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First Case of Catheter-related *Malassezia pachydermatis* Fungemia in an Adult

Jaehyeon Lee, M.D., Ph.D.[1,3], Yong Gon Cho, M.D., Ph.D.[2,3], Dal Sik Kim, M.D., Ph.D.[2,3], Sam Im Choi, M.D., Ph.D.[2,3], and Hye Soo Lee, M.D., Ph.D.[2,3]

[1]Department of Laboratory Medicine, Chonbuk National University Hospital, Jeonju, Korea; [2]Department of Laboratory Medicine, Chonbuk National University Medical School, Jeonju, Korea; [3]Research Institute of Clinical Medicine of Chonbuk National University-Biomedical Research Institute of Chonbuk National University Hospital, Jeonju, Korea

Dear Editor,

Malassezia yeast species are normal microbiota in the skin of humans and various animals and are mainly lipophilic. Unlike other *Malassezia* species, *M. pachydermatis* is non-lipid-dependent; it is a zoonophilic yeast that has been associated with otitis externa and seborrheic dermatitis in dogs [1]. Reported *Malassezia* species infections have mainly involved *M. furfur*, and most were localized skin infections [1, 2]. Systemic infection by *M. pachydermatis* in adults is extremely rare, with only three cases being reported so far (Table 1) [3-5]. We report a case of *M. pachydermatis* fungemia in an adult. The Institutional Review Board of Chonbuk National University Hospital exempted this study (IRB No. CUH 2014-08-002).

A 62-year-old male presented to the emergency room of Chonbuk National University Hospital in May 2014 with abdominal pain. He had undergone radical total gastrectomy with adjuvant chemotherapy for poorly differentiated (stage IIIa, T2bN2M0) tubular adenocarcinoma a month previously. On arrival, he was diagnosed as having ileus and an intraabdominal abscess. On hospital day 32, his white blood cell count and C-reactive protein level increased to 1.6×10^9/L and 1,122.1 nmol/L, respectively, and his body temperature was 37°C. Two sets of venous blood cultures (FA Plus, FN Plus, BacT/Alert 3D system, bioMérieux, Durham, NC, USA) were conducted. Following three days of incubation, very tiny, dry-looking, creamy colonies that broke easily were observed on 5% sheep blood agar and Sabouraud dextrose agar. These colonies were identified as *M. pachydermatis* using Vitek 2 (bioMérieux, Hazelwood, MO, USA) and VITEK MS (bioMérieux, Marcy L'Etoile, France). Internal transcribed spacer ribosomal RNA sequencing demonstrated 100% identity with GenBank entry NR 126114. A total of four sets (FA Plus, FN Plus) of blood culture—two sets of venous blood culture and two sets of blood culture—were conducted, and all sets gave positive results. The differential time to positivity (DTP) for the chemoport and peripheral venous blood was six hours and five hours, respectively. The patient was treated with a lipid infusion one day after admission, and colony growth was enhanced with olive oil. Antifungal susceptibility results using ETEST (bioMérieux, Marcy L'Etoile, France) demonstrated that the minimal inhibitory concentrations of fluconazole, 5-flucytosine, and voriconazole were 32 μg/mL, >32 μg/mL, and 0.25 μg/mL, respectively [6].

The source of *M. pachydermatis* infection in this case is unclear, as the patient, his family, and the medical team confirmed that the patient had no contact with dogs. As most *M. pachydermatis* systemic infections are reported in neonates, risk fac-

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Corresponding author: Hye Soo Lee, M.D.
https://orcid.org/ 0000-0001-9391-2532
Department of Laboratory Medicine, Chonbuk National University Medical School, 20 Geonji-ro, Dukjin-gu, Jeonju 54907, Korea
Tel: +82-63-250-1218, Fax: +82-63-250-1200, E-mail: leehs@jbnu.ac.kr

Table 1. Cases of *Malassezia pachydermatis* systemic infection reported in adults to date

No. Case	Predisposing Diagnosis	Age/ Sex	Prophylactic antifungal agents	Reported risk factors		Not considered risk factors (to date)		Outcome	Reference
				Arterial catherization	Contact with a potential carrier, including animals	Lipid infusion	Intravascular devices		
1	Acute myeloid leukemia	21/M	No	N/M	Yes	No	Two central catheters	Died	3 (Lautenbach *et al.*, 1998)
2	Acute myeloid leukemia	69/M	Posaconazole	N/M	No	N/M	Peripherally inserted central catheter line	Improved	4 (Choudhury *et al.*, 2014)
3	Leprosy, Pneumonia	53/M	No	No	No	No	Midline catheter	Fully recovered	5 (Roman *et al.*, 2016)
Present patient	Gastric cancer	62/M	No	Yes	No	Yes	Chemoport	Died	

Abbreviations: N/M, not mentioned; M, male.

tors have been determined for only pediatric patients [7, 8]. There is no clear consensus concerning risk factors in adults because of the low incidence in adults (only three cases to date; Table 1) [3-5]. A recent study suggested that a DTP over two hrs in catheter-related candidemia, except for *Candida glabrata*, is an optimal cut-off [9]. Although the DTP cut-off has not been determined for *Malassezia* species, in this case, the DTP was over five hours. We therefore hypothesize that this is a case of catheter-related fungemia, as our patient had a chemoport. Although Chang *et al.* [2] identified various risk factors for *Malassezia* infections, they did not consider the influence of intravascular devices because their study was conducted in a neonatal intensive care unit. Lipid infusion could also be a risk factor.

Standardized assays to determine the *in vitro* antifungal susceptibilities of *Malassezia* species are unavailable; therefore, we carried out antifungal susceptibility tests based on the CLSI method [6]; to date, most of the results have been reported for animal isolates. The three previously reported fungemia cases in adults were treated with amphotericin B; however, no susceptibility test results are available [3-5]. Although our patient was treated with amphotericin B for two days, he died of multiple organ failure. As there is no study on the DTP cut-off in *Malassezia* infections, and there is limited information regarding treatment, clinicians should consider an approach similar to the one outlined for *C. glabrata* in the European Society of Clinical Microbiology and Infectious Diseases guidelines for the diagnosis and management of *Candida* diseases [10].

In conclusion, although information regarding human infections is limited, lipid infusion and intravascular catheters should be considered as risk factors for *M. pachydermatis* infection in adults. Further studies on the risk factors and antifungal susceptibility tests are needed.

Authors' Disclosures of Potential Conflicts of Interest

No potential conflicts of interest relevant to this article were reported.

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