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ORIGINAL ARTICLE

Implications of Broad Spectrum Antibiotic Treatment in Children with Acute Upper Respiratory Tract infection. A Clinical Study

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ABSTRACT

Aims and objectives: The aims and objectives of current study were to identify the proper spectrum of different broad spectrum antibiotics in children for acute upper respiratory infections.

Methodology: Total 200 children patients with acute upper respiratory tract infections like acute sinusitis, acute bronchitis, pharyngitis, otitis media, laryngitis, and tracheitis were reported. Different antibiotics such as quinolones, amoxicillin, co-amoxiclav, azithromycin and clarithromycin were prescribed.

Results: All individual reported their medical conditions and predominate symptoms were fever, cough, sore throat and wheezing. Broad spectrum antibiotics were prescribed to the all children patients regarding to their culture sensitivity test. These agents, Amoxicillin, Clamoxin, third generation Cephalosporin, Ciprofloxacin, Levofloxacin, Cefixime were given to all children according to their sensitivity spectrum.

Conclusion: More incidences of acute upper respiratory infections with empyema being caused by bacteria have been documented. Microorganisms S. pneumonia and H. influenza were found in a large number of samples.

INTRODUCTION

In simple words self-limited irritation and swelling in upper air-passage are the indications of upper respiratory tract infections and different complications like runny nose, sinusitis, pharyngitis, laryngitis, pneumonia etc. [3]. are produced. Upper respiratory tract infections can be caused by a wide range of viruses and bacteria [4]. Acute bronchitis, the common cold, influenza, and respiratory distress syndromes can all be caused by them. The common cold continues to be a significant economic and social burden on society [1]. Rhinoviruses are the most frequent kind of viruses but Influenza, adenovirus, enterovirus and respiratory syncytial virus are some of the other viruses that can infect humans [2].

The incubation period for influenza ranges from one to four days, and the symptom onset interval is considered to be three to four days. Direct, indirect, droplet, or aerosol transmission of influenza virus is thought to be possible and it is evidences that from 1 meter its infection may spread in humans [7]. Influenza is most commonly spread via direct touch and droplet transfer, according to the majority of scientific evidence [8]. Rhinovirus, adenovirus, parainfluenza virus, respiratory syncytial virus, enterovirus, and coronavirus are all viruses that cause the common cold in humans [5]. Viral infections of the larynx and trachea are common [6]. Laryngitis is more common in older children, adolescents, and adults than in younger children and infants. Acute laryngotracheitis, more often known as croup, is a respiratory illness that affects the upper and lower respiratory tracts in young children [19].

Inflammation or infection of the trachea is the medical term for tracheitis. The upper respiratory tract is infected with bacteria in children with bacterial tracheitis, a condition that looks and feels a lot like croup [18]. There are several causes of acute viral infections in the upper and lower respiratory tracts, and viral tracheitis is often one of them. It is an acute bacterial infection of the epiglottis and the surrounding supraglottic tissues, which is called epiglottitis [16]. In most cases, an acute laryngitis is caused by a viral infection that either infects the tissues directly or stimulates excessive secretions that cause inflammation of the vocal cords [12].

In children acute respiratory tract infections are treated by broad spectrum antibiotics, mostly family physicians and general practitioner used such medicine very frequently. There is a global public health threat posed by antimicrobial resistance [14]. In many cases, children are given broad-spectrum antibiotics for common infections, which can lead to antibiotic resistance and unwanted side effects. Researchers discovered that broad-spectrum antibiotics have a much higher risk of side effects than narrow-spectrum antibiotics. Between the two classes of antibiotics, there was no discernible difference in the failure rates [15]. A typical therapeutic option is the use of broad-spectrum antibiotics. Different researchers described in their studies that in children acute respiratory tract infections may be treated with broad-spectrum or narrow-spectrum antibiotics [20].

MATERIALS AND METHODS

Study design: This is a clinical study in which different antibiotics were used in the indications of acute respiratory tract infections in children. Patients were selected from different medical institutes. Duration of study was 6 months.

Sample size: 200 patients with acute respiratory tract infections were selected and efficacy of different antibiotics were observed against indications such as acute sinusitis, acute bronchitis, pharyngitis, otitis media, laryngitis, and tracheitis.

Sampling technique: The sample for culture sensitivity test was collected from nasopharyngeal cavity through swab.

Bacterial culture sensitivity test: The test was performed to check the efficacy of best antibiotic against bacterial infection. The collected samples were transferred into agar plates were incubated at 37^0 C. 5 percent atmosphere carbon dioxide and Cysteine-Lactose-Electrolyte-Deficient in normal atmosphere are used for 18 to 24 hours.

Indicated bacteria: Collected sample may contain Gram-positive bacteria, Staphylococcus aureus, Streptococcus pneumonia, Streptococcus pyogenes and Gram-negative bacteria, Haemophilus influenza, Moraxella catarrhalis**.**

Selected antibiotic's discs: Amoxicillin, Clamoxin, third generation Cephalosporins, Ciprofloxacin, Levofloxacin, Cefixime.

Patient's data collection Performa: Cultural sensitivity test results of each antibiotic against pathogen of every patient were collected on a Patient's data collection Performa.

Data analysis: Collected raw data of each culture sensitivity test were treated bio-statistically by applying percentage regression standard mean deviation of ISSP model 2021. T-test and $p<0.05$ significant variations were applicable.

RESULTS

Overall 200 children of both gender were selected their average age were 3-6 years there were no difference between mean ages of all individuals. The Patients were considered

regarding sociodemographic and clinical characteristics. All individual reported their medical conditions and predominate symptoms were fever, cough, sore throat and wheezing. Broad spectrum antibiotics were prescribed to the all children patients regarding to their culture sensitivity test. These agents, Amoxicillin, Clamoxin, third generation Cephalosporins, Ciprofloxacin, Levofloxacin, Cefixime were given to all children according to their sensitivity spectrum.

Table 1:

Patients	Cough	Temperature	Sore throat	Wheezing
n= 100+100	Indications			
Girl kids 5 years	++	++	++	++
Boy kids 5 years	++	++	++	++

Table 2:

Pathogens	Amoxicillin	Clamoxin	Cephalosporin	Ciprofloxacin	Levofloxacin	Cefixime
G+tive & G-tive	Efficacy Percentage of broad spectrum antibiotics against pathogenic bacteria (Mean ±SD)					
Streptococcus pneumonia	29.1±01	39.01±01	11.1±01	24.1±01	2.1±0	11.1±01
Haemophilus influenza	21.1±01	31.21±01	4.1±01	32.1±01	4.1±01	10.1±01
Moraxella catarrhalis	39.1±01	14.11±01	10.1±01	24.1±01	8.1±01	4.1±01
Staphylococcus	38.1±01	37.01±02	22.1±01	14.1±01	4.1±01	9.1±01
Streptococcus pyogenes	39.1±01	41.1±01	11.1±01	24.1±01	3.1±01	3.1±01

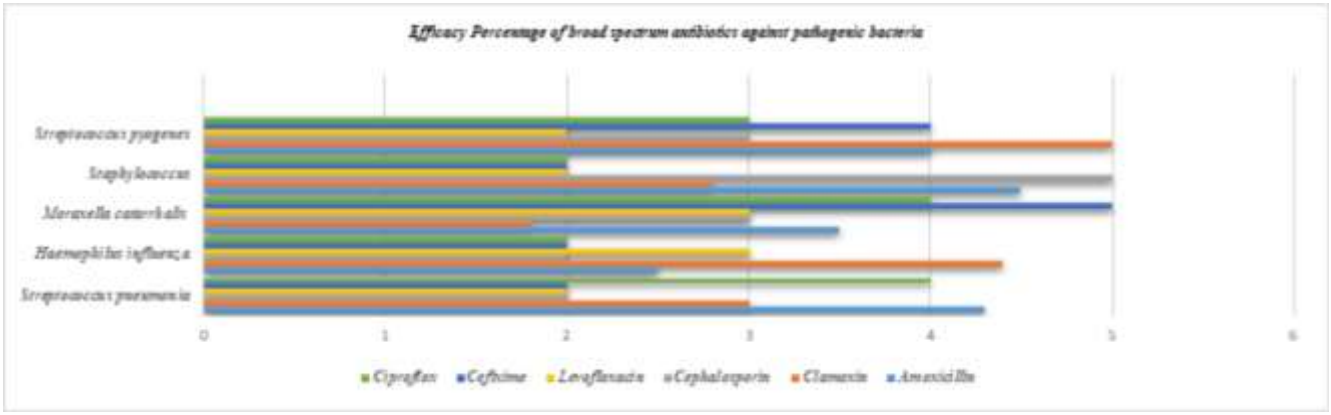

Figure 1:

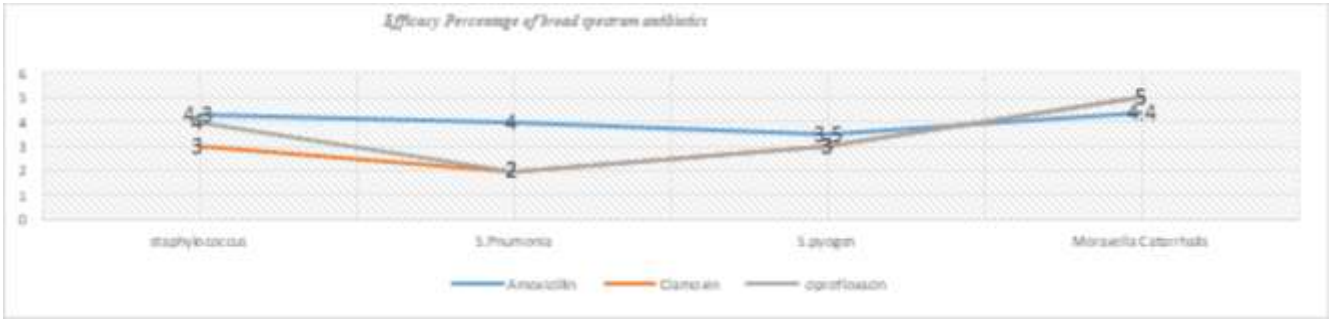

Figure 2:

The efficacy percentage (mean standard deviation of percentage) of Amoxicillin and Clamoxin against Staphylococcus aureus, Streptococcus pneumonia, Streptococcus pyogenes were (29.1±01), (38.1±01), (39.1±01) and (39.01±01), (37.01±02), (41.1±01) respectively. In this study the efficacy spectrum of Amoxicillin and Clamoxin as Broad spectrum antibiotic against G+tive bacteria such as Staphylococcus aureus, Streptococcus pneumonia, Streptococcus pyogenes have a significant ($p<0.05$) difference than other antibiotic agents used in present study. Efficacy Percentage of broad spectrum antibiotics against pathogenic bacteria is presented graphically in figure-1 and figure-2 comparatively. Graphically the efficacy trend of each broad spectrum antibiotic against represented in figure-1 and figure-2.

DISCUSSION

Egbe et al., (2021) elaborated in their study that management and diagnosis of respiratory tract infections are great challenges in all over the world. Well guideline for proper treatment of respiratory tract infections and use of antibiotic in these indications is so important. . Ouedraogo et al., (2017) in their study stated that H. influenza and K. pneumonia. S. pneumonia are the mainly bacterial pathogens caused respiratory tract infections in children and further research and suggestions are needed for vaccine impact in young children. In another study acute upper respiratory tract infections are included common cold, epiglottitis, laryngitis, Pharyngitis, sinusitis and otitis media [20].

Acute upper respiratory tract infections may be viral or bacterial, in children timely clinical observations and diagnosis are very important, mostly viral infections converted into bacterial infections [17]. Mostly Gram positive bacterial pathogens caused temperature, epiglottitis, laryngitis, Pharyngitis, sinusitis and otitis media in young children. Acute upper respiratory infection is more likely to strike someone who already has heart or lung disease and infection can be more severe in people with compromised immune systems [18]. Infections of the upper respiratory tract are easily spread. Hand-to-hand contact or breathing droplets can spread the disease [15].

During coughing or sneezing without a nose or mouth protection, sprayed germs and droplets into the air which other persons can received [14]. Upper respiratory tract infections remain active from one to two weeks in a person and most of the time with effective medicine this time may be reduced. In children mostly epiglottis created complications in kids because air passage become narrow because of this indication [16]. Similarly the symptom of laryngitis is the changing of voice. Current study has close associations with the previous studies and suggested that further research projects are required for public awareness about this medical complication.

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