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Pneumonia due to invasion of an oral commensal: *Rothia dentocariosa*

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Abstract
A fifty year old diabetic female with fever, cough with expectoration, dyspnoea, and sever toothache presented at our hospital for dental treatment. Owing to the patient's medical history, she was referred to the medical cell, where she was evaluated further and was diagnosed with pneumonia. Upon microbiological examination of sputum samples, the organism isolated was *R. dentocariosa*, an oral commensal that can rarely cause pneumonia. This gram positive bacterium once suspected can be easily isolated, identified and treated. Only challenge lies in considering the bacterium as a potent pathogen, while treating uncontrolled diabetic cases, as there is a close association between hyperglycaemia and infections.

Keywords: *Rothia dentocariosa*, pneumonia, diabetes, dental commensal

Introduction
Rothia dentocariosa is an established commensal found in the oral cavity of human [1].These gram positive pleomorphic bacteria were initially placed under the genus *Actinomycetes* due to its filamentous appearance and ability to vary in shape from coccoid to rod like bacilli. But later they were reclassified under the genus *Nocardia* on account of their requirement of aerobic conditions for growth [2]. It was only in 1967, that Georg and Brown placed these organisms in a totally separate monospecific genus *Rothia*, considering its unique cell wall composition [3]. *Rothia dentocariosa* was considered an organism of low pathogenicity and infections caused by it are rare, generally having an underlying immumocompromisation or vulvular heart diseases [4, 5]. They have been found to be associated with fatal conditions like endocarditis [1, 6], pneumonia [7, 8], endophthalmitis [9] and peritonitis [10] in rare cases as well. The current article elaborates a rare case of pneumonia caused by *Rothia dentocariosa* in a dental patient with uncontrolled diabetes.

Case Report
A fifty years old female patient came to the outpatient department of our dental college with chief complaint of pain severe toothache. The patient presented with associated complaints of fever, cough with expectoration and dyspnoea. Seeing her medical condition she was sent to the medical OPD for a consultation. Physical examination, basic haematological, microbiological and radiological investigations were performed. Chest auscultation revealed rhonchi and crepts. Chest X-ray revealed pneumonitic patches in the right lung.

The patient was unfit for dental procedures and hence was sent to a nearby tertiary care hospital for management.
The sputum sample was subjected to Grams stain and graded as per Bartlet's Grading. Ziehl Nelsons stain was also done to screen the presence of acid fast bacilli. Samples were then plated on blood agar and MacConkey agar and incubated at 37^0C for 24hours to isolate any pathogenic bacteria present. Identification of the isolated bacteria as well as antibiotic sensitivity testing was outsourced to be done on Vitek2. Blood samples were also collected for complete blood count which was done using Nihon Kohden.
The sputum sample was graded one as per Bartlet's Grading System. Grams stain smear showed the presence of moderate pus cells and gram positive branching rods. Ziehl Nelson stain did not show the presence of any acid fast bacilli.Blood agar plate showed the growth of raised rough colonies with irregular margins (Fig 1). A Gram stain smear of these colonies showed gram positive branching rods (Fig 2). Identification of the colonies done by using the Vitek2 confirmed it to be *Rothia dentocariosa* (excellent identification, 99% probability, bionumber-001032320201131). The blood picture showed total WBC count of 16500 WBC /mm^3 along with neutrophilia and an erythrocyte sedimentation rate of 82 mm/hr. Patient's C-reactive protein level was 6.52 mg/dl i.e. slightly elevated and also random blood sugar level was found to be elevated to 354mg/dl. So, the fasting, post prandial and glycosylated haemoglobin (HBA1C) tests were done which were also markedly elevated as 298mg/dl, 408mg/dl and 9.8% respectively. All of this indicated the uncontrolled diabetic state. Rest of the investigation were well within normal limits.

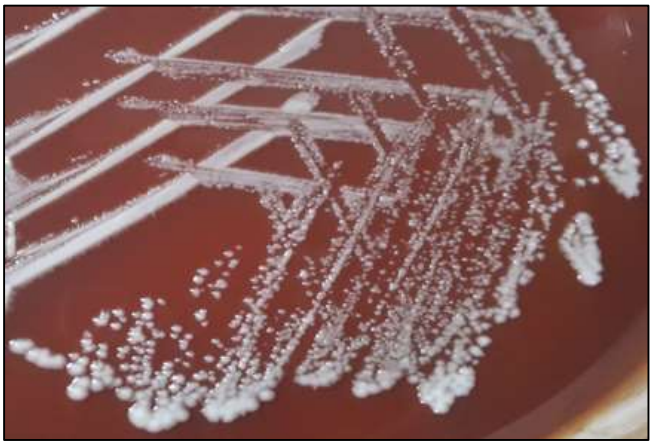

Fig 1: Colonies of *Rothia dentocariosa* on blood agar

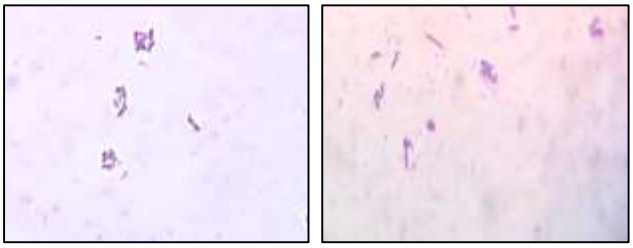

Fig 2: *Rothiadentocariosa* showing coccobacillary and branching rod forms on Gram stain under oil immersion

Discussion

Pulmonary infection caused by *R.dentocariosa* is very rare. On extensive literature search it was found that very few cases have been reported till date [7, 8]. All these infections were in cases with immuno-compromised state, thereby allowing this opportunistic bacterium of the oral flora to cause invasion. One of these reported cases had acute myelocytic leukemia and the other two had lung cancer [8]. In the current report the patient did not have any such underlying malignancy. However, the patient was found to suffer from longstanding uncontrolled diabetes; probably the reason for immumo-compromised state and hence the resultant pneumonia. Long standing uncontrolled diabetic status which is known to affect the humoral and cell mediated immunity may have facilitated invasion of the bacterium to a great extent. There are reports of association of *R. dentocariosa* with dental caries and periodontal diseases.[9]It has also been suggested that oral, mucosal or dental disease and dental treatment procedures involving surgery may trigger the invasion of the bacterium to cause severe infections [10]. Severe toothache was the chief complaint of the current case but she did not report of having undergone any prior dental treatment or operative procedure. Although we planned on culturing samples from the oral cavity to study the presence of the organism the patient did not turn up again as the antibiotics prescribed for pneumonia might have taken care of the tooth pain also.

In conclusion this case report is an attempt to highlight the importance of the oral commensal *R. dentocariosa* as a potent pathogen in presence of underlying longstanding uncontrolled diabetes. The organism should be put into consideration while treating patients with diabetes mellitus as well. Antibiotic therapy and management of *R. dentocariosa* infection can be aptly done once diagnosed. The course of the infection can also be minimised with prompt identification of the organism. *R. dentocariosa* should thus be no more considered to be just a normal commensal and be thought of while treating patients with underlying conditions.

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