Disseminated *Rhodococcus rhodochrous* infection in an immunocompromised patient

Setu Patolia, Eneh Kennedy, Zahir Mehjabin, Neerja Gulati, Swati Patlia, Dharani Narendra, Rakesh Vadde, Saurav Pokharel, Frances Schmidt, Joseph Quist, Danilo Enriquez

**ABSTRACT**

**Introduction:** Genus *Rhodococcus* is a rare cause of infection in human. *Rhodococcus equi* has been reported as a cause of majority of these infections. However, *Rhodococcus rhodochrous* has never been reported as an etiologic agent in human diseases.

**Case Report:** A 45-year-old female was admitted with cough with yellowish sputum production, fever, chills and shortness of breath for three days. Patient had significantly decline in her functional capacity. Over past three months, patients had recurrent admissions for pneumonia and developed increasing numbers of skin nodules. Blood cultures sent from previous admissions were reported as *Corynebacterium* species. Lung and skin biopsy showed *Rhodococcus rhodochrous* species confirmed by high performance liquid chromatography. Later in the course of disease, patient developed brain abscesses.

**Conclusion:** Corynebacterium species in blood should be carefully reviewed in an immunocompromised patient and *Rhodococcus rhodochrous* species infection should be considered as one of the differential diagnosis.
Disseminated *Rhodococcus rhodochrous* infection in an immunocompromised patient

Setu Patolia, Eneh Kennedy, Zahir Mehjabin, Neerja Gulati, Swati Patlia, Dharani Narendra, Rakesh Vadde, Saurav Pokharel, Frances Schmidt, Joseph Quist, Danilo Enriquez

**ABSTRACT**

Introduction: Genus *Rhodococcus* is a rare cause of infection in human. *Rhodococcus equi* has been reported as a cause of majority of these infections. However, *Rhodococcus rhodochrous* has never been reported as an etiologic agent in human diseases. Case report: A 45-year-old female was admitted with cough with yellowish sputum production, fever, chills and shortness of breath for three days. Patient had significantly decline in her functional capacity. Over past three months, patients had recurrent admissions for pneumonia and developed increasing numbers of skin nodules. Blood cultures sent from previous admissions were reported as *Corynebacterium* species. Lung and skin biopsy showed *Rhodococcus rhodochrous* species confirmed by high performance liquid chromatography. Later in the course of disease, patient developed brain abscesses. Conclusion: *Corynebacterium* species in blood should be carefully reviewed in an immunocompromised patient and *Rhodococcus rhodochrous* species infection should be considered as one of the differential diagnosis.

**Keywords:** *Rhodococcus rhodochrous*, Immunocompromised, Disseminated infection, *Corynebacterium, Rhodococcus equi*

**INTRODUCTION**

*Rhodococcus* species is a rare cause of infection in humans. Most of the reported human infections are due to *Rhodococcus equi* [1–3]. *Rhodococcus rhodochrous* is rarely reported as an etiology in humans [4]. *Rhodococcus* species usually causes disease in immunocompromised individuals [5, 6]. *Rhodococcus equi* infection in an immunocompetent persons have been reported, though such reports are very few [7–9]. We present a case of a 45-year-old HIV patient who had recurrent pneumonia for three months. Blood cultures reports of *Corynebacterium* species were considered as contaminated samples. However, lung and skin biopsy specimen showed *Rhodococcus rhodochrous* species infection.

**CASE SERIES**

A 45-year-old HIV positive female (CD4 cell count- 15 cells/mm³) was brought to the emergency department with complaints of fever, cough, and shortness of breath...
of three days duration. Cough was productive of yellowish sputum with no associated hemoptysis or chest pain. Fever was intermittent with chills but no night sweats. Patient’s functional capacity decreased from a prior walking distance of half a block. Review of symptoms was significant for multiple painful skin bumps which were increasing in number. Her past medical history revealed multiple admissions in the last three months, two of which were for pneumonia. Patient was not on antiretroviral therapy and signed out against medical advice from hospital each time she felt better. She was a chronic smoker (1–1.5 packs per day for 25 years) and active cocaine abuser. She denied any history of occupational exposure and never had pets.

On examination, patient was chronically ill looking with low grade fever of 100.4 °F, tachypnea (RR 21/min), tachycardia (HR 128/min). Oxygen saturation was 97% on room air. Other significant findings on examination were poor oral hygiene, oral thrush and right middle lung and basal crackles. Multiple subcutaneous nodules sparsely distributed on the thigh, face, abdomen and upper arm were noted (Figure 1). The nodules were tender, of varying sizes (5–10 mm), with some erythema but non blanching.

Pertinent laboratory findings were as follows: white blood cell count of 14.5 with neutrophil count of 91.7. Basic metabolic panel was essentially normal. Liver profile showed hypoalbuminemia (1.2 g/dL), mildly elevated alkaline phosphatase (193 IU/L) and lactate dehydrogenase (231 IU/L). Coagulation profile was normal and blood culture was negative. X-ray revealed right middle lobe infiltrate (Figure 2). Computed tomography (CT) scan revealed nodule with cavitation in right middle and lower lobe (Figure 3). Echocardiography showed normal ejection fraction with moderate pericardial effusion but no evidence of vegetation. Sputum acid fast bacilli test came negative five times; transbronchial biopsy was negative for malignancy, acid fast bacilli stain, and fungal smear. Blood cultures drawn during previous admissions were reported to positive for Corynebacterium spp. on three different occasions. These reports were considered as contamination during past admissions. Culture drug susceptibility reports were requested for previous blood cultures because of patient’s persistent and new symptoms. Patient also agreed for surgical biopsy and specimens were taken from the skin of right buttock, right upper thigh and lung (right lower and upper lobes). Both specimens showed the same findings: acute suppurative and chronic inflammation and fibrohistiocytic granulomatous proliferation with...
no evidence of malignancy. Gomori methenamine silver stain and Gram stains show long filamentous branching, beaded Gram-positive organisms distributed in large aggregates (Figure 4). Morphology was said to be highly suggestive of Nocardia-type organisms. Same specimen was sent out to city department of health where the organism was identified as Genus Rhodococcus and species Rhodochrous by high performance liquid chromatography.

Patient again signed out against medical advice. Patient was given prescriptions for clarithromycin and bactrim, along with antiretroviral therapy. However, the patient was very noncompliant with the treatment. Four weeks later, she presented with headache, vomiting, fever. Computed tomography scan of the brain showed hypodense areas in the left parietal lobe. Magnetic resonance imaging scan with contrast showed multiple ring enhancing lesions scattered throughout both cerebral hemispheres (Figure 5).

DISCUSSION

The genus name Rhodococcus, first used by Zopf in 1891 [10], was revived and redefined in 1977 to accommodate the ‘rhodochrous’ complex which comprised a number of strains that resembled but did not belong to the established genera of Nocardia, Corynebacterium and Mycobacterium [11]. Rhodococci are described as aerobic, Gram positive, non-motile, mycolate-containing, nocardioform actinomycetes [12]. The term ‘nocardioform’ is morphologically descriptive and refers to mycelial growth with fragmentation into rod-shaped or coccoid elements [13]. This morphological similarity may pose a problem in the preliminary differentiation and identification of the organism.

Various species of genus Rhodococcus have been recovered from a variety of sources [14, 15]. Most of the species are saprophytes [16], but occasionally Rhodococcus species have been isolated from humans. In some cases, Rhodococcus has been linked to human infection [17, 18].

It has been suggested that other Rhodococcus species may be of more importance in human disease than previously thought. Osagbaka described the isolation of a number of Rhodococcus and related bacteria from the sputum of patients with respiratory illnesses [19]. Schaal and Lee also reported the isolation of various rhodococcal species from clinical samples [20]. The identification of other Rhodococcus species in clinical samples is more problematic and it is possible that some cases of non Rhodococcal equi species infection go unrecognized. Rhodococcus rhodochrous was isolated in two patients with pneumonia during autopsy in lung and blood [21]. Rhodococcus rhodochrous species has been isolated from a chronic corneal ulcer [4]. Ventricular peritoneal shunt infection by Rhodococcus rhodochrous was described in a five-month old infant [14]. Most of the cases of Rhodococcus rhodochrous infection described in literature occurred in immunocompromised or debilitating patients [21, 22]. Treatment protocol for the infections caused by Rhodococcus genus is not established. Different studies have noted response to ampicillin, methicillin and intraventricular cephalothin [23]. Our patient was treated based on the available report of the drug susceptibility.
CONCLUSION

*Rhodococcus rhodochrous* is a rare cause of human infection. When cultures are reported as *Corynebacterium* species, *Rhodococcus rhodochrous* should be considered as a differential diagnosis. Primary manifestations of this infection range from pneumonia to skin and brain abscessed. There is no consensus on treatment, but beta lactams and tetracycline derivatives appear to be an effective treatment.

********

Author Contributions

Setu Patolia – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data. Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Eneh Kennedy – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Zahir Mehjabin – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Neerja Gulati – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Swati Patolia – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Dharani Narendra – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Rakesh Vadde – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Saurav Pokharel – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Frances Schmidt – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Joseph Quist – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Danilo Enriquez – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

REFERENCES

Edorium Journals: An introduction

Edorium Journals Team

About Edorium Journals
Edorium Journals is a publisher of high-quality, open access, international scholarly journals covering subjects in basic sciences and clinical specialties and subspecialties.

Invitation for article submission
We sincerely invite you to submit your valuable research for publication to Edorium Journals.

But why should you publish with Edorium Journals?
In less than 10 words - we give you what no one does.

Vision of being the best
We have the vision of making our journals the best and the most authoritative journals in their respective specialties. We are working towards this goal every day of every week of every month of every year.

Exceptional services
We care for you, your work and your time. Our efficient, personalized and courteous services are a testimony to this.

Editorial Review
All manuscripts submitted to Edorium Journals undergo pre-processing review, first editorial review, peer review, second editorial review and finally third editorial review.

Peer Review
All manuscripts submitted to Edorium Journals undergo anonymous, double-blind, external peer review.

Early View version
Early View version of your manuscript will be published in the journal within 72 hours of final acceptance.

Manuscript status
From submission to publication of your article you will get regular updates (minimum six times) about status of your manuscripts directly in your email.

Our Commitment

Six weeks
You will get first decision on your manuscript within six weeks (42 days) of submission. If we fail to honor this by even one day, we will publish your manuscript free of charge.

Four weeks
After we receive page proofs, your manuscript will be published in the journal within four weeks (31 days). If we fail to honor this by even one day, we will publish your manuscript free of charge and refund you the full article publication charges you paid for your manuscript.

Mentored Review Articles (MRA)
Our academic program “Mentored Review Article” (MRA) gives you a unique opportunity to publish papers under mentorship of international faculty. These articles are published free of charges.

Most Favored Author program
Join this program and publish any number of articles free of charge for one to five years.

Favored Author program
One email is all it takes to become our favored author. You will not only get fee waivers but also get information and insights about scholarly publishing.

Institutional Membership program
Join our Institutional Memberships program and help scholars from your institute make their research accessible to all and save thousands of dollars in fees make their research accessible to all.

Our presence
We have some of the best designed publication formats. Our websites are very user friendly and enable you to do your work very easily with no hassle.

Something more...
We request you to have a look at our website to know more about us and our services.

We welcome you to interact with us, share with us, join us and of course publish with us.

CONNECT WITH US

Edorium Journals: On Web
Browse Journals

This page is not a part of the published article. This page is an introduction to Edorium Journals and the publication services.