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Rhodotorula mucilaginosa as a cause of persistent femoral nonunion

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ABSTRACT
We present a case of postoperative infection which presented as nonunion fracture femur in a 30-year-old man due to Rhodotorula mucilaginosa. This is the first report of Rhodotorula infection in a patient with fracture nonunion. The patient underwent repeated surgical debridement and received intensive antibiotic therapy before the diagnosis was made. The diagnosis could have been made earlier if the fungal etiology had been suspected earlier. Early suspicion and diagnosis of infection with atypical yeasts could be under-reported because of difficulties in accurate diagnosis and a tendency of attributing isolates to specimen contamination.

KEY WORDS: Fracture shaft femur, nonunion, Rhodotorula

Case Report

A 30-year-old male (body weight: 76 kg) sustained a closed fracture of the shaft of the left femur in a road traffic accident. Open reduction and internal fixation of the fracture was done with an intramedullary nail at a rural hospital. He developed postoperative local infection. The sutures were opened and wound debridement was done. He was started on ceftriaxone 1 g IV 12-hourly and gentamicin 80 mg IV 12-hourly and gave history of repeated dressings of the wound with the wound cavity being packed with gauze pieces. He continued on daily dressings and oral antibiotics (ciprofloxacin 500 mg 12-hourly). The patient reported to our hospital seven months after the initial surgery owing to continuous pus discharge from wound site.

On examination, there was purulent discharge from the incision site. His vitals were stable and patient was afebrile. There were no overt signs of septicemia. Radiograph of the affected limb showed nonunion of femoral shaft fracture with an intramedullary implant in situ [Figure 1]. A clinico-radiological diagnosis of infective nonunion of femur was made. Laboratory studies were within normal limits with mild leucocytosis and an ESR of 62. The patient was taken up for wound debridement and implant removal and the femoral nonunion was stabilized with an AO tubular external fixator. The wound was closed over corrugated rubber drains and patient was empirically started on injection ceftriaxone 1 g IV BD (two weeks) and Amikacin 500 mg IV BD (seven days). The infected granulation tissue was sent for bacteriological culture. Fungal culture was not requested at this stage. Culture grew Staphylococcus aureus sensitive to amoxycillin clavulanic acid and vancomycin. Based on the culture report patient was started on amoxycillin clavulanic acid 1200 mg IV BD for seven days.

The drain continued to show discharge. Repeat radiographs at three weeks showed sequestrum at the proximal part of the distal fragment. Repeat debridement and sequestrectomy was done but the purulent discharge continued. Another debridement and removal of dead necrotic bone was performed. Gentamicin beads were put at the local site. The discharge
incubation for 72 h at 37°C [Figure 2]. On the basis of fermented growth on dextrose agar grew red-colored yeast profusely, after aerobic incubation for 72 h at 37°C [Figure 2]. On the basis of macroscopic morphology, urease production and carbohydrate fermentation performed with manual conventional method the yeast was identified as *Rhodotorula mucilaginosa*. [8] Despite the presence of yeast no antifungal treatment was started and patient was continued on antibiotics as this fungus is normally considered as a contaminating fungus. Pyogenic cultures revealed multi-drug-resistant *Acinetobacter* sp. sensitive only to piperacillin tazobactam and imipenem. Blood culture and acid fast staining of tissue specimen was negative. Hence piperacillin tazobactam 4.5 g IV eight-hourly and amikacin 500 mg IV 12-hourly was started along with clindamycin 600 mg IV eight-hourly. After 10 days of first isolation a repeat sample was sent for fungal culture and histopathology. Fungal culture revealed similar findings with profuse fungal growth in all the pieces of tissue inoculated in four separate tubes. Histopathological examination of the debrided tissue showed fibrocollageneous tissue with bony trabeculae with numerous budding yeast cells [Figure 2]. The PAS and Grocotts staining further confirmed the presence of budding yeasts. The patient was screened for immune status and was negative for HbsAg, HIV, had normal CD 4 and CD 8 counts and normal serum immunoglobulins with blood sugar in the normal range. Based on this patient was started on Injection Amphotericin B 0.5 mg/kg/day (40 mg/day) IV which was gradually increased to 60 mg daily for a period of four weeks. After one week of starting therapy the discharge from the drain decreased. The KOH examination and fungal cultures of the discharge did not reveal any fungal element. The infection completely subsided by one month of therapy but the bone did not unite due to persistent infection for a long time and the patient was advised bone grafting. The patient did not agree for bone grafting and took discharge from hospital after another negative report of fungus. Unfortunately, the patient was lost to follow up.

**Discussion**

*Rhodotorula mucilaginosa* is a yeast-like fungus that is marked by salmon pink pigmentation of colonies grown on Sabouraud’s dextrose or malt extract agar. [12] It has a worldwide terrestrial and marine distribution and is occasionally considered pathogenic but recently many well-documented cases of serious infection due to members of the genus *Rhodotorula* have been reported. [2-4] Almost all the published cases of *Rhodotorula* infection had one or more risk factors like central venous catheter in place over a long period of time, prolonged treatment with broad-spectrum antibiotics or steroids. [2-8] This yeast possesses a strong affinity for plastics and has been recovered from various items such as hemodialysis machines and fibreoptic bronchoscopes. [7] However, in our case corrugated rubber drain or packing material used for wound dressing were not subjected to culture but it appears that this yeast being a ubiquitous organism was introduced into the wound from any of these materials. This patient was on prolonged antibiotic therapy and underwent repeated wound debridement, which might have contributed to the establishment of infection.

As, to the question of possible contamination of the cultures, this is extremely unlikely for several reasons. Specimens were obtained by means of sterile techniques and were immediately subjected to KOH examination and culture (within half an hour) and profuse pure growth of red yeast was noticed in all the inoculated tubes. Repeat sample taken after 10 days revealed similar findings. Moreover, histopathological findings and response to antifungal therapy corroborate our findings. *Rhodotorula* fungemia can be a life-threatening complication, but yeast was not isolated from any of the blood cultures in our patient, suggesting the poor invasive power of the organism.

In the previous published studies, *Rhodotorula* has shown low MICs to amphotericin B (0.25-1 ug/ml) and flucytosine (0.025-0.25 ug/ml) than to azoles and echinocandins. [1A,10] Amphotericin B preparations along with removal of any predisposing factors have been found to be a favorable therapy for treatment of *Rhodotorula* infections in a large number of studies. [6,10] Azoles and echinocandins are not considered appropriate therapy for *Rhodotorula* species, moreover azole derivatives have been found to predispose patients to *Rhodotorula* infections if used for...
prophylaxis. In the present study in vitro susceptibility testing was not done, but Amphotericin B was used.[6,10]

In this case, specimens were not sent for fungal culture in the beginning, as fungus was not suspected as a cause of infection. This case highlights the need to consider fungal etiology in a non-healing wound. Our case clearly illustrates that Rhodotorula can be a cause of serious infection in patients on prolonged antibiotics. Early suspicion, diagnosis and treatment with potent antifungal drugs are needed to prevent untoward complications.

References

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ERRATUM

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The error is regretted

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