Case Series

Progressive Pulmonary Tuberculosis – Progress Beyond the Walls

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Abstract

Tuberculosis is caused by Mycobacterium tuberculosis. If the treatment is inadequate or if host defenses are impaired, the apical lesion in primary tuberculosis expands into adjacent lung tissues and may spread via airways, lymphatic channels, or the vascular system. It may also circulate back to the lung and cause miliary pulmonary disease. Systemic miliary tuberculosis occurs when bacteria disseminate through the systemic arterial system to involve any organ. In the present study, we discuss five such cases of systemic miliary tuberculosis wherein the deceased succumbed to the illness.

Key words: Tuberculosis; Miliary; series; histopathology; autopsy

Introduction

According to WHO estimates, around 2.7 million people developed TB in India and over 400,000 people died due to TB in the year 2017.[1] Tuberculosis is caused by Mycobacterium tuberculosis. Primary tuberculosis is the form of disease that develops in a previously unexposed person. The inhaled bacilli get implanted in the distal airspaces of the lower part of the upper lobe or the upper part of the lower lobe, known as the Ghon's focus.[2] In most people, the primary infection is contained, but in others, primary tuberculosis is progressive. The diagnosis of progressive primary tuberculosis in adults can be difficult. Progressive primary tuberculosis more often resembles acute bacterial pneumonia, with lower and middle lobe consolidation, hilaradenopathy, and pleural effusion; cavitation is rare, especially in people with severe immunosuppression. Lymphohematogenous dissemination may result in the development of tuberculous meningitis and miliary tuberculosis.

Case one

A 60-year-old unidentified male was found dead in a public sports playground by the police during

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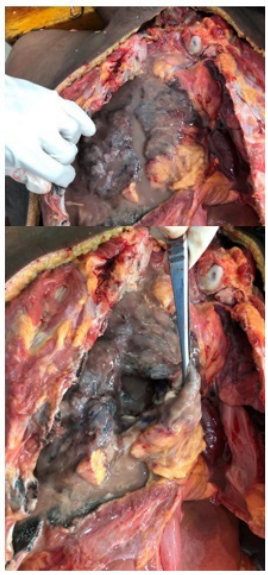
the early morning hours. There was no history of any illness available.

On examination, the deceased was an emaciated male weighing 35kg, with no external injuries present over the body. On internal examination, the upper lobes of both lungs were adherent to the chest wall, and the entire upper lobes of both lungs showed multiple cavities with active caseous materials.



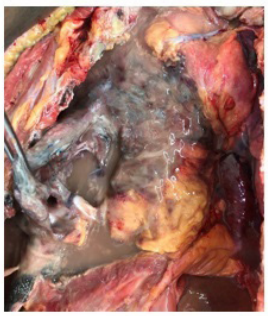


Fig.1,2,3:Caseous necrosis of lung with cavities

Case two

A 32 -year -old male brought dead to casualty after he collapsed infront of his neighbor's house. His family gave a history of the deceased having fever and cough for the past one week. There is no history of any other significant illnesses in the past. On external examination, the deceased was a poorly nourished male weighing 50kg. Internally, there were multiple white granulomas seen on the parietal pleura, diaphragm, lungs, kidneys, mesentery, and the intestines.

Fig.4: White granulomas on mesentery and intestines

Fig.5: Cut section shows millet-seeds appearance

Fig.6: White granulomas on kidney

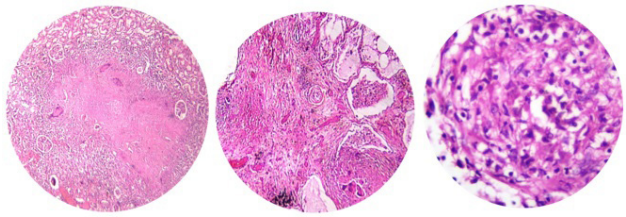


Fig.7,8,9: Histology of kidney (left), lung (middle) and mesenteric lymph node (right) showing granulomas

Case three

A50-year-old unidentified male was found unconscious at a bus stand shed by a passerby in the morning hours. He was brought to the casualty of a nearby clinic where he was declared as 'brought dead'. There was no medical history available.

On external examination, the deceased was an emaciated male weighing 42kg with no injuries. Internally, it was seen that both lungs were adherent to chest wall, diaphragm, and pericardium. The entire upper lobe and middle lobe of right lung showed active caseous material.

Fig.10: Caseous necrosis of lung

Case four

A 44-year-old lady collapsed in her house and was rushed to the hospital; however, she was dead on arrival. The history obtained from her family informs that she had persistent cough for the last 2 years and that she was on herbal medications for the same. There was no history of any other significant illnesses in the past.

Externally, the deceased was a poorly nourished female weighing 50kg with no injuries. Internally, multiple white granulomas were seen on the intestines, mesentery, lungs, pericardium, spleen, diaphragm, liver, gall bladder, stomach, pancreas, uterus, and pleural cavities.

Fig.11: White granulomas on mesentery and intestines

Fig.12: White granulomas on pericardium

Fig.13: Granulomas on parietal pleura

Fig.14: Granulomas on liver and gallbladder

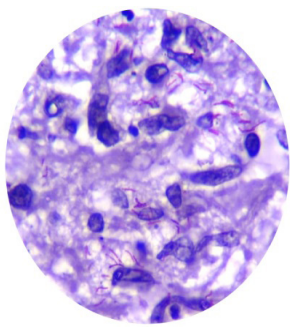


Fig.15: Acid fast bacilli staining showing bacilli

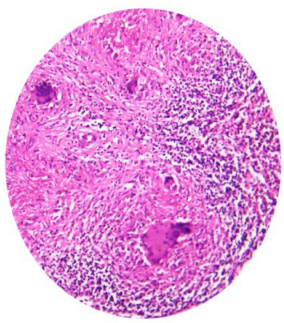


Fig. 16: Histology of spleen showing granuloma

Case five

A 65-year-old unidentified male was found dead in front of a garment shop by the police during early morning hours. There was no history of any previous illness available.

External examination showed an emaciated male weighing 38kg, with no injuries. On internal examination, the pleura on both sides was adherent to the chest wall and one lung showed multiple cavities with caseous material and other lung showed small whitish lesions involving all lobes.

Fig.17: Cut section of lung shows Millet-seed appearance **Fig.18: Lung: Caseous necrosis with cavities**

Discussion

Pulmonary tuberculosis progressing into disseminated pulmonary tuberculosis commonly manifests in the elderly and immunosuppressed. The apical lesion in primary tuberculosis expands into the adjacent lung tissue, this lesion is characterised by caseous material surrounded by macrophages and lymphocytes. Eventually, the lesion erodes into the bronchi and vessels, evacuating the caseous center, creating a ragged, irregular cavity that is poorly walled off by fibrous tissue. Unchecked bacterial growth may lead to hematogenous spread of bacilli to produce disseminated tuberculosis. Disseminated disease with lesions resembling millet seeds is termed miliary tuberculosis.[3]

With adequate treatment the process may be arrested. If the treatment is inadequate or if host defenses are impaired, the infection may spread via airways, lymphatic channels, or the vascular system.[2]Miliary pulmonary disease occurs when organisms draining through lymphatics enter the

venous blood and circulate back to the lung. Individual lesions are either microscopic or small, visible (2-mm foci of yellow-white consolidation scattered through the lung parenchyma(Millet seed appearance). Miliary lesions may expand and coalesce, resulting in consolidation of large regions or even whole lobes of the lung. Over time and with progressive pulmonary tuberculosis, the pleural cavity is invariably involved, and serous pleural effusions, tuberculous empyema, or obliterative fibrous pleuritis may develop.[2]

Disseminated tuberculosis is defined as tuberculous infection involving the blood stream, bone marrow, liver, or 2 or more non-contiguous sites, or miliary tuberculosis. [4]Of all cases of disseminated tuberculosis found at autopsy, 33%–80% were missed antemortem. [5]Systemic miliary tuberculosis occurs when bacteria disseminate through the systemic arterial system; most prominently in the liver, bone marrow, spleen, adrenals, and meninges but could involve any organ.

Miliary tuberculosis has typically been considered a childhood disease. However, during the last three decades, it is increasingly being recognized in adults as well. Several reasons are thought to be responsible for this changing epidemiological trend. These include: human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS), causes of immunosuppression, such as use of biologicals and immunosuppressive drugs for treatment, increasing occurrence of organ transplantation, malnutrition. Among immunocompetent adults, miliary tuberculosis accounts for less than 2 per cent of all cases of TB and up to 20 per cent of all extra-pulmonary tuberculosis (EPTB) cases in various clinical studies.[7-10] In late HIV infection, EPTB accounts for more than 50 per cent of all cases of TB.[11]

A lesser encountered manifestation of this disease in the form of sudden death also finds a mention in literature and case reports.[12,13]

Conclusion

In the present study, all the cases that we have reported presented with scarce previous medical history, most of them were malnourished individuals, who may have also been immunocompromised. White granulomas may resemble metastatic lesions and must be differentiated by means of Acid-Fast Bacilli staining and histopathological examination. As disseminated miliary tuberculosis can be a cause of sudden death and poor response to unrelated treatments, it bears keeping in mind for all forensic surgeons as a direct and indirect cause for death. As HIV/AIDS is an important cause of immunosuppression, forensic surgeons should take precautions to avoid getting infected. There is a possibility of the deceased in our cases being defaulters of Anti-TB therapy which not only puts themselves at risk but the community at large via the appearance of drug resistant forms, and so the Government must take necessary strategies to prevent spread and mortality of the disease.

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