ISSN 2689-8268 | Volume 8

American Journal of Surgery and Clinical Case Reports

Case Report Open Access

Post Traumatic Pneumomediustenum of Unidentified Pathology

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Received: 12 Aug 2024
Accepted: 25 Sep 2024
Published: 30 Sep 2024
J Short Name: AJSCCR

Keywords:

Post traumatic pneumomediastinum; Spontaneous pneumomediastinum Malignant pneumomediastinum; Extensive Subcutaneous emphysema

Citation:

Teressa M. Post Traumatic Pneumomediustenum of Unidentified Pathology. Ame J Surg Clin Case Rep. 2024; 8(2): 1-5

Abbreviations:

HUCSH: Hawassa university comprehensive specialized hospital; WCSH: Worabe comprehensive specialized hospital; ESCE: Extensive subcutaneous emphysema; PTPM: Post traumatic pneumomediastinum; CT: Computed tomographic scan; CXR: plain chest x-ray; MD: Doctor of Medicine

1. Abstract

1.1. Background: The term pneumomediastinum refers to the air that is present within the mediastinum.it happens when air from the lungs, esophagus, or airways enters the mediastinum. Based on its etiology, this unusual entity is divided into two broad categories: spontaneous, occurring in otherwise healthy individuals and secondary, resulting from trauma or underlying medical conditions. In addition to dyspnea and retrosternal discomfort, the patient with pneumomediastinum may also have tachypnea and extensive subcutaneous emphysema of trunk, neck, face, periorbital and retroperitoneal as well. most cases of pneumomediastinum is self-limited.

1.2. Case presentation: Here in this case report we are describing an 8 years old child present after fall down accident on stony ground from about 3m high sustained blunt trunk and neck injury of 7-hours presented with severe retrosternal chest pain and respiratory distress. Upon examination he was normotensive, tachypnic, tachycardic, afebrile, desaturating and bilateral good air entry and extensive subcutaneous emphysema He was imaged with chest x-ray & CT with contrast of neck & chest which showed evidence of pneumomediastinum and patient was managed conservatively.

1.3. Result: Initially patient was in distress but no evidence of pneumothorax clinically and on x-ray as well patient was stabilized with supportive care bed rest, oxygen therapy, strict pain control later imaged with contrast chest CT-scan which showed strong evidence of pneumomediastinum but no major airodigestive and lung injury seen subsequently continued with supportive care and close follow up.

1.4. Conclusion: For patient with post traumatic Pneumomediastinum with extensive subcutaneous emphysema identifying the precise pathology is challenging even in ideal set up and barely necessary Thus supportive care and empirical antibiotics is crucial.

2. Introduction

2.1. Background: The term pneumomediastinum refers to the air that is present within the mediastinum.it happens when air from the lungs, esophagus, or airways enters the mediastinum. Based on its etiology, this unusual entity is divided into two broad categories: spontaneous, occurring in otherwise healthy individuals and secondary, resulting from trauma or underlying medical conditions. According different literature state incidence is extremely rare clinical condition which is about 0.002% in healthy individual patients usually present with dyspnea and severe retrosternal chest discomfort, tachypnea, tachycardia and extensive subcutaneous emphysema of trunk, neck, face and periorbital as well. most cases

of pneumomediastinum is self-limited and conservative treatment includes bed rest, oxygen delivery, and analgesics alone result in significant improvement without surgical intervention.

2.2. Statement of the problem: Challenge of pathologic identification of post traumatic Pneumomediastinum in clinically stable patients and its non-significance management alternation

2.3. Purpose of the study: Pneumomediastinum following trauma for stable patients does not require precise pathologic identification since it does not alter the course of treatment.

2.4. Objective of the study: To better assist medical professionals in managing post-traumatic pneumomediastinum in clinically stable patient.

2.5. Significance of the study: This worthy clinical experience will improve diagnosis and management of post traumatic pneumomediastinum

3. Case Description

Here in this case, we are describing an 8-year-old male child presented with trauma to chest after he sustained fall down accident on stony ground from 3m high tree of 7-hour duration, following the incident the patient experienced severe retrosternal pain, and neck swelling. For this reason, he visited a local primary hospital, where face mask oxygen therapy and referred to our hospital. Up on arrival on physical examination the patient was acutely sick looking with PR 92 RR 28 T 36.7 and SPO2 93% on 4L intranasal oxygen. The pertinent positive physical examinations are there is subcutaneous emphysema which extend from periorbital to level of umbilicus both anteriorly and posteriorly otherwise there is comparable air entry bilateral lung field. cardiovascular and other component of physical examination where unremarkable. with impression of blunt chest trauma with significant subcutaneous emphysema secondary to likely lung contusion the patient was put on face mask oxygen and analgesia. Basic laboratory blood work up was unremarkable. On CXR it shows pneumomediastinum and extensive subcutaneous emphysema (Figure 1) and chest and neck CT scan with contrast illustrates; diffuse air collection in the anterior, posterior, and middle mediastinal compartment with extension to the neck and retroperitoneum; there is no sign of mediastinal fluid collection. the bilateral mainstem bronchi, trachea and esophagus have normal luminal diameter; there is no sign of wall defect (Figure 1-5) there is also diffuse soft tissue air in the bilateral anterior, posterior and lateral chest and abdominal wall with extension to the bilateral axillary, proximal arm and periorbital (Figure 2,3,4). Therefore; after investigation patient diagnosis settled on the line of posttraumatic pneumomediastinum and conservative management continued mean while on 3rd day of admission, he develops fever to the level of 38.9 and tachycardia up to 130 for which with consideration acute mediastinitis he was started with ceftriaxone 75mg /kg/ day in BID dose and vancomycin 15mg /kg /dose in TID dose. the patient followed closely for total of 10 days in hospital and discharged with significant improvement of overall clinical condition & doing well on subsequent follow up.

Figure 1: plain chest film shows all signs of pneumomediastinum and subcutaneous emphysema

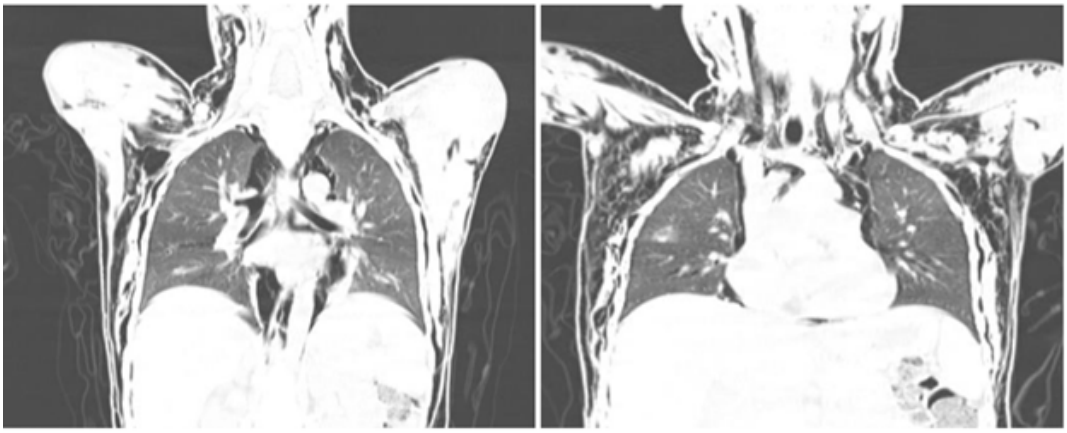

Figure 2: Coronal sections of chest CT-scan with contrast shows pneumomediastinum and subcutaneous emphysema

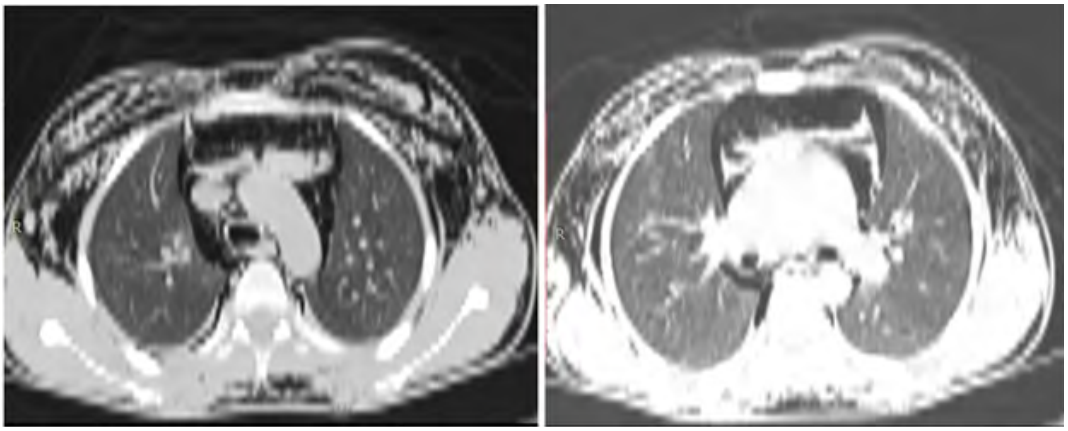

Figure 3: Axial sections of chest CT-scan with contrast shows pneumomediastinum and subcutaneous emphysema

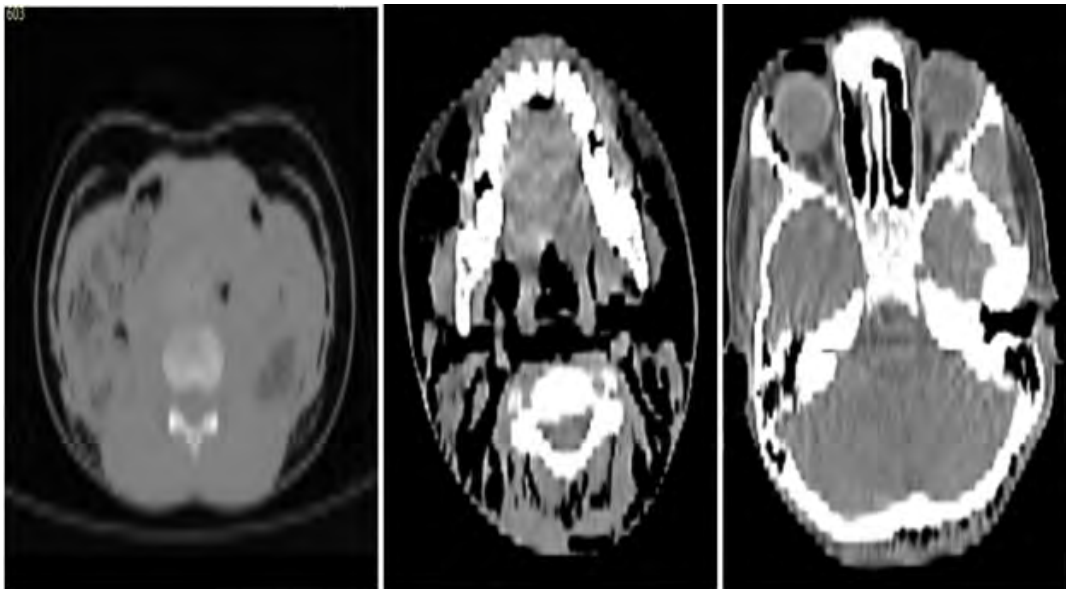

Figure 4: Axial sections of abdomen, chest, neck and brain CT-scan with contrast shows pneumomediastinum and subcutaneous emphysema extension from lower abdomen to periorbital region

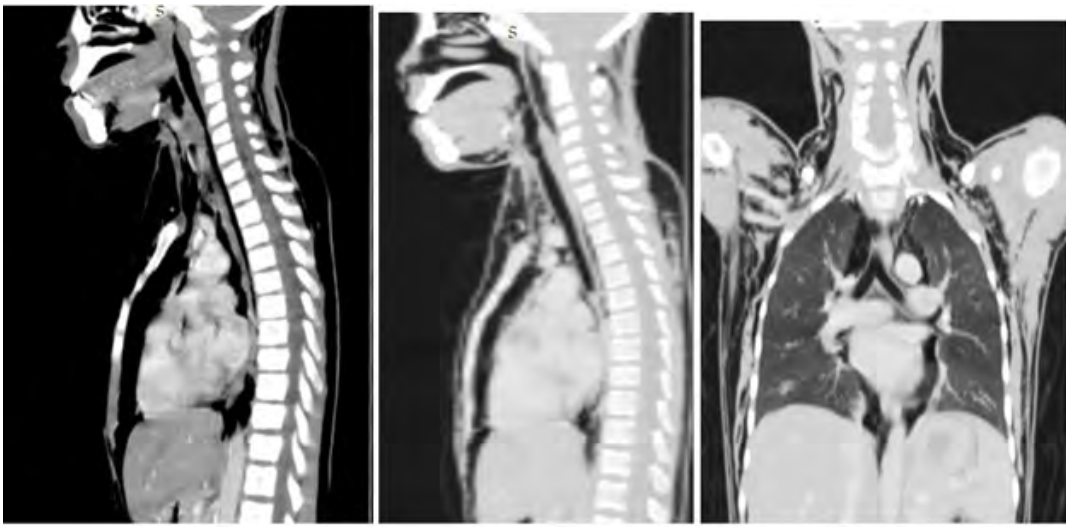

Figure 5: Coronal sections of abdomen, chest and neck CT-scan with contrast shows pneumomediastinum and subcutaneous emphysema and normal gross radio-anatomic image of major mediastinal airodigestive structures (esophagus and trachea)

4. Discussion and Results

Pneumomediastinum is defined as the presence of air in the mediastinum, the space which found in the central thorax bounded laterally by partial pleura of lung inferiorly by diaphragm posteriorly by the thoracic vertebral column superiorly by thoracic inlet and anteriorly by sternum [1][2][3]. The source of the air can be airways, lung or esophagus and migrate to mediastinum. it's classified into two based on presence of trivial event prior to presentation and underlying disease. Spontaneous pneumomediastinum is pneumomediastinum which occur without trivial event in another wise normal individual. its rare condition with predilection to young adult male patient. secondary pneumomediastinum result from underlying disease condition or elicited trauma. The cause of secondary pneumomediastinum can be categorized into intrinsic lung disease, iatrogenic cause and traumatic cause. The trauma can be on the chest or cervical area [3][4]. Our patient present with trauma to the chest area. Traumatic pneumomediastinum probably occurred due to blunt trauma result in sudden increased intrathoracic pressure lead subclinical alveolar rupture from primary lung parenchymal trauma, In minority of cases may result from missed positive pressure ventilation, tracheobronchial rupture or esophageal tear[5][6][7]. The most common presentation is retrosternal chest pain (75%) which may radiate to back or neck. other less common symptoms are dysphonia (50%), dysphagia, and neck pain. physical examination can be normal in up to 30% of the patient. In most patient we may found subcutaneous emphysema (60%), tachycardia, tachypnea and some of the patient may have crunching sound synchronous with heart beat best heard at apex of the heart [Hamman's sign][5][8]. In rare condition the patient may develop distended neck vein due to compromise of the venous return which is called tension or malignant pneumomediastinum. our patient present with significant subcutaneous emphysema with retrosternal chest pain [9] [1][10], [11]. To diagnose pneumomediastinum the patient needs to be investigated with CXR (AP & lateral). CXR shows lucent streak of gas that outline mediastinal structure like ascending aorta, aortic arch, pericardiac, and retrosternal. another radiographic sign which suggests pneumomediastinum are continuous diaphragm sign and ring around the artery sign. and on CXR we can rule out pneumothorax also. Computed tomography is done if the chest Xray found to be normal or high suspicion of aerodigestive injury. Despite diagnosis of pneumomediastinum CT scan can also tell us the underlying cause and the extent of pneumomediastinum. In our patient the pneumomediastinum was diagnosed by chest x ray and confirmed by CT scan which show the extent and lung consolidation [12][13].

5. Conclusion

Pneumomediastinum mostly managed with conservatively which include bed rest, oxygen supplementation and strict pain control unless patient develop malignant pneumomediastinum due to aerodigestive injury which rarely require surgical intervention. Early initiation of Prophylactic antibiotics is crucial to prevent acute mediastinitis due to occult airodigestive perforation.

6. Authors' Contributions

1-conceptualization, Review final manuscript approval

2-writing the original manuscript, literature review and overall case analysis

3, 4 - literature review and review of initial draft and final manuscript approval

7. Ethical Considerations

7.1. Informed Consent

We hereby declare that the patient family has provided written informed consent for the publication of her medical case for educational purposes; the patient's name has been anonymised for privacy; a copy of the consent is available for distribution to the chief editorial of this case study.

7.2. Institutional Review Board

We affirm that an official letter from the WCSH institutional review board has been obtained, and it is available upon request from the main editorial of this case study.

7.3. Funding

In this case study, we declare no financing.

7.4. Disclosure of Conflict of Interest

We declare that there is no conflict of interest in computation.

7.5. Acknowledgements

Firstly, we would like to express our gratitude to the patient's family for providing us with informed consent for publications.

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