

# Post-COVID-19 complications - pansinusitis with orbital and cerebral abscess. Case report



Dr. Kr. Bozov, Dr. A. Ali

*ENT Department, MHAT - Shumen*

## Abstract

The occurrence of superinfections in COVID-19 patients has attracted increasing attention in recent studies. They are associated with the immunocompromised state of the patient. Such a secondary infection is also fungal sinusitis. The most common causative agents are Zygomycetes (*Rhizopus*, *Mucor*, *Rhizomucor*) and *Aspergillus*, with mucormycosis being more commonly reported. Undetected for a longer period of time give orbital and brain complications, which are distinguished by high mortality. Treatment of this pathology is extremely difficult, but there are also described cases in which it is successful. Such is our clinical case. It concerns a 77-year-old patient who entered the ENT department of "MHAT - Shumen" SA with clinical manifestation of pansinusitis, complicated with brain and orbital abscess after suffering from COVID-19. It comes with severe headache, difficulty breathing, more to the left, pain and loss of vision of the left eye, inability to move the eyeball, ptosis of the left upper eyelid, infiltrate and hyperemia in the area of an inner eye corner spreading to the nose with two fistula openings, from which a thick purulent discharge leaks when pressed over the eyeball. CT showed pansinusitis complicated with a cerebral abscess in the left frontal lobe and an intraorbital abscess in the left medial. Along with antibiotic and antimycotic treatment (Ampicillin, Ceftriaxon, Teicoplanin, Fluconazole, Itraconazole), endonasal surgical treatment with sinus-nasal optics and external incision periorbital medial was carried out. Isolated and identified in NRL by mycoses are *Aspergillus niger* - en masse and *Candida palmiophila* - moderately. A month after surgery, a new external incision periorbital was required. A smooth postoperative period followed. As a way out of the disease, pansinusitis, brain and orbital abscess were controlled, improved in the movements of the eyeball, with persistent ptosis of the left upper eyelid and lack of vision in the left eye.

**Keywords:** COVID-19, pansinusitis, fungal sinusitis, aspergilosis, orbital abscess, brain abscess

## Introduction

The outbreak of COVID-19 has spread rapidly on a global scale. Despite great efforts, there is no definitive treatment. Prevention and symptomatic management are the best options. Secondary infections are a well-described phenomenon in influenza, SARS, MERS, and other respiratory viral illnesses but super-infections and co-infections in COVID-19 pneumonia are still under exploration. In 10 to 30% of cases of hospitalized, seriously ill patients with COVID-19, secondary infections occur. Corticosteroids are thought to reduce the progression of respiratory failure in COVID-19. Their side effects include increased secondary infections, immune modulation, manifestation of latent diabetes mellitus, dizziness, weight gain, mood changes, insomnia and muscle weakness. COVID-19 has been shown to cause a derangement of immune parameters both during active infection and the convalescent period. There are several

forms of rhinosinusitis that are associated with the fungus as pathogens, and their clinical presentation is determined by the immune state of the patient. Fungal sinusitis accounts for around 6% to 9% of all rhinosinusitis cases. Maxillary sinus being most commonly affected. The species Zygomycetes (*Rhizopus*, *Mucor*, *Rhizomucor*) and *Aspergillus* are the most common causative agents, with mucormycosis more commonly reported. Invasive Aspergillosis of the paranasal sinus is an aggressive illness, that can progress rapidly to the orbit and the brain, especially if it goes on undetected for a long period. Affecting the immunocompromised and rarely, the immunocompetent. High mortality rate has been reported for both species. The principles of treatment are systemic antifungal therapy, endoscopic surgical debridement of necrotic sinusoidal tissue and reduction of the patient's immune suppression whenever possible.

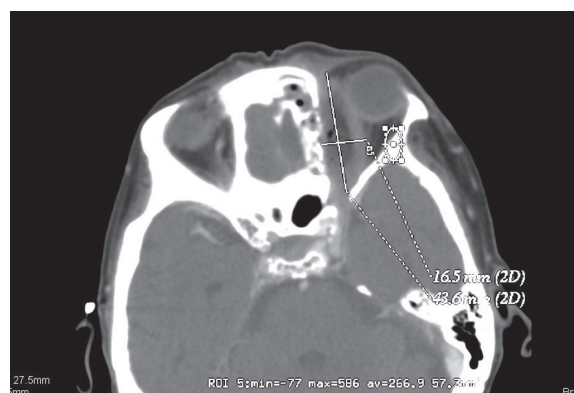
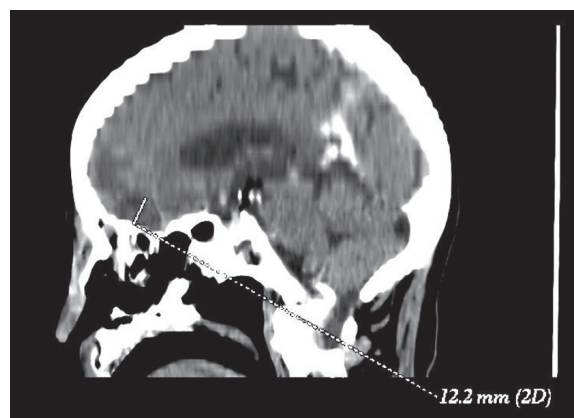
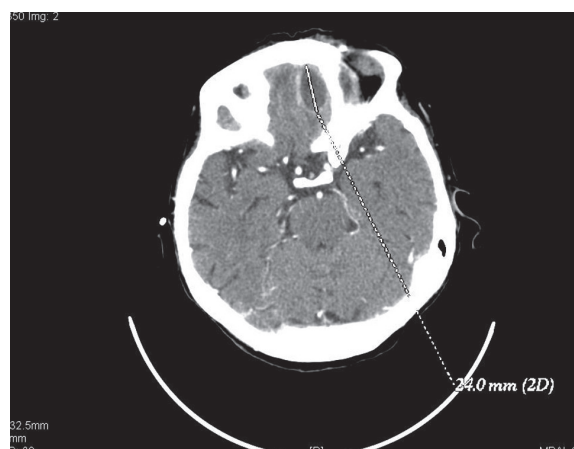
## Materials and methods

Source of information are the clinical-laboratory, physical and imaging tests in hospital care.

## Case presentation

- Anamnesis: 77-year-old patient treated for COVID-19 in November 2020. A few days after discharge, the patient lost vision of her left eye and was unable to move the eyeball. Gradually, the nasal breathing became more difficult, more on the left. There were severe headaches and pain in the left eye. After consultation with ophthalmologist and otorhinolaryngologist on 14.01.2021 was hospitalized in „MHAT – Shumen” SA with anamnestic, clinical and para-clinical data for bilateral pneumonia in reverse development and pansinusitis, complicated with brain and intraorbital abscess.
- Status:
  - Inspection and palpation – Ptosis of the left upper eyelid with mild hyperemia of the skin of the eyelid. Eyeball with limited mobility in all directions. Leachate and hyperemia of the skin in the area of an inner eye corner spreading to the nose. Presence of a baseline opening of two fistulas, from which a thick purulent discharge leaks when pressed on the eyeball.
  - Anterior rhinoscopy – Presence of dry crusts with brownish-black color upholstering nasal meatuses bilaterally, more on the left.
- Paraclinic: CRP – 23 mg/l, ESR – 95 mm/h. Other indicators in reference values.
- Chest Roentgenography – bilateral pneumonia in reverse
- • CT from 15.01.2021 – Fluid in both maxillary sinuses and ethmoid cells. Osteolytic partitions to the left orbit and to the base of the anterior cranial fossa on the left. After contrast - hypodense lesion on the base in the left frontal lobe with a thin capsule and a slight perifocal swelling of the white matter. Dimensions 24/19/16mm. A seal along a medial wall of the left orbit and a small amount of liquid with a shaped capsule. Increased density of adipose tissues retrobulbar, medially with the presence of gas bubbles. Dimensions – 44/17/13mm. Compression of the medial rectus muscle with enclosure of the dorsal part of the optic nerve,

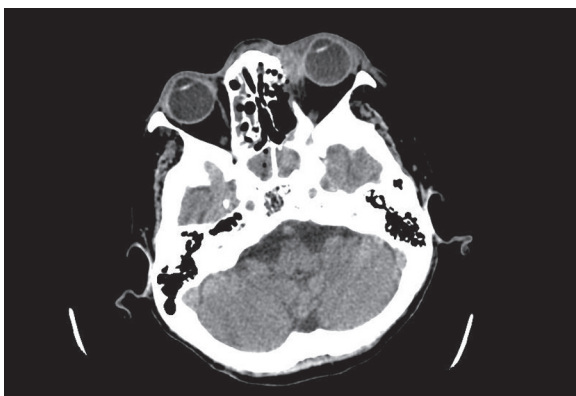
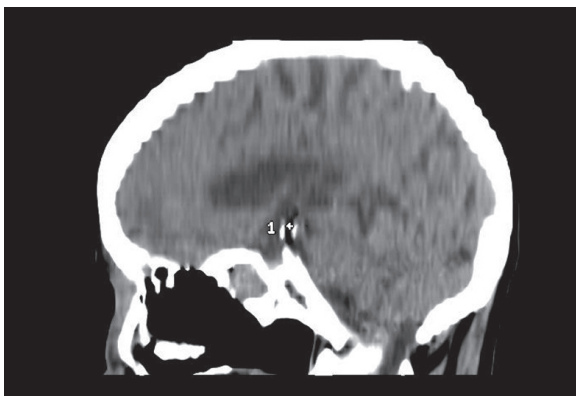
in the area of the foramen opticum. CT data for pansinusitis. Brain abscess in the left frontal lobe. Intraorbital abscess on the left, medial.



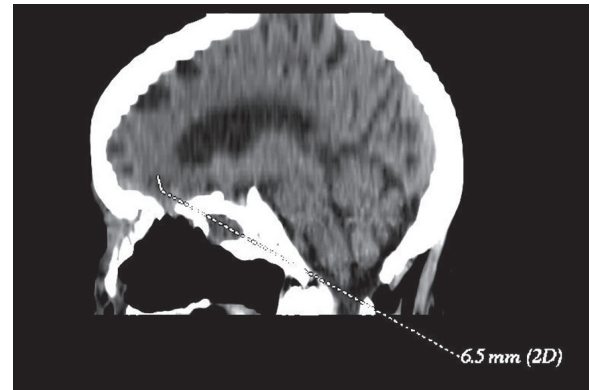
- Treatment: antibiotics and antimycotics – Ampicillin, Ceftriaxon, Teicoplanin, Fluconazole, Itraconazole.
- • Surgical treatment: General anesthesia with intubation. Under the control of sinus-nasal optics, dense, dry, fused with the mucous membrane brownish-black crusts were found, which were difficult to clean with lavage and

aspiration. Perforation of the septum, covered with the same crusts, was inspected. Strongly reduced conchae. Maxillary sinuses and ethmoid cells opened. Evacuation of thick purulent fluid. There was a desctraction of a medial wall in orbit, through which, under pressure of the eye, purulent discharge leaks. The opening expanded. Skin incision in left periorbital, median. Evacuation of purulent fluid.

- Microbiology: *Enterococcus faecalis* and *Corynebacterium* sp. (diphtheroid).
- Isolates were identified in mycosis NRLs such as *Aspergillus niger* – mass and *Candida palmioleophila* - moderately. They were tested for antimycotics also in NRLs.
- Histology: Multiple nuggets showing inflammatory crust composed of blood, leukocytes, fibrins and lymph and bone tissue with necrotic changes with multiple bacterial colonies between bone beams and haemorrhage.
- Control CT from 25.01.2021 – Reverse development of the cerebral abscess in the left hemisphere and pansinusitis.



- Dehospitalized on 04.02.2021 with therapy – Itraconazol 100mg 1x1 p.o.
- Control CT from 15.02.2022 – Reverse development of the brain abscess. Persists abscess in left orbit.



- Second surgical treatment: General venous anesthesia. Skin incision expanded into left periorbital, median. Evacuate purulent contents. Put on a glove drain. Bleeding scarcely. Dressing.
- Control CT on 31.05.2021 – There is no liquid collection in the left orbit. Cerebrum with slightly decreased cortical density in the left anterior cranial fossa, basal, with no evidence of an abscess.
- Outcome of the disease:
  - Pansinusitis, brain abscess, and orbital abscess were healed
  - Clear eyeball
  - Improvement in the movements of the left eyeball with some difficulty in moving the pupil medially
  - Persists ptosis of left upper eyelid
  - Anopia on the left.



## Discussion

Fungi are ubiquitous in our environment and with dedicated assessments they can be found in nasal mucus from almost all healthy and diseased sinuses. However, there are several forms of sinus disease that are associated with fungi as pathogens. In these situations, rather than the fungi determining the disease, it is usually the host immune state that determines the clinical presentation. Immunocompromised states are related to uncontrolled diabetes mellitus, hematological malignancies, post renal or bone marrow transplant patients, acquired immunodeficiency syndrome, immunosuppressant or receiving chemotherapy for underlying malignancies. COVID-19 infection is added to this list. The most susceptible patients for secondary bacterial or fungal infections are precisely the immunocompromised.

According to the study of Jeremy A.W. Gold, Stacey Adjei, Adi V. Gundlapalli, Ya-Lin A. Huang, Tom Chiller, Kaitlin Benedict and Mitsuru Toda during 2020–2021 in United States, patients hospitalized with COVID-19–associated fungal infections had higher (48.5%) in-hospital mortality rates than those with non–COVID-19–associated fungal infections (12.3%).

The most common causative pathogens remain the Zygomycetes (Rhizopus, Mucor, Rhizomucor) and the Aspergillus species. Many case reports are published on rhino-orbito-cerebral mucormycosis and less on aspergillosis.

As per the study on Invasive Fungal Sinusitis in Post COVID-19, patients by Noha Ahmed et al., all the 36 patients had sino-nasal involvement, 80.6% had orbital, 27.8% had cerebral and 33.3% of the patients had palatine involvement. Among 32 patients 77.8% were diagnosed to have Mucor species and 30.6% of the patients had Aspergillus species.

Surgical intervention along with administration of antifungal agents remains as the main stay of treatment in these patients. This primarily takes the form of endoscopic sinus surgery with the aim of firstly establishing an early diagnosis, obtaining tissue samples and debridement of necrotic tissue (mucosa and bone if necessary). It is well established that the debridement of necrotic tissue in this setting should be undertaken until healthy,

bleeding tissue is encountered. This may well include removal of large amounts of nasal mucosa, turbinates as well as extended sinonasal access procedures to clear the sinus. In patients with more advanced AIFR involving the orbit or intracranial complications, the question arises as to whether a more extensive and disfiguring open surgery is required. The evidence suggests that procedures such as orbital exenteration or radical maxillectomies do not significantly improve survival, it must be noted that these patients have extremely poor survival anyway. Many authors agree that orbital exenteration should only be performed in the case of a non-functioning eye.

There are also case reports of 100% healing in operations for orbital complications of sinus origin, including medially located intraorbital abscesses, such as our case.

Surgical treatment helps in providing better access for the penetration of anti-fungal medications. Choice of antifungal medications is tailor made to every patient. Most commonly administered anti-fungal agents includes Amphotericin, Voriconazole, Posaconazole.

Control of underlying medical condition plays an important role in better recovery of the patient. Immune suppression should be reduced whenever possible.

## Conclusion

Early diagnosis of fungal infections is very important, because treatment in such cases as the presented pansinusitis with orbital and cerebral complications of a patient in an immunocompromised state is a real challenge.

## References

1. Fokkens W.J., Lund V.J., Hopkins C., Hellings P.W., Kern R., Reitsma S., et al. European Position Paper on Rhinosinusitis and Nasal Polyps 2020 Rhinology. 2020 Suppl. 29: 1–464.
2. Издание на българско ринологично сдружение Европейски консенсус за Риносинуити и Носна полипоза 2020 ISBN 978-619-91274-2-1 Пловдив, 2021 г.
3. Деспотов О., Джамбазов К. Ендоназална хирургия 2002 ISBN:954-9752-27-5
4. Джамбазов, К. и сътр. Случай на аспергилоза на носа и околоносните кухини. Фолиа Медика, 4:30-32, 2001
5. Maini A, Tomar G, Khanna D, Kini Y, Mehta H, Bhagyasree V.

- Sino-orbital mucormycosis in a COVID-19 patient: A case report  
Int J Surg Case Rep. 2021;82:105957
6. M. Jayaweera, H. Perera, B. Gunawardana, J. Manatunge  
e Transmission of COVID-19 virus by droplets and aerosols: a critical review on the unresolved dichotomy Environ. Res., 188 (2020 Sep), p. 109819
  7. Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations <https://www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations>
  8. Superinfections and coinfections in COVID-19 MedPage Today. <https://www.medpagetoday.com/infectiousdisease/covid19/86192>
  9. RECOVERY Collaborative Group, P. Horby, W.S. Lim, et al.  
a. Dexamethasone in Hospitalized Patients with Covid-19  
b. N. Engl. J. Med., 384 (8) (2021 Feb), pp. 693-704, 10.1056/nejmoa2021436
  10. Methylprednisolone for patients with COVID-19 severe acute respiratory syndrome - full text view ClinicalTrials.gov <https://clinicaltrials.gov/ct2/show/NCT04323592>
  11. Kronish JW, Johnson TE, Gilberg SM, Corrent GF, McLeish WM, Scott KR. Orbital infections in patients with human immunodeficiency virus infection Ophthalmology. 1996;103:1483-92
  12. Sandeep Shetty, C Shilpa, S Kavya, Anand Sundararaman, Kiran Hegde, Sriram Madhan Invasive Aspergillosis of Nose and Paranasal Sinus in COVID-19 Convalescents: Mold Goes Viral? PMID: 35043088 PMCID: PMC8758239 DOI: 10.1007/s12070-022-03073-6
  13. Hamad M. Alsulaiman, Sahar M. Elkhamary, Mohammed Alrajeh, Osama Al-Alsheikh, and Huda Al-Ghadeer Invasive sino-orbital aspergillosis with brain invasion in an immunocompetent pregnant patient Am J Ophthalmol Case Rep. 2021 Dec; 24: 101210. Published online 2021 Sep 23. doi: 10.1016/j.ajoc.2021.101210
  14. El-Kholy NA, Abd El-Fattah AM, Khafagy YW. Invasive fungal sinusitis in post COVID-19 patients: a new clinical entity. The Laryngoscope. 2021;6:66.
  15. Gold J, Adjei S, Gundlapalli AV, et al. Increased Hospitalizations Involving Fungal Infections during COVID-19 Pandemic, United States, January 2020–December 2021. Emerging Infectious Diseases. 2023;29(7):1433-1437.
  16. Peter George Deutsch, Joshua Whittaker and Shashi Prasad Invasive and Non-Invasive Fungal Rhinosinusitis - A Review and Update of the Evidence Medicina (Kaunas). 2019 Jul; 55(7): 319. Published online 2019 Jun 28.



Save  
the date **19,22**  
September **2024**

**Paris, France**

CNIT Paris La Défense