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Original Article

ASSESSMENT OF USAGE OF ANTIBIOTIC AND THEIR PATTERN OF ANTIBIOTIC SENSITIVITY TEST AMONG CHILDHOOD FEVER

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ABSTRACT

Objective: The present study evaluated the pattern of antibiotic usage and sensitivity pattern among children with fever.

Methods: Questionnaires was specifically designed factoring patients' demographical profile, illness history, prescription regimen, antibiotic sensitivity report.

Results: A total 157 prescriptions (80% OPD and 20% IPD) of children who visited Pediatric department complaining of fever were analyzed. Maximum children were of the age group between 2 – 3 yr (41%) with male/ female ratio of 1.54. Of total 157 patients, etiology of fever was diagnosed as Viral fever (60.15%), Fever with diarrhea(5%), Fever with seizure(3%) and Bacterial fever(31.8%). Average number of drugs per prescription was 3.27. Most common antibiotic used were Cefixime (42%), Cefotaxime (38%), Ceftriaxone (8%) and Amoxicillin (12%) among total antibiotic prescribed. Most commonly encountered drugs other than antibiotic prescribed were antipyretic: paracetamol syp (95%), Nasal decongestant: phenylephrine (70%), antihistaminic: Levocetrizine (65%), Multivitamin (60%), Zinc (20%) and ORS (20%) of prescription. Most widely prescribed antibiotic was Cefixime followed by cefotaxime. All the drugs were prescribed by brand names. positive Antibiotic sensitivity report was available for only 50 patients. Gram positive microbes like Staphylococcus species was isolated in 26 % cases and Streptococcus species in 6 % cases. These gram positive microbes were 100% sensitive to Cefotaxime, tetracycline, linezolid, Ampicillin etc. The gram negative microbes isolated were E. coli (5 %), Acenatobacter species (30 %), salmonella typhi (12%), and Klebsiella sp(21%). All of them were sensitive to Cefotaxime, Pefloxacin, Ofloxacin, Cefuroxime, etc.

Conclusion: Antibiotic sensitivity of blood culture studies demonstrated that both gram positive and gram negative bacteria showed maximum sensitivity to Cefotaxime. The most commonly prescribed antibiotic encountered in the present study was Cefixime followed by Cefotaxime.

Keywords: Antibiotic prescribing patterns, Antibiotic sensitivity pattern, Pediatrics.

INTRODUCTION

Fever in children is a frequent reason for parents to contact a primary care physician [1]. It is a common symptom in children, often caused by benign infections with no need for medical intervention. Nevertheless, because approximately 1% of the children with an acute infection have a serious infection [2].The Netherlands, the management of children with fever in primary care is based on the guideline for the management of febrile children of the Dutch College of General Practitioners (NHG) [3].

This guideline does not recommend routine use of antibiotics in children with fever without an apparent source. The US guideline for children with fever without a source does have some recommendations about antibiotic treatment, for example, starting empirical antibiotics in children aged >1 month when they are not meeting the predefined low-risk criteria for a serious bacterial infection [4]. However, these recommendations are subject to debate [4, 5]. In case of fever with a focus, *Dutch* treatment recommendations can be found in several disease- specific guidelines, most of which are relatively conservative concerning the use of antibiotics [6, 7, 8, 9]. Therefore it is important to monitor the frequency of antibiotic prescription and to critically evaluate the signs and symptom on which physicians base their decision to prescribe antibiotics.

Antibiotics are among the most commonly prescribed drugs in pediatrics. Because of an overall rise in health care costs, lack of uniformity in drug prescribing and the emergence of antibiotic resistance. Monitoring and control of antibiotic use is of growing concern and strict antibiotic policies are warranted. Before such policies can be implemented, detailed knowledge of antibiotic prescribing patterns is important.

The worldwide emergence of antimicrobial resistance is a major public health problem that significantly impacts patient treatment and outcomes. The relationship between antimicrobial use and antimicrobial resistance is complex, with a growing body of data strongly suggesting that higher levels of antimicrobial usage are associated with increased levels of antimicrobial resistance [10, 11, 12]. Patients in hospitals nowadays are older, more severely ill, and more immune compromised than was the case two or three decades ago, and are predisposed to contracting bacterial infections requiring frequent antimicrobial therapy[10,13]. With the increase in antimicrobial prescription, prescribing errors have also become more common. These include treatments of colonization, suboptimal empiric therapy, inappropriate combination therapy, dosing, as well as duration errors and mismanagement of apparent antibiotic failures. Studies have shown an inappropriate prescribing of antimicrobials for prophylaxis as well as treatment [14].

Fever occurs all parts of the world where substandard water supply and sanitation. WHO estimates the annual global incidence of typhoid fever at 0.3%.The annual incidence is markedly higher in some developing countries of Asia and Africa. An estimated 6, 00,000deaths from enteric fever occur annually worldwide. In India it is endemic with morbidity ranging from 102 to 2219 per 100,000 populations. Improved standards of public health have resulted in marked decline in the incidence of typhoid fever in developed countries. It is one of the common causes of febrile illness and is the major reason for seeking health service by general population. However in the last two decades, here has been an increase in the resistance of *S. typhi to* chloramphenicol. It was first reported in Britain in 1950. Due to increasing frequency of antibiotic resistance, the use of chloramphenicol,amoxicillin and co-trimoxazole have becomein frequent and quinolones have become the first line of

treatment of typhoid fever.Emergence of resistance towards quinolones are also being noticed frequently[15].

The use of antibiotic for fever has unfortunately been indiscriminate in office practice. This not only churns out several resistant bugs but also has deleterious effects, particularly on children. Studies have shown that, no new antibiotic has been discovered in last 20 yrs. Nor is any in the immediate pipe line, whereas very many microbes have emerged and re-emerged, in resistant forms.It was felt worth while looking at the prescription pattern of antibiotics use in pediatric practices and its justification. Given that background, this study was conducted in a tertiary care hospital in Navi Mumbai to evaluate the pattern of antibiotic prescriptions in terms of the appropriateness of the choice of antibiotics in Fever.

Aims and Objective

Aim: The present study evaluated the antibiotic usage and sensitivity patterns of isolated

Organisms in Children presenting with fever.

Objective: 1. To analyze the patterns of drugs used in children presenting with fever.

2. To assess antibiotic sensitivity patterns of organisms isolated.

MATERIALS AND METHODS

Ethical Clearance was obtained from Institutional Ethics Committee

Study Design

This is cross sectional open label study.

Site and duration of Study

Department of Pediatric, MGM Hospital, Kalamboli, Navi Mumbai during Nov 2012 to Sep 2013.

Sample Size

157 Patients were included in the study from OPD and IPD.

A questionnaire was specifically designed factoring patients' demographical profile, OPD/IPD number, illness history, prescription regimen and antibiotic sensitivity report.

The data were analyzed for the type of drug prescribed in fever and pattern of antibiotic sensitivity of organism isolated if any.

All the suspected cases of fever on the basis of clinical features of high grade fever, Cough and cold, headache, diarrhea, vomiting and splenomegaly were investigated. The blood cultures were incubated at 37°C for at least 72 hrs. Only culture positive cases were included in the study. The sensitivity pattern of blood culture, mode of presentation, clinical courses, lab investigation reports and the antibiotic administered were recorded. Antibiotic sensitivities were carried out using Kirby- Bauer disc diffusion.

Inclusion and exclusion criteria

Patients presenting with any of the symptoms, running (or blocked) nose, cough, sore throat, diarrhea or fever for less than 7 days were included. Pregnant women, lactating mothers, infants, seriously ill patients and those who declined to give informed consent were excluded.

RESULTS

The total one hundred fifty seven patients were included in the present study, in which 80% were OPD and 20% were IPD Patients. All cases sent to Laboratory for the Antibiotic sensitivity testing, 50 case showed positive blood culture. Maximum patients were in age group of 2-3yr (41%), 65% of patients were female children. Fig 1

The total Five hundred forty one drug were prescribed in study and average drug per prescription was 3.27. Polypharmacy practice were seen 100% cases. 35.26% of the prescription encountered with Antibiotic. Total 149(28%) antibiotic were prescribed among total drug prescribed. Most commonly prescribed drug was cefixime. 32% of prescription was encountered by parenteral prescription. Most commonly prescribed other drug was paracetamol (85%) and Chlorpheneramine (75%). All the drug prescribed by brand name. Table 1,

Among all patients 61.15% of Patients were suffering from viral fever, 5 % with Fever with diarrhea, 3 % with Fever with seizure and 31.85 % with bacterial fever..Fig 2

Among all antibiotic prescribed, 42% was Cefixime, 38% was Cefotaxime, 8% was Ceftriaxone and 12% were Amoxicillin. Fig 3

There were other than antimicrobial prescribed in all 150 patients. The Prescription showed 95% was Paracetamol, 70% phenylpherine, 65% Levocetrizine, 60% multivitamin, 20% Zinc,20% Oral rehydration solution and 10% Diazepam among total drug prescribed. Table 2

Table 1: Prescribing Indices of Pediatric Patients with fever

S. No.	Parameter	Results
1	Total no. of patients	157
	OPD Cases	80%
	IPD Case	20%
2	Total drug prescribed	541
3	Average Drugs per prescription	3.27
4	Poly-pharmacy practice	90%
5	Encounters with antibiotics	95%
6	Most frequently prescribed antibiotic	Cefixime
	Total no of antibiotic prescribed	149
7	Encounters with brand names	100%
8	Encounters with parenteral preparations	32%
9	Concomitant medication	Paracetamol Phenylepherine Levocetrizine Multivitamin, zinc ORS, Diazepam

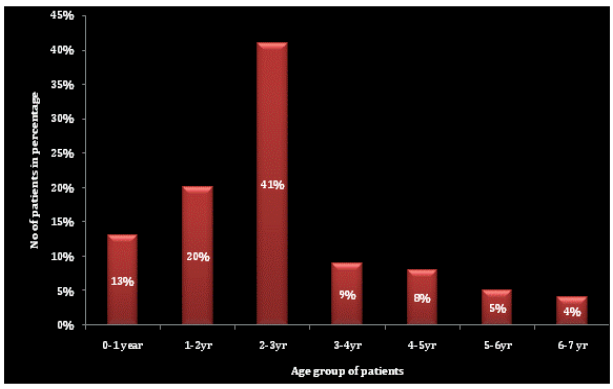

Fig. 1: Age wise distribution of Patients

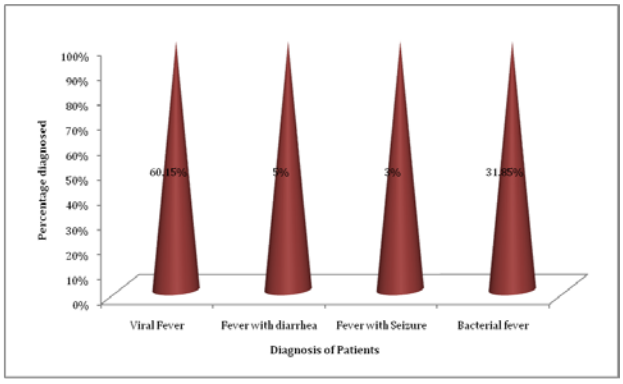

Fig. 2: Diagnosis of disease among Pediatric Patients with fever

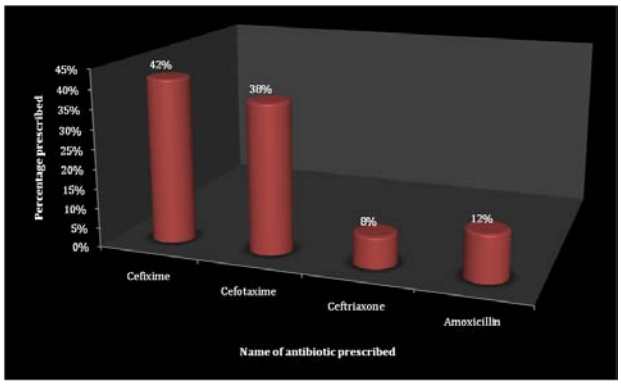

Fig. 3: Pattern of antibiotic prescribed

Table 2 shows: Prescribing pattern of other medication

SN	Name of drug	Percentage prescribed
1	Paracetamol	95%
2	Phenylpherine	70%
3	Levocetrizine	65%
4	Multivitamin	60%
5	zinc	20%
6	ORS	20%
7	Diazepam	10%

Antibiotic Sensitivity Pattern

In our study, among all patients, 157 cases presenting with fever were sent to laboratory for Culture & Antibiotic sensitivity testing. Out of which 50 cases (31.85%) shows positive blood culture. Among all 50 cases. 32% of cases diagnosed for Gram Positive bacterial infection, the isolated gram positive bacteria were Staphylococcus sp (26%) and Streptococcus sp (6%). Similarly 68% were diagnosed for Gram Negative bacterial infection, the isolated gram negative bacteria were Klebsiella spp (21%), Escherichia coli (5%), Acinetobacter spp (30%) & Salmonella typhi (12%). The Antibiotic Sensitivity Pattern for Gram negative and Gram positive Bacteria were different. The Cephalexin, Tetracycline & Cefotaxime were the 100% sensitive to gram positive bacteria. While Cefotaxime, Cefuroxime & Pefloxacin were 100% sensitive to Gram negative bacteria. **(Table 3**, **Fig 4, 5)**

Table 3: Class of microbes and their percentage isolated

S. No.	Name of Organism isolated	Class of Microbes	percentage
1.	Staphylococcus sp	Gram Positive	26%
2.	Streptococcus sp	Gram Positive	6%
3.	E. coli	Gram Negative	5%
4.	Acenatobactersp	Gram Negative	30%
5.	Klebsiella spp	Gram Negative	21%
6.	Salmonella typhi	Gram Negative	12%

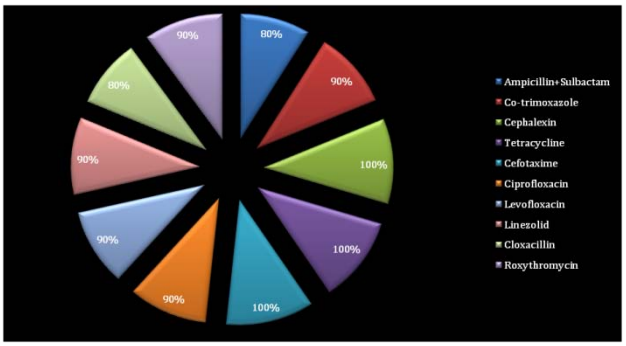

Fig. 4: Antibiotic sensitivity Pattern of Isolated Gram-positive Bacteria

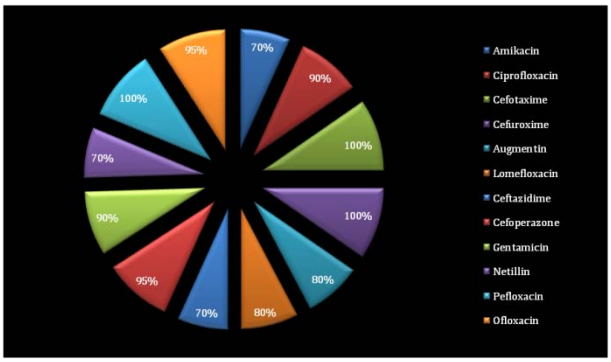

Fig. 5: Antibiotic sensitivity Pattern of Isolated Gram Negative Bacteria

DISCUSSION

The present study analyzed 157 prescriptions of the patients who visited our Pediatric Department for complaining of Fever. We have also analyzed Antibiotic sensitivity report of patients which was positive for culture.

The present study reveals that, among all patient who were complaining for fever were diagnosed as, 60.15% were suffering from viral fever, 5% had fever with diarrhea, 3% had fever with seizure, and 31.85% had bacterial fever who were culture positive for bacteria. In this study total 541 drugs were prescribed, among total drug prescribed 149 (28%) were antibiotic prescribed.

The pattern of present study showed, Cefixime was the most commonly prescribed (42%) followed by Cefotaxime 38%, Ceftriaxone (8%) and Amoxicillin (12%). The study conducted by Endale Getachew et al[16] in Ethopia showed that, they had taken 770 prescription among them 378 (24.37%) antibiotics were prescribed in this study. This was slightly to similar to present study. But it was different from other studies in other regions of the countries like Bahir Dar university Hospital (41.9%), University Gondar hospital (36.9%) and Debretabor (64.1%) (Desta et al[17]). Jimma University specialized hospital 33.1% (Mohammed et al[18]). The same was true when compared with studies in other countries USA (60%) (Strolley et al[19].) and China 31% (Jun et al[20]).

The pattern of antibiotic in endale Getachew et al was Amoxicillin 19.05%, chloramphenicol 14.02%, ampicillin 13.22%, and ceftriaxone 11.38% were the most commonly prescribed antibiotics which was different from present study. This was also different from different from studies in USA and Europe where tetracycline groups were most frequently used, followed by penicillin's (Kiivet et al[21]. Strolley et al[19]) This might be due to the difference in purpose of use and prevalence of infectious diseases.

In this study 32% of the drug were prescribed by parenteral route which was different from study in Cap cost, Ghana where over 60% of the patients were prescribed one or more injectable antibiotics (Desantis et al[22]). The same is true when compared with pediatric patients in Kathmandu where about 75% were prescribed antibiotics (Palikhe et al[23]). The difference might be due to difference in perception of community towards injection use, severity of infections and difference. Being chief complaint of fever, the present study also showed that, Prescribing of other than antibiotic like paracetamol, Levocetrizine, Phenylpherine, Multivitamin, Zinc, ORS and Diazepam which is completely differ from other previous study.

Antibiotic sensitivity Pattern

In our study, among all patients, 157 cases presenting with fever were sent to laboratory for Culture & Antibiotic sensitivity testing. Out of which 50 cases (31.85%) shows positive blood culture. Among all 50 cases. 32% of cases diagnosed for Gram Positive bacterial infection, the isolated gram positive bacteria were Staphylococcus sp (26%) and Streptococcus sp (6%). Similarly 68% were diagnosed for Gram Negative bacterial infection, the isolated

gram negative bacteria were Klebsiella spp (21%), Escherichia coli (5%), Acinetobacter spp (30%) & Salmonella typhi (12%). The Antibiotic Sensitivity Pattern for Gram negative and Gram positive Bacteria were different. The Cephalexin, Tetracycline & Cefotaxime were the 100% sensitive to gram positive bacteria. While Cefotaxime, Cefuroxime & Pefloxacin were 100% sensitive to Gram negative bacteria.

Our study is similar to Ghanshyam D. Kumhar et al[24], the study was undertaken to determine the profile and antibiotic sensitivity patterns of aerobic isolates from blood cultures of neonates in a tertiary care hospital. Blood were collected from all neonates born to mothers with maternal fever and all newborns with lethargy, refusal of feeds & instability in temperature. They showed that the positivity of blood culture was 42% (770/1,828). Gram-negative organisms were isolated in 60% of cases, with Klebsiella (33.8%), Enterobacter (7.5%) and Escherichia coli (4.6%) being the common microbes. Staphylococcus aureus (24.4%), followed by Coagulase-negative staphylococci (7.9%), were the major Gram-positive isolates. This is similar to our study which shows 32% GPC & 68% GNB. Most (80%) Gram positive isolates were sensitive to Vancomycin and 50-75% of the Gram-negative isolates were sensitive to Ciprofloxacin and Amikacin. Our study shows Cephalexin, Tetracycline & Cefotaxime were the 100% sensitive to gram positive bacteria. While Cefotaxime, Cefuroxime & Pefloxacin were 100% sensitive to Gram negative bacteria. Similarly Dr. Kairavi. J. Desai et al[25] carried a study on Bacterial isolates & their Antibiotics Susceptibility Patterns in Neonatal Septicemia. Most of the Neonates are with high fever. Out of 303 cases studied, growth of bacteria was obtained in 140 (46.20%) blood samples. They showed that the incidence of Gram negative & Gram positive organisms was 67.85% & 28.57% respectively, which is almost similar to our study. Candida also isolated in 3.57% of cases. Klebsiella spp. Escherichia coli & Staphylococcus aureus was the most common Gram negative & Gram positive organism's together accounting for 47.14%, 10.71% & 25% of the isolates respectively with other less frequent isolates. The isolated organism is similar to our isolates. In most cases S.aureus was resistant to the commonly used antibiotics, including Penicillin, Cloxacillin & Cefelexin. Amikacin & Gentamicin were sensitivity for S. aureus. Most of the Gram-negative organisms also were resistant to commonly used antibiotics. Ciprofloxacin were sensitive in about 50-60% of cases isolated.

CONCLUSION

Antibiotic sensitivity of blood culture studies demonstrated that both gram positive and gram negative bacteria showed maximum sensitivity to Cefotaxime. The most commonly prescribed antibiotic encountered in the present study was Cefixime, followed by Cefotaxime.

CONFLICT OF INTEREST

None

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