



## Antibiotic sensitivity pattern of *Moraxella catarrhalis* at a tertiary care hospital

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### Abstract

*Moraxella catarrhalis* is a human-specific bacterium previously discounted as a simple commensal organism with only limited pathogenic potential. This view has changed considerably and we now know that *M. catarrhalis* is associated with a range of disease states affecting both children and adults. A retrospective study was carried out to assess the clinical significance of *Moraxella catarrhalis* (*M. catarrhalis*) isolated from sputum specimens received from patients seen during a 1 year period. The isolation of *M. catarrhalis* should be considered significant in adult patients with lower respiratory tract infections and associated underlying risk factors. Since 70 % of the isolates showed penicillin resistance, treatment with appropriate antibiotics should be instituted.

Key-Words: *Moraxella catarrhalis*, Nosocomial infection, Beta-lactamase

### Introduction

Respiratory tract infections are the most common infectious diseases affecting humans worldwide. *Moraxella catarrhalis* formerly called *Neisseria catarrhalis* or *Branhamella catarrhalis* is a Gram negative aerobic diplococcus frequently found as a commensal of the upper respiratory tract. Over the last 20 years, the bacterium has emerged as a pathogen and is now considered an important cause of lower respiratory tract infection.<sup>1</sup> It resides exclusively in humans and colonizes the nasopharynx and occasionally the conjunctiva and genital tract.<sup>2</sup> *M. catarrhalis* causes otitis media in infants and children, and bacterial tracheitis, sinusitis and atypical pseudo croup in preschool children.<sup>3</sup> It also causes conjunctivitis in infants and adults. In adults *M. catarrhalis* has been associated with exacerbations of chronic obstructive pulmonary disease (COPD) and pneumonia.<sup>4</sup> In addition, hospital outbreaks of respiratory disease due to *Moraxella catarrhalis* have been described establishing the bacterium as a nosocomial pathogen.<sup>5</sup> The continuing increase in the antibiotic resistance of respiratory pathogens remains a global problem. Surveillance to monitor shifting trends in resistance is vital and ultimately influences the selection of antimicrobial agents available for use against a particular organism.<sup>6</sup> The aim of our study was to evaluate the significance of *Moraxella catarrhalis* as a pathogen in respiratory tract infection and its antibiotic resistance pattern to various antibiotics.

### Material and Methods

A total of 2560 sputum samples from the patients with respiratory tract infection received at the Department of Microbiology of our hospital from January to December 2011 were included in this study. Only sputum specimens with > 25 white blood cells and < 25 epithelial cells per low power field on microscopic examination were studied. Samples were inoculated on blood agar and MacConkey agar and incubated at 37°C for 18 to 24 hours. The isolates were identified by colony characteristics and biochemical tests. Antibiotic susceptibility test was done by Kirby Bauer disk diffusion technique<sup>7</sup> against following antibiotics: Amikacin, Ampicillin, Amoxicillin-Clavulanic acid, Ciprofloxacin, Trimethoprim Sulfamethoxazole, Cefotaxime, Imipenem, and Piperacillin-Tazobactam.

### Results and Discussion

A total 1020 (40%) respiratory pathogens were isolated from the 2560 sputum samples, of these 312 (30%) were *Klebsiella pneumoniae*, 220 (21%) *Streptococci* Sp, 180 (17%) *Moraxella*, 134 (13%) *Pseudomonas*, 120 (11.7%) *E. coli*, 92 (9%) *Staphylococci* and 52 (5%) non fermenting gram negative bacilli (NFGNB). The *Moraxella* isolates showed maximum resistance to cotrimoxazole (100%), followed by ampicillin (70%) and amikacin (40%), while susceptibility was maximum (100%) to amoxycylav, cefoperazone sulbactam, cefotaxime, imipenem and piperacillin tazobactam followed by ciprofloxacin (80%).

*Moraxella catarrhalis* has now emerged as a real pathogen and is now considered as an important cause

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for respiratory tract infections both in children and in adults. It accounted for 17% (180 of 1020) of all pathogens isolated in our study. Out of the 180 isolates of *Moraxella*, 110 (61%) were from males and 70 (39%) from female patients. Similar reports have been made by others.<sup>8</sup> *Moraxella catarrhalis* may produce beta-lactamase especially in clinically significant isolates. Many treatment failures with ampicillin or amoxicillin are due to the production of this enzyme. In our study 70% of isolates were resistance to ampicillin. However they were sensitive to amoxicillin clavulanic acid combination in 100% of cases. This data indicates that the antibiotic susceptibility of *Moraxella catarrhalis* is similar to other recent studies. Thornsberry et al<sup>9</sup> in 1996-1997 found that the most active for *Moraxella catarrhalis* were amoxicillin-clavulanate, ceftriaxone, and levofloxacin (100%) and the least active was ampicillin. Jakubicz et al in 1997<sup>10</sup> reported ampicillin resistance in 66.7% strains of *Moraxella catarrhalis*, they however found all the strains to be sensitive to ofloxacin and amoxicillin-clavulanate.

In conclusion, over the past two decades *M. catarrhalis* has evolved from an emerging to a well-established pathogen. Indeed, beta-lactamase producing isolates appear to be widespread, and this may play an important role in the therapy of infections. Although amoxicillin with clavulanate remains the antimicrobial therapy of choice for *Moraxella catarrhalis* infections, continued surveillance of antimicrobial susceptibility and application of control measures against further transmission are required to inhibit the emergence of the resistant strains.

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