Significance, Isolation, Identification and Sensitivity of Branhaemella (Moraxella) Catarrhalis

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Abstract

In a study lasting over two years the frequency and sensitivity of moraxella catarrhalis causing respiratory tract infections were studied. Sputum samples from patients with lower respiratory tract infections were screened for moraxella catarrhalis. The organisms isolated ideniffed and their sensitivity determined by simple methods which are practicable. The study shows that 22.4% of the infections were due to moraxella catarrhalis and 98% of the isolates were sensitive to amoxicillin-culvanalic acid (augmentin). The paper signifies the importance of reporting moraxella catarrhalis and its treatment (JPMA 43: 153, 1993).

Introduction

The organism was first reported by Frosch and Kolle in 1896 and named as micrococcus catarrhalis meaning a small coccus down flowing catarrh. Ghon and Pfeiffer studied and stated that in sputum it occurred in pairs, tetrads or occasionally in small groups and produced colonies resembling those of streptococcus pyogenes. Elser and Huntoon described two types of colonies being produced by the organism[1]. The organism was renamed as neisseria catarrhalis as it rcsembled the neisseria group[2]. Its name was changed to branhaemella catarrhalis as it differs from neisseria in its DNA base content and fatty acid composition. Now the organism is renamed as moraxella catarrhalis[3]. The organism has been recognised as a cause of human infection since the early 1900's but only in 1982 it received a clear appreciation due to the extent of disease in which it produces. It causes a wide variety of human infections, ranging from systemic life threatening diseases such as endocarditis and meningitis[4] to acute, localized infections including acute otitis media, sinusitis and bronchopulmonary infections[5-7]. In certain conditions M. catarrhalis is the second or third most common cause of bacterial infections of the lower respiratory tract[4]. It is also associated with frank pneumonia and superinfections in patients with active tuberculosis[3]. Since there is no record of the actual extent of M. catarrhalis infection in Pakistani population a prospective study was planned to study the frequency and sensitivity of pulmonary infection due to M. catarrhaiis.

Patients and Methods

Patients with the evidence of chest infections and symptoms of chronic obstructive airway disease were selected for bacteriological screening. Two hundred and fifty sputa and 150 bronchial aspirates were collected from out-patients and in- patients attending different hospitals and coming to chest physicians of Karachi over the period of one year. The sputa were screened for acceptability based on the cellular criteria[8] and grams stain was performed which is very helpful in the diagnosis of M. catarrhalis broncho-pulmonary infections. All sputa were inoculated onto blood agar and chocolate agar plates and incubated at 35-36°C in a candle jar for 24-48 hours. M. catarrhalis produced small round, entire whitish grey colonies which could be pushed across the plates with a bacteriological loop, and the

colonies were oxidase positive strongly suggestive of M. catarrhalis. The isolates were grams stained, oxidase tested, carbohydrate fermentation carried out and tested for deoxyribonuclease activity[9]. The organisms were oxidase and catalase positive fail to ferment glucose, maltose, sucrose and lactose or to grow on nutrient agar at room temperature. Sensitivity tests were carried out against penicillin, a.mpicillin, augmentin, cotrimoxazole, erythromycin, tetracycline and cepharidine using the stokes disc diffusion method[10] and scnsitivity recorded[11].

Results

A total of 250 sputa and 150 bronchial aspirates were obtained and processed for the presence of M. catarrhalis mixed infections in which streptococcus pneumoniae, haemophilus influenzae and group A beta haemolytic streptococci were found alongwith M. catarrhalis were excluded and only cases where M. catarrhalis was seen as the only pathogen were included in the study.

Table I. Frequency of M. catarrhalis in respiratory tract.

Specimen	No. tested	No. positive	Percentage
Sputum	250	52	20.8
Bronchial aspirate	150	34	22.66
Both	400	86	21.5

Table I shows the frequency of infection due to M. catarrhalis seen in 400 cases. The overall infection rate was found 21.5%. Twenty-three percent of bronchial aspirates yielded the pathogen while sputum resulted in 20.8% cases indicating that both samples are suitable for the isolation of this pathogen.

Table II. Sensitivity Pattern of 86 Isolates of M. catarrhalis.

Antibiotic	No. sensitive	Percentage
Penicillin	40	46.5
Ampicillin/Amoxycillin	40	46.5
Augmentin	84	97.6
Cepharidine	59	68.6
Cotrimoxazole	44	51.1
Tetracycline	56	65.1
Erythromycin	78	90.6

Table II gives the sensitivity pattern of 86 isolates to the antibiotics tested. Most (96.5%) isolates were found to be sensitive to amoxycillin clavulanate (augmentin) and 90.6% were sensitive to erythromycin. Fifty-three percent of the isolates were resistant to penicillin, ampicillin/amoxil and 49% were resistant to cotrimoxazole.

Discussion

Moraxella (branhaemella) catarrhalis is now regarded as pathogen and is being reported and treated in the western world[12]. The organism is encountered in our population and causes respiratory tract infections. The present data shows that the organisms can be recovered from sputum and bronchial aspirates, hence, for culture bronchial aspirates or sputum are both suitable. The pathogen can be grown easily and the methods of identification are within the reach of an average clinical laboratory. There is evidence of beta lactamase production by M. catarrhalis which is an alarming situation. Most of the isolates are sensitive to amoxycillin-clavulanate (augmentin) and erythromycin and seems to be the antibiotic of choice for treating infections due to M. catarrhalis. Finally, M. catarrhalis has emerged as an important clinical pathogen in our part of the world and probably causes diseases more frequently than realized, hence it should be looked for isolated, reported and treated.

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