



DISSEMINATED INVASIVE ASPERGILLOSIS IN A DRUG ADDICT - A CASE REPORT

Pathology

Monika Kalyan*

Senior Resident Department Of Pathology, Pgims, Rohtak. *Corresponding Author

**Dr Sant Parkash
Kataria**

Professor Department Of Pathology, Pgims, Rohtak.

ABSTRACT

Disseminated Invasive aspergillosis is an uncommon infection, which is mainly seen among immunocompromised patients. We report the case of a 34-year-old male who was hospitalized after person went into shock due to overdose of drug. The various organs were sent for histopathological examination to perform a medicolegal autopsy. The heart, lungs, and kidneys showed extensive involvement by aspergillus. Thus, a final diagnosis of disseminated invasive aspergillosis was rendered which itself is a rare entity. This case report described disseminated invasive aspergillosis in drug addict.

KEYWORDS

Disseminated Invasive aspergillosis, Autopsy, Histopathological Examination, Drug Addict

INTRODUCTION

The illicit drug users are commonly harmed by the infections with systemic fungal infections being occasionally implicated. The various mode by which the drug users can acquire different forms of aspergillosis is by inhalation of fungal spores or by direct inoculation from a contaminated drug supply or injection material.[1]

Aspergilli are saprophytes and are present worldwide. Most human infections are caused by the species *Aspergillus fumigatus*. [2] The natural ecological niche of aspergillus organism is the soil, wherein it survives and grows on organic debris. It is one of the most ubiquitous of those with airborne conidia. [3] Colonies of the fungus form conidiophores. The every conidial head produce thousands of conidia. Conidia released into the atmosphere have a diameter small enough (2 to 3 μ m) to reach the lung alveoli. [4] So, humans and animals constantly inhale numerous conidia of this *Aspergillus*. In the normal healthy and immunocompetent host these conidia are eliminated. The dissemination of *A. fumigatus* usually depends on variation of the environment and strong air currents. Once the conidia are released in the air, their small size is effective to makes them buoyant, tending to keep them airborne both indoors and outdoors. All human beings inhale atleast several hundred *A. fumigatus* conidia per day as per environmental surveys. [5] Therefore, disease occurs predominantly in the lungs in majority of the patients, although dissemination to virtually any organ occurs in the most severely predisposed and immunosuppressed patients.

Systemic mycosis is a rare disease that affects immunosuppressed patients more than the immunocompetent host. The incidence of systemic mycosis at postmortem in various studies varies from 0.98% to 10.4%. [6] The prolonged use of antibiotics, immunosuppressive agents, and parenteral nutrition may act as contributing factors to the increased incidence of fungemia. [7]

There is paucity of literature regarding association of aspergillosis with drug addiction. Here we report the autopsy case of invasive aspergillosis involving heart, lung and kidney in the decedent who died of drug overdose.

Case Report

A 34-year-old male was admitted in emergency department in shock due to overdose of drug. The patient was having multiple brownish-black scab over bilateral knee. Sumeg dressing over right forearm. 6x5 cm contusion present over front aspect of right wrist. There was history of opiod addiction. There was no history of diabetes mellitus, hypertension, tuberculosis, or any chronic illness in the deceased. There was no history of immunosuppressive therapy or steroid intake. He died during treatment at hospital, and a medicolegal autopsy was conducted to ascertain the cause of death.

The various organs including piece of brain, whole heart, both lungs, and pieces of liver, spleen, and kidneys were sent for histopathological examination to determine the cause of death. On gross examination, the piece of brain weighed 164 gm, measured 9 x 7 x 2 cm and was

grossly unremarkable. The heart weighed 346 gm and measured 14 x 9 x 6 cm. The lungs weighed 78 gm (right lung) and 66 gm (left lung) and measured 9 x 8 x 2 cm and 8 x 6 x 2 cm, respectively. The liver (145 gm) and spleen (84 gm) were unremarkable on gross examination. The kidneys weighed 76 gm (right kidney) and 66 gm (left kidney) and measured 10 x 6 x 2 cm and 9 x 5 x 2 cm. Grossly, there was no significant change in any of the organ submitted for autopsy.

However, representative microsections examined from the different areas of heart ie. left ventricular wall, the interventricular septum and the apex of the heart showed infiltration by acute inflammatory cells infiltrate comprising of mainly neutrophils, few lymphocytes with focal areas of necrosis and the presence of fungal huphae with branching septate and conforming to the morphology of *Aspergillus* species. (Figure 1) Multiple sections examined from the lung and kidney showed extensive multifocal areas of necrosis along with the presence of acute and chronic inflammatory infiltrate, a few giant cells, and the fungal hyphae with a morphology similar to *Aspergillus* species. (Figure 2 and figure 3) Periodic acid-Schiff (PAS) and Gomori methenamine silver (GMS) stain of the fungus revealed the distinct dichotomous acute angle branching of septate hyphae with the orientation of the branches in a similar direction. The representative microsections examined from the different areas of liver and spleen do not show any significant pathology.

Thus, the post-mortem diagnosis of disseminated invasive aspergillosis was offered.

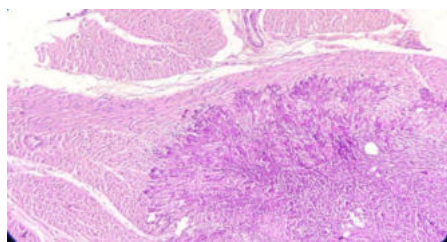


Figure 1 : Section of the heart showing which reveal the destruction of cardiomyocytes intermingled with focal necrotic debris and fungal hyphae. The fungal hyphae were septate with acute angle branching (H & E; 100X).

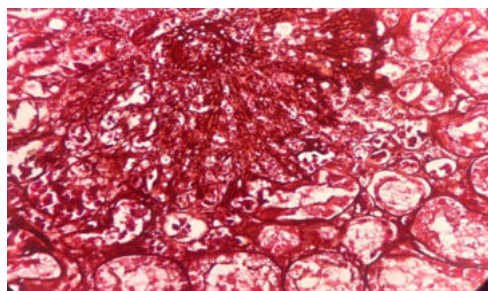


Figure 2 : Section of the kidney showing spatate fungal hyphae with acute angle branching (GMS; 400X).

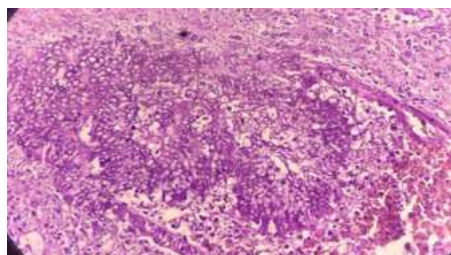


Figure 3 : Section from the lung shows necrotic debris, inflammatory exudate and fungal hyphae. (PAS; 400X).

DISCUSSION

Drug overdose has continued to increase substantially. This increase is largely driven by fluctuations in the drug supply and complex socioeconomic factors that are associated with drug harms, often including health events beyond overdose.[8] If we see drug overdose trends in the current scenario, very less is known about these drug use-associated infections and their contribution to mortality on a population level.

Aspergillus is a ubiquitous mold. The disease caused by the *aspergillus* is quite uncommon although its exposure is universal. Host factors play a major role in determining The outcome following exposure to *aspergillus* spore is determined mainly by the host factors. Among the main predisposing factors that lead to fungal infection are debilitating disease, a discontinuity of the skin or mucous membranes providing a portal of entry and disturbance in the saprophyte-host relationship by immunosuppressive agents or antibiotics. The patients may have one or all of these predisposing conditions.[7] Invasive aspergillosis has become an important cause of morbidity and mortality in immunocompromised or immunosuppressed patients. The other common predisposing conditions leading to *Aspergillus* infection includes neutropenia, prolonged antibiotic therapy, steroid therapy, AIDS, hematological malignancies, organ transplantation, cytotoxic therapy, diabetes mellitus, alcohol abuse, renal failure, hepatic failure, or any chronic debilitating disease.

Although illicit drugs are often contaminated with *Aspergillus* spores [9], the development of invasive aspergillosis requires exposure to a critical amount of inoculum that is hard to quantify and may depend upon the immune status of the patient [10]. The overdose of opioid has increased in the passing years in the several countries, which might be due to the increased availability of opioids used commonly in the management of chronic pain, and also due to increased use of highly potent opioids in the illicit drug market. Fungal infection is predominantly seen in immunosuppressed patients; however, it is important to note that these infections can affect the immunocompetent as well [11]. Although the patient discussed here did have history of drug abuse, he did not have depressed cellular immunity. A literature review by Kim et al. has shown that patients with predisposing factors such as chronic alcoholism, drug addiction, sinusitis, hepatic failure, trauma, and certain occupations are more susceptible to invasive aspergillosis [11].

Due to the increase in the incidence of immunosuppressed patients in the recent years, *Aspergillus* became the most common pathogenic mold worldwide. The incidence of invasive aspergillosis on medicolegal autopsy is approximately 0.19%. It is increasingly being reported in AIDS patients (1-12%) and as a common complication of chronic granulomatous disease (25-40%).[6]

Although fungus can colonize any organ in the body, the lungs are the most commonly affected site. The main portal of entry to cause pulmonary infection is by the inhalation of the fungal spores. The symptoms of invasive aspergillosis are non-specific and most commonly include fever, cough, chest pain, dyspnea, malaise, and weight loss. Invasive pulmonary aspergillosis has several clinicopathological manifestation, including acute bronchopneumonia, angioinvasive aspergillosis, acute tracheobronchitis, miliary aspergillosis, and pleural aspergillosis.[12] Apart from the pulmonary system, aspergillosis may present in other organs, including brain, heart, liver, spleen, kidney, thyroid gland, and lymph nodes.[13]

Disseminated invasive aspergillosis may involve any organ of the body. As disseminated invasive aspergillosis is a devastating disease, so thorough clinical, biochemical and radiological workup are required for its early diagnosis and management. A high index of suspicion is required, especially in immunosuppressed individuals.[12] Culture or microscopic examination of sputum or bronchoalveolar lavage specimens can be used to demonstrate colonization of the airways.

CONCLUSION

Disseminated invasive aspergillosis is a devastating condition with multiorgan involvement and a high rate of mortality. Even with early diagnosis, the disease is difficult to manage due to extensive pulmonary and extra pulmonary involvement. Since the clinical manifestations vary according to the host's immune status and other predisposing factors, the clinical, radiological and biochemical features may vary. A vigorous and careful demonstration of fungi, followed by empirical treatment, forms the mainstay of the management of disseminated invasive aspergillosis.

REFERENCES :

1. Trullas JC, Bisbe J, Miro JM. Aspergillosis in Drug Addicts. 2010; 545-58.
2. Lee SH, Lee BJ, Jung DY, et al. Clinical manifestations and treatment outcomes of pulmonary aspergilloma. Korean J Intern Med. 2004;19:38-42.
3. Mullins J, Harvey R, Seaton A. Sources and incidence of airborne *Aspergillus fumigatus*. Clin Allergy. 1976;6:209-17.
4. Raper KB, Fennell DI. *Aspergillus fumigatus* group. In: Raper KB, Fennell DI (eds). The genus *Aspergillus*. Baltimore, MD: The William & Wilkins Co; USA. 1965:238-68.
5. Hospenthal DR, Kwon-Chung KJ, Bennett JE. Concentrations of airborne *Aspergillus* compared to the incidence of invasive aspergillosis: Lack of correlation. Med Mycol. 1998;36:165-8.
6. Aleksenko A, Gyasi RK, Gyasi RK. Disseminated invasive aspergillosis. Ghana Med J. 2006;40(2):69-72. PMID:17299570. <http://dx.doi.org/10.4314/gmj.v40i2.36021>.
7. Cishek MB, Yost B, Schaefer S. Cardiac aspergillosis presenting as myocardial infarction. Clin Cardiol. 1996;19(10):824-7. PMID:8896916. <http://dx.doi.org/10.1002/clc.4960191012>.
8. Figgatt MC, Schranz AJ, Jackson BE, Dasgupta N, Juan M, Castillo H, Baggett C, Marshall SW, Golightly YM. Mortality associated with bacterial and fungal infections and overdose among people with drug use diagnose. Annals of Epidemiology.2023; 87:45-50.e14.
9. Leen CLS, Brettell RP. Fungal infections in drug users. J Antimicrob Chemother.1991;28:83-96.
10. Denning DW. Invasive aspergillosis. Clin Infect Dis.19;2:781-803.
11. D.G. Kim, S.C. Hong, H.J. Kim, J.G. Chi, M.H. Han, K.S. Choi, et al.Cerebral aspergillosis in immunologically competent patients.Surg Neurol.1993;40(4):326-31.
12. Vaideswar P, Prasad S, Deshpande JR, Pandit SP. Invasive pulmonary aspergillosis: a study of 39 cases at autopsy. J Postgrad Med. 2004;50(1):21-6.
13. Feng D, Heffner R, Wright J. Invasive aspergillosis extensively involving the brain and multiple organs in a bone marrow transplant patient. The Internet Journal of Pathology. 2007;7:1-7.