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Brief Communication

PREVALENCE OF ANTIBIOTIC RESISTANCE AMONG BACTERIA ISOLATES OF LOWER RESPIRATORY TRACT INFECTION IN COPD SHAHREKORD – IRAN, 2005

Reza Imani[1], Hamid Rouhi[2], Forouzan Ganji[3]

ABSTRACT

Background: Bacterial infection is one of the several important causes of exacerbations of chronic obstructive pulmonary disease (COPD). Antibiotic resistance has increased in all the major pathogens. The objective of this study was investigate frequency of drug resistance of species from LRTs.

Methods: This cross sectional study was performed in Hajar hospital of shahrekord-Iran. Protected brush samples were obtained from the lower respiratory tract by bronchoscopy in both hospitalized and ambulatory 54 COPD patients with exacerbations yield. The in vitro susceptibilities of the isolates to 6 antimicrobial agents were then determined by the broth microdilution test.

Results: Among the s. pneumonia isolates tested 5.9% and 94.1% were intermediate and high level resistant to penicillin and ampicillin respectively. 58.8% of isolates were erythromycin resistance. H.influenzae isolates were 100% resistance to penicillin and ampicillin.

Conclusion: Antibiotics are an important part of the treatment of COPD, suggesting that every effort should be made to conserve sensitivity of antibiotic by using them appropriately.

KEY WORDS: COPD, Drug resistance, LRTIs.

Pak J Med Sci May - June 2007 Vol. 23 No. 3 438-440

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a chronic, smoking – related inflammatory disorder of the lungs.[1-3] Patients with chronic bronchitis are more susceptible to infections. Mucus hypersecretion, which is the hallmark of chronic bronchitis, is particularly associated with mortality from an infectious cause.[4]

There is general agreement that the bacterial species most commonly isolated from sputum and lower respiratory tract during acute exacerbations of COPD are nontypable H.influenzae, streptococcus pneumoniae and Moraxella catarrhalis.[5,6] In recent years, there has been a dramatic rise in antibiotic resistance among common respiratory pathogens. For example before 1987, <1% of pneumococci in the USA demonstrated high–level resistance to penicillin.[7] In 1997 overall penicillin resistance had reached to 43.8%.[8]

Patients with chronic obstructive pulmonary disease are generally subjected to multiple regimens of antimicrobial treatment. It is difficult to decide whether patient characteristics or the risk of antibiotic resistance should influence choice of empiric antibiotic treatment. This study was performed to investigate the

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* Received for Publication: August 21, 2006

* Accepted: December 12, 2006

frequency of drug–resistant bacterial species commonly isolated from lower respiratory tract by bronchoscopy.

MATERIALS AND METHODS

This cross sectional study was performed in Hajar hospital of Shahrekord - Iran in 2005. Protected brush samples were obtained from the lower respiratory tract by bronchoscopy in both hospitalized and ambulatory 54 patients with exacerbations yield. The pathogens collected for study were streptococcus pneumonia, Haemophilus influenzae, Moraxella catarrhalis.

In vitro susceptibility testing was performed by the broth micro dilution test according to guidelines of the National committee for clinical laboratory standards (NCCLS).[9] The MICs of six antimicrobial drugs, penicillin, ampicillin, erythromycin, ciprofloxacin, ceftriaxone, ofloxacin were determined by a standardized microdilution method in 0.1ml volumes of Cation – adjusted Muller – Hinton broth with 5% lysed horse blood . The microdilution plate was inoculated with a disposable inoculator so that the final inoculum was 5 * 10cfu/ml, and was incubated at 37 c for 20 hr.[10] To analyze the factors such as age and sex for acquiring bacterial pneumonia was obtained at the time of patient enrollment in the study. Chi square and independent t test were performed to evaluate that factors.

RESULTS

Our result showed that culture was positive for 23 (40%) isolates. There were no significant difference between results of culture in variable of age and sex (P>0.05). Table-I

DISCUSSION

In this study we used bronchoscopy techniques to avoid nasopharyngeal contamination of expectorated sputum. Data from this study revealed 60% were negative for bacterial culture. We presume that main cause of these infections were viral agents and atypical pathogen. Our data from this study revealed high frequency of pneumococcal penicillin and ampicillin resistance. In 1998 The ANSORP study reported penicillin resistance in Korea almost 80% of all isolates. Pneumococcal drug resistance in Nagasaki, Japan, was also as serious as in Korea.[11] In France, the prevalence of penicillin – resistant s. pneumoniae was 53.3% of submitted isolates in 1992. At the same time Germany had low resistance (7.2%).[12]

According to the data from the present study the prevalence rate of erythromycin among s.pneumonia was 75% isolates and about ciprofloxacin 29.4% isolates. Reported rates of erythromycin resistance in the western Hemisphere were high in France (58.1%) Spain (57.1%) and the eastern south-central parts of the United States (47%) Reports from Hong Kong and Taiwan showed that 80 to 91% of pneumococcal Isolates were resistant to erythromycin.[13,14]

This study revealed penicillin, ampicillin resistance 100% for H.influenzae and M.catarrhalis.

In two studies beta-lactamase production was found in 33.4% of H.influenzae and 95% of M. catarrhalis.[15,16] In Hong Kong investigators demonstrated the high rates of resistance of s.pneumoniae isolates to various fluoroquinolones.[14] Recently attention has also been drawn to decreased susceptibility of S.P to fluoroquinolones, perhaps reflecting increased use of this class of antibiotic. Use of antibiotics in anima husbandry and agriculture is contributing to the problem. Risk factors for multi drug resistant S.pneumoniae includes prior antibiotic use, extremes of age and hospitalization. High rates (>15%) of B-lactamase production were found in the UK,

Table-I: Distribution of antibiotic resistance among bacteria isolates of LRTIs

Pathogens	*No. of*	*Penicillin*		*Ampicillin*		*Erythromycin*		*Ciprofloxacin*		*Ceftriaxone*		*Ofloxacin*	
	isolates	*Inter*	*Resist*	*Inter*	*Resist*	*Inter*	*Resist*	*Inter*	*Resist*	*Inter*	*Resist*	*Inter*	*Resist*
S.Pneumonia	17	5.9	94.1	5.9	94.1	35.3	58.8	17.6	11.8	11.8	5.9	23.5	11.8
H.influenzae	4	0.0	100	0.0	100	50	25	75	25	75	25	75	25
M.catarrhalis	2	0.0	100	100	0.0	100	0.0	0.0	0.0	0.0	0.0	0.0	0.0

France, Belgium and Spain.[12,16] 92.2% of 371 isolates of M. catarrhalis collected in Europe in 1998 produced B- lactamase.[12]

According to our data the prevalence of erythromycin–resistant H. influenzae is 50% of isolates where as isolates from France showed the same result.[12] Resistance to the Erythromycin is associated with penicillin resistance.[17] Our data showed no fluoroquinolones resistance for isolates of M.catarrhalis. Fluoroquinolone resistance was detected in UK, France and Spain.[12,18] Differences in the prevalence of antimicrobial resistance in countries may be due to several factors. Different patterns of antimicrobial usage, which lead to variable selective pressure on resistance, might be one of the primary factors.[19] Other factors could be the distribution of specific serotypes and the spread of resistant clones within certain regions. Respiratory tract infections are the most common indication for antibiotic prescription, accounting for 60% of all scripts in the UK. In Europe, >80% of all LRTI are treated with antibiotics.[19] Healthcare systems around the world are attempting to minimize costs and at the same time improve overall quality of care. As such continuous study for drug resistance and providing guidelines for the use of antibiotics is suggested.

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