



Original Article

Aspergillus endocarditis in a known case of allergic bronchopulmonary aspergillosis: an autopsy report

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Abstract

Invasive aspergillosis is an emerging infection mainly affecting immunocompromised patients. *Aspergillus* endocarditis remains a rare infection and usually occurs following cardiac surgery for prosthetic valves. This is an uncommon case of a 60-year-old asthmatic male who developed allergic bronchopulmonary aspergillosis during the course of his illness, and while receiving low dose oral steroids, he subsequently developed right-sided *Aspergillus* mural and native valvular endocarditis with extensive invasive pulmonary aspergillosis. © 2009 Published by Elsevier Inc.

Key words: *Aspergillus* endocarditis; Invasive aspergillosis; Allergic bronchopulmonary aspergillosis

1. Case history

A 60 year-old male presented with low-grade fever, cough, expectoration, and recent onset of shortness of breath. The cough was mucopurulent (30–40 ml/day), non-foul-smelling. He was a known asthmatic for the past 9 years for which he was receiving inhaled salmeterol and fluticasone and oral salbutamol. Subsequently, he developed allergic bronchopulmonary aspergillosis (ABPA), diagnosed on the basis of a positive skin test, presence of central bronchiectasis, and elevated levels of specific serum immunoglobulin E, for which he was receiving oral steroids. Chest examination revealed bronchial breath sounds, bilateral coarse crepts, and polyphonic wheeze. Cardiovascular system examination was within normal limits. The culture of bronchioloalveolar lavage fluid revealed growth of *Aspergillus fumigatus*. Chest radiograph, contrast-enhanced computerized tomography, and high-resolution computerized tomography showed

bilateral upper zone and midzone consolidation and bilateral pleural effusion. Bronchiectasis in a central distribution alongwith centrilobular nodules and tree-in-bud pattern was seen in bilateral lower lobes. Echocardiography was not carried out. The patient's condition progressively deteriorated, and he succumbed to his illness.

At autopsy, the heart (weight, 280 g) revealed many small abscesses (2–3 mm and 1.6 cm in diameter) on the anterior, posterior pericardial surfaces and left border. The right and left atrial chambers showed button-shaped vegetations (0.6–0.8 cm in diameter) firmly attached to the endocardial surface near fossa ovalis (Fig. 1A) and just above the posterior mitral leaflet (Fig. 1B), respectively. The tricuspid valvular leaflet (septal) showed large bulky, friable vegetations (1.5×0.8 cm) attached to its free border (Fig. 1A). The leaflets, chordae, and papillary muscle were normal. Similar vegetations (4–5 mm) were seen on the ventricular surface of the pulmonary valve cusps. In addition, pin-head-sized abscesses were seen on the endocardial surface of both the ventricular walls. The mitral and aortic valves were within normal limits. Microscopic examination revealed foci of abscesses (Fig. 1C) composed of acute inflammatory cells

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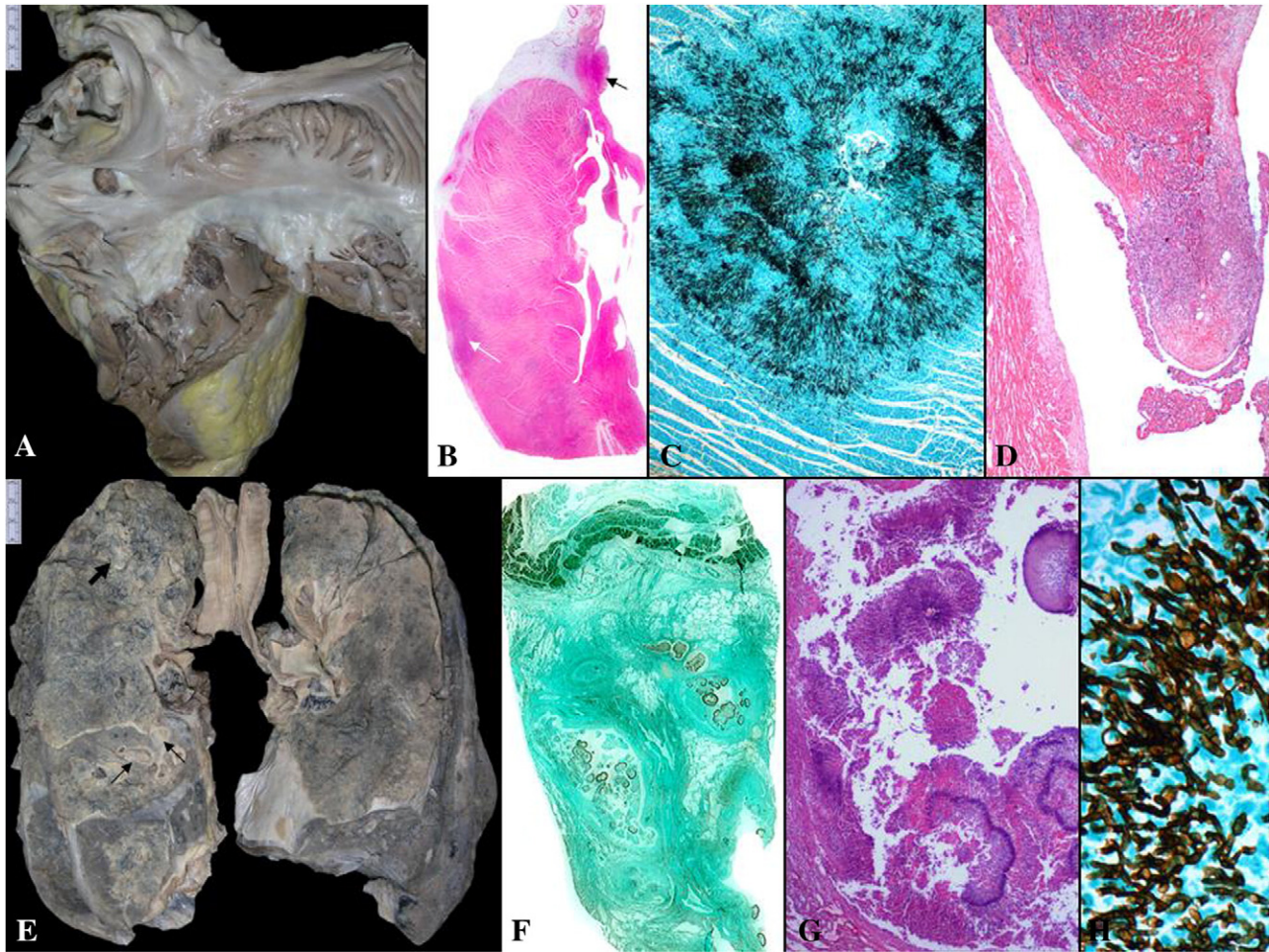


Fig. 1. (A) Friable vegetations firmly adherent on the right atrial endocardial surface near fossa ovalis, crista terminalis, and septal leaflet of the tricuspid valve. (B) Scanned image of the left ventricular wall showing the abscess near the epicardial surface (white arrow). The vegetation on left atrial endocardium is seen as a small elevation (black arrow) (H&E stain). (C) Myocardial abscess with extensive invasion by *Aspergillus* hyphae (Grocott's methamine silver stain; original magnification $\times 40$). (D) Vegetations on the tricuspid valve composed of inflammatory cells, fibrin and fungal hyphae (H&E; original magnification $\times 40$). (E) Cut surface of both the lungs with multiple abscess cavities in the upper lobes (bold arrow) bilaterally and bronchiectatic cavities in the right lower lobes (arrow). (F) Scanned image showing the bronchiectatic cavities colonized by *Aspergillus* hyphae (Grocott's methamine silver stain). (G) Higher magnification showing a dense feltwork of fungal hyphae forming balls within the bronchiectatic cavities (H&E; original magnification $\times 40$). (H) Dichotomously branching septate fungal hyphae of *Aspergillus* (Grocott's methamine silver stain; original magnification $\times 400$).

dissecting through the myocardial fibers causing necrosis and adjoining vasculitis with areas of infarction. Many dichotomously branching, septate fungal *Aspergillus* hyphae were seen both within the abscesses and invading the vessel wall. Microscopically, the valvular and mural vegetations were chiefly composed of fibrinous exudates with neutrophils and *Aspergillus* hyphae (Fig. 1D). Both lungs (weight, 2700 g) revealed extensive pleuritis and multiple cavitary lesions (4×3 cm) with abscess cavities. Few of the bronchi were dilated, filled with mucus. The lower lobe of right lung showed bronchiectatic cavities (2–3 cm) with smooth inner walls (Fig. 1E), which revealed *Aspergillus* balls within them (Fig. 1F, G, and H) which were also seen invading the walls of the cavities and the vessels. The adjoining vessels revealed vasculitis with large areas of infarction. *Aspergillus* colonies with fruiting heads were seen growing extensively

over the infarcted lung parenchyma. Occasional foci of bronchocentric granulomas with ulceration of the bronchial epithelium and collections of giant cells were seen. Mucus impaction was identified in a few bronchioles. Multiple abscess cavities (0.8–1.2 cm) with presence of *Aspergillus* hyphae were seen in kidneys, transverse colon, and thyroid.

2. Discussion

Literature review cites isolated case reports of occurrence of *Aspergillus* native valvular and mural endocarditis in a nonintravenous drug abuser [1] and without a prior history of surgery [2]. The most common fungal organism to cause endocarditis is *Candida* with 62%, which is followed by *Aspergillus* at 18% [3]. *Aspergillus* involves the myocardium

more frequently than the endocardium and is more invasive than *Candida* resulting in combined endocardial and myocardial infection. In an autopsy series of fungal endocarditis reported in literature, 85% had distant foci of mycotic infection (most commonly lung, kidney, brain, and spleen) [4]. In the present case, the lungs had multiple smooth-walled cavities colonized by *Aspergillus* and invasion into the cavity wall along with angioinvasion was also noted.

The patient had multiple predisposing factors contributing to development of invasive aspergillosis. Besides chronic renal failure, the low dose steroids that the patient received for ABPA resulted in immunosuppression predisposing him to develop invasive aspergillosis that subsequently disseminated to the systemic circulation. However, the intravenous line could also have served as a portal of entry with opportunistic *Aspergillus* gaining entry to reach the right side of the heart producing vegetations and myocardial abscesses and secondarily embolizing to the lungs, causing extensive invasive aspergillosis. Occasional case reports cited in literature document the occurrence of invasion by *Aspergillus* hyphae following ABPA [5].

As dissemination invariably occurs, early diagnosis is needed for proper therapy. The diagnosis in this group is especially difficult because blood cultures are always negative, and the only clues are fever and embolic phenomenon. Survival can be improved by early diagnosis and the institution of aggressive antifungal therapy.

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