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Bacterial Prevalence of Respiratory Tract Infection other than Mycobacterium Tuberculosis and Their Sensitivity to Amoxicillin in Rohilkhand Region of Uttar Pradesh

KEYWORDS: Bacterial prevalence, Culture and sensitivity, bacterial pathogens, antibiotic, hygiene.

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ABSTRACT *Objectives: To see the bacterial prevalence other than mycobacterium tuberculosis and its sensitivity against amoxicillin in patient with acute respiratory tract infection.*

Methods: 300 sputum samples were collected each year from 2013 to 2015 in two summer month (May and June) from all the adult patients with diagnosis of acute respiratory tract infection. Collected specimens were sent for bacterial identification and for their sensitivity against amoxicillin.

Results: There is increase in bacterial pathogen load from year 2013 to 2015. The amoxicillin sensitivity is also found to be decrease from year 2013 to 2015 in Haemophilus influenzae, Klebsiella pneumoniae and Pseudomonas aeruginosa

Conclusion: Bacterial pathogen causing acute respiratory infection except mycobacterium tuberculosis and its resistance against amoxicillin are increasing year by year in Rohilkhand Region of Uttar Pradesh. This can be prevented by maintaining proper hygiene and judicial use of amoxicillin.

Introduction

During the summer season the quantity of patients, especially in pulmonary medicine department of various institution increases. The close contact with patient aggravates the spread of infection. In summer season epidemics of respiratory tract infection increases. Outbreaks of respiratory illness of Bacterial and Viral etiology have been recognized in many isolated communities after contact with the outside world[1,2,3] and accounts for large proportion of patients, especially during summer season. Upper respiratory tract infections are involved in great majority, but lower respiratory tract infections are also frequent. Viruses are the leading cause of upper respiratory tract infection but bacteria are also not much behind. In warm climates above 30 degree centigrade, respiratory infection stands as a leading cause of hospitalization and death. Although there is lack of epidemiological and clinical information in warm countries[4]. Therefore, surveillance of acute respiratory infection in defined populations is important, as it help in taking proper preventive measures.

Staphylococcus aureus, Haemophilus influenzae, Streptococcus pneumoniae, Streptococcus pyogens, Pseudomonas aeruginosa and members of enterobacteriacae are main bacterial pathogens. These bacterial pathogens can also be recovered from complicated influenza virus infections[5,6,7].

In Haj pilgrims, respiratory tract infections during pilgrimage seasons especially in summer ranks second in cause of death among pilgrims after heart disease[8].

Increasing number of cases and their resistance to the antibiotics lead us to conduct this study. We hope that this study could contribute to better management and control of disease in the future.

Aims and Objectives

To see the bacterial prevalence other than mycobacterium tuberculosis and its sensitivity against amoxicillin in patient with acute respiratory tract infection, during May and June month for each consecutive year 2013, 2014 and 2015 by the help of sputum culture and sensitivity.

Material and Method

Total 300 sputum samples were collected each year from 2013 to 2015 in two summer month (May and June) from all the adult patients with diagnosis of acute respiratory tract infection attending outdoor and indoor of pulmonary medicine department of Rohilkhand Medical College and Hospital, Bareilly in Rohilkhand Region, Uttar Pradesh. The diagnosis of the patient was confirmed by history, physical examination and investigation. Patient who were immunocompromised, or having pulmonary tuberculosis or having chronic signs of respiratory illness were excluded from the study.

Collected specimens were sent for bacterial identification and for their sensitivity against amoxicillin.

RESULTS

Total 900 sputum samples were collected in three years, 2013, 2014 and 2015; bacterial pathogens were recorded in 598 sputum samples.

300 sputum samples were collected in May and June month of each year 2013, 2014 & 2015 and positivity were noted in 182, 204 and 212 samples. Detail description is mentioned in table 1.

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Table 1: Frequency of bacterias in 2013, 2014 & 2015 sputum samples.

Bacteria isolated on sputum culture	2013 (n=182)	2014 (n=204)	2015 (n=212)
Haemophilus influenzae	48(26.4%)	52(25.5%)	53(25%)
Klebsiella pneumoniae	36(19.8%)	58(28.4%)	62(29.2%)
Streptococcus pneumoniae	33(18.1%)	34(16.7%)	32(15.1%)
Staphylococcus aureus	27(14.8%)	23(11.3%)	26(12.3%)
Streptococcus pyogens	20(11%)	18(8.8%)	17(8%)
Pseudomonas aeruginosa	18(10%)	19(9.3%)	23(10.8%)

Sensitivity of amoxicillin against Haemophilus influenzae, Klebsiella pneumoniae, Streptococcus pneumoniae, Staphylococcus aureus, Streptococcus pyogens and Pseudomonas aeruginosa in 2013, 2014 and 2015 is described in Table 2.

Table 2: Sensitivity of Bacteria against Amoxicillin in 2013, 2014 & 2015 sputum samples

Bacteria Isolated	Amoxicillin Sensitive Sputum Samples					
	2013		2014		2015	
	n	Sensitivity (%)	n	Sensitivity (%)	N	Sensitivity (%)
Haemophilus influenzae	48	46(95.8%)	52	38(73.1%)	53	32(60.4%)
Klebsiella pneumoniae	36	31(86.1%)	58	44(75.9%)	62	45(72.6%)
Streptococcus pneumoniae	33	31(93.9%)	34	31(91.2%)	32	29(90.6%)
Staphylococcus aureus	27	24(88.9%)	23	21(91.3%)	26	23(88.5%)
Streptococcus pyogens	20	16(80%)	18	15(83.3%)	17	14(82.4%)
Pseudomonas aeruginosa	18	17(94.4%)	19	15(78.9%)	23	(69.6%)

Discussion

The study focused on the pattern of respiratory tract infection other than mycobacterium tuberculosis during summer seasons mainly in May and June month of year 2013, 2014 and 2015. There was an increase in the potential bacterial pathogens isolated from sputum specimen of patients with respiratory tract infection from 2013 to 2015, as in 2013 total 182 sample , in 2014 total 204 samples and in 2015 total 212 samples were pyogenic positive. This can be due to hot climate or increase in unnecessary contact with the patients. Haemophilus influenzae was the most frequent organism isolated in May and June month for three consecutive years, followed by Klebsiella pneumoniae, Streptococcus pneumoniae, Staphylococcus aureus, Streptococcus pyogens and pseudomonas aeruginosa. In contrast with other findings, a study conducted by Al-Hadramy et al, H. influenzae was the predominating organism isolated from patients with lower respiratory tract infection[9,10,11]. Another study conducted by Al Dabhagh et al showed that H. influenzae accounted for more than one third of the cases followed by S. pneumoniae[12]. On the other hand a study conducted by Kamat et al from Bombay showed that Klebsiella pneumonia was the common potential pathogen isolated from the patients with respiratory tract infection[13].

Patients with negative pyogenic culture may be tubercular/viral or attributed to other aetiological agents or patients already being on chemotherapy. Isolation of potential pathogens from sputum is difficult when the patient had taken or has present history of antimicrobial chemotherapy[14,15]. The growth of pneumococcus in particular may be inhibited by even a single dose of an antimicrobial agent before admission[16].

In the due course of study of May and June for long three years (2013, 2014 and 2015), in above mentioned bacteria (isolated from sputum sample) following trend was noticed regarding amoxicillin sensitivity. In H.influenzae sensitivity for amoxicillin recorded in 2013 was 95.8% which shows a decline in subsequent years, in 2014 was 73.1% & in 2015 was 60.4%, respectively. Similar trend was seen in Klebsiella pneumoniae 86.1% sensitivity in 2013 with fall to 75.9% in 2014 and further decline to 72.6% in next year. Sensitivity of amoxicillin in Pseudomonas aeruginosa was 94.4% at the time of start of study (2013) which fall to 78.9% in 2014 and further to 69.6% in 2015. However remaining bacteria listed as S.pneumonia, s.aureus and s.pyogens exhibit fluctuations not more than 3% for sensitivity against amoxicillin. Decline in sensitivity of amoxicillin in the bacteria could be due to its irrational use.

Conclusion

Respiratory sickness due to bacterial pathogen except mycobacterium tuberculosis is increasing year by year and so is the resistance against the antibiotic amoxicillin in Rohilkhand Region of Uttar Pradesh. Avoiding unnecessary contact with susceptible person, maintaining proper hygiene especially during hot climate and judicious use of antibiotics can help us to control bacterial aggravation in long run.

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