

***Bordetella bronchiseptica* exudative tonsillitis in a previously healthy child**

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Introduction

- *Bordetella* spp. are aerobic coccobacilli known to be found in the upper respiratory tract of several mammalian animals.
- It causes tracheobronchitis in dogs (kennel cough), pneumonia in cats, neonatal pneumonia and atrophic rhinitis in pigs. Asymptomatic and chronic colonization is also known.
- *Bordetella bronchiseptica* infections in humans is a very rare entity.
- Very few cases of infections involving bloodstream, respiratory tract, meningitis, peritonitis and wound infections have been described in literature.
- Many of the cases reported in humans are of patients who are debilitated or immunosuppressed.
- The organism is less commonly isolated from immunocompetent individuals.

Materials and Methods

- A 7 years old male child presented with history of throat pain for three days.
- He was not able to take solid food and could accept only sips of fluids.
- On examination tonsils were enlarged and inflamed and throat showed white patchy exudates on the tonsils.
- X-ray neck lateral view had revealed enlarged submandibular glands.
- There was no associated illness or history of drug intake.
- Blood was sent for complete haemogram (CBC), C-Reactive protein.
- Exudate on the tonsils was taken on a swab for Gram Stain and aerobic culture.
- Aerobic culture grew Alpha haemolytic streptococci, nonpathogenic *Neisseria* and moist opaque colonies on blood agar.
- Gram stain of the moist opaque colonies on culture showed small gram negative coccobacilli. These colonies were oxidase positive, urease positive.
- The isolate was put for identification on Vitek 2 Compact using ID GN card (BioMérieux, Marcy l'Etoile, France) and Vitek MS (matrix-assisted laser desorption/ionization time-of flight mass spectrometry; BioMérieux).
- To further confirm the identity of the isolate 16S rRNA sequencing was performed.
- Consensus sequence of 16S rDNA gene was generated from forward and reverse sequence data using aligner software.
- The 16S rDNA gene sequence was used to carry out BLAST with the database of NCBI genbank database.
- Based on maximum identity score first ten sequences were selected and aligned using multiple alignment software program ClustalW.
- Distance matrix was generated and the phylogenetic tree was constructed using MEGA 7.

Results

- CBC showed elevated neutrophils -71% (biological reference interval (40%-62%).
- C-reactive protein was raised: 24.4mg/l (normal value <6mg/L).
- Gram stain of the exudate showed plenty of pus cells and plenty of small gram negative coccobacilli and occasional Gram positive cocci in short chains.
- The isolate was identified as *Bordetella bronchiseptica* on Vitek 2 Compact using ID GN card (BioMérieux, Marcy l'Etoile, France) and Vitek MS with a confidence value of 99.9.
- The isolate (Accession Number KY075896 in Figure below) showed high similarity with *Bordetella bronchiseptica* based on nucleotide homology and phylogenetic analysis.

Phylogenetic Tree:

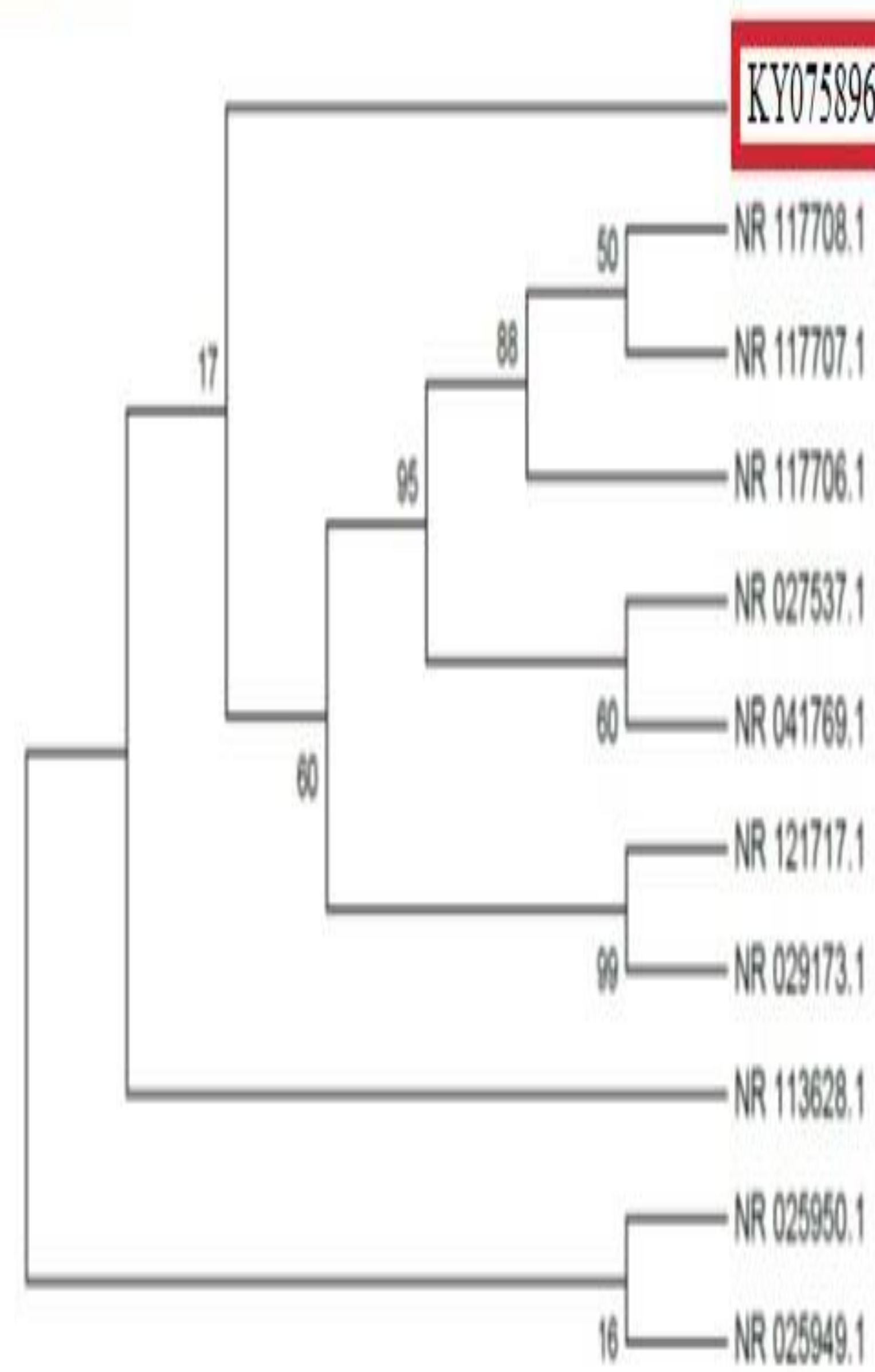


Figure. Molecular Phylogenetic analysis by Maximum Likelihood method

- Antibiotics susceptibility test was put up and interpreted according to CLSI document M45-A2.
- The isolate was sensitive to ciprofloxacin, erythromycin, amoxicillin-clavulanate, trimethoprim-sulfamethoxazole and Minocycline.
- The child was treated with Syrup amoxicillin plus clavulanate (400mg) 5ml per orally 12 hourly for 7 days. He recovered after completion of therapy.
- There was history of close contact with his pet dog; a Cocker Spaniel.

Conclusions

- Keeping in view the clinical picture of fever with exudative tonsillitis, raised neutrophils and CRP and the Gram stain report with presence of pus cells and the culture showing growth of only *Bordetella bronchiseptica* besides normal flora we conclude it to be the likely pathogen.
- This is the first case report from India of Tonsillitis due to *Bordetella bronchiseptica* in a child.
- An unusual bacterial causative agent could be rapidly identified by using MALDI-TOF technology and subsequent confirmation by 16S rRNA sequencing.
- History of contact with animals should be kept in mind with such a clinical presentation.
- Since we could not take a sample from the pet we can only suggest it to be the likely source of infection.



Bibliography

- Mattoo S, Cherry J D. Molecular Pathogenesis, Epidemiology, and Clinical Manifestations of Respiratory Infections Due to *Bordetella pertussis* and Other *Bordetella* Subspecies. *Clinical Microbiology Reviews*. April 2005 : 326–382.
- Frédéric Wallet, Thierry Perez, Sylvie Armand, Benoit Wallaert, René J. Courcol. Pneumonia Due to *Bordetella bronchiseptica* in a Cystic Fibrosis patient: 16S rRNA Sequencing for Diagnosis Confirmation. *J. Clin. Microbiol.* June 2002, 2300–2301.
- Woolfrey BF, Moody JA. Human infections associated with *Bordetella bronchiseptica*. *Clin Microbiol Rev.* 1991 Jul;4(3):243-55.
- Papsian CJ, Downs NJ, Talley RL, Romberger DJ, Hodges GR. *Bordetella bronchiseptica* bronchitis. *J Clin Microbiol.* 1987 Mar;25 (3):575-7.
- Berkowitz DM, Bechara RI, Wolfenden LL. An unusual cause of cough and dyspnea in an immunocompromised patient. *Chest.* 2007.May;131(5):1599-602.
- Clinical and Laboratory Standards Institute (CLSI). Methods for antimicrobial dilution and disk susceptibility testing of infrequently isolated or fastidious bacteria: approved guideline. CLSI document M45-A2. Pennsylvania: CLSI; 2010.