To Study the Prescribing Pattern of Drugs in Dengue Patients of a Tertiary Care Hospital: A Prospective and Observational Study

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Abstract - Dengue fever (DF) is an acute febrile illness which is transmitted by mosquito bite. Annually 5 lakhs of patients are hospitalized and more than 20,000 deaths are reported worldwide. Till today there is no specific therapy available for DF, therefore it is very essential to study the prescribing pattern of drugs among dengue patients in order to make the pharmacotherapy streamline and reduce the mortality rate. A Prospective observational prescription pattern study was conducted for a period of six months in a tertiary care hospital. The sample size of the study was 100 from medicine and pediatric departments and relevant information were extracted from respective files and selected patients. A total of 661 drugs were prescribed among selected dengue patients, in whom 145 were anti-invectives, out of them 143 drugs were antibiotics, Cefixime contributes 35% and followed by Doxycyclin 25.8% and remaining 516 drugs were as supportive therapy. DF was more prevalent in males and prominent in age group of 11-20 years. As concern with the laboratory diagnosis, it was seen that the NS1positive were 97% and IgM positive were 3%, indicates the most of the patients were brought to the hospital in time, because the NS1 is detected early stage of dengue infection. The hematological values (SBP, DBP, PCV, PLT & TC) were in the optimal range indicating the treatment was started abruptly and prescription was most appropriate to the medical condition of patients.

Keywords: Prescribing pattern; Dengue fever (DF); Anti-infective; Supportive therapy.

I. INTRODUCTION

Aedes albopictus is the main vector for dengue chiungunya and other viruses in asian countries[1] and , it is a serious public health problem in tropical and subtropical areas with 30-fold increase in incidence since last 50 years [2]. Each year, 50-100 million cases occur worldwide and hospitalizations for the infection have reached 5, 00,000 and the global death toll is >20,000 people and in India too it is continues since after year 1956 [3], [4]. Dengue virus belongs to Flaviviridae family, is transmitted to humans by bite of an infected female mosquito mainly of the species Aedes aegypti, Aedes albopictus (to a lesser extent). Unplanned rapid urbanization, increases in long-distance travel, temperature, rainfall, poor water storage, substandard sanitary conditions and ineffective mosquito control are some of the environmental factors that contributes for dengue disease [5], [6]. Dengue is classified as Dengue fever (DF), Dengue haemorrhagic fever (DHF) and Dengue shock syndrome (DSS) based on the clinical presentations [7]. There are four serotypes of the dengue virus i.e., DEN-1, DEN-2, DEN-3 and DEN-4 which are responsible for causing dengue [8]. Generally, it infects immature Langerhans cells, keratinocytes, Leukocytes and Bone marrow stromal cells followed by migration from site of infection to lymph nodes, where monocytes and macrophages are recruited, which become targets for infection. This results in production of bulk of mediators that are involved in inflammatory and haemostatic responses of the host [9]. Initially dengue infections may be asymptomatic later may develop headache, retro-orbital pain, myalgia/arthralgia, rash, haemorrhagic manifestation (positive tourniquet test), leukopenia and thrombocytopaenia [10]. Early diagnosis of dengue is detection of the viral NS1 antigen (non-structural protein 1), viral RNA, the virus itself or greater increase in serum IgG (by hemagglutination inhibition test) or increase in IgM antibody [11]. The most effective way to prevent dengue is larval source reduction or using a repellent containing dimethyl-met toluamide (DEET) on exposed skin and in indoors using aerosol bomb insecticides to kill adult mosquitoes [12].

There is no standard/ well defined pharmacotherapy is available for the treatment of dengue infection till today, hence it is being treated symptomatically [13]. To manage dengue fever, administer intravenous fluids followed by antipyretics and antibiotics as prophylaxis and bed rest, cold sponging, ORS, and platelet transfusion in DHF patients, oxygen and fresh whole blood transfusion 10ml/kg/hr for all patients in shock can be used as a supportive therapy [14]. The inpatients should fulfil the

following criteria before discharge; No fever for at least 24 hours without the usage of antipyretic drugs and When platelet count has risen above 50,000 /mm^3 [15]. Evaluation of patient's heart rate, capillary refill, skin colour and temperature, peripheral pulse volume, pulse pressure, and blood pressure are essential to assess the severity of dengue as it can rapidly progress into DHF/DSS, which, if not treated correctly, can lead to severe complications and death [16]. Therefore the current study was undertaken to study and analyze the prescribing patter of drugs among dengue patients of a tertiary care hospital.

II. MATERIALS AND METHODS

Study design and settings: A prospective observational study was conducted in a tertiary care hospital among the inpatients after meeting the inclusion and exclusion criteria. The study was conducted over a period of six months in the departments of medicine and Pediatric wards of a Shri B M. Patil Medical College, Hospital and Research Center, Vijayapura.

Inclusion Criteria: All the inpatients irrespective of age from departments of Medicine and pediatrics who are provisionally diagnosed with the dengue infection.

Exclusion Criteria:
- Out patients are excluded due to the lack of ability to follow up with the treatment regimen.
- Patient with incomplete documentation.
- Trauma and burn patients are excluded due to the medico legal aspects which makes accessing the patient's record difficult.
- The patients with intellectual, psychiatric and emotional disturbances that could affect the reliability of their responses will be excluded from the study.

Source of data: Patient case files consists of demographic details, clinical characteristics, social history, Diagnosis, blood pressure readings, Brand and Generic name of drugs, Drug dosages, duration of patient's treatment and Discharged drugs. Truven Micromedex online drug data bases, Standard Textbooks, Journals, Research articles and Newsletters were utilized.

Data collection and assessment: The data collected from case sheets and other sources such as micromedex, test books and journals were used for assessing the prescribing pattern of drugs, evaluation of laboratory data and reviewing the medication chart prescribed among dengue patients.

Statistical analysis: All the data were analyzed by using simple mathematical calculations such as mean, average and percentages by utilizing the Microsoft office.

III. RESULTS AND DISCUSSION

Distribution of subjects according to age: Analysis of age wise distribution showed that maximum number of patients affected with dengue were highest among the age group between 11-20 yrs, that is comprising about 38% followed by the age group 5-10 yrs comprising about 30% and followed by the age group 21-30 yrs about 18% and followed by the age group of 31-40 yrs comprising about 8% and age group more than 40 yrs about 6% with the least percentage of dengue cases were identified in the study (Fig. 1).

Distribution of patients according to sex: In a total of 100 patients, 54 were male and 46 were female patients. Male were more in number compared to females (Fig. 2).

Distribution of cases according to total number of drugs prescribed: A total of 661 drugs were prescribed to 100 patients. Out of which 145(21.93%) anti-infective were prescribed followed by 98(14.82%) antipyretics, and least class of adjuvant 10(1.82) ORS supplements were prescribed (Table 1).

Diagnostic tests for dengue: In the present study the various tests were performed to identify the different types [such as NS1 (Nonstructural protein 1), IgM (Immunoglobulin M), IgG (Immunoglobulin G)]. Out of 100 cases 97 patients were diagnosed with NS1 +ve comprising about 97% and followed by 3 patients diagnosed with IgM +ve contributes about 3% and No patients were diagnosed with IgG +ve (Fig. 3).

Distribution of antibiotics prescribed for dengue patients: Various classe of antibiotics were prescribed based on the patient condition. Total 143 antibiotics were prescribed to 100 patients. Maximum prescribed classes of antibiotics were Cephalosporin such as Cefixime 50 (35%) prescription. And minimum prescribed classes of antibiotics were Macrolide such as Azithromycin 4 (2.8%) and penicillin antibiotics such as Ampicillin in 4 (2.8%) prescription (Fig. 4).

Distribution of cases according to supportive therapy: In the present study supportive therapy was given for most of the dengue patients during their critical phase. Out of 100 patients' maximum number of patients treated with ringer's lactate for fluid-electrolyte imbalances correction in 80% of prescriptions and minimum number of patients were treated with the oral rehydration salts (10%) (Fig. 5).

Evaluation of laboratory data: Mean value of WBC, systolic blood pressure and Diastolic blood pressure was normal, Hematocrit (PCV) and platelet count were decreased (Fig. 6).

Discussion
In the present study there were no gender specific differentiations for affecting rate of dengue fever (Fig. 2). Children and teenagers were more affected in comparison with adults; this might be because of often exposure to external environment, which is contradicted to study conducted by A K Hafeez where highest patients were in the age group 19-60 [7].

The diagnosis of Dengue infection, includes 97% tests were NS1+ve, 3% of IgM +ve and No patients were diagnosed with IgG +ve . Most of the patients were shown NS1+ve indicating that, the patients were brought to the hospital in time, because the NS1 is detected early stage of dengue infection. Among 661 drugs prescribed, 145 drugs were anti-infective, among 143 drugs were antibiotics and 2 were anti-malarial drugs. Though it looks irrational the use of antibiotics/anti-infective agents except antiviral in viral infection (Dengue fever), the facts finding of the study exhibits the patients were shown with improved/attenuated signs and symptoms of dengue fever with better quality of life with the prescribed antibiotics in dengue fever.

A supportive treatment was adapted such as ringer's lactate in 80 patients, followed by NS (28) and DNS (38) for the management of fluid and electrolyte balance among dengue patients, a similar kind of intravenous fluids were prescribed to retain the patient health by the study conducted by Dutta S. B. *et.al*. As symptomatic treatment patients were prescribed with different class/types of medication depend on patient's medical condition, which includes Vitamin supplements, Carica papaya, antipyretics , iron supp , antiemetic, antacids , ORS , O_2 , sponging and steaming .The mean haematological findings (SBP, DBP, PCV, PLT & TC) in the present study were in optimal range accept PLT count, it was decreased during admission of the patients and there were no haemorrhagic dengue fever/ dengue shock syndrome. These findings are contraindicated to the study conducted by Krishna Murthy S et.al and, whereas, the progression of dengue fever to dengue haemorrhagic fever is indicated by 20% increase of haematocrit from the baseline [17] [18]. Among all the selected patients there were no single Petechiae exhibited and Leukopenia with thrombocytopenia patient seen in comparison to deepti et. Al [19], and hari kishan et.al [20].

In the present study the prescribing pattern meets the WHO guidelines indicating the primary choice of therapy is supportive and secondary choice of therapy is antipyretics followed by anti-infective [21]. Hence the study justifies the use of medication in the dengue patients are optimal and effective for better patient compliance.

IV. CONCLUSION

Till today there is no standard treatment is available for dengue, but in accordance to WHO the primary drug of choice is supportive and secondary is antipyretics followed by anti infective agents (antibiotics). Though the antibiotics does not justifies its rational usage for viral infection, but able to prevent the development of secondary infection and faster recovery from the dengue infection. In the present study it was rightly followed with supportive and symptomatic approach for its treatment and practiced by prescribing the fluid management, antipyretics and anti-infective agents for better patient compliance. Hence the present study justifies that the

supportive and symptomatic management is remain an ideal therapy for dengue treatment, though there is scope to develop specific pharmacotherapy for viral infection (Dengue).

Table 1. Distribution of Cases According To Total Number of Drugs Prescribed

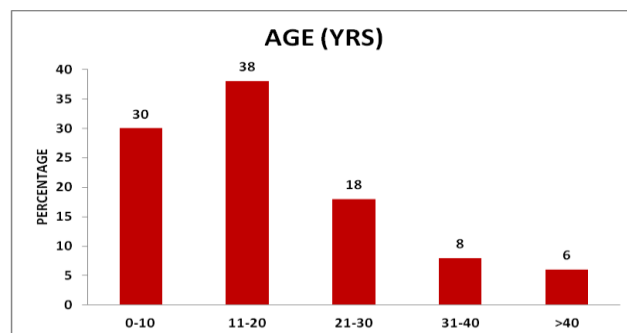| Types of Drugs prescribed	Total number of drugs	%
RL	80	12.10%
NS	28	4.23%
DNS	38	5.74%
Anti-Infective	145	21.93%
Anti-Pyretic	98	14.82%
Anti-Emetic	55	8.33%
Antacids	60	9.07%
Vitamins	19	2.88%
Carica Papaya	51	7.72%
Iron	12	1.82%
ORS	10	1.52%
Oxygen	15	2.27%
Sponging	30	4.54%
Steam	20	3.03%
Total	**661**	**100%**

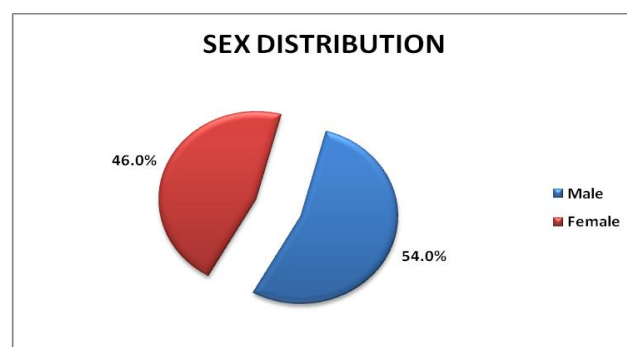Fig. 1: Distribution of Subjects According to Age

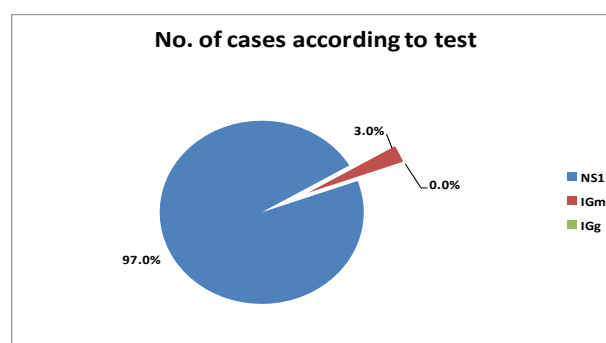Fig. 2: Distribution of Patients According to Sex
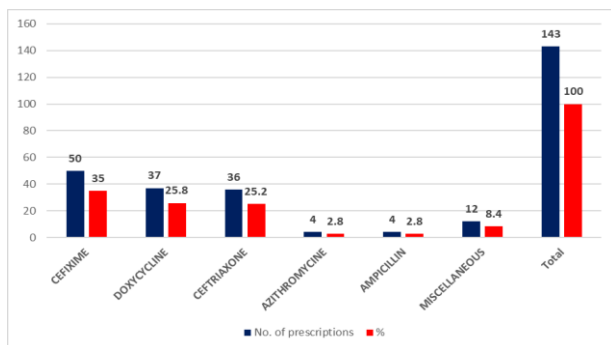

Fig. 3: Diagnostic Tests for Dengue

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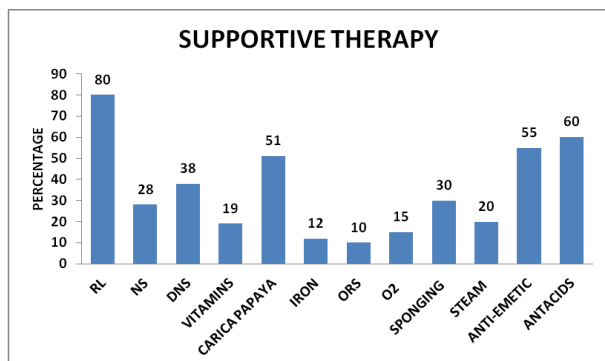Fig. 4: Distribution of Antibiotics Prescribed.

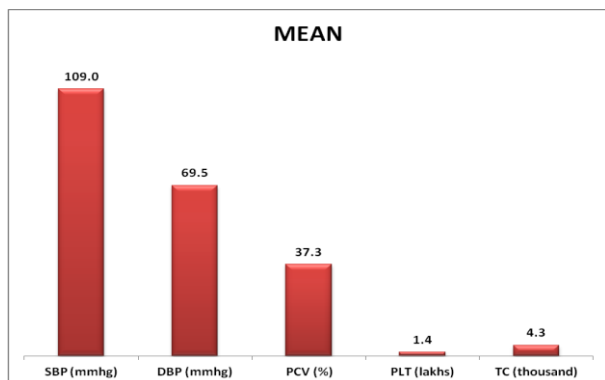Fig. 5: Distribution of drugs according to supportive therapy.

Fig. 6: Evaluation of Laboratory Data

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Conflict of Interest: Authors do not have any conflict of interest.

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