

Original article

Study of prevalence of drug resistance among patients having common respiratory infections

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Abstract:

Introduction: Acute respiratory infections are a major cause of morbidity and mortality in children and are particularly significant in developing countries like India. In a hospital-based study on patients with acute respiratory tract infection, 38% were upper respiratory tract infection including nasopharyngitis, tonsillitis and pharyngitis. The aim of the study was to calculate the prevalence of drug resistance among patients having common respiratory infections.

Materials and methods: The study was conducted between the months of May 2015 to July 2015 in the Out-Patient Department of ENT, Dr. D. Y. Patil Medical College, Pimpri, Pune, Maharashtra. Due consent from the Ethical Committee was taken before the commencement of the project.

Observations and results : Out of the 50 bacterial isolates collected, 29 were found to be Methicillin-resistant *S. aureus*, 11 Methicillin-sensitive *S. aureus*, 7 *Klebsiella* spp., 1 *Streptococcus pyogenes*, 1 Beta hemolytic *Streptococci* and 1 *Moraxella*

Conclusion : Data from this study showed resistance exists to certain first/second line antibiotics such as Gentamycin (20%), Vancomycin (0%), Ofloxacin (74%), Ciprofloxacin (70%), Cefotaxime (74%), Ceftazidime (76%) and Amoxicillin+Clavulanic acid (78%).

Keywords: Acute respiratory infections , drug resistance

Introduction

Acute respiratory infections are a major cause of morbidity and mortality in children and are particularly significant in developing countries like India. In view of applied physiological facts, a hospital-based study on patients with acute respiratory tract infection, 38% were upper respiratory tract infection including nasopharyngitis, tonsillitis and pharyngitis⁽¹⁾. It is estimated that approximately 7 sore throat episodes occur per child per year, with 13.5% of these being caused by group A streptococcus (GAS) and the vast majority are viral in etiology⁽²⁾. Inappropriate antibiotic treatment for a common infection like, pharyngitis is becoming a major issue; hence only true group- A beta-hemolytic streptococcal infections proven by rapid antigen test or culture should be treated with antibiotics. GABHS pharyngitis is often a mild and self-limiting infection in the absence of antimicrobial therapy⁽³⁾.

The resistance spectrum of pathogens varies in different regions. Therefore local resistance patterns have to be known for appropriate antimicrobial use^[4]. This highlights the importance of such a study in Pune as well as elsewhere in Maharashtra and a nationwide surveillance programme. The aim of the study was to calculate the prevalence of drug resistance among patients having common respiratory infections.

Materials and methods

The study was conducted between the months of May 2015 to July 2015 in the Out-Patient Department of ENT, Dr. D. Y. Patil Medical College, Pimpri, Pune, Maharashtra. Due consent from the Ethical Committee was taken before the commencement of the project.

Samples were collected from patients within the inclusion criteria.

Inclusion Criteria

Patients presenting with Tonsillopharyngitis (Inflammation/Irritation of pharynx, palatine tonsil or both) with symptoms such as:

- Sore Throat
- Upper deep cervical lymphadenopathy
- Dysphagia
- Associated symptoms such as fever, malaise, weakness etc.

Preliminary diagnosis will be clinical.

The **exclusion criteria** for the study is as follows:

- Patients below 5yrs
- Patients above 70yrs
- Immuno-compromised patients (HIV, Steroid Therapy, etc.)
- Diabetic patients

Verbal consent was taken from each patient after explaining the procedure and objective of procuring and testing the throat sample. Patients were assured of anonymity in the published study.

Throat swabs were then collected using sterile cotton swabs. These were transported to the Microbiology Department with 1 - 2 hours of collection in test tubes with sealed cotton plugs to assure viability and avoid contamination.

Identification of bacterial isolates

Identification of the organism was done based on standard testing procedures followed by the department i.e. Gram staining, Acid-fast staining, Light microscopy, culture growth and inoculation in respective media. Routine biochemical tests (like catalase test, oxidase test, B-hemolysis, etc.) will be done to pinpoint the exact organism.

E.g. *S. pyogenes* is identified by the presence of thin and smooth colonies appearing as Gram -positive cocci grouped into chains ; Negative catalase test ; showing growth inhibition around a disc containing 0.04 units of Bacitracin. *H. influenza* is identified by the presence of tiny, moist and smooth gray colonies ; absence of hemolysis ; positive catalase and oxidase tests ; presence of growth factor X and V ; satellite growth around streaks of *Staphylococcus aureus*.

Antibiotic Sensitivity Testing

Antibiotic sensitivity testing was done using the Kirby Bauer disc diffusion method.

Observations and results

Out of the 50 bacterial isolates collected, 29 were found to be Methicillin-resistant *S. aureus*, 11 Methicillin-sensitive *S. aureus*, 7 *Klebsiella* spp., 1 *Streptococcus pyogenes*, 1 Beta hemolytic *Streptococci* and 1 *Moraxella*. This is represented in Table 1.

Name of organism	Number of bacterial isolates
Methicillin-resistant <i>S. aureus</i>	29
Methicillin-sensitive <i>S. aureus</i>	11
<i>Klebsiella</i> spp.	7
<i>Streptococcus pyogenes</i>	1
Beta hemolytic <i>Streptococci</i>	1
<i>Moraxella</i>	1
	50

Table 1

Table 2

ANTIBIOTICS	RESISTANT	SENSITIVE
Ampicillin	29	21
Norfloxacin	32	18
Gentamycin	10	40
Vancomycin	0	50
Linezolid	3	47
Ciprofloxacin	35	15
Ofloxacin	37	13
Cotrimoxazole	26	24
Erythromycin	21	29

Amoxicillin	22	28
Clindamycin	19	31
Chloramphenicol	37	13
Tobramycin	15	35
Amikacin	20	30
Amoxicillin + Clavulnic acid	25	25
Ceftazidime + Tazobactam	20	30
Caeftazidime + Clavulnic acid	21	29
Ceftazidime	38	12
Cefotaxime	34	16

Discussion

Our study has showed that anti-microbial resistance (AMR) has emerged in Pimpri, Maharashtra. This was a very small study with a small sample size that isn't necessarily representative of the whole population. But the aim of the study was to highlight the emergence of multi -drug resistance, which was achieved. Other similar studies with larger sample sizes are required for better extrapolation of the data that can correctly analyze the significance of such resistance in the general population. Such clinical based studies are the need of the hour. In the last decade, a large number of new initiatives have been launched by various agencies to contain this problem. These include India Clen (Indian Clinical Epidemiology Network) which has generated some quality data on AMR in pathogens like pneumococcus, H. influenzae across the country; IIMAR (Indian Initiative for Management of Antibiotic Resistance) launched in March 2008, with WHO support, by a consortium of NGOs to promote prudent use of antimicrobials, INSAR (Indian Network for Surveillance of Antimicrobial Resistance) a network of 20 laboratories in the private as well as public sector across the country to generate quality data on AMR, organization by the ICMR of an expert group meeting in December 2009 and an Indo-Swedish workshop held at New Delhi on 2 February 2010 to discuss a joint strategy for containment of AMR ⁽⁵⁾. This study can be extended to other hospitals based record like karandikar et al.'s Robotics surgery work conducted in Pune city region. ⁽⁶⁾Use of advance aids may be beneficial. ⁽⁷⁾ Ethical views should be underlined. ⁽⁸⁾

Conclusion

Data from this study showed resistance exists to certain first/second line antibiotics such as Gentamycin (20%), Vancomycin (0%), Ofloxacin (74%), Ciprofloxacin (70%), Cefotaxime (74%), Ceftazidime (76%) and

Amoxicillin+Clavulinic acid (78%). This shows a rising prevalence of multi -drug resistant pathogens, which is an alarming sign.

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