Journal of Pediatric Surgery Case Reports 29 (2018) 26–29

Contents lists available at ScienceDirect

Journal of Pediatric Surgery Case Reports

journal homepage: www.elsevier.com/locate/epsc

Traumatic pulmonary pseudocysts mimicking a congenital malformation of the lung

Alexander Ngoo[a,*], Charlotte Slaney[b], Bhanu Mariyappara[c], Harry Stalewski[c], Daniel Carroll[c]

[a] Paediatrics Department, Townsville Hospital, Australia
[b] Queensland X-Ray, Townsville, Australia
[c] Paediatric Surgery Department, Townsville Hospital, Australia

ABSTRACT

Traumatic Pulmonary Pseudocysts (TPPs) are a rare consequence of thoracic trauma that is seen disproportionately in young adults and paediatric populations. In this case report, we detail a case of a TPP initially misdiagnosed on imaging as a Congenital Cystic Adenomatoid Malformation (CCAM). Conservative management and monitoring for resolution of TPP is highly effective as in most cases it self-resolves without issue or need for intervention. This contrasts with the surgical treatment often indicated for symptomatic CCAMs. Clearly, failure to recognize TPP as a rare but important differential of pulmonary cystic lesions in the context of trauma can lead to significant distress for the patient's family, over investigation and unnecessary or harmful interventions. We also review in this article the literature surrounding the radiological appearances, clinical features and management of both conditions.

1. Introduction

- TPPs are a rare though important cystic lesion seen in lungs post blunt chest trauma. While TPP is its current consensus term [1] varying nomenclature has been used historically; it has been varyingly referred to as pneumatoceles, traumatic lung cysts, pulmonary cavitations and cavitating haematomas [1].
- TPP is primarily a pathology of children and young adults and previous reports suggest that up to 85% involve individuals younger than 30 years of age [1]. Exact incidences vary however its recognition has grown in recent years. Indeed, pre-2007 it was reported as a complication of blunt thoracic trauma in 2–5% of cases though within the past decade some centres now report rates as high as 10% [2]. As CT scanning is the gold standard for TPP diagnosis, the increasing ubiquity of this technology in high resource medical settings likely explains this trend.
- Recognition of TPP as a rare but benign differential for cystic lesions in the lung post-trauma is important as unlike many other complications of chest trauma, it has an excellent prognosis and runs a self-limiting and benign course that only requires careful observation and follow up to ensure resolution [2].

In contrast, CCAM is a hamartomatous cystic malformation and represents the most common malformation in lung development. It occurs in approximately 1 in 25,000 pregnancies [3]. The vast majority of cases are detected antenatally via ultrasound [3] however postnatally, a wide variety of presentations are possible ranging from being asymptomatic to acting as a foci for chronic respiratory infections to presenting as a pneumothorax in early adulthood [4]. Between 80 and 90% of symptomatic cases are diagnosed at less than 2 years of age [3]. Symptomatic patients are generally managed via surgical interventions such as lobectomies however the benefit of surgical management in the asymptomatic remains uncertain [5].

This case report hopes to draw attention to a case of misdiagnosis of a TPP. Given TPP's have a benign and self-resolving course, misdiagnosis may place patient's down a path of at best unnecessary and at worse harmful interventions, medications or procedures [6]; a problem all the more pertinent given it is primarily seen in young individuals for whom complications of unnecessary intervention have lifelong consequences.

2. Case report

A 12-year-old boy was involved in a high-speed go-kart rollover in which he impacted the right side of his thorax. The vehicle rolled over multiple times though he remained conscious throughout, was wearing

Abbreviations: TPP, Traumatic Pulmonary Pseudocyst; CCAM, Congenital Cystic Adenomatoid Formation

* Corresponding author. Paediatrics Department, Townsville Hospital, 100 Angus Smith Drive, Douglas, Queensland 4814, Australia.
E-mail address: alexander.ngoo@uqconnect.edu.au (A. Ngoo).

http://dx.doi.org/10.1016/j.epsc.2017.10.012
Received 11 October 2017; Accepted 15 October 2017
Available online 16 October 2017

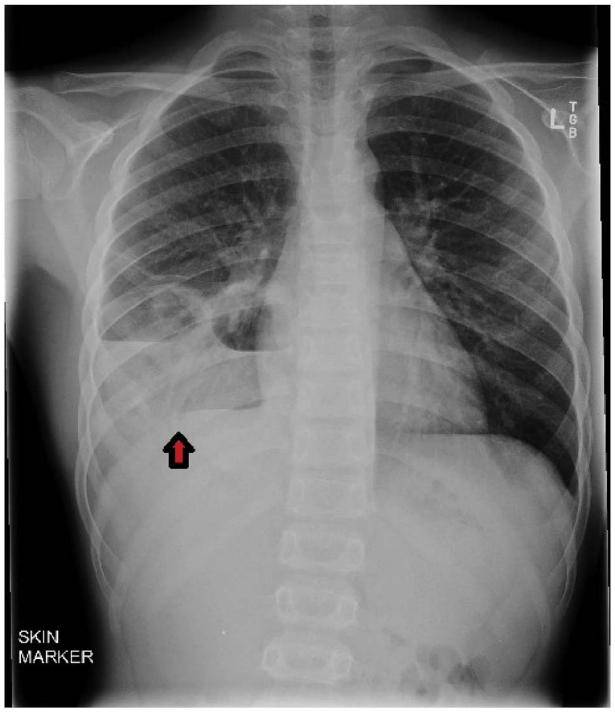

Fig. 1. Initial PA CXR performed 3 days after the traumatic event showing thin-walled cystic structures with air fluid levels at the base of the right lung.

full protective equipment and was able to extricate himself unaided from the vehicle immediately after. He was monitored after the event for multiple hours by paramedics and aside from mild shortness of breath and a single vomit one hour after the incident he felt otherwise well. 3 days after the rollover however, he had ongoing dyspnea along with a mild right sided pleuritic chest pain along a band-like distribution over his 5th to 9th ribs and back. He denied any haemoptysis though reported a metallic taste in his mouth since the incidence. His past medical and antenatal history was unremarkable.

He was reviewed by his GP who ordered a CXR which revealed two thin walled cystic structures with air fluid levels at the base of his right lung (Fig. 1). No previous CXR existed for comparison. A CT with contrast was then performed to further define these structures. It found two large (42 mm × 38 mm × 75 mm and 52 mm × 42 mm × 48 mm) and multiple smaller cystic spaces involving the basal segments of the right lower lobe. They were thin walled and did not communicate with the bronchi (Figs. 2 and 3). The provisional diagnosis for these findings was a post-traumatic haemorrhage into a pre-existing congenital cystic adenomatoid malformation (CCAM) of the right lower lobe.

He was immediately referred by his GP to an emergency department for Paediatric Surgery admission. As he was clinically stable, had no hemoptysis and his symptoms had self-resolved by the time he was admitted, he was simply monitored for 4 days in hospital before being discharged for outpatient follow up.

Remarkably, repeat CXRs 2 months and 8 months after the incident revealed complete resolution of the CXR changes (Fig. 4). His initial symptoms had also completely resolved.

Given this, it was deemed that the more likely diagnosis was TPPs as opposed to a haemorrhage into a CCAM.

He is currently planned to be reviewed at 15 years of age for consideration of a repeat CT to confirm resolution of any ongoing pathology in the lung however that decision will be performed in discussion with the patient and his family given there is likely to be limited benefit of further investigation.

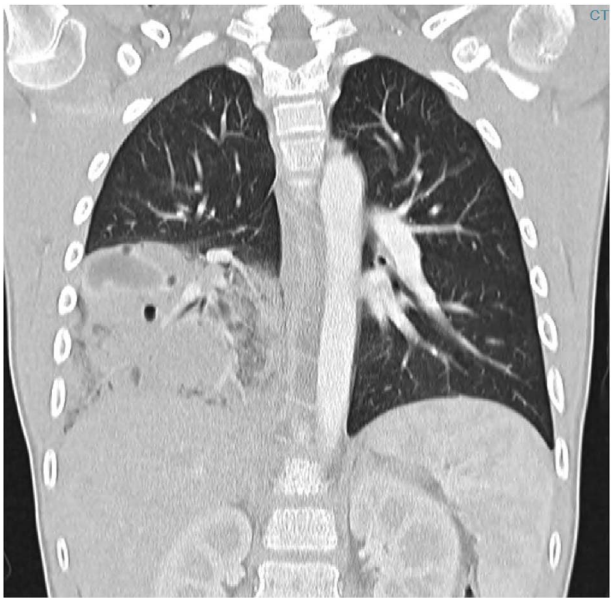

Fig. 2. Coronal View of CT chest with contrast performed after CXR. Two large cystic spaces are present measuring 42 mm × 38 mm × 75 mm and 52 mm × 42 mm × 48 mm. Together they fill nearly half of the lung volume. There are also multiple smaller cystic spaces involving the basal segments of the right lower lobe.

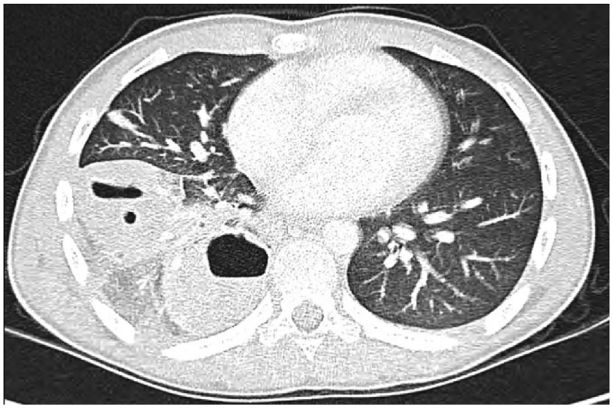

Fig. 3. Axial view of CT with contrast performed after the initial CXR. Note the two large (42 mm × 38 mm × 75 mm and 52 mm × 42 mm × 48 mm) and multiple smaller cystic spaces involving the basal segments of the right lower lobe.

3. Discussion

- The case history provided represents quite a classical clinical presentation and radiological finding of TPP and outlines many of the challenges in diagnosis.
- Among paediatric populations motor vehicle accidents represent the most common mechanism of injury [7] as it was in our patient. TPP is believed to result from thoracic trauma via a two step mechanism. The first step involves compressive forces raising intrapulmonary pressure, creating shear forces and thus causing parenchymal lacerations. After the force resolves, the elastic tissue of the lung recoils resulting in intrathoracic pressure becoming increasingly negative. This results in the lacerations forming small cavities which fill with air or fluid that grow until pressure within them equalizes with the surrounding lung tissue [4]. This mechanism perhaps explains why TPP is fundamentally a pathology of younger demographics – by the fourth decade of life costal cartilages and posterior costovertebral ligaments have lost their flexibility [4]. Therefore blunt chest trauma tends to result in rib and sternal fractures rather than pseudocyst formation.