Invasive candidiasis and PJP in COVID-19 patients

M Salehi
Associate professor in infectious diseases
Tehran University of Medical Sciences
Many factors could influence the morbidity and mortality in COVID-19 patients, among these, opportunistic fungal infections have a serious role.
There are three reasons for immunocompromised status in COVID-19 area:

• Significant decrease of different cell components, essentially microphages, neutrophils, and lymphocytes

• Downregulation of tight junction, integrity and barrier function of the epithelium of respiratory system.

• Immunosuppressive agents such as corticosteroids used in treatment
Candida species are the most isolated fungi responsible for invasive infection of extrapulmonary sites in COVID-19 patients.
Opportunistic Fungal Infections in the Epidemic Area of COVID-19: A Clinical and Diagnostic Perspective from Iran

Mohammadreza Salehi · Kazem Ahmadikia · Hamid Badali · Sadegh Khodavaisy
• The role of opportunistic fungal infections in the morbidity and mortality of COVID-19 patients remains less defined.

• COVID-19 patients are most likely to develop pulmonary aspergillosis, oral candidiasis, or pneumocystis pneumonia.

• Other IFI are probable as the accurate diagnosis of opportunistic fungal infections remains challenging in resource-poor settings.
Oropharyngeal candidiasis in hospitalised COVID-19 patients from Iran: Species identification and antifungal susceptibility pattern


First published: 01 July 2020 | https://doi.org/10.1111/myc.13137 | Citations: 23
Patients and Methods

• hospitalized COVID-19 patients with OPC were studied.

• Relevant clinical data were mined.

• Strain identification was performed by 21-plex PCR.

• Antifungal susceptibility testing was performed according to the CLSI broth dilution method.
Results

• During the period of this study, **53 (5%) out of 1059** Iranian patients with confirmed COVID-19 infection had OPC.

• Almost **80%** of the patients (n = 42) were ≥50 years of age, which was significantly associated with OPC (P = .03).

• The **mean time interval** between diagnosis of COVID-19 and clinical presentations of OPC leading to specimen collection was **8 days**.

• Cardiovascular diseases (28/53; 52.8%) and diabetes (20/53; 37.7%) were the principal underlying conditions.

• **Seventy-one per cent of patients showed lymphopaenia** (a median lymphocyte count of 1000 cells/mm) (P < .001).

• **C. albicans** (46/6; 70.7%) was the most prevalent yeast species.

• In general, there was a **high level of susceptibility** to all the tested antifungal drugs.
<table>
<thead>
<tr>
<th>Risk factors</th>
<th>49</th>
<th>92</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recipient broad-spectrum antibiotics</td>
<td>25</td>
<td>47</td>
</tr>
<tr>
<td>Corticosteroid therapy</td>
<td>26</td>
<td>49</td>
</tr>
<tr>
<td>Admission to ICU</td>
<td>16</td>
<td>30</td>
</tr>
</tbody>
</table>
Critically ill patients with COVID-19 and candidaemia: We must keep this in mind

Usually and in relation to our local epidemiology, the annual incidence rate is $1.07 - 2.19$ candidaemia for every 1000 patients admitted to the ICU. C. albicans is the most commonly isolated species (50%) in blood cultures, followed by C. parapsilosis (20%), C. glabrata (13%), C. tropicalis (10%) and C. krusei (7%).
Incidence of bacterial and fungal bloodstream infections in COVID-19 patients in intensive care: An alarming “collateral effect”

Maria Adriana Cataldo*, Nardi Tetaj, Marina Selleri, Luisa Marchioni, Alessandro Capone, Emanuela Caraffa, Antonino Di Caro, Nicola Petrosillo, the INMICOVID-19 Co-infection Group

National Institute for Infectious Diseases Lazzaro Spallanzani-IRCCS, Rome, Italy
<table>
<thead>
<tr>
<th>Aetiological agent</th>
<th>Number of patients</th>
</tr>
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<tbody>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>6</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa + Enterococcus faecium</td>
<td>1</td>
</tr>
<tr>
<td>Pseudomonas putida</td>
<td>1</td>
</tr>
<tr>
<td>Enterococcus faecalis</td>
<td>3</td>
</tr>
<tr>
<td>Enterococcus faecium</td>
<td>4</td>
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<tr>
<td>Klebsiella aerogenes + Enterococcus faecium</td>
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</tr>
<tr>
<td>Klebsiella aerogenes</td>
<td>1</td>
</tr>
<tr>
<td>Klebsiella pneumoniaiae</td>
<td>1</td>
</tr>
<tr>
<td>Escherichia coli</td>
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</tr>
<tr>
<td>Enterobacter cloacae</td>
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</tr>
<tr>
<td>Stenotrophomonas maltophilia</td>
<td>1</td>
</tr>
<tr>
<td>Enterococcus casseliflavus/gallinarum</td>
<td>2</td>
</tr>
<tr>
<td>Candida albicans</td>
<td>2</td>
</tr>
<tr>
<td>Candida parapsilosis</td>
<td>2</td>
</tr>
<tr>
<td>Candida glabrata + Candida parapsilosis</td>
<td>1</td>
</tr>
</tbody>
</table>
In this retrospective study, investigators assessed COVID-19-associated candidemia (CAC) epidemiology in the intensive care units (ICUs) of two COVID-19 centers in Mashhad, Iran, from early November 2020 to late January 2021.
Results

• Among 1988 patients with COVID-19 admitted to ICUs, seven had fungemia (7/1988; 0.03%).

• The mortality of the limited CAC cases was high and greatly exceeded that of patients with COVID-19 but without candidemia (100% (6/6) vs. 22.7% (452/1988)).

• In total, nine yeast isolates were collected from patients with fungemia: five Candida albicans, three C. glabrata, and one Rhodotorula mucilaginosa.

• Half of the patients infected with C. albicans (2/4) were refractory to both azoles and echinocandins.
Pneumocystis pneumonia (PJP)
in COVID-19 Patients
Pneumocystis pneumonia (PJP), an opportunistic fungal infection, is caused in immunocompromised individuals, specially immunodeficiency virus (HIV).
Pneumocystis and Severe Acute Respiratory Syndrome Coronavirus 2 Coinfection: A Case Report and Review of an Emerging Diagnostic Dilemma

Carlos Rubiano, Kathleen Tompkins, Subhashini A Sellers, Brian Bramson, Joseph Eron, Jonathan B Parr, Asher J Schranz

Open Forum Infectious Diseases, Volume 8, Issue 1, January 2021, ofaa633
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Published: 18 December 2020  Article history
They present a case of a critically ill patient with coronavirus disease 2019 (COVID-19).

Chest CT Scan showed diffuse bilateral ground-glass opacifications.

HIV-1/2 antigen/antibody test was performed and reactive.

He took Remdesivir, a transfusion of COVID-19 convalescent plasma, and antibacterial medications (ceftriaxone and azithromycin).
Based on subacute symptoms and x-ray findings, an evaluation for PCP was undertaken and he was started on empiric trimethoprim-sulfamethoxazole and prednisone.
• A tracheal aspirate acid-fast stain, bacterial culture, and P. jirovecii direct fluorescent antibody stain (DFA) were all negative.

• **Positive** serological studies included (1→3)-β-D-glucan >500 pg/mL.

• On hospital day 7, he underwent **bronchoscopy with bronchial alveolar lavage** that yielded **positive Pneumocystis DFA and PCR tests, positive SARS-CoV-2 PCR**, and bacterial, fungal, and mycobacterial cultures that remain negative to date.

• The patient completed a course of remdesivir. He received a 21-day course of trimethoprim-sulfamethoxazole and prednisone for PCP, and he started dolutegravir with combination tenofovir alafenamide/emtricitabine for HIV.
He continued to experience refractory hypoxemia despite maximal ventilator settings, paralytic agents, and prone positioning. On hospital day 26, he developed asystolic cardiac arrest and died.
A 25-year-old male presented with profound hypoxemia during SARS-CoV-2 pandemic. Chest X-ray showed a large right pneumothorax and extensive interstitial disease.
SARS-CoV-2 PCR was positive. HIV serology was positive and his absolute CD4+ count was 32 cells/mm3.
• Pneumocystis pneumonia (PCP) was confirmed by bronchoscopic Pneumocystis RT PCR.

• Trimethoprim–sulfamethoxazole, prednisone, and Remdesivir was started.

• The patient improved clinically and was successfully extubated 21 days later.

• Multifocal ground-glass opacities are the principal finding in both PCP and SARS-CoV-2 infection, making radiographic differentiation potentially difficult, especially in the immunocompromised host.

• Cystic lesions can occur in one third of patients with advanced PCP.
Methods

• We conducted a literature search of articles to better comprehend previous studies' similarity using PubMed/MEDLINE, Scopus, and Google scholar. The search terms used were "Pneumocystis" and "PJP", combined with "SARS-COV-2", or "COVID-19".
Result

- **Twelve** cases were the search results of the databases.
- The mean age was **53 years** and men compromised 75% cases.
- Underling disease was observed in all patients.
- The advanced **HIV/AIDS** was the most common risk factor in **59%**.
- The **remdesivir, tocilizumab, and hydroxychloroquine** were used more than other anti-COVID-19 drugs.
- The combination of (TMP/SMX) was the most common anti-PJP treatment, followed by caspofungin.
- Moreover, among our reviewed cases, there were five deaths. Overall, the **mortality rate** was **44%**.
They present two cases of newly diagnosed advanced HIV infection with Pneumocystis pneumonia (PCP) that were initially managed as suspect cases of COVID-19, and in whom HIV was not initially considered. PCP frequently occurs when the CD4 count drops below 200 cells/μL, which can manifest as lymphopenia.