

Surgical experience in the treatment of invasive fungal disease of upper respiratory tract in hematological patients and patients who have a new coronavirus infection caused by SARS-CoV-2



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Introduction:

An immunocompromised patients are at high risk of invasive fungal disease (IFD). The incidence of sinusitis in this group of patients is up to 15%, of which 8% is caused by fungi. The relevance of IFD with upper respiratory tract lesions has increased due to the pandemic of the new coronavirus infection SARS-CoV-2, secondary immunodeficiency due to COVID-19 and its treatment.

Patients and methods:

We present data of 20 cases of IFD: 11 cases in hematological patients who were treated in RM Gorbacheva Research Institute in the period from 2018 to 2021 and 9 patients who underwent COVID-19. Age: from 1 year 8 months to 80 years, 7 children (35%) and 13 adults (65%). Patients with IFD had the following background conditions: agranulocytosis as a result of antitumor chemotherapy for acute leukemia (n=8), allo-HSCT (n=2) with acute leukemia and mucopolysaccharidosis type I (MPS I), and drug hapten agranulocytosis (n=1), as well as the use of glucocorticosteroids (GCS) for the treatment of COVID-19 (n=9). Diagnosis of IFD in 100% of patients included computed tomography (CT) of the paranasal sinuses, endoscopic examination, biopsy, direct microscopy, cultural examination of the biopsy.

Results:

The main clinical manifestations of IFD localized in the upper respiratory tract were: fever above 38C – 77.8% (only in hematological patients), nasal breathing disorder – 100%, hyperemia and local facial edema – 77.8%, pain/pressure and feeling of overflow in the facial area – 77.8%. headache – 44.4%, ptosis – 22.2%, ophthalmoplegia – 11.1%. In two patients, IFD of the upper respiratory tract was combined with lung – 22.2%. CT-signs of IFD: decrease in pneumatization of sinuses – 100%, destruction of bone tissue – 77.8%. During endoscopic examination: necrosis of the mucous membrane – 88.9%, destruction of bone structures – 77.8%. The diagnosis of IFD was established using microscopy with calcofluor staining of a biopsy specimen (100%). Etiology of IFD: mucormycosis (n=9), fusarium (n=2), aspergillosis (n=2), a combination of mucormycosis and aspergillosis (n=7). The culture of the pathogen was obtained in 6 patients: *Lichtheimia corymbifera* – 33.3%, *Fusarium oxysporum* – 16.7%, *Fusarium solani* – 16.7%, *Aspergillus fumigatus* – 16.7%, a combination of *Aspergillus niger*, *Aspergillus flavus* and *Rhizopus arrizus* – 16.6%. Patients received systemic antifungal therapy in accordance with international guidelines. Surgical treatment was performed in 100% of patients with mucormycosis and fusarium in an emergency, patients with aspergillosis – after hematological recovery. Hematological patients: 100% received antifungal therapy, 73% received surgical treatment. Patients with Covid-19: 73% received antifungal therapy, 100% of patients underwent surgery. With the median of the follow up time 2 years: all patients in COVID-19 group and 8 patients in hematology group are alive.

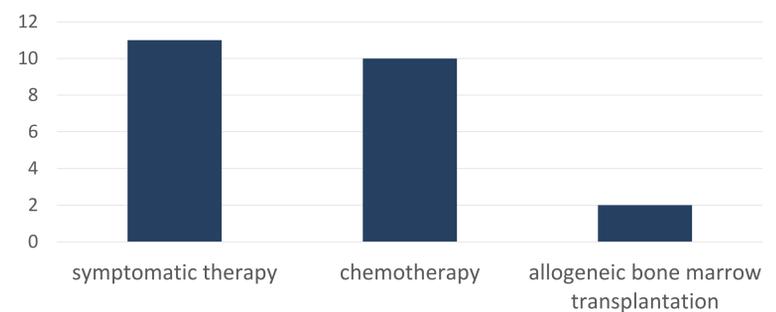
Conclusion:

Immunocompromised patients as hematology patients as post-COVID-19 are a risk group of developing IFD. A feature of IFD is an extremely rapid spread with the formation of significant lesions in the form of necrosis, destruction, bleeding, penetration into the orbit, the cranial cavity. IFD of the upper respiratory tract are associated with serious complications, and surgery is disabling. Identification of the pathogen is required for early adequate antifungal therapy. The success of diagnosis and therapy is possible only with a multidisciplinary approach to the treatment of the patient. The key is early drug therapy and surgical tactics, which are determined by a specific pathogen. The combination of antifungals and surgical treatment increases the survival rate.

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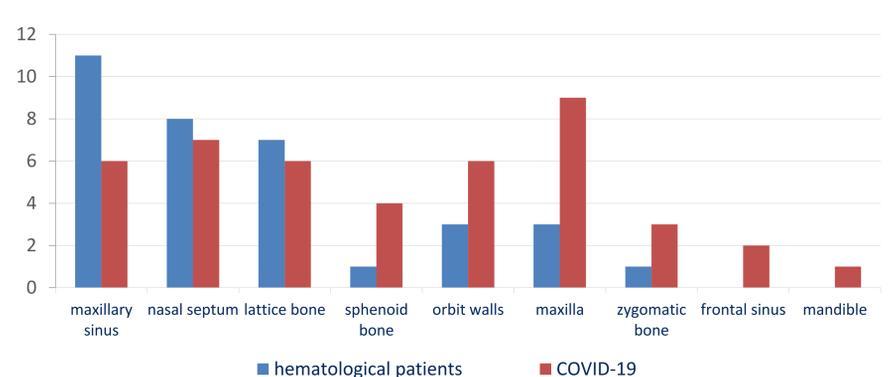
Background of hematological patients: therapy of underlying disease



Background of post-COVID-19 patients: course and therapy of COVID-19

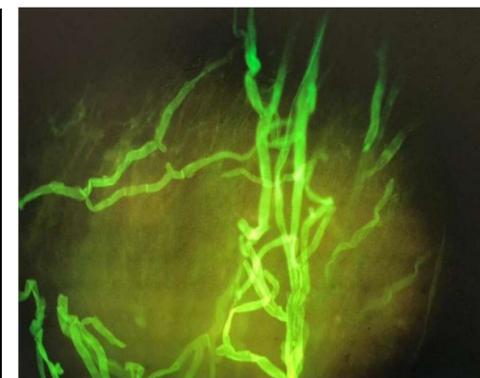


Radiological signs of destruction of the bones of the facial skeleton



A clinical case: 11-year-old patient, diagnosed with acute lymphoblastic leukemia, after chemotherapy and COVID-19

a) computed tomography in coronary projection b) electron microscopy



c) endoscopy of the nasal cavity

d) growth of the mycelium of the fungus

