# A Rare Case of Pulmonary Aspergilloma in an Immunocompetent Filipino Elderly Woman Who Initially Presented as Otomycosis: A Case Report

Alfie F. Calingacion, MD,[1] and Maria Philina P. Villamor MD[1]


## Abstract

**Background.** Otomycosis, or fungal infection of the ear, is most commonly caused by *Aspergillus*, particularly of the *Aspergillus niger* species. On the other hand, pulmonary aspergilloma is a late manifestation of chronic cavitary pulmonary aspergillosis. Development of invasive aspergillosis is a possibility in immunocompromised patient but very rarely seen in immunocompetent persons. There have been no published reports in patients who initially presented as otomycosis and later development of pulmonary aspergilloma.

**Case Presentation.** This case report presents 53-year-old Filipino immunocompetent female who was initially presented with ear discharges with diagnosed with otomycosis. She underwent modified radical mastoidectomy of the right ear with tympanoplasty type II. The patient then developed right facial nerve palsy due to erosion of the facial nerve canal. She was discharged with a final diagnosis of chronic suppurative otitis media with cholesteatoma; however, patient was not started on any anti-fungal medications. After fourteen months, the patient presented with episodes of hemoptysis and dyspnea and eventually re-admitted. Diagnostic work up was done with chest CT scan and serum galactomannan antigen test. She was diagnosed to have pulmonary aspergilloma. Patient was then started on long term anti-fungal therapy, instead of invasive surgical procedure. Repeat chest CT scan after six months showed a decrease in the size of the fungal ball.

**Conclusion.** This study illustrates the lung aspergilloma may happen with preceding history of invasive otic fungal infection even if there is no immunocompromised condition. It also emphasizes the importance of proper identification of infection etiology to ensure adequate control and prevent further opportunistic infection.


**Keywords.** *Aspergillus infection, Otomycosis, Pulmonary aspergilloma*

## Introduction

Aspergillosis is an infection caused by *Aspergillus*, a fungus that lives indoors and outdoors. Most people acquire spores but does not develop any disease. However, immunocompromised people are at higher risk of developing illness due to *Aspergillus*. Different health issues are caused by *Aspergillus* include allergic reactions, pulmonary infections, and infections in other organs in the body. Mortality rate without treatment is almost 100%.[1]

Certain chronic pulmonary conditions, such as tuberculosis, can cause air spaces to form in the lungs. When these types of people are also infected with such fungus, its fibers find their way into the cavities and grow into tangled masses, or more commonly known as fungus balls or aspergillomas. Initially, people with aspergillomas may produce no symptoms at all or can cause only a mild cough. However, without treatment, it can worsen the underlying chronic pulmonary condition and possibly cause an array of symptoms such as hemoptysis, dyspnea, unintentional weight loss, and fatigue.[2]

Otomycosis is fungal infection of the ear, particularly in the external auditory canal and auricle. Clinically, it is one of the most commonly seen fungal infection in outpatient ear clinics. The organisms responsible for this disease are usually environmental saprotrophic fungi especially *Aspergillus*. Usually, these fungi are secondary invaders of tissue already provide susceptibility to bacterial infections, physical trauma or even by too much

1 Resident Physician, Department of Internal Medicine, Vicente Sotto Memorial Medical Center
2 Medical Specialist – Pulmonologist, Vicente Sotto Memorial Medical Center
Corresponding Author: Alfie F. Calingacion, MD eMail:

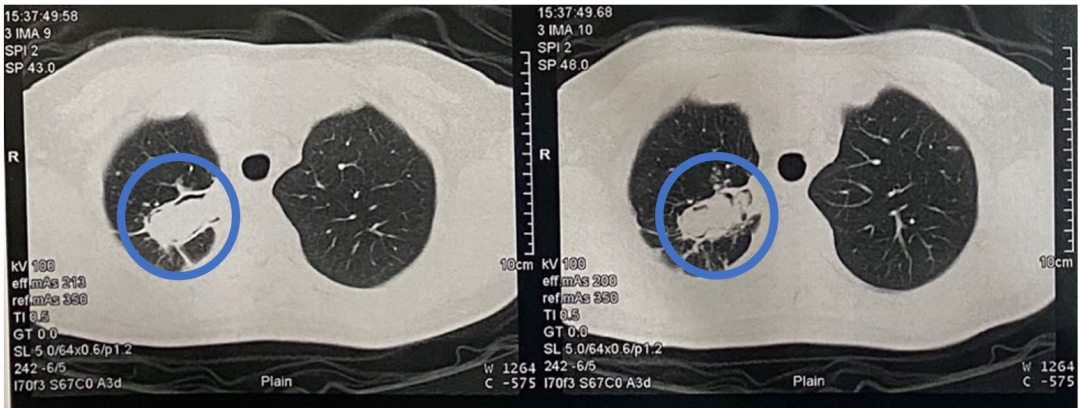


**Figure 1. Chest CT showed a 37mm cavity in the right upper lobe with a fungus ball.**

accumulation of cerumen in the ear, especially in the external auditory canal. Sometimes it is a non-pathogenic fungus that colonizes the external auditory canal.[3] There have no published reports on patients diagnosed with pulmonary aspergilloma, who initially presented with a fungal infection in the ear, or otomycosis.

## Case Presentation

This is a case of a 53-year-old, Filipino, woman, diabetic, nonsmoker, from Cebu City, Cebu who came in due to dyspnea.

Four years prior to admission, the patient had sudden onset of dizziness and generalized headache with pain score of 4/10. This was associated with brownish-black discharges on the right ear. No fever was noted and there were no other subjective complaints. The patient sought consult and was diagnosed with otomycosis. She was given Clotrimazole 1% solution, 2-3 drops into the affected ear 3x a day for 2 weeks and noted temporary relief of symptoms.

Three years prior to admission, there was still persistence of occasional dizziness and headache with increasing in pain score (highest at 6/10). The patient decided to seek follow up at the outpatient. Plain CT scan of the temporal fossa showed bilateral chronic mastoiditis with suspicious cholesteatoma. She underwent modified radical mastoidectomy of the right ear with tympanoplasty type II. She developed right facial palsy and was advised physical rehabilitation. During this admission, the patient had good control of her diabetes mellitus type 2. She was discharged improved after 6 days of hospitalization with a final diagnosis of chronic suppurative otitis media with cholesteatoma. Take home medications include co-amoxiclav 625 mg/tab, one tablet 2x a day for 7 days; celecoxib 200 mg/cap one capsule 2x a day for pain; ofloxacin otic drop, 3 drops 3x a day; and betahistine 24 mg, 1 tablet 2x a day as needed for dizziness. She was not advised to take any anti-fungal medications.

In the interim, the patient claimed to have no recurrence of dizziness and headache. There was no recurrence of ear discharges. Improvement of daily activities was also reported. Other family members did not complain of the same condition.

After about fourteen months, the patient had onset of productive cough and hemoptysis. There was no fever noted. She tolerated the condition initially and no medications were taken, and no consult was done. One week prior to admission, the hemoptysis persisted but now associated with dyspnea. The patient sought consult at our hospital Outpatient Department and was advised to undergo chest x-ray PA view which revealed a consideration of a chronic inflammatory process (mycetoma), right upper lung versus pulmonary mass. On the day of admission, patient went back for follow up check-up with her plain CT scan which revealed a 37mm cavity in the right upper lobe with a fungus ball (*Figure 1*). There are noncalcified nodules and tree-in-bud nodular opacities scattered in the right upper and right lower lobe. The latter were judged to be fairly stable with interval development of two new nodules within the anterior segment of the left upper lobe. The findings were compatible with a chronic infection such as a fungal infection. Physical examination findings were unremarkable, except for decrease breath sounds of the right upper lung field. Thus, she was advised for admission.

During the course in the ward, the patient underwent testing for serum *Aspergillus* galactomannan antigen test which revealed a positive result with patient index of 3.96. Her sputum was tested for GeneXpert MTB/RIF and was negative. She also underwent HIV antibody testing with non-reactive result and CD4 count of 672 cells/ul.

The patient also underwent bronchoscopy as additional diagnostic procedure. Specimen for bronchial washing was sent for fungal culture and sensitivity and showed no growth after four weeks of incubation.

The patient was then started with voriconazole 200 mg IV every 12 hours for 7 days with no side effects noted. Due to unavailable of current antifungal medication and financial constraints of the members of the family, medication was then shifted to itraconazole 200 mg/tab, 2x a day for 3-6 months. Surgical plans were discussed

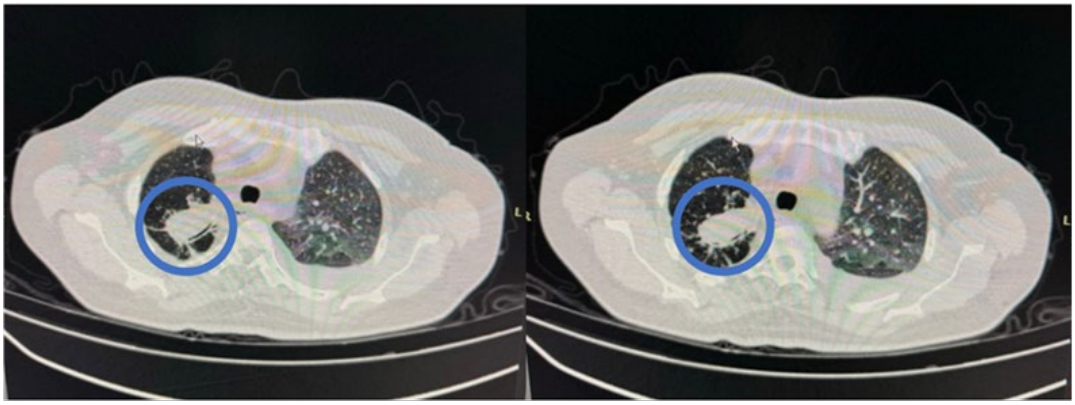

**Figure 2. Repeat Chest CT showed a 19mm cavity in the right upper lobe**

with the patient; however, she opted to start first on oral medications. She was discharged improved after 16 days of hospitalization.

Follow up check-up via teleconsultation was done, and she was noted to have improvement of condition with no recurrence of dyspnea, cough, and hemoptysis. The patient had very good adherence to medications, taking her anti-fungal daily, and well tolerated without any adverse or untoward side effects noted. Repeat CT scan was done after 6 months of anti-fungal medications showed a decreased in the size of the fungal ball from 37mm to 19mm (*Figure 2*).

## Discussion

This is a case report of a 53-year-old woman with prior history of adequately treated PTB and concomitant controlled diabetes mellitus. She has no other identified immunocompromising condition but developed otic fungal infection for which she underwent surgery. Thereafter, she developed lung aspergilloma, which was identified by chest imaging and serum galactomannan testing. She was treated medically with anti-fungal medications and eventually improved clinically.

Aspergillosis is a common opportunistic fungal infection among immunocompromised patients.[4] *Aspergillus fumigatus* is the most frequently isolated. There are different risk factors involved to develop *Aspergillus* infection including: patients with profound neutropenia, those using glucocorticoid, and those with underlying respiratory disease. The use of higher doses of glucocorticoids essentially increases the risk for more invasive infection and eventually to death. Neutrophil and/or phagocyte dysfunction is likewise a very important risk factor, as seen by aspergillosis in CGD, patient with HIV infection, and relapsed leukemic patients.[5] All of these risk factors were not seen in our patient.

Fungal infections in the ear are extremely rare cases seen in clinical practice. However, it can develop in patients with immunocompromised states such as those with AIDS, malignancy, and patients undergoing immunosuppressive therapy. Very rarely, this infection is seen in immunocompetent persons.[6] On both admissions, our patient had well controlled blood sugar levels. Also, she tested non-reactive on HIV antibody testing and had a CD4 count of 672 cells/μL.

The clinical manifestation of aspergillosis of the tympanomastoid cavity are otorrhea which, unfortunately, does not respond to medical treatment and eventually leading to potential hearing loss. Our patient underwent modified radical mastoidectomy with tympanoplasty type 2. This procedure is different from the usual radical mastoidectomy because the ossicles and the tympanic membrane are preserved for hearing reconstruction. It involves removing all disease from the middle ear and the mastoid.[7]

Iatrogenic injury to the facial nerve is one of the most common complications of ear surgery, particularly of mastoidectomy.[8] Paralysis of the seventh cranial nerve, or facial nerve, may happen because of erosion of facial nerve canal. Patients who developed facial nerve palsy with chronic otitis media in immunocompromised patients will give rise to suspicion of invasive aspergillosis with tympanomastoiditis.[9] This was exhibited by our patient upon physical examination of right facial asymmetry, which was claimed to be the consequence of her previous diagnosis due to chronic suppurative otitis media with cholesteatoma.

Aspergilloma, or otherwise known as fungal ball, is a late demonstration of a chronic cavitary pulmonary aspergillosis. Some patients with this disease entity do not develop any symptoms as all. The inside of a pulmonary cavity allows fungal development that peels off, and eventually forms different layers of the fungal ball. Clinical manifestations associated with aspergillomas include productive cough, hemoptysis, wheezing, and body malaise. In about 10% of cases of aspergilloma, it may resolve spontaneously in its own by virtue of being coughed up by the patient. However, the cavity may still be infected and the patient symptomatic.[4]

There are different diagnostic tests for Aspergillosis. CT scan of the chest can be done to evaluate the presence of an ova-shaped mass that is separated from the wall of the cavity by a crescent-shaped airspace. This is known as

the "air crescent sign." This radiologic finding is typical of aspergilloma but can also be present in pulmonary tuberculosis, hydatid cyst, pulmonary abscess, bronchogenic carcinoma, and *Pneumocystis jirovecii* pneumonia (PCP). A more sensitive radiologic finding for aspergilloma is the "Monod sign" in which the mass usually moves within the cavity when the patient changes in position.[10]

One of the most sensitive tests is blood antigen detection of serum galactomannan assay, which yielded a positive result in our patient. Diagnostic sensitivity of respiratory specimen culture is only about 10-30%.[4] Furthermore, in a journal published by Levy et. al, sensitivity of fungal culture of respiratory specimen for pulmonary aspergillosis was only at 40% while its specificity is at 90.3%.[11] This could explain why our patient yielded a negative fungal culture result after 4 weeks of incubation for bronchial washing specimen.

There are different antifungal medications used against *Aspergillus*. These include voriconazole, itraconazole, posaconazole, isavuconazole, caspofungin, micafungin, and amphotericin B. Possible drug-drug interactions should always be considered before any azoles are used. The initial use of intravenous treatment is preferred for acute invasive aspergillosis and oral administration for all other diseases that require antifungal therapy. Duration of treatment may vary for Aspergillus infection ranging from about three months up to several years, depending on the patient's immune status and response to therapy. Possibility of relapse may happen if the response to therapy is suboptimal.[4] Our patient did not receive any anti-fungal medications post-surgery, and it should have been ideal to start her on anti-fungal medications at that time.

Currently, voriconazole is the ideal oral agent for chronic aspergillosis while itraconazole or posaconazole may be used as substitutes when there is failure, emergence of resistance, or adverse events. Treatment for more than six months is necessary because chronic cavitary pulmonary aspergillosis responds slowly. Disease control may require years of treatment, whereas the duration of treatment for other forms of chronic and allergic aspergillosis is on a case-by-case basis.[4]

A published report of invasive aspergillosis of tympanomastoid cavity by Swain et. al., reported a case of invasive aspergillosis of the tympanomastoid region in a 60-year-old diabetic patient with facial nerve palsy. The diagnosis was made by the demonstration of fungi in the tissue with Gomori methenamine silver staining and subsequently confirmed using molecular diagnosis. Surgical debridement of the tympanomastoid region was done together with long term anti-fungal voriconazole therapy.[12] While there are several case reports on invasive aspergilloma of the ear, these are mostly in immunocompromised patients. We found no report published on cases of invasive ear aspergillosis who later developed lung aspergilloma in an individual who appear to be immunocompetent such as our patient.

Our patient is known to have had previous pulmonary tuberculosis infection but she completed treatment for six months. Initially, prior to the current admission, past medical history showed she had fungal infection on her ears with brown-black discharge, which we can presumably attribute to an *Aspergillus* infection. *Aspergillus* makes at least two types of melanin, namely pyomelanin and dihydroxynapthhalene (DHN) melanin. Pyomelanin is produced during tyrosine catabolism via accumulation of homogentisic acid. On the other hand, DHN melanin is responsible for the characteristic gray color of Aspergillus.[13,14]

An article by Master et al reported that chronic suppurative otitis media can be caused by bacteria or fungi. The most common cause of bacterial pathology is *Staphylococcus aureus,* which exhibits an amber colored fluid ear discharge. This can be differentiated from fungal pathology mainly caused by *Aspergillus* species which has a brownish-black or gray discharge.[15]

Later during the patient's hospital stay, she started to have dyspneic episodes and hemoptysis. She was then eventually diagnosed with pulmonary aspergilloma through CT scan of the chest with evidence of a fungus ball and a positive serum galactomannan antigen test.

Instead of the usual therapeutic approach of invasive surgery for this kind of disease, we started the patient with anti-fungal management. Patient was then discharged improved and close monitoring was done as outpatient management. There was noted no recurrence of hemoptysis and dyspnea. Likewise, a repeat CT scan of the chest with contrast will be done to evaluate her condition.

For this case, the confirmation of the diagnosis and the initiation of anti-fungal treatment contributed to improved clinical outcome of this patient. It would have been ideal for the patient to have confirmation of fungal infection post-surgery and subsequent anti-fungal therapy. It could have prevented the patient from developing lung aspergillosis infection.

This case report illustrates that aspergilloma may happen with previous history of invasive otic fungal infection even if there is no immunocompromised condition. It also highlights the importance of proper identification of infection etiology to ensure adequate control and prevent further opportunistic infections.

## Conclusion

This case report illustrates that lung aspergilloma may happen with previous history of invasive otic fungal infection even if there is no immunocompromised condition and emphasizes the importance of proper identification of infection etiology to ensure adequate control and prevent further opportunistic infection.

When encountering a case in the healthcare setting, an internist or any clinician should keep in mind the possibility of developing invasive aspergillosis infection from a simple otomycosis. Anti-fungal therapy should be

started right away to avoid unnecessary complications such as development of pulmonary aspergilloma.

## Patient Perspective

Upon initial interview with the patient during her hospital stay, she was eager to start first on anti-fungal medications and see if there will be any progress in her condition prior to any surgical intervention.

During follow up through teleconsultation, the patient was relieved knowing that there was no recurrence of hemoptysis and dyspnea. Although long term daily oral anti-fungal treatment for her condition is a struggle for her, she is still glad to have not undergone any surgical procedure.

## References


1. U.S Department of Health & Human Services. Center for Disease Control and Prevention [Internet]. USA: 2021. Available from https://www.cdc.gov/fungal/diseases/aspergillosis/index.html
2. Mayo Foundation for Medical Education and Research. Mayo Clinic [Internet]. USA: 2021. Available from https://www.mayoclinic.org/ diseases conditions/ aspergillosis/symptoms-causes/syc20369619
3. Chander, J. (February 2009). Department of Microbiology, Government Medical College Hospital, Chandigarh, India. [Internet]. Available from https://www.aspergillus.org.uk/ new treatment/ aspergillus-otomycosis/
4. Fauci AS, Braunwald, E., Isselbacher KJ, Wilson JD, Martin JB, Kasper DL, et al, editors. Harrison's principle of internal medicine. 21st ed. New York: McGraw Hill; 2015.
5. Mani R, Belcadhi M, Ben Said M, Bouzouita K. Aspergillus mastoiditis with intact tympanic membrane in immunocompetent host B-ENT. 2008; 4:39–43.
6. Van Tol A, Van Rijswijk J. Aspergillus mastoiditis, presenting with unexplained progressive otalgia, in an immunocompetent (older) patient. European Archives of Otorhinolaryngology. 2009; 266:1655–7.
7. Varughese, D. (June 19, 2023). Department of Otolaryngology – Head and Neck Surgery, Rutgers New Jersey Medical School. [Internet]. Available from https://emedicine.medscape.com/article/859501-treatment?form=fpf#d16
8. Nam-Gyu, R., Kim, J. How to avoid facial nerve injury in mastoidectomy. Journal of Audiology and Otology. September 2019; 20(2): 68-72.
9. Lyos AT, Malpica A, Estrada R, Katz CD, Jenkins HA. Invasive aspergillosis of the temporal bone: An unusual manifestation of acquired immunodeficiency syndrome. American Journal of Otolaryngology. 1993; 14:444–8.
10. Sharma, S., Dubey, S., Kumar, N., Sundriyal, D. Monod and air crescent sign in aspergilloma. British Medical Journal. 2013: Published online at https://www. ncbi.nlm.nih.gov/pmc/articles/PMC3794289/
11. Levy, H., Horak, D., Tegtmeier, B., Yokota, S., Forman, S. The value of bronchoalveolar lavage and bronchial washings in the diagnosis of invasive pulmonary aspergillosis. Journal of Respiratory Medicine. May 1992; 86(3):243-248.
12. Swain, SK., Debta, P, Bishoyi, AK, Padhy, R. Invasive aspergillosis of tympanomastoid cavity. Journal of the Scientific Society. September – December 2019; 46(3): 109-109.
13. Heinekamp, T., Thywibenm A., Macheleidt, J., Keller, Sophia., et. al. Aspergillus fumigatus melanins: interference with the host endocytosis pathway and impact on virulence. Frontiers in Microbiology. January 10, 2013; Volume 3: 2012.
14. Ozcan N, Saat N, Yildirim Baylan M, Akpolat N, Atmaca S, Gül K. Three cases of Chronic Suppurative Otitis Media caused by Kerstersia gyiorum and a review of the literature. Infez Med. 2018 Dec 01;26(4):364-368.
15. Master A, Wilkinson E, Wagner R. Management of Chronic Suppurative Otitis Media and Otosclerosis in Developing Countries. Otolaryngology Clinics North America. 2018 June; 51(3): 593-605.