Case Report

Fatal Air Embolism secondary to fungal bronchopneumonia

Ritika Ramanathan[1], Shankar M Bakkannavar[2]

Abstract

Pneumonia is an acute respiratory illness mostly bacterial or viral in origin. Fungal pneumonias on the other hand are rare and mostly occur in immunocompromised people. Fungal pneumonias can progress to disseminated disease which is a life-threatening complication. Here we present a case of an 18-year-old boy who was brought to the hospital with severe head injury and was declared dead on arrival. Autopsy revealed incidental finding of pulmonary air embolism secondary to fungal bronchopneumonia. Air embolism is a blood vessel blockage caused by one or more bubbles of air or any other gas in the circulatory system. It is usually iatrogenic but may also be a consequence of decompression sickness. Among all of its etiologies, fungal bronchopneumonia has never been encountered.

However, the rarity of this case lies in that it hosts findings suggestive of an air embolism that can be traced to fungal bronchopneumonia, thus making this the first such case in medical literature.

Keywords: Pneumonia; Fugal pneumonia; broncholithiasis; fibromatosis.

Introduction:

Pneumonia is an acute respiratory illness associated with recently developed radiological pulmonary shadowing which maybe segmental, lobar, or multilobar.[1,2] Lobar pneumonia refers to homogenous consolidation of one or more lobes whereas bronchopneumonia refers to more patchy alveolar consolidation associated with bronchial and bronchiolar inflammation. Most pneumonias are caused by bacteria and viruses. Fungal pneumonias on the other hand are rare and are usually a problem for immunocompromised people. Fungal pneumonias can progress to disseminated disease where it affects multiple organs resulting in life threatening complications.[3] Other complications include bronchopleural fistulas, broncholithiasis, pericarditis and mediastinal fibromatosis.[3]

Few rare complications are also possible and one such is air embolism.

Here we present a case of an 18-year-old boy who was brought to the hospital with severe head injury and was declared dead on arrival. Autopsy revealed incidental finding of pulmonary air embolism secondary to fungal bronchopneumonia.

[1]Former student, [2]Associate Professor, [a]Department of Forensic Medicine and Toxicology, Kasturba Medical College, Manipal, MAHE (Deemed to be University) Manipal - 576104

Correspondence: Dr Shankar M Bakkannavar

Email ID: shankar.mb@manipal.edu

Mob: +91 9110240992

Received on 13.11.2023	Accepted on 31.11.2023

Case report

An 18-year-old boy was brought to the tertiary care hospital after first aid in a nearby local hospital with head injury any was declared dead on arrival. Rigor mortis was present and livor mortis was present over the body and fixed.

Following external injuries were present:

1. Linear abrasion and abraded contusions over the left shoulder.
2. Partially healed wounds over the right hand and foot.

3. Abrasion with black scab over the left forearm 8cm above the wrist.

Internal examination

1. Cranium: contusion over an area of 6x4 cm over right temporoparietal area, diffuse subdural hemorrhage was present and the dura was intact. Brain was congested and edematous.
2. Thorax: ribs and cartilages were intact and unremarkable. Right and left pleura were unremarkable. Lungs were firm edematous congested and frothy fluid oozed out on cut section.
3. Abdomen and Genitourinary organs were intact and unremarkable.

Following regular autopsy protocol specimen of liver, lung and kidney were sent for histopathological analysis.

Gross: specimen consists of a piece of lung that weighed 7gms, measured 3x2x1.2 cms. Cut section shows areas of congested spongy lining parenchyma.

Microscopy (Figure 1): section of the lung showed dilated alveolar spaces with eosinophilic edema fluid and a dense intra-alveolar neutrophilic exudate with lymphoplasmocytic infiltrate along with anthracotic pigment laden macrophages, areas of fibrin deposition and hyalinization. Few alveoli show rupture with a diffuse hyaline material deposit. Intra alveolar spaces show spores and pseudo hyphae form of fungal species with neutrophilic reaction, interstitial hemorrhage and congested blood vessels an arteriole also showed presence of luminal air bubble.

Special stains were used in this: 1.PAS and GMS: POSITIVE (confirming fungal emboli)

2.Sudan III: NEGATIVE (ruling out fat emboli)

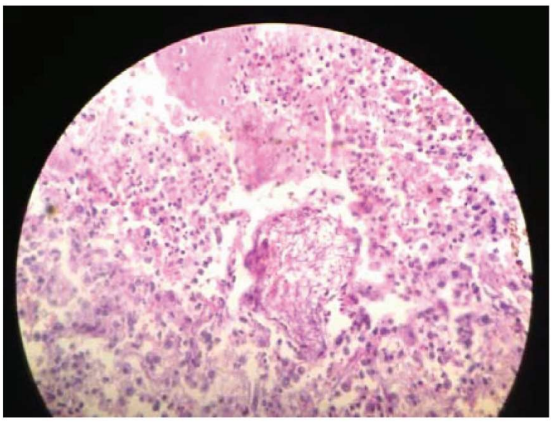

Figure 1: Showing dilated alveolar spaces with eosinophilic oedema fluid and a dense intra-alveolar neutrophilic exudate.

Discussion:

Pneumonia is an acute respiratory illness associated with recently developed radiological pulmonary shadowing. Most pneumonias are caused by bacteria and viruses. Fungal pneumonias on the other hand are rare and are usually a problem for immunocompromised people. They can occur due to disease complications, treatment or both.[4] Fungal pneumonias can progress to disseminated disease where it affects multiple organs resulting in life threatening complications.

Air embolism is a blood vessel blockage caused by one or more bubbles of air or any other gas in the circulatory system. It is usually iatrogenic but may also be a consequence of decompression sickness. Among all its etiologies, fungal bronchopneumonia is rarely reported in the literature. Black RA et al[5] encountered a case of cryptococcal bronchopneumonia in a 8 year old boy. Abbott JD and his associates[6] noticed Pulmonary aspergillosis following post-influenzal bronchopneumonia. P. Citrinum was isolated from the bronchopneumonia of a 67-year-old diabetic patient who was effectively treated as reported by Zhao J et al.[7] Huang H et al. reported a case on air embolism following fungal pneumonia in a 20 year old male patient who also recovered with early detection of air embolism and its management.[8] In all these cases the patients

were recovered with effective treatment. Air embolism is mostly being iatrogenic induced, has a fatality rate of 48% – 80%.[9] However, the rarity of this case lies in that it hosts findings suggestive of an air embolism which led to the death of the patient that can be traced to fungal bronchopneumonia, thus making this the rare case.

Conclusion:

Though the air embolism following bronchopneumonia is highly fatal, early diagnosis and effective treatment is essential and which saves the life of the patient. Probably the compromised, diseased lung could have led to the air embolism without any iatrogenic event, thus making this an uncommon case in medical literature.

References:

1. Reynolds JH, McDonald G, Alton H, Gordon SB. Pneumonia in the immunocompetent patient. Br J Radiol. 2010 Dec;83(996):998-1009. doi: 10.1259/bjr/31200593. PMID: 21088086; PMCID: PMC3473604.
2. Feldman C, Kallenbach JM, Levy H, Thorburn JR, Hurwitz MD, Koornhof HJ. Comparison of bacteraemic community-acquired lobar pneumonia due to Streptococcus pneumoniae and Klebsiella pneumoniae in an intensive care unit". Respiration. 1991:58 (5–6): 265-70. doi:10.1159/000195943.
3. Romeo A Mandanas. Fungal Pneumonia. Accessed on 12.11.2023 at **https://emedicine.medscape.com/article/300341-overview?form=fpf**
4. Clarke, Ann M, Skelton, Jane, Fraser, Richard S. Fungal Tracheobronchitis Report of 9 Cases and Review of the Literature. Medicine. January 1991;70(1):p 1-14.
5. Black RA, Fisher VC. Cryptococcic Bronchopneumonia. *Am J Dis Child.* 1937;54(1):81-88. doi:10.1001/archpedi.1937.01980010090008.
6. Abbott JD, Fernando HV, Gurling K, Meade BW. Pulmonary aspergillosis following post-influenzal bronchopneumonia treated with antibiotics. Br Med J. 1952 Mar 8;1(4757):523-5. doi:10.1136/bmj.1.4757.523.
7. Zhao J, Shi Y, Yuan D, Shi Q, Wang W, Su X. A case report of fungal infection associated acute fibrinous and organizing pneumonitis. BMC Pulm Med. 2020 Apr 20;20(1):98. doi: 10.1186/s12890-020-1145-7.
8. Huang HJ, Lei S, Yang L, Jin LM. Systemic air embolism in a fungal pneumonia patient with lung cavities formation and review of literature. Chin J Traumatol. 2019 Oct;22(5):308-310. doi: 10.1016/j.cjtee.2019.05.002.
9. Ho A.M., Ling E. Systemic air embolism after lung trauma. *Anaesthesiology.* 1999;90:564–575.