

## Candida glabrata Infection: A Rare Complication of Chest Trauma

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### ABSTRACT

*Candida species are fungi, which are ubiquitous organisms. It is a normal flora of the oral cavity, genitourinary and gastrointestinal tract. An increasing incidence of fungal infections with Candida species has been noted in immunocompromised patients such as intensive care, postsurgical, and neutropenic patients. Candida species are detected in approximately 31 to 55% of healthy individuals. They are more common in immunocompromised individuals. Colonization rates increase with severity of illness and duration of hospitalization. We present a 32-year-old male who presented at our institution with a thoracoabdominal penetrating injury following assault. He had injury to the stomach and left hemi diaphragm, with moderate hemothorax. He had surgery done with repair of the stomach and diaphragm. He however developed chest infection with empyema thoracis thereafter. Culture of the pleural effluent revealed growth of Candida glabrata which was sensitive to Ketoconazole. He was treated for two weeks and subsequently discharged from the ward and followed up in the clinic. Though C. glabrata infection of the chest is rare, it is however useful to exclude fungal infection in patients with empyema thoracis, as early diagnosis and treatment provides good outcome.*

### Keywords

*Candida glabrata*, Hemothorax, Empyema thoracis.

### Introduction

*Candida glabrata*, like other *Candida* species, belongs to the class Fungi imperfecti, the order Moniliales, and the family Cryptococcaceae [1,2].

*Candida* species are ubiquitous organisms [3]. An increasing incidence of fungal infections with *Candida* species has been noted in immunocompromised patients such as intensive-care, postsurgical, and neutropenic patients [4-9]. *Candida* species are most frequently isolated from the oral cavity and are detected in approximately 31 to 55% of healthy individuals [3]. Colonization rates increase with severity of illness and duration of hospitalization [3,9,10]. Historically, *C. albicans* accounted for 70 to 80% of the isolates recovered from infected patients. *C. glabrata* and *C. tropicalis* each accounted for approximately 5 to 8% of isolates, while other non-*albicans* *Candida* species occur only rarely [4,11]. However, more recent epidemiological data reveal a mycological

shift from *C. albicans* to the non-*albicans* *Candida* species such as *C. glabrata*, *C. tropicalis*, *C. parapsilosis*, and *C. krusei* [2,8,12-15].

*Candida glabrata* has been considered a relatively nonpathogenic saprophyte of the normal flora of healthy individuals, rarely causing serious infection in humans[16,17]. However, following the widespread and increased use of immunosuppressive therapy together with broad-spectrum antimycotic therapy, the frequency of mucosal and systemic infections caused by *C. glabrata* has increased significantly [8,15,18-20]. In fact, depending on the site of infection, *C. glabrata* is often the second or third most common cause of candidiasis after *C. albicans* [21]. *C. glabrata* infections can be mucosal or systemic and are common in abnormal hosts (e.g., immuno-compromised persons or those with diabetes mellitus) [21,22].

*C. glabrata* can be routinely isolated as a commensal from oral cavity, genitourinary tract, alimentary tract and respiratory tract.

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Risk factors for postoperative infections include depressed immune response, lung damage caused by resection, tube and catheter-related contamination of the airway, impaired expectoration, silent aspirations, changed local ventilation parameters and impaired postoperative ventilation due to pain [23,24].

The aim of this article is to highlight the importance of investigating for fungi infection in patients with post-surgical chest infection and empyema thoracis, as early diagnosis and treatment yields good result.

## Case Report

A 32 year old male businessman, presented at the Accident and Emergency center with 2 hour history of stab injury to the abdomen following an argument with a friend. He was stabbed at the left upper abdominal quadrant with associated sharp abdominal pain, bleeding (with blood loss of approximately 500mls), and bowel evisceration. There was also associated left sided chest pain and difficulty in breathing. He had neither haemoptysis nor haematemesis. He was initially treated in a general hospital where the wound was sutured before being referred for further management.

On arrival, he was looking acutely ill, he was not pale and afebrile, not dehydrated, but was in painful and respiratory distress. Oxygen saturation was 97% on intranasal oxygen therapy at 5 litres/minute.

His pulse rate was 107 beats/minute; blood pressure was 112/77mmHg. His heart sounds were normal.

He had a respiratory rate of 48 cycles/minute on arrival. There was reduced chest excursion on the left, and stony dull percussion note at the middle and lower lung zones of the left hemithorax with associated reduced air entry. Diagnostic thoracentesis yielded free-flowing non-clotting blood.

There was a sutured wound (approx 6cm) in the Left upper quadrant of the abdomen with associated generalized abdominal tenderness. Guarding was positive and bowel sounds were absent.

A diagnosis of penetrating thoraco-abdominal injury was made.

Haematological investigation revealed a haemogram of 14g/dl (Packed Cell Volume - 41%), White Cell Count - 6,800 x 106/l, differentials were within normal range, platelet - 270,000 x 106/l. electrolytes, urea and creatinine were all within normal limits.

Abdomino-pelvic ultrasound scanning showed anterior abdominal wall haematoma and minimal haemoperitoneum.

Chest radiograph showed left hemothorax.

Initial care involved intranasal oxygen therapy at 6Litres per minute, intravenous fluids, intravenous antibiotics (Ceftriaxone and Metronidazole) and parenteral analgesics. He was kept nil per os.

The patient had left closed thoracostomy tube drainage using a large bore chest tube which drained ~600mls of blood immediately. He was also given an incentive spirometer. He underwent emergency exploratory laparotomy. Intraoperative findings included:

1. Two lacerations on the anterior wall of the stomach, along the greater curvature (3 cm and 2 cm respectively).
2. A 4cm diaphragmatic tear.
3. Haemoperitoneum of 1.7Litres.

An abdominal drain was left in situ and he was transfused with a total of 3 pints of whole blood.

Intravenous Levofloxacin, 500mg daily was added to the antibiotics post-operatively.

Investigations done on the second postoperative day showed Packed Cell Volume of 34% and electrolytes, urea creatinine were essentially within normal limits.

He moved bowel on the third day; he commenced graded oral sips on the 5th day and normal diet on the 6th day. All parenteral medications were also changed to oral and abdominal drain was removed on the 5th day postoperatively.

By the 7th postoperative day, total volume of effluent from the chest drain was ~3,000mls, and the effluent became purulent. The patient became febrile with temperature of 38.2°C. He developed chills, rigor, generalized body pains and cough. An assessment of pyothorax was then made.

Blood sample was taken for full blood count and malarial parasite check. Pleural aspirate was also collected for cholesterol, triglyceride with cholesterol/triglyceride ratio, microscopy culture and sensitivity and lactate dehydrogenase assay. Viral studies for Hepatitis B surface antigen and retroviral screening were negative. The patient was treated empirically for malaria using Artemisinin combination therapy.

Pleural fluid aspirate culture yielded moderate growth of *Candida glabrata* which was sensitive to caspofungin, Ketoconazole and Amphotericin B. Ketoconazole tablets 400mg daily was administered for 2 weeks, then 200mg daily was administered for 2 weeks.

After 6 days, the fever subsided. The chest tube was removed on the 13th day. Chest radiograph showed minimal left pleural effusion. The lungs were well expanded.

The patient was discharged home after 29 days of hospital stay and he is being followed up in the clinic.

## Discussion

*Candida glabrata* was considered a relatively nonpathogenic commensal fungal organism of human mucosal tissues. However, with the increased use of immunosuppressive agents, mucosal and systemic infections caused by *C. glabrata* have increased

significantly, especially in the human immunodeficiency virus-infected population [25]. Other common candida infections include those involving the urinary tract, postsurgical or peritoneal dialysis-related peritonitis, endocarditis, and esophagitis. *C. glabrata* currently ranks second or third as the causative agent of superficial (oral, esophageal, vaginal, or urinary) or systemic candida infections, which are often nosocomial [25].

The indexed patient was found to be HIV negative after three consecutive tests in different laboratories. The surgery probably predisposed him to the fungal infection. However, Candida infection of the lungs could result from nosocomial infection, which could also be the case with the patient. In a prospective study by Sok et al. [26], patients with postoperative infection, causative pathogens were identified from sputum, tracheal aspirate, thoracic puncture and thoracic drainage fluids. They concluded that pathogens that cause pleuropulmonary infective complications are probably acquired postoperatively from the patient's oral cavity, pharynx and hypopharynx.

A variety of clinical features should suggest the possibility of a fungal lung infection. Slow-to-resolve lung infiltrates, with or without associated adenopathy, that are unresponsive to usual antibacterial drugs is a classical presentation. Symptoms of fungal infections of the lung includes fever, cough which is usually dry, chest discomfort (dull and poorly localised or focal and pleuritic), progressive dyspnoea, particularly on exertion and haemoptysis which is a relatively common symptom of invasive aspergillosis/mucormycosis. Our patient presented with fever, cough, chest pain and dyspnoea.

In a prospective review of 75 patients by Wansbrough-Jones et al. [27], Haemophilus influenza was the most common cause of post-operative chest infection following lung surgery. In another prospective study of 194 patients, Sok et al. [26] demonstrated that 17.6% of patients who had lung surgeries were complicated by chest infection and the common causes were Bacteria and Candida albicans.

Currently, however, there are few recognized virulence factors of *C. glabrata* and little is known about the host defense mechanisms that protect against infection. A major obstacle in *C. glabrata* infections is their innate resistance to azole antimycotic therapy, which is very effective in treating infections caused by other Candida species [25]. However, our patient did well on treatment with Ketoconazole.

## Conclusion

*Candida glabrata* though a normal flora of the oral cavity, genitourinary and gastrointestinal tract, can rarely be a cause of chest infection with empyema thoracis. In patients with empyema thoracis following surgery, it is useful to conduct fungal studies on the pleural aspirate in order to make early diagnosis and appropriate and timely treatment instituted. Outcome of appropriate treatment of *C. glabrata* is good.

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