CASE REPORT

Candida pelliculosa Infection in Adults Admitted in Intensive Care Unit of Tertiary Care Center: Should We Treat or Not?

Sangam Yadav[1], Ankur Sharma[2], Nikhil Kothari[3], Vidhi Jain[4], Shilpa Goyal[5], Mahima Khatri[6], Tejashree Nare[7]

Received on: 28 October 2022; *Accepted on:* 15 August 2023; *Published on:* 27 October 2023

Abstract

Introduction: *Candida pelliculosa (C. pelliculosa)* infection has been reported as an agent of healthcare-associated candidemia in the neonatal intensive care unit (ICU) but is less commonly reported in critically ill adults.

Case description: We reported two cases in our adult ICU who were found to have this uncommon infection. The first patient was a 25-year-old female with preeclampsia who underwent emergency lower segment cesarean section (LSCS) for abruption placentae and showed signs of sepsis. On examining her blood cultures, we could isolate *C. pelliculosa* and start her on anti-fungal treatment, to which she responded appropriately. The second case was of a 57-year-old male with pituitary apoplexy on steroid therapy whose surveillance blood culture was also flagged for *C. pelliculosa*. However, he was not started on any treatment. We try to discuss the difference in approach to treatment in both cases, though they flagged for the same organism.

Conclusion: These cases further emphasize the necessity of source control, as *C. pelliculosa* infection has been linked to outbreaks.

Keywords: *Candida pelliculosa*, Case report, Echinocandins, Outbreak, Intensive care unit.

Indian Journal of Critical Care Case Report (2023): 10.5005/jp-journals-11006-0070

Introduction

Candida pelliculosa (*C. pelliculosa)* is the new name given to the budding yeast *Pichia anomala*, a less-commonly known human pathogen. It has been demonstrated that outbreaks of candidemia in the neonatal intensive care unit (ICU) are associated with increased mortality and morbidity.[1] In neonates, the risk factors include; prolonged hospital stay and use of three or more broad-spectrum antibiotics.[2] A few adult case reports show that the infection was seen in patients with human immunodeficiency virus (HIV), joint prosthesis, and prosthetic cardiac valve, requiring echinocandins treatment.[3,4] Transmission is likely *via* adhesion to the cell surfaces in the environment and biofilm formation. It has been isolated from bloodstream infections in neonates, leading to neonatal ICU outbreaks.[2] The following two cases were reported from our hospital's adult ICU (AICU) simultaneously, sparking the possibility of a potential outbreak.

Case Description (Table 1)

Case 1

A 25-year-old pregnant female with preeclampsia; had bleeding per vagina and raised blood pressure recordings of 200/110 mm Hg, for which she presented to a private hospital. Ultrasonography (USG) revealed intrauterine death of the fetus with abruption placentae. She underwent emergency lower segment cesarean section (LSCS) and received a massive blood transfusion intraoperatively with 4 units each of packed red cells, fresh frozen plasma, and platelets. Postoperatively she was shifted to the ICU and was kept intubated. The patient developed acute kidney injury and became anuric in the postoperative period with clinical features of fluid overload; hence dialysis was initiated immediately. Echocardiography and USG abdomen were normal. Because of high blood pressure recordings, she was started on labetalol infusion and magnesium sulfate ($MgSO_4$) infusion by Zuspan regimen continued for 24 hours.[3] Initially, the blood investigation revealed features of hemolysis, elevated liver enzymes, and low platelets (HELLP) syndrome, and there was suspicion of thrombotic thrombocytopenic purpura (TTP). Her peripheral blood film was normal; hence, TTP was ruled out, and we proceeded with the provisional diagnosis of HELLP with sepsis. She required alternate-day dialysis and therapy. High-resolution chest tomography revealed bilateral basal consolidation. Given increasing leukocyte counts with fever, two-site blood cultures, urine cultures, and high vaginal swabs were sent, and antibiotics were escalated from piperacillin-tazobactam to meropenem on the very next day. The two blood cultures, one from a dialysis catheter and one from a peripheral site, were flagged for *C. pelliculosa*. The

[1,3,5]Department of Anaesthesiology and Critical Care, All India Institute of Medical Sciences (AIIMS), Jodhpur, Rajasthan, India

[2]Department of Trauma and Emergency (Anaesthesiology and Critical Care), All India Institute of Medical Sciences (AIIMS), Jodhpur, Rajasthan, India

[4,6,7]Department of Microbiology, All India Institute of Medical Sciences (AIIMS), Jodhpur, Rajasthan, India

Corresponding Author: Ankur Sharma, Department of Trauma and Emergency (Anaesthesiology and Critical Care), All India Institute of Medical Sciences (AIIMS), Jodhpur, Rajasthan, India, Phone: +91 9654045653, e-mail: ankuranaesthesia@gmail.com

How to cite this article: Yadav S, Sharma A, Kothari N, *et al. Candida pelliculosa* Infection in Adults Admitted in Intensive Care Unit of Tertiary Care Center: Should We Treat or Not? Indian J Crit Care Case Rep 2023;2(5):124–127.

Source of support: Nil

Conflict of interest: None

Patient consent statement: The author(s) have obtained written informed consent from the patient for publication of the case report details and related images.

Table 1: Characteristics, events, and outcomes of patients diagnosed with *C. pelliculosa* in the ICU

S/N	*Age(years)/sex (M/F)*	*Presenting history*	*Relevant event*	*Signs/symptoms of fungal infection*	*Culture*	*Anti-fungal Yes/no + other intervention*	*Outcome*
1	25/F	Abruptio placentae with preeclampsia with prerenal AKI	• $MgSo_4$—24 hours postdelivery. • Labetalol infusion–high BP. • Peripheral film—normal (TTP ruled out). • Noninvasive ventilation–pulmonary edema. • HRCT—bilateral consolidation. • Dialysis. • Vaginal swab—sterile.	• Fever. • All cultures were sterile for bacterial infection. • Dialysis catheter *in situ*.	• Two blood cultures, one from a dialysis catheter and one from a peripheral site, were flagged for *C. Pelliculosa*; on BD BACTEC's automated blood culture system. • DTP of 3 hours and 16 minutes. • The isolated identity was established using the MALDI-TOF-MS. • Anti-fungal susceptibility was determined by VITEK2 (Biomerieux). • Susceptibility to echinocandin and resistance to fluconazole.	• Caspofungin added. • The dialysis line was removed, and a new one was secured.	Discharged
2	57/M	• Operated case of craniopharyngioma with VP shunt in situ on anti-epileptics. • Developed pituitary apoplexy and was transferred to a tertiary care center for further management.	• Corticosteroids and thyroxine continued. • GCS—E1VTM2. • CSF exam–normal. • Tracheostomy done. • All cultures sent. • Extrapontine myelinolysis.	No sign	• Fungal blood culture, which was sent as he was on steroids. • Positive for *C. pelliculosa*. • Identity using the MALDI-TOF-MS. 4. anti-fungal susceptibility was determined by VITEK2 (Biomerieux). • Susceptibility–same as above.	No treatment	Discharged

AKI, acute kidney injury; GCS, Glasgow Coma Scale; HRCT, high-resolution computed tomography; ICU, intensive care unit; MALDI-TOF-MS, matrix-assisted laser desorption/ionization-time of flight mass spectrometry; $MgSo_4$, magnesium sulfate; TTP, thrombotic thrombocytopenic purpura; VP, ventriculoperitoneal

paired samples flagged positively on the BD BACTEC automated blood culture system, with a differential time to positivity (DTP) of 3 hours and 16 minutes. The isolate identity was established using the matrix-assisted laser desorption ionization time-of-flight mass spectrometry (MALDI-TOF-MS). Anti-fungal susceptibility was determined by VITEK2 (Biomerieux), which showed susceptibility to echinocandins and resistance to fluconazole. All other cultures were sterile. A new dialysis catheter was secured at a different site, and intravenous Caspofungin was started. The patient's leukocyte counts and clinical condition improved, and was weaned from mechanical ventilation. She was shifted to the ward on room air.

Case 2

A 57-year-old male who was an operated case of craniopharyngioma with a ventriculoperitoneal shunt in situ on anti-epileptics; presented to a private hospital with a complaint of abdominal pain, vomiting, and decreased response for 3 days. The patient was diagnosed with hypernatremia, and correction was given. However, after 2 days, he became unresponsive and was shifted to the ICU, where he was intubated in view of decreased sensorium. Magnetic resonance imaging (MRI) suggested pituitary apoplexy; hence he was started on corticosteroid and thyroxine. He was weaned off the ventilator to T-piece and referred to our hospital for further management. From the emergency, the patient was shifted to the AICU and was intubated. He had Glasgow Coma Scale (GCS) of E1VTM2, bilateral constricted pupil, and bilateral unresponsive plantar reflex. His cerebrospinal fluid examination was unremarkable, but a repeat MRI showed extrapontine myelinolysis and pituitary macro adenoma with internal hemorrhage. He was tracheotomized, and surveillance cultures were sent in view of the immune-suppressed state of the patient. His fungal blood culture was positive for *C. pelliculosa*. The isolate identity was again established using the MALDI-TOF-MS. Anti-fungal susceptibility was determined by VITEK2 (Biomerieux) system, which showed the same susceptibility profile. As the patient was clinically stable and there was no sign of infection, it was decided not to treat it. The patient remained stable for 4 days though his GCS did not improve as he had extrapontine myelinolysis, so he was shifted to the medicine ward.

As both cases were simultaneously present in AICU when the culture reports came, the microbiology department decided to conduct a possible outbreak investigation. After discussion with the AICU team, a random sampling of the fingertips of all residents, ICU staff, and attending consultants was done to locate the source possibly. However, *C. pelliculosa* was not demonstrated by any staff during this random sampling exercise. It was therefore decided to observe for any new cases via passive surveillance of AICU blood cultures in the coming week, all of which turned out negative for this opportunistic fungal pathogen.

Discussion

Candida pelliculosa (*C. pelliculosa)* is an opportunistic yeast known to cause bloodstream infections among immunocompromised hosts such as pre-term neonates with prolonged hospitalization and broad-spectrum antibiotic use. Recently few case reports highlighted the incidence of the infection in adult patients with prostheses and HIV infection.[4,5] In our scenario, one patient was on steroids and was prone to infection, and the other patient had a dialysis catheter, which was the source of invasive fungal infection.[6] In an outbreak reported by the pediatric population, *C. pelliculosa* had shown susceptibility to all anti-fungal, but our isolates from adults showed higher minimum inhibitory concentration against fluconazole and itraconazole.[7]

For the first patient, the isolation of *C. pelliculosa* from paired samples, meeting DTP criteria, confirmed central line-associated bloodstream infection. We removed the central line and used echinocandins as the drug of choice in the patient, who was symptomatic and nonneutropenic.[8] In contrast, only a single blood culture specimen grew *C. pelliculosa* in the second patient, who was afebrile and clinically stable. Therefore, the isolate was interpreted as a contaminant and not treated. The patient remained clinically stable under observation. This highlights the importance of clinical judgment and correct laboratory blood culture protocol by paired sampling before concluding a true infection by uncommon fungal pathogens. The reported mortality of *C. pelliculosa* is 38.5%, with a central venous catheter, broad-spectrum antibiotic therapy, total parenteral nutrition, surgery, and mechanical ventilation as major risk factors.[9] Most of these factors were present in both of our patients. Considering the high mortality, not giving an anti-fungal despite a positive result is very tough. As shown by the case report of Chan et al., subclinical infection of *C. pelliculosa* is a possibility in an immune-compromised host.[10] Lack of literature on *C. pelliculosa* in adults further adds to the confusion. Hence the question still stands valid and unanswered.

The possibility of an outbreak has been suggested in the neonatal ICU population, so extrapolating from there, we, in collaboration with the microbiology department, did a random screening of the AICU team to locate and control the source possibly. As elucidated in the study done by Yang et al.[11] in neonatal ICU population, there are possible clones of this fungus, and hence to prevent an outbreak, their phenotyping is equally essential, which was done by our microbiology department. *C. pelliculosa* was not isolated from the healthcare worker sampling attempt. This could be due to these fungi's transient colonization of hands and other surfaces. Proper hand hygiene practices, active surveillance of suspected healthcare-associated infections, and proper blood culture protocols for patients with central lines are the way forward in such situations.

These two cases raise a few questions which could pave the way for further research. Firstly, should we treat *C. pelliculosa* in asymptomatic adults? Secondly, what can be the role of microbiologists in controlling *C. pelliculosa* infection?

Orcid

Sangam Yadav https://orcid.org/0000-0001-7329-8782
Ankur Sharma https://orcid.org/0000-0001-9339-6988
Nikhil Kothari https://orcid.org/0000-0002-9829-905X
Vidhi Jain https://orcid.org/0000-0002-0180-6175
Shilpa Goyal https://orcid.org/0000-0002-8983-0953
Mahima Khatri https://orcid.org/0000-0002-1384-5999
Tejashree Nare https://orcid.org/0000-0001-7952-1367

References

1. Lin HC, Lin HY, Su BH, et al. Reporting an outbreak of Candida pelliculosa fungemia in a neonatal intensive care unit. J Microbiol Immunol Infect 2013;46(6):456–462. DOI: 10.1016/j.jmii.2012.07.013
2. Zhang Z, Cao Y, Li Y, et al. Risk factors and biofilm formation analyses of hospital-acquired infection of Candida pelliculosa in a neonatal intensive care unit. BMC Infect Dis 2021;21(1):620. DOI: 10.1186/s12879-021-06295-1
3. Pratt JJ, Niedle PS, Vogel JP, et al. Alternative regimens of magnesium sulfate for treatment of preeclampsia and eclampsia: a systematic

review of non-randomized studies. Acta Obstet Gynecol Scand 2016;95(2):144–156. DOI: 10.1111/aogs.12807
4. Song KY, Park C, Byun JH, et al. Fungal arthritis with adjacent osteomyelitis caused by Candida pelliculosa: a case report. BMC Infect Dis 2020;20(1):438. DOI: 10.1186/s12879-020-05171-8
5. Kang SJ, Jang MO, Jang HC, et al. A case of candida pelliculosa prosthetic valve endocarditis treated with anidulafungin and valve replacement. Infect Chemother 2012;44(6):499–503. DOI: 10.3947/ic.2012.44.6.499
6. Kojic EM, Darouiche RO. Candida infections of medical devices. Clin Microbiol Rev 2004;17(2):255–267. DOI: 10.1128/CMR.17.2.255-267.2004
7. Kalkanci A, Dizbay M, Turan O, et al. Nosocomial transmission of Candida pelliculosa fungemia in a pediatric intensive care unit and review of the literature. Turk J Pediatr 2010;52(1):42–49. PMID: 20402066.
8. Pappas PG, Kauffman CA, Andes DR, et al. Clinical practice guideline for the management of candidiasis: 2016 update by the Infectious Diseases Society of America. Clin Infect Dis 2016;62(4):e1–50. DOI: 10.1093/cid/civ933
9. Zhang L, Xiao M, Arastehfar A, et al. Investigation of the emerging nosocomial wickerhamomyces anomalus infections at a Chinese Tertiary Teaching Hospital and a systemic review: clinical manifestations, risk factors, treatment, outcomes, and anti-fungal susceptibility. Front Microbiol 2021;12:744502. DOI: 10.3389/fmicb.2021.744502
10. Chan AW, Cartwright EJ, Reddy SC, et al. Pichia anomala (Candida pelliculosa) fungemia in a patient with sickle cell disease. Mycopathologia 2013;176(3-4):273–277. DOI: 10.1007/s11046-013-9677-5
11. Yang Y, Wu W, Ding L, et al. Two different clones of Candida pelliculosa bloodstream infection in a tertiary neonatal intensive care unit. J Infect Dev Ctries 2021;15(6):870–876. DOI: 10.3855/jidc.12103