Figure 3: Axial section of cervicothoracic CT scan, showing the pneumomediastinum.

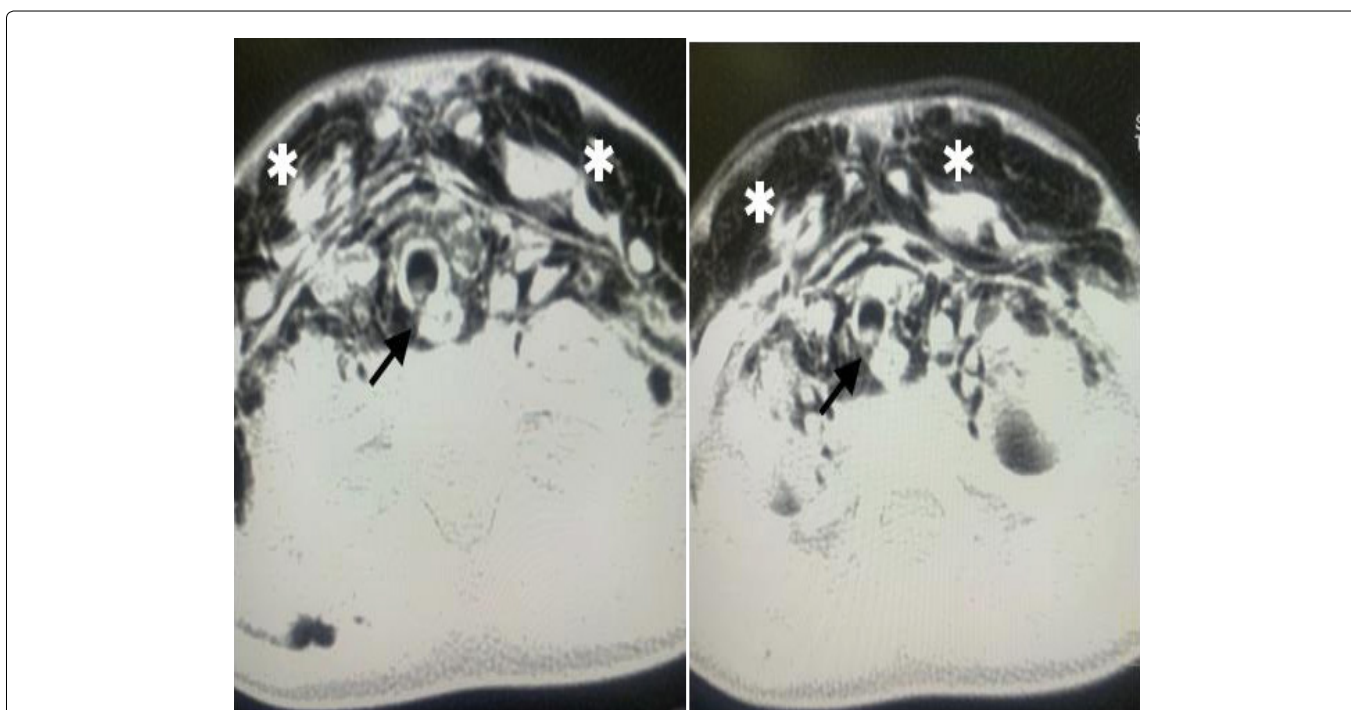


Figure 4: Axial section of a cervicothoracic CT scan. The arrow points to the continuity solution of the trachea. The asterix shows the dissection subcutaneous emphysema.

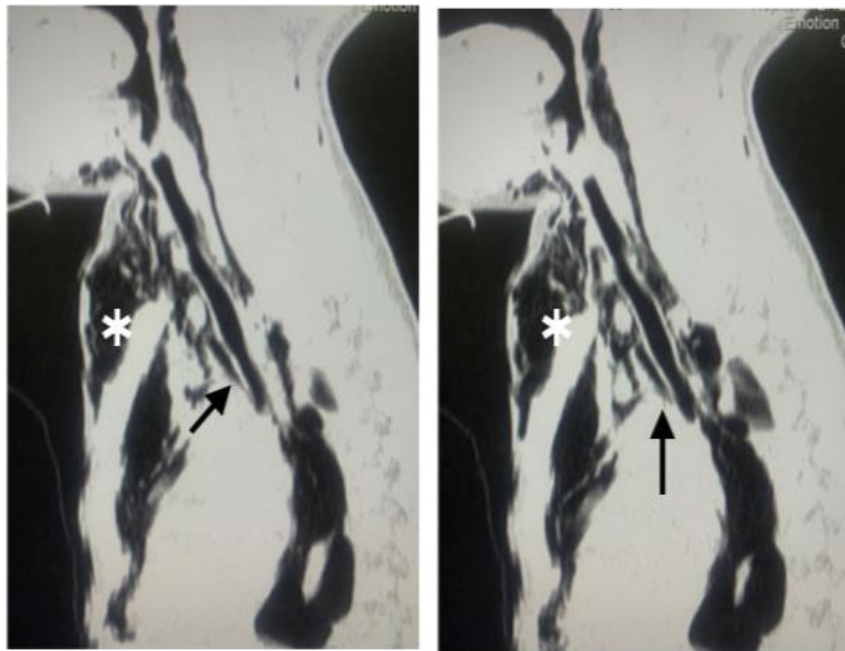


Figure 5: Sagittal section of a cervicothoracic CT scan. The arrow points to the continuity solution of the trachea. The asterix shows the dissection subcutaneous emphysema.



Figure 6: Picture showing the subcutaneous emphysema after 48 H of the patient admission.



Figure 7: Picture showing the subcutaneous emphysema after 5 days following the patient admission and a notable regression of the subcutaneous emphysema.

therapy was given with discontinuation of feeding and monitoring of the clinical condition.

A second Cervicothoracic CT scan was performed after 48 hours and showed a continuity solution in the posterior tracheal wall at the C7 vertebra level, measuring 3.1 mm and extending over 2.9 mm, with no clearly individualizable foreign body; complicated by a large anterior and posterior pneumomediastinum radiating to the cervical region and a subcutaneous emphysema dissecting the cervical soft tissues, chest wall and axillary regions, extended to the deep spaces

of the face (Figure 4 and Figure 5).

The evolution was favorable, after 72 hours of monitoring, with progressive regression of the subcutaneous emphysema and signs of respiratory struggle (Figure 6 and Figure 7).

Discussion

Spontaneous pneumomediastinum (SPM) in children is rare and represents 1/400 of admission in the emergency room [2,3], It was first described by Hamman

in 1939 [1,4] it is defined by the presence of air in the mediastinum with no underlying lung disease nor any traumatic or surgical procedure, it is mostly described in early twenties sportive young adults [3,5]. In children it is mostly seen between the age of 3 to 4-years-old [6]. The association of a SPM and a spontaneous rupture of the trachea are even more uncommon. This association is mostly reported following a violent trauma [7,8].

The etiopathogenesis behind it isn't clear, though there are two mechanisms reported: Increased intra-alveolar pressure and reduced interstitial pressure [5,9-11]. A spontaneous alveolar or a respiratory bronchiole rupture may cause the leak of air in the mediastinum [3,6,7]. In a case reported by S. Ohja in 2018, stated the case of a 12-year-old male child that presented a SPM associated to a tracheal breach and surgical emphysema, and assumed that it could be secondary to a preexistent posterior tracheal wall weakness, that ruptured and caused the SPM [12].

The main clinical presentation found in the literature are chest pain, dyspnea, Hamman's sign; A hallmark sign that is a precordial crepitation heard with cardiac systole; and crepitus on palpation [1,6,13]. The CT scan is the main investigation to assess the diagnosis and shows the extension of the SPM and its association to a possible tracheal breach, a pneumothorax or a subcutaneous emphysema [6,12-14].

M. Tortajada, stated that the SPM is usually benign and self-limiting, and should be treated conservatively without the need of an invasive procedure [14]. Other authors share this same point of view as a simple observation and administration of prophylactic antibiotics, to prevent the occurrence of mediastinitis, are the gold standard of treatment of SPM. As for the posterior tracheal rupture the surgery is mainly indicated if the tear is superior to 2 cm [12], if not the conservative attitude with a good surveillance of the patient is the best option in these cases. The prognosis is favorable [12,13,15].

Conclusion

The origin of the spontaneous pneumomediastinum and the spontaneous rupture of the trachea is still not understood as the cases reported in the literature are still rare. The conservative approach is the best therapeutic option as it has shown a great regression of the symptomatology and a good evolution of the patients.

Conflict of Interest

The authors declared that there is no conflict of interests.

Funding

None.

Consent

Informed consent was obtained from the patient's mother for publication of this case report and accompanying images.

References

- Gasser CRB, Pellaton R, Rochat CP (2017) Pediatric spontaneous pneumomediastinum: Narrative literature review. *Pediatr Emerg Care* 33: 370-374.
- Fantacci C, Ferrara P, Franceschi F, Chiaretti A (2017) Pneumopericardium, pneumomediastinum, and pneumorrhachis complicating acute respiratory syncytial virus bronchiolitis in children. *Eur Rev Med Pharmacol Sci* 21: 3465-3468.
- Swords C, Tan NCW, Jonas N (2017) The implications of pneumomediastinum and subcutaneous emphysema for the paediatric otolaryngologist. *Int J Pediatr Otorhinolaryngol* 101: 241-245.
- Alemu BN, Yeheyis ET, Tiruneh AG (2021) Spontaneous primary pneumomediastinum: Is it always benign? *J Med Case Rep* 15: 157.
- Versteegh FG, Broeders IA (1991) Spontaneous pneumomediastinum in children. *Eur J Pediatr* 150: 304-307.
- Giuliani S, Franklin A, Pierce J, Ford H, Grikscheit TC (2010) Massive subcutaneous emphysema, pneumomediastinum, and pneumopericardium in children. *J Pediatr Surg* 45: 647-649.
- Heinz P, Steinborn MM, Krohn C (2019) Pneumomediastinum bei einem Kind nach stumpfem Thoraxtrauma. *Dtsch Arztebl Int* 116: 564.
- Ebina M, Inoue A, Takaba A, Ariyoshi K (2017) Management of spontaneous pneumomediastinum: Are hospitalization and prophylactic antibiotics needed? *Am J Emerg Med* 35: 1150-1153.
- Maunder RJ, Pierson DJ, Hudson LD (1984) Subcutaneous and mediastinal emphysema. Pathophysiology, diagnosis, and management. *Arch Intern Med* 144: 1447-1453.
- Halperin AK, Deichmann RE (1985) Spontaneous pneumomediastinum: A report of 10 cases and review of the literature. *N C Med J* 46: 21-23.
- Buckner CB, Harmon BH, Pallin JS (1988) The radiology of abnormal intrathoracic air. *Curr Probl Diagn Radiol* 17: 37-71.
- Ojha S, Gaskin J (2018) Spontaneous pneumomediastinum. *BMJ Case Rep* 2018: 1-4.
- Alexandre AR, Marto NF, Raimundo P (2018) Hamman's crunch: A forgotten clue to the diagnosis of spontaneous pneumomediastinum. *BMJ Case Rep* 2018: 1-2.
- Tortajada-Girbés M, Moreno-Prat M, Ainsa-Laguna D, Mas S (2016) Spontaneous pneumomediastinum and subcutaneous emphysema as a complication of asthma in children: Case report and literature review. *Ther Adv Respir Dis* 10: 402-409.
- Fitzwater JW, Silva NN, Knight CG, Malvezzi L, Ramos-Irizarry C, et al. (2015) Management of spontaneous pneumomediastinum in children. *J Pediatr Surg* 50: 983-986.