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Original article

Antibiotic resistance in commonly acquired acute tonsillopharyngitis patients in urban population.

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Abstract:

Introduction: Increasing incidence of tonsillopharyngitis cases in children may reflect synergistic infection with Staphylococcus aureus, Moraxella catarrhalis, Haemophilus influenzae or anaerobes. This "copathogenicity" may create the most common clinical setting for recurrent group A Streptococcal pharyngitis.

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.

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

Conclusion: This shows a rising prevalence of multi -drug resistant pathogens, which is an alarming sign. This calls for attention from the policy makers as well as the healthcare workers. Active measures need to be taken for its prevention and control. Keeping in mind the drawbacks of this study, similar studies need to be conducted with a larger sample size.

Introduction

Increasing incidence of tonsillopharyngitis cases in children may reflect synergistic infection with Staphylococcus aureus, Moraxella catarrhalis, Haemophilus influenzae or anaerobes. This "copathogenicity" may create the most common clinical setting for recurrent group A Streptococcal pharyngitis [(1)]. This brings forth the importance of judicious use of antibiotics in such cases.

Antibiotic- resistant organisms appear to be biologically fit and are capable of causing serious infections that are difficult to manage because treatment options are limited. Genes can encode proteins or ribosomal RNA that enables bacteria to evade the actions of antibiotics [(2)] . This increase in the prevalence of drug-resistant pathogens is

occurring at a time when the discovery and development of new anti-infective agents is slowing down dramatically. The burden of antimicrobial resistance refers to the impact of events that would not have occurred if resistance had not been present. The outcome can be measured in terms of excess mortality, morbidity (e.g., length of hospital stay and complications) and attributable costs (e.g., costs to the hospital, patient and society). As expected the risk of such outcomes was found to be higher in patients with infections caused by an antibiotic resistant organism than by susceptible strains of the same pathogen, even after adjustment for underlying comorbidities [(3)].

Thus, many such small-scale as well large - scale studies need to be conducted for the true assessment of the problem in our country.

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.

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. sureus, 7 Klebsiella spp., 1 Strptococcus pyogenes, 1 Beta hemolytic Streptococci and 1 Moraxella.

The results were statistically analyzed using the Test of Proportion. The incidence of resistance for each drug was calculated in percentage (%) .

The average resistance of the bacterial isolates was found to be 46.73%.

The p-value of each observation was found along with their Z-score to test the significance of these values. Confidence interval was set at 95% (p=0.05). The significant resistances are highlighted in green and are as follows:

- Gentamycin – 20%
- Vancomycin – 0%
- Ciprofloxacin – 70%
- Ofloxacin – 74%
- Cefataxime – 74%
- Ceftazidime – 76%
- Amoxacillin + Clavulinic acid – 68%

As can be observed from , the number of significant observations is less compared to the total number of drugs tested. This is due to the small sample size selected. The high percentage of resistance doesn't necessarily indicate same levels of resistance in the community but indicates a definite rise in incidence that should serve as a warning sign.

Discussion

Studies reporting the quantity of antibiotic prescribed found that longer duration and multiple courses were associated with higher rates of resistance. Prescription of antibiotics in primary care centers for common respiratory infections leads to a more likely chance of drug resistance. The effect is greatest in the month immediately after treatment but may persist for up to 12 months. This effect not only increases the population carriage of organisms resistant to first line antibiotics, but also creates the conditions for increased use of second line antibiotics in the community. However, there are some studies, which produced contradictory results to the existence of any such direct relationship between antibacterial exposure and bacterial resistance, due to the presence of a number of individual risk factors, which also play a role in its pathogenesis.

Bacteria from clinical and non-clinical settings are becoming increasingly resistant to conventional antibiotics. 10 years ago, concern centered on Gram-positive bacteria, particularly methicillin-resistant *Staphylococcus aureus* and vancomycin - resistant *Enterococcus* spp. However, clinical microbiologists increasingly agree that multidrug-resistant Gram-negative bacteria pose a risk to public health due to increase in resistance of Gram- negative bacteria faster than in Gram- positive bacteria [4,5] but also there are fewer new and developmental antibiotics active against

Gram-negative bacteria [6,7,8].

Our study has showed that anti-microbial resistance (AMR) has emerged in Pimpri, Maharashtra. 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 [9].

The main problems regarding this issue, in context to our country is limited public awareness, over the counter sale of antibiotics, poor surveillance data and poor sanitation and endemic infections (leading to recurrent infections). This can be solved by diligent government commitment towards this issue. National policies and guidelines need to be drawn to contain the problem. Operational research to understand the technical aspects of prevention and control as well as follow up intervention research needs to be conducted. Newer technical approaches may be helpful.[10] The wide sample study will be highlighted more clearly. [11]

Conclusion

This shows a rising prevalence of multi -drug resistant pathogens, which is an alarming sign. This calls for attention from the policy makers as well as the healthcare workers. Active measures need to be taken for its prevention and control. Keeping in mind the drawbacks of this study, similar studies need to be conducted with a larger sample size.

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