

SINO-ORBITAL ASPERGILLOSIS WITH CENTRAL NERVOUS SYSTEM COMPLICATION: A Case Report

GC ONYEKONWU, *FMC Ophthalmol*, Consultant Ophthalmic Surgeon
Department of Ophthalmology, Ebonyi State University Teaching Hospital (EBSUTH), Abakaliki

*CM CHUKA-OKOSA, *MBBS, FWACS*, Consultant Ophthalmic Surgeon
Department of Ophthalmology, University of Nigeria Teaching Hospital (UNTH), Enugu

SUMMARY

Aim: To report a case of sino-orbital aspergillosis presenting as a proptosis in an adult immunocompetent Nigerian woman.

Case report: A 60 year-old woman first presented to the eye clinic more than a month after initial symptoms of catarrh and nasal blockage and two weeks after the development of proptosis. From the results of radiological investigations and fungal culture it was found that the patient primarily had aspergillosis of the paranasal sinuses with secondary involvement of the orbit. A central nervous system (CNS) complication (cerebral abscess) was diagnosed following seizures in the patient. The patient died a few days later.

Conclusion: The diagnosis of aspergillosis of the orbit was only made from fungal culture after the patient's death. It requires a high index of suspicion to make a diagnosis of aspergillosis of the orbit. In this era of HIV/AIDS, with increasing incidence of aspergillosis, ophthalmologists are advised to be on the alert for this disease and rule it out in every patient that presents to them with proptosis.

Key words: aspergillosis, orbit, paranasal sinuses

INTRODUCTION

The incidence and frequency of fungal infections, especially aspergillosis, has increased over the past century and it is most commonly seen in patients who are immunocompromised.¹

Fungal infection involving the sinuses is an uncommon condition which is, however, now being increasingly seen both in normal and immunocompromised individuals.² The aspergillus

species are the most common causative agents of fungal sinusitis.³⁻⁵ Other fungi which are implicated in the cause of fungal sinusitis are mucor and rhizopus.²

Infection can spread from the sinus to the orbit, either directly through extension via the osseous structures or indirectly through the valveless venous plexus surrounding the orbit and paranasal sinuses.⁶

Invasive aspergillosis of the paranasal sinuses involving the orbit⁷ is known as sino-orbital aspergillosis. It is diagnosed when, in addition to the presence of fungal hyphae in the tissue, there is tissue necrosis.¹ This form of aspergillosis can also extend to involve the intracranial structures, thereby mimicking conditions like malignant neoplasm, Wegener's granulomatosis, etc.

The prognosis for sino-orbital aspergillosis, complicated by impaired visual acuity and neurological signs, is grave and usually fatal.

In this paper, we present a case of sino-orbital aspergillosis with central nervous system complication, in a normal immunocompetent 60 year-old Nigerian woman. To the best of our knowledge, this is the first report of such a case in Nigeria.

CASE REPORT

NA, a 60 year-old Nigerian woman presented to the eye clinic of the University of Nigeria Teaching Hospital (UNTH), Enugu in January 2004, with a one-month history of tearing with mucopurulent discharge in the left eye, left-sided headache and a two-week history of bulging of the same eye with associated progressive diminution in vision. Before the ocular symptoms, the patient had catarrh with associated nasal blockage. She was neither diabetic nor hypertensive. Systemic examination showed nothing abnormal. The patient was a farmer. Findings on ocular examination were as follows:

* Author for correspondence

	R	L
❖ Unaided visual acuity	6/36	6/36
❖ Globe	No abnormal finding (15mm with transparent ruler)	● Axial proptosis (26mm with transparent ruler) ● Firm, non-tender mass at the lacrimal fossa region
❖ Lids	No abnormal finding	● Complete ptosis ● Gangrenous lids ● Hyperaemic ● Chemosis ● Mucopurulent discharge
❖ Cornea	Clear	Clear
❖ Anterior chamber	No abnormal finding	No abnormal finding
❖ Ins	No abnormal finding	No abnormal finding
❖ Pupil	No abnormal finding	No abnormal finding
❖ Lens	Transparent	Transparent
❖ Fundus	No abnormal finding	No abnormal finding
❖ Intraocular pressure using Schiotz tonometer (7.5g weight)	25.8mmHg	17.5mmHg

With a diagnosis of left orbital cellulitis, the patient was admitted and placed on: guttae Ciloxan; caps Ampiclox 500mg 6 hourly; and tabs Flagyl 400mg t.d.s.

The following investigations were requested: urinalysis; orbital X-ray; ultrasound of the left orbit; FBC + ESR; retroviral test and serum electrolytes, urea and creatinine. The patient could not afford to pay for a CT scan.

One week later, the patient was found not to be improving with treatment. Tabs Ciproxin 500mg b.d. and guttae Gentacin were therefore added to the treatment.

Results of investigations

X-ray

The X-ray showed opacification of the left maxillary sinus without bone destruction, air-fluid level in the left

maxilla, and bilateral ethmoidal opacities. The frontal sinus was not well developed but the frontal bone showed inflammatory reaction. The x-ray showed chronic sinusitis.

Ultrasound of the left orbit

Ultrasound of the left orbit showed retroorbital mass and left pansinusitis with orbital complication.

FBC+ESR

Hb: 10.0g/dl(PCV 30%)
Total WBC: 3,900/mm³
Differential WBC: Not available in the records
ESR: Not available in the records

Serum electrolytes/urea/creatinine

Serum electrolytes/urea/creatinine were normal.

HIV test

The HIV test was negative.

Otorhinolaryngology review

Significant clinical findings included a blocked nostril, and mucopus from the nasopharynx into the oropharynx.

The treatment was surgery (left ethmoidectomy and bilateral intranasal antrostomy).

Pre-op ophthalmic review (February 2004)

The pre-ophthalmic review revealed that there was no perception of light (NPL) and complete ophthalmoplegia in the left eye.

Intraoperative otorhinolaryngologist's findings

- a proptosed left eye
- swollen indurated upper/lower eyelids
- necrotizing/gangrenous skin 3cm of left medial canthus involving the medial upper/lower lids
- thick pus filled the ethmoidal labyrinth
- friable air cells
- both maxillary antra containing mucopus with necrotic skin

The tissue and pus were taken for histology and fungal studies.

Postoperatively, the lower lid was necrotic and matted to the globe. There was periorbital oedema, progressive lid necrosis; and globe necrosis medially. There was wound breakdown by the fifth postoperative day.

The culture of the wound swab yielded the organism *E. coli* which is sensitive to erythromycin. The KOH study showed fungal spores/hyphae. Based on these findings, the patient was also diagnosed to have orbital mucormycoses and tabs Ketoconazole 200mg b.d. were added to the treatment (Amphotericin tablets were not available).

A wound swab was again collected for fungal culture. The globe progressively necrosed and this extended to the cheek region. Three weeks postoperatively, the patient had seizures. The physicians reviewed the patient, made a diagnosis of cerebral abscess and added the following to her treatment: intravenous Flagyl; Augmentin; and tabs Tegretol. The patient, however, died a few days later.

One week after her death, the culture for fungi yielded aspergillus. Thus, the diagnosis of sino-orbital aspergillosis with CNS complication was made.

DISCUSSION

Aspergillus is a spore-forming filamentous fungus which occurs as a saprophyte in soil and decaying vegetable matter and is spread by airborne transmission.⁸⁻¹² In most patients, the usual port of entry is the respiratory tract. Transmission occurs through the inhalation of airborne spores. Transmission between humans is unknown.⁸

Aspergillus infection is the most common fungal infection of the paranasal sinuses;³ *Aspergillus flavus* being the specie most commonly responsible for sinusitis.^{8,13}

Risk factors: Environmental and host-related factors are implicated in the pathogenesis of fungal sinusitis.²

The environmental factors may include the agricultural economy which encourages the proliferation of the aspergillus organism and the warm, moist climate with its high rate of allergic and infectious rhinosinusitis.⁴ Immunosuppressive conditions such as chemotherapy, debilitating illnesses like diabetes, etc. might also predispose to fungal sinusitis.⁴

The patient was a farmer but had no history or signs of any debilitating illness.

Clinical manifestations

Fungal sinusitis can manifest in different ways:¹⁴

- Acute invasive fungal sinusitis: This is observed in patients who are immunosuppressed or diabetic.
- Chronic fungal sinusitis: This is usually observed in patients who are immunocompetent.
- Mycetomas or fungus balls: These may be asymptomatic or may manifest as chronic sinusitis.
- Allergic fungal sinusitis: This usually manifests as nasal polyps and allergic rhinitis.

Fungal sinusitis can be non-invasive (confined to the sinus) or invasive. Invasive fungal sinusitis includes chronic indolent sinusitis and the acute fulminant type. The chronic indolent variety occurs in both normal immunocompetent patients and those with altered immune response as a result of diabetes mellitus, burns, trauma, and steroid therapy.^{2,15} It extends beyond the bony confines of the sinuses to the orbit or even to the anterior cranial fossa.¹⁶

Chronic indolent sinusitis is characterized by a chronic granulomatous inflammation surrounding broken fungal hyphae. Clinically, it may mimick malignant neoplasm, osteomyelitis, TB, or Wegener's granulomatosis.

Acute fulminant fungal sinusitis, on the other hand, manifests as a rapidly progressive gangrenous necrosis of the mucoperiosteum advancing relentlessly with early destruction of the bony walls of the nose and the paranasal sinuses.¹⁷ This rapid progressive course of fulminant sinusitis contrasts sharply with the chronic indolent variety.

At the time this patient presented, there were clinical features of sinusitis as well as signs of orbital involvement, but no systemic signs of immunosuppression. She had no nasal polyps, neither were her symptoms acute.

She presented about two months after the development of the initial symptoms of sinusitis (catarrh with nasal blockage), and a month after the development of proptosis. She was on admission under our care for another three months before she died, a few days after the diagnosis of cerebral abscess.

The picture presented is more of a chronic indolent type of (invasive) fungal sinusitis in an immunocompetent patient.

Diagnosis of aspergillosis of the paranasal sinuses requires a high index of suspicion. Chronic sinusitis manifests more subtly than acute sinusitis. Unless an appropriate history is taken, the diagnosis may be missed.

The patient presented first to the eye clinic with the orbital complications of paranasal sinus infection, in the form of proptosis. From the clinical features, a diagnosis of orbital cellulitis was made. Radiological findings confirmed sinusitis as the primary disease, but because there was no evidence of immunosuppression in the patient as well as the fact that the problem is rare in our hospital, a fungal aetiology was not suspected at all.

Retrospectively, there were pointers to the presence of a fungal infection in the patient and these were:

- i. The nonresponsiveness to the antibiotic therapy. This was a clue to the presence of a non-bacterial infection in the patient.
- ii. Necrotic lid ulcers are characteristic findings in orbital fungal infections.

A fungal aetiology was only entertained in the patient when KOH studies of the wound swab showed hyphae. She was placed on tabs Ketoconazole; Amphotericin B was not available.

The patient later had seizures and a diagnosis of cerebral abscess was made. The patient died two weeks later. The results of the fungal culture which came out a week after her death yielded aspergillus.



Figure 1. The necrotic lid ulcers (LE) are obvious.



Figure 2. Sino-orbital aspergillosis in an immunocompetent Nigerian woman

Aspergillosis of the paranasal sinuses is increasingly being recognized.¹ Also, with the increase in the incidence of AIDS, that of aspergillosis has also increased. More cases of aspergillosis have been seen over the past decade, with most in immunocompromised patients.¹

Aspergillosis is the second most common fungal infection in patients who are immunocompromised¹ and invasive orbital aspergillosis¹ is the most common orbital infection occurring in patients with AIDS.

Ophthalmologists should therefore, be more suspicious of the fungal aetiology of cases of proptosis that present to them, for early diagnosis and treatment.

Before the CNS invasion, early diagnosis, and prompt surgical eradication including orbital exenteration with the use of antifungals (Amphotericin B or Itraconazole) would probably have prevented death in this patient.

The major setback we had in the management of this patient was the inability to make the correct diagnosis before the patient died.

CONCLUSIONS

- i. A high index of suspicion is the first step towards the early diagnosis of orbital aspergillosis.
- ii. A good prognosis for life, prompt treatment should be instituted on diagnosis.

ACKNOWLEDGEMENT

We are very grateful to the personnel of the Medical Records department who helped us recover this patient's folder.

REFERENCES

1. Kirsch C, Turbin R, Gor D. Orbit infection. *emedicine*.
2. Al-Bhlah, LA. Fungal infection of the nasal cavity and paranasal sinuses: Review of 26 cases <http://www.kfshrc.edu.salannals/166/96-140html>.
3. Stammberger M, Jakes R, Beaufort F, Austria G. Aspergillosis of the paranasal sinuses: X-ray diagnosis, histopathology and clinical aspects. *Ann Otol Rhinol, Laryngol* 1984; 93: 251-6.
4. Mc Guirt WF, Harrill JA, Salem W. Paranasal sinus aspergillosis. *The Laryngoscope* 1979; 89: 1563-8.
5. Robb PJ. Aspergillosis of the paranasal sinuses: A case report and historical perspective. *J Laryngol Otol* 1986; 100: 1071-7.
6. Jabor MA, Amedee RG. Orbital complications of sinusitis. *J La State Med Soc* 1997 AP105-8 (Medline).
7. Yumoto E, Kitani S, Okamora H, Yanagihara N. Sino-orbital aspergillosis associated with total ophthalmoplegia. *Laryngoscope* 1985; 95 (2): 190-2.
8. Kameswaran M, Al-Wadi A, Khorana P, Okafor BC. Rhinocerebral aspergillosis. *J Laryngol Otol* 1992; 106: 981-5.
9. Daphistani KJ, Jamal TS, Zaher S, Nassif OI. Allergic *Aspergillus sinusitis* with proptosis. *J Laryngol Otol* 1992; 106: 799-803.
10. Schwart HU, Witt JW, Sher TM. Allergic bronchopulmonary aspergillosis and allergic *Aspergillus sinusitis*: Case report. *Ann Allergy* 1992; 69: 447-8.
11. Meikle D, Yarrington CT, Winterbauers RH. Aspergillosis of the maxillary sinuses in otherwise healthy patients. *The Laryngoscope* 1985; 95: 776-9.

12. Katzenstein AA, Sale SR, Greenberger PA. Allergic *Aspergillus sinusitis*: A newly recognised form of sinusitis. *J Allergy Clin Immunol* 1983; 72: 89-93.
13. Waxman JF, Spector JG, Sale SR, Katzenstein AA. Allergic *Aspergillus sinusitis* concept in diagnosis and treatment of a new clinical entity. *The Laryngoscope* 1987; 97: 261-6.
14. Bajracharya II, Hinthorn D. Sinusitis, Chronic, emedicine.
15. Hora JF. Primary aspergillosis of the paranasal sinuses and associated areas. *Laryngoscope* 1965; 75: 768-73.
16. Hartwick RW, Batsakis JG. Pathology consultation sinus aspergillosis and allergic fungal sinusitis. *Ann Otol Rhinol Laryngol* 1991; 100: 427-30.
17. Rowe-Jones JM, Moore Gillon V. Destructive non-invasive paranasal sinus aspergillosis: Component of a spectrum of disease. *J Otol Laryngol* 1994; 23: 92-6.