**Rhodococcus Equi: A Pathogen in Immunocompetent Patients**

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**ABSTRACT**

*Rhodococcus equi* is an uncommon human pathogen known to cause lung infections in immunocompromised patients. We report two cases of *Rhodococcus* infections in immunocompetent individuals, who were treated successfully.

**Keywords:** Immunocompetent, *rhodococcus equi*, trauma

**Introduction**

*Rhodococcus equi*, formerly known as Corynebacterium equi, is a causative agent of pulmonary disease in foals and other domestic animals.[1] They are uncommon human pathogens and known to cause lung infections in immunocompromised patients. We report here two cases of infections with *Rhodococcus equi* in immunocompetent patients.

**Case Reports**

**Case 1**

A 38-year-old female came with a complaint of lump in the upper quadrant of the right breast since 9 days following a trauma 15 days back due to a fall. There was no history of pain or fever. There was no history of nipple discharge, nipple retraction or ulceration of skin. On local examination a lump was found in the upper outer quadrant of the right breast which was nodular and erythematous. The lump was tender and there was local rise in temperature. It was firm to hard in consistency. Anterior axillary lymph nodes were palpable. The patient's vitals and systemic examination were normal. Investigations showed a total leucocyte count of 9,400 cells/cumm with neutrophils 84%, lymphocytes 13%, eosinophils 1% and monocytes 2%. Random blood sugar was 87 mg/dl. The patient was found to be HBsAg reactive and HIV nonreactive. Liver function tests were within normal limits. Ultrasonography of the right breast showed mixed echogenic collection in upper and outer quadrant indicating either infected hematoma or abscess. Incision and drainage were done under general anesthesia and the pus was sent for microbiological investigations. She was given intravenous amoxicillin-clavulanic acid 1.2 g 8-hourly for 6 days.

Gram staining of the sample revealed numerous pus cells and a moderate number of irregularly stained gram-positive bacilli which were acid fast by 1% H₂SO₄ Zeihl–Neelson staining [Figure 1] Culture on blood agar showed growth of 1–2 mm sized orange pigmented, nonhemolytic colonies [Figure 2] after 48 hours of incubation. MacConkey’s agar did not show any growth. On Gram staining they were irregular Gram-positive bacilli with diphtheroid morphology. It was identified as *Rhodococcus equi* by conventional biochemical tests. It was sensitive to ampicillin, amoxicillin-clavulanic acid, cephalosporins, gentamicin, erythromycin, ciprofloxacin.

Patient was discharged on the seventh day with advice of oral amoxicillin-clavulanate 625 mg three times a day for 10 days.

**Case 2**

A 78-year-old female came to surgical OPD with the complaint of pain abdomen and distension since 1 day and fever since 2 days. The patient was apparently normal when she developed pain in abdomen. It was insidious in onset, progressive in nature, throbbing type, with more on the right side, nonradiating, no aggravating or relieving factors were observed. Fever was high grade, insidious in onset, continuous with no variation. No history of vomiting or loose stools was found. She was nondiabetic,
nonhypertensive. Her vitals and systemic examination were normal except per abdomen examination showed tender hepatomegaly. Laboratory investigations showed a total count of 18,599 cells/cumm with N 84%, L 13%, Platelet count was 390,000 cells/cumm. ESR was 45 mm at the end of the first hour. Serum total protein level was 5.7 g/dl, serum albumin 2.6 g/dl, serum globulin 3.1 g/dl, A/G ratio 0.8, serum AST 61.0 U/l, serum ALT 51.0 U/l, serum alkaline phosphatase 149.0 U/l. She was nonreactive for HIV and HBsAg.

Aspirate from liver abscess and Bactec blood culture were sent for microbiological investigations. Gram staining of pus showed numerous pus cells but no bacteria. Culture of the pus did not show any growth. The blood culture bottle flagged positive in 48 hours, Salmon-colored colonies grew which were gram positive bacilli and weakly acid-fast by 1% H2SO4. The colony was identified as *Rhodococcus equi* which was sensitive to ampicillin, amoxicillin-clavulanic acid, cephalosporins, gentamicin, erythromycin, ciprofloxacin. She was treated with ceftriaxone 1.5 g I.V BD for 14 days. She showed remarkable clinical improvement and discharged.

**Discussion**

*Rhodococcus equi* was first identified as a pathogen in 1923 from the lungs of foals with pyogranulomatous pneumonia.[1] The first case was reported in 1967 when *R. equi* was cultured from a young man with autoimmune hepatitis presented with cavitary pneumonia on treatment with corticosteroids and 6-mercaptopurine.[2] Human infections most commonly occur in immunocompromised individuals, primarily those with defects in cell mediated immunity. Although most infections have occurred in immunocompromised patients, especially those with AIDS, infections have occurred in immunocompetent persons as well.[3] The increase in the incidence of reported human cases has been noted possibly because of greater attention being given to this pathogen but certainly also because of the rising number of immunocompromised patients.[4]

Infection is acquired through inhalation, ingestion or inoculation into a wound. Exposure to farm soil, animals or manure has been reported in many cases. *Rhodococcus equi* are widely distributed in soil, perhaps accounting for infection in persons who do not recall contact with animals.[5] In our case the first patient gave a history of trauma but in the second patient we could not elicit any history of wound or contact with animals.

As facultative intracellular bacteria, *Rhodococcus* species may persist and replicate within macrophages. This accounts for the frequent relapses that occur even with antimicrobial treatment.[3] Standard treatment regimens for *R. equi* have not been established, although a combination of antibiotics with drainage of abscess forms the mainstay of therapy.[5] Some studies also report excellent activity against *R. equi* with the use of ampicillin-sulbactam and amoxicillin-clavulanate.[5] There generally is widespread resistance to β-lactams, with the exception of imipenem and meropenem. *R. equi* is susceptible to vancomycin which is considered as the therapy of choice, and most isolates are susceptible to erythromycin, aminoglycosides, rifampicin and chloramphenicol.[5]

*R. equi* is an uncommon pathogen. The organism may be easily mistaken as a contaminant due to its diphtheroid-like morphology. A high index of suspicion is needed to diagnose the infections.

**References**

1. Winn W, Allen S, Janda W, Koneman E, Procip G, Schrekenberger P, et al. Aerobic actinomyces. Chap 15. In Koneman's color atlas and textbook of diagnostic microbiology, 6th ed. Philadelphia: Lippincott Williams and Wilkin; 2006. p. 859-76.
2. Gobert B, Falk G, Spink WW. Lung abscess due to *Corynebacterium equi*. Report of first human infection. Ann Intern Med 1967;66:1174-7.
3. Gabriels P, Joosen H, Put EV, erhaegen J, Magerman K, Cartuyels R. Recurrent *Rhodococcus equi* infection with fatal outcome in an immunocompetent patient. Eur J Clin Microbiol Infect Dis 2006;25:46-8.
4. Chen XY, Xu F, Xia JY, Cheng YS, Yang Y. Bacteremia due to *Rhodococcus equi*: A case report and review of the literature. J Zhejiang Univ Sci B 2009;10:933-6.

5. Sistla S, Karthiketan S, Biswas R, Parija SC, Patro DC. Acute osteomyelitis caused by *Rhodococcus equi* in an immunocompetent child. Indian J Pathol Microbiol 2009;52:263-4.

6. Cornish N, Washington JA. *Rhodococcus equi* infections: Clinical features and laboratory diagnosis. Curr Clin Top Infect Dis 1999;19:198-215.

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