

To Determine the Association of Acute Febrile Illness with MODS in Terms Of Clinical Features, Etiology and Outcome**Mahendra Chouhan¹, Harshal Joshi², Sanjay Gulhane³**¹Senior Resident, Dept of General Medicine, HBTMC & Dr R N Cooper Hospital, Juhu, Mumbai²Associate Professor, Dept of General Medicine, HBTMC & Dr R N Cooper Hospital, Juhu, Mumbai³Professor, Dept of General Medicine, HBTMC & Dr R N Cooper Hospital, Juhu, Mumbai

Received: 25-02-2024 / Revised: 23-03-2024 / Accepted: 26-04-2024

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Conflict of interest: Nil

Abstract:

Background: Multiple organ failure (MOF) is a clinical syndrome that came to prominence in the 1970s.¹ Its conception resulted from reports in the late 1960s which described remote organ failure, such as pulmonary and liver failure, as a consequence of severe sepsis. As there were limited studies on acute febrile illness and its association with MODS, we conducted this study in order of clinical features, etiology and outcome of MODS in patients with acute febrile illness.

Material and Methods: A Hospital based prospective Observational study was conducted at Department of Medicine, tertiary care public hospital for period one year after Ethics committee permission. Total 100 patients were enrolled after matching inclusion and exclusion criteria.

Results: 16 to 25 years (46%) was the most common age group amongst study population with male predominance (81%). Fever (100%) was the most frequent Clinical features followed by Chills/Rigors (98%). Bleeding Manifestations was present in 19% of study population. Deranged creatinine was present in 29% of study population. Vivax Malaria (26%) was the most common Peripheral smear findings amongst study population followed by Falciparum Malaria (1%) and Mixed malaria (1%). INR was Deranged in 36 % of study population. On USG Abdomen/Pelvis, Hepatomegaly (17%) was the most frequent findings. Dengue (53%) was the most common cause of thrombocytopenia amongst study population followed by Malaria (27%), Leptospirosis (13%), Septicemia (4%), Enteric fever (3%). Blood Transfusion was given in 16% of study population. RDP, FFP, PCV and SDP were Blood Product Transfused amongst which RDP was the most common. 94% of the study population had Less than 10 days of hospital stay. 89% of the study population were alive while death was occurred in 11% of study population. Death occurred most commonly in Dengue (36.40%) and Leptospirosis (36.40%) each and septicemia (27.30%). The common causes of death were Dengue Hemorrhagic Fever, Leptospirosis with ARDS and septicemia with shock. Blood system (31%) was the most common system in MODS followed by kidney(30%), lungs (13%), liver (12%) and CNS (5%). Mortality was observed most commonly in patients with more than 3 organ involvement (54.5%) followed by three organ (36.4%) and two organ (9.1%).

Conclusions: Most common etiology of MODS was Dengue and Leptospirosis and septicemia. Hematological system was the most common system in MODS followed by kidney, lungs, liver and CNS. Mortality in was observed most commonly in patients with more than 3 organ involvement followed by three organ and two organ. It was observed that as the number of organ involvement increases in MODS, the risk of mortality also increases.

Keywords: Acute febrile illness, MODS.

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Introduction

Fever is the most ancient hallmark of disease. Fever is known as pyrexia from Greek “pyretus” meaning fire. The word Febrile is from the Latin word Febris, meaning fever. Fever is defined as rectal temperature of >38° C (100.4° F) or axillary temperature of > 37.5°C. [2]

It is a frequent medical sign that implies increase in body temperature to above normal level. It is a symptom caused by a variety of illnesses. Fever

usually occurs in response to infection or inflammation. However many other causes are possible, including drugs, poisons, cancer, heat exposure, injuries or abnormalities in the brain, or disease of the endocrine (hormonal or glandular) system.

Fever is a main symptom of many deadly diseases including dengue, malaria, chikunguniya etc, therefore fever has to be taken as a serious symptom

and should be treated in order to avoid the possible complications. The Multiple Organ Dysfunction Syndrome (MODS) can be defined as the development of potentially reversible physiologic derangement involving two or more organ systems not involved in the disorder that resulted in ICU admission, and arising in the wake of a potentially life-threatening physiologic insult.

The pathophysiology of MODS remains incompletely understood. It arises through the interactions of a network of physiologic insults including infection, the host inflammatory response, tissue ischemia, injury, and the interventions used to sustain organ function during a time of otherwise lethal insufficiency. [3]

There is activation of numerous humoral and cellular cascades, such as inflammatory mediators (both pro- and anti-inflammatory), along with host defence and clotting mechanisms. Genetic factors probably determine an individual's susceptibility to the effects of inflammatory activation. Successful management of MODS involves treating and, ultimately, controlling the underlying disease process. Widespread capillary damage and increased permeability, derangements in oxygen utilization, systemic inflammation, disordered coagulation, and apoptosis are some of the mechanisms that lie behind the process of MODS.

Furthermore, an imbalance between pro- and anti-inflammatory events is probably critical in the development of remote organ damage and dysfunction. Understanding the complicated pathophysiology of organ dysfunction will be crucial in the development of new methods and therapies to prevent or treat this process. As there were limited studies on acute febrile illness and its association with MODS, we conducted this study in order to study clinical features, etiology and outcome of MODS in patients with acute febrile illness.

Aims and Objective: To study clinical features, etiology and outcome of MODS in patients with acute febrile illness.

Material and Methods

Type of Study & Study Area: A Hospital based prospective Observational study was conducted at Department of Medicine, tertiary care public hospital for period one year. Total 100 patients were enrolled after matching inclusion and exclusion criteria. Ethics committee permission was taken prior to study.

Inclusion criteria

- Patients with fever and fulfilling for MODS
- Age more than 12 years

Exclusion criteria

- Patients with fever not fulfilling for MODS
- Age less than 12 years
- Postoperative and postsurgical cases
- Patients not giving consent

Method of Collecting Data: Prior informed consent was obtained before evaluating each patient. Detailed History about the disease from the patient and his/her relatives during history taking and findings of clinical examination. Following this blood was collected to assess the organ involvement. Blood collected was investigated for complete blood count, liver function test, renal function test. Chest X ray, arterial blood gas and other investigations were done as required.

Statistical Analysis: All the collected data was entered in Microsoft Excel sheet and then transferred to SPSS software ver. 17 for analysis. Qualitative data was presented as frequency and percentages and analyzed using chi-square test. Quantitative data was presented as mean and SD and compared by t-test. P-value < 0.05 was taken as level of significance.

Results

16 to 25 years (46%) was the most common age group amongst study population followed by 26 to 35 years (30%) more than 45 years (15%) and 36 to 45 years (9%) (table 1). There was male predominance (81%) amongst study population as compared to female (19%).(table 2). Fever (100%) was the most common Clinical features amongst study population followed by Chills/Rigors (98%), Vomiting (40%) and Headache (27%). (table 3). Icterus, Pallor and Subconjunctival hemorrhage was present in 12%, 10% and 7% of study population respectively. (Table 4).

Bleeding Manifestations was present in 19% of study population. (Table 5). Splenomegaly, Hepatomegaly and Hepatosplenomegaly was present in 7%, 10% and 13% of study population respectively. (Graph no.1). Crepitations was present in 12% of study population on Respiratory examination (Table 6). Altered sensorium was present in 5% of study population on CNS examination (table 7). Deranged creatinine was present in 29% of study population (table 8).

Vivax Malaria (26%) was the most common Peripheral smear findings amongst study population followed by Falciparum Malaria (1%) and Mixed malaria (1%). (Table 9). NS1 positive (47%) was the most common Diagnostic test for Dengue amongst study population followed by IgG positive (6%) and IgG & IgM (1%) (Table 10). Leptospirosis was positive in 13% of study population (Table 11). Widal was positive in 2% of study population (Table 12). INR was Deranged in 36% of study population (Table 13). Acinobacterial sp., E.Coli, Klebsiella

and *S. typhi* was found in 1%, 1%, 1% and 1% of study population on blood culture findings respectively (graph no.2). On USG Abdomen/Pelvis, Hepatomegaly (17%) was the most common findings amongst study population followed by Hepatosplenomegaly (15%) and Splenomegaly (10%) (graph no. 3).

Dengue (53%) was the most common cause of thrombocytopenia amongst study population followed by Malaria (27%), Leptospirosis (13%), Septicemia (4%), Enteric fever (3%) (graph no.4). Most of the study population had Platelet count of 50000-1lakh/cumm (39%) followed by 1-1.5 lakh/cumm (37%) and less than 50,000/cumm (24%)(graph no.5). Blood Transfusion was given in 16% of study population. (table 14). RDP, FFP, PCV and SDP were Blood Product Transfused amongst which RDP was the most common (15%) followed by FFP (5%) (graph no.6). 94% of the study population had Less than 10 days of hospital

stay while More than 10 days of hospital stay was observed in 6% of study population with minimum and maximum hospital stay was 6 days and 17 days respectively. (table 15). 89% of the study population were Alive while death was occurred in 11% of study population(graph no.7).

Death occurred most commonly in Dengue (36.40%) and Leptospirosis (36.40%) each and septicemia (27.30%) and the difference was statistically significant (P value – 0.0001). The common causes of death were Dengue Hemorrhagic Fever, Leptospirosis with ARDS and septicemia with shock. (table 16, graph no.8).Blood system (31%) was the most common system in MODS followed by kidney (30%), lungs (13%), liver (12%) and CNS (5%).(graph no.9). Mortality was observed most commonly in patients with more than 3 organ involvement (54.5%) followed by three organ (36.4%) and two organ (9.1%) (Table 17).

Table 1: age group distribution amongst study population

| Age group | Frequency | Percent |
|--------------------|-----------|---------|
| 16 to 25 years | 46 | 46.0 |
| 26 to 35 years | 30 | 30.0 |
| 36 to 45 years | 9 | 9.0 |
| more than 45 years | 15 | 15.0 |
| Total | 100 | 100.0 |

Table 2: Sex distribution amongst study population

| Sex | Frequency | Percent |
|--------|-----------|---------|
| Female | 19 | 19.0 |
| Male | 81 | 81.0 |
| Total | 100 | 100.0 |

Table 3: Clinical features amongst study population

| Clinical features | Frequency | Percent |
|----------------------|-----------|---------|
| Fever | 100 | 100 |
| Chills/Rigors | 98 | 98 |
| Vomiting | 40 | 40 |
| Headache | 27 | 27 |
| Cough/Breathlessness | 18 | 18 |
| Bleeding | 19 | 19 |
| Altered sensorium | 05 | 05 |

Table 4: General examination findings amongst study population

| General examination | Frequency | Percent |
|----------------------------|-----------|---------|
| Icterus | 12 | 12 |
| Pallor | 10 | 10 |
| Subconjunctival hemorrhage | 7 | 7 |

Table 5: Bleeding Manifestations amongst study population

| Bleeding Manifestations | Frequency | Percent |
|-------------------------|-----------|---------|
| Absent | 81 | 81.0 |
| Present | 19 | 19.0 |
| Total | 100 | 100.0 |

Table 6: Respiratory findings amongst study population

| Respiratory findings | Frequency | Percent |
|----------------------|-----------|---------|
| Crepitations | 12 | 12.0 |
| Not significant (NS) | 88 | 88.0 |
| Total | 100 | 100.0 |

Table 7: CNS findings amongst study population

| CNS | Frequency | Percent |
|----------------------|-----------|---------|
| Altered Sensorium | 5 | 5.0 |
| Not significant (NS) | 95 | 95.0 |
| Total | 100 | 100.0 |

Table 8: Deranged creatinine

| Deranged creatinine | Frequency | Percent |
|---------------------|-----------|---------|
| Yes | 29 | 29 |
| No | 71 | 71 |
| Total | 100 | 100.0 |

Table 9: Peripheral smear findings amongst study population

| Peripheral smear for MP/RMAT | Frequency | Percent |
|---|-----------|---------|
| Absent | 72 | 72.0 |
| P. Falciparum | 1 | 1.0 |
| P. Vivax | 26 | 26.0 |
| Mixed Malaria (P. Falciparum and P. Vivax) | 1 | 1.0 |
| Total | 100 | 100.0 |

Table 10: Diagnostic test for Dengue amongst study population

| Dengue | Frequency | Percent |
|------------------|-----------|---------|
| Absent | 46 | 46.0 |
| IgG & IgM method | 1 | 1.0 |
| IgG+ method | 6 | 6.0 |
| NS1+ antigen | 47 | 47.0 |
| Total | 100 | 100.0 |

Table 11: Diagnostic test for Leptospirosis amongst study population

| Leptospirosis(polymerase chain reaction (PCR) | Frequency | Percent |
|---|-----------|---------|
| Negative | 87 | 87.0 |
| Positive | 13 | 13.0 |
| Total | 100 | 100.0 |

Table 12: Diagnostic test for typhoid (TO antigen titer is more than 1:160) amongst study population

| Widal test | Frequency | Percent |
|------------|-----------|---------|
| Negative | 97 | 97.0 |
| Positive | 3 | 3.0 |
| Total | 100 | 100.0 |

Table 13: INR amongst study population

| INR | Frequency | Percent |
|-----------|-----------|---------|
| Derranged | 36 | 36.0 |
| Normal | 64 | 64.0 |
| Total | 100 | 100.0 |

Table 14: Blood Transfusion amongst study population

| Blood Transfusion | Frequency | Percent |
|-------------------|-----------|---------|
| No | 84 | 84.0 |
| Yes | 16 | 16.0 |
| Total | 100 | 100.0 |

Table 15: duration of stay in hospital amongst study population

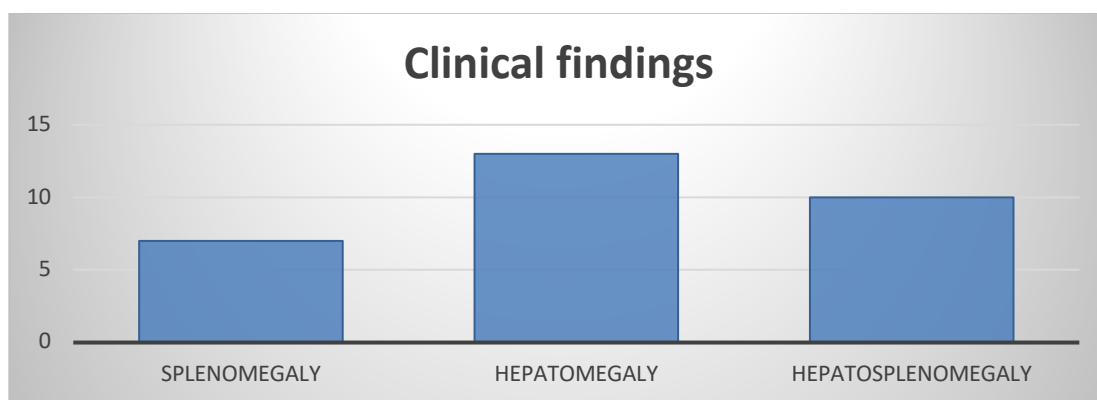
| Duration of stay in hospital | Frequency | Percent |
|------------------------------|-----------|---------|
| Less than 10 days | 94 | 94.0 |
| More than 10 days | 6 | 6.0 |
| Total | 100 | 100.0 |

Table 16: Comparison of Final diagnosis with Outcome amongst study population

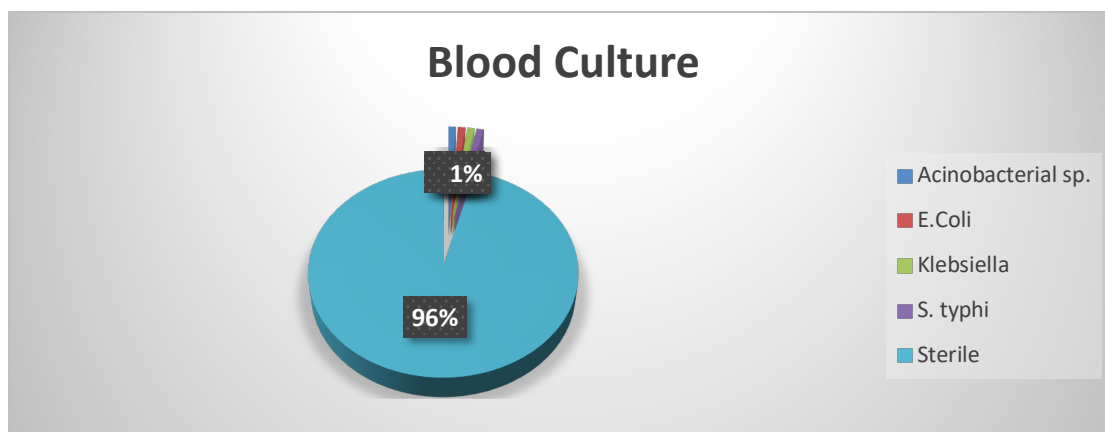
| | | Outcome | | Total | |
|-----------|--------------------|---------|---------|---------|---------|
| | | Death | Alive | | |
| Diagnosis | Dengue (53) | Count | 4 | 49 | 53 |
| | | % | 36.40% | 55.10% | |
| | Enteric fever (2) | Count | 0 | 2 | 2 |
| | | % | 0.00% | 2.20% | 2.00% |
| | Leptospirosis (13) | Count | 4 | 9 | 13 |
| | | % | 36.40% | 10.10% | 13.00% |
| | Malaria (27) | Count | 0 | 27 | 27 |
| | | % | 0.00% | 30.30% | 27.00% |
| | Septicemia (5) | Count | 3 | 2 | 5 |
| | | % | 27.30% | 1.10% | 4.00% |
| Total | | Count | 11 | 89 | 100 |
| | | % | 100.00% | 100.00% | 100.00% |

Table 17: Number of organ involved in death patients

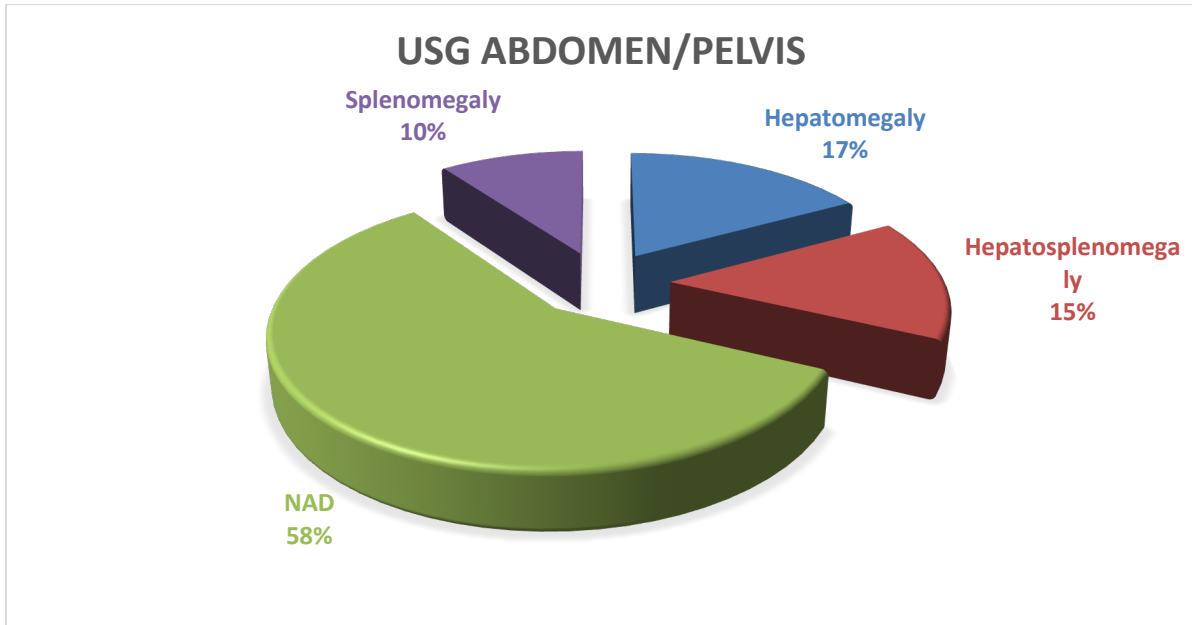
| Number of organ involved | Frequency | Percent |
|--------------------------|-----------|---------|
| 1 | 0 | 0 |
| 2 | 1 | 9.1 |
| 3 | 4 | 36.4 |
| more than 3 | 6 | 54.5 |
| total | 11 | 100.0 |



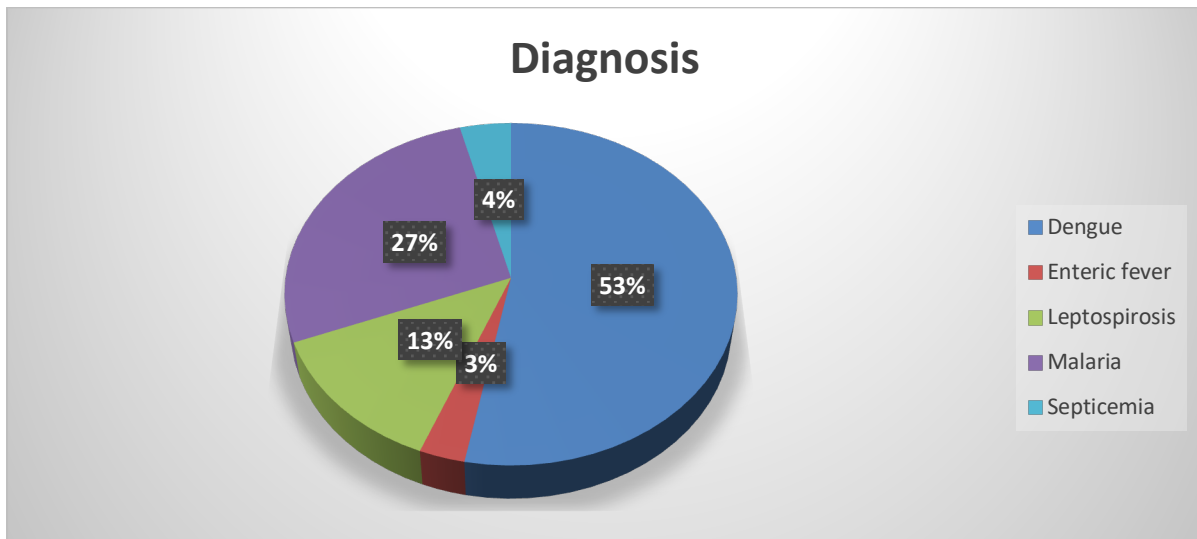
Graph 1: Clinical finding



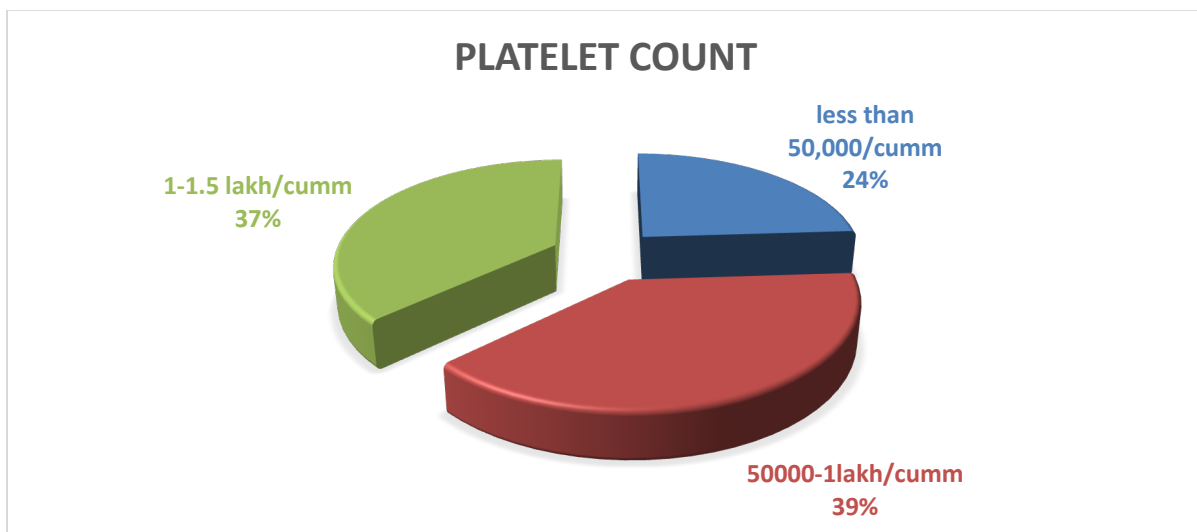
Graph 2: Blood culture



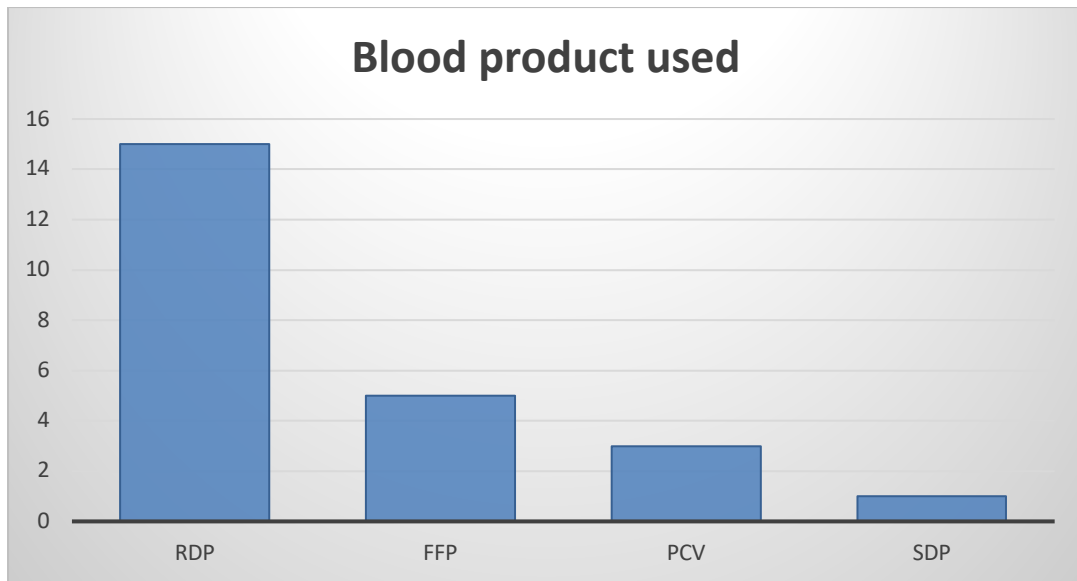
Graph 3: USG Abdomen and pelvis



Graph 4: Final diagnosis



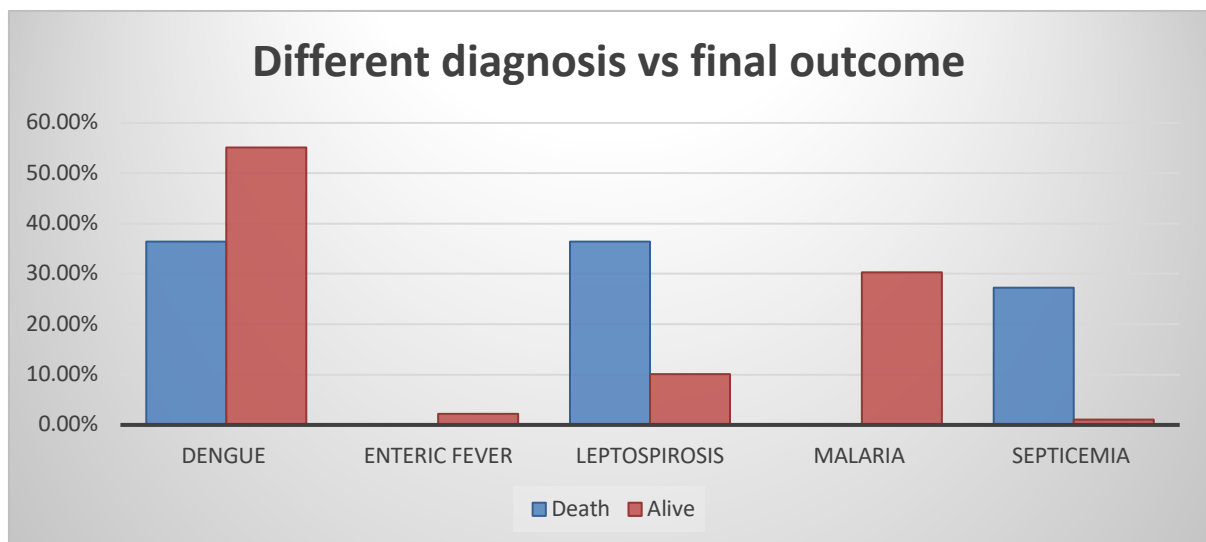
Graph 5: platelet count



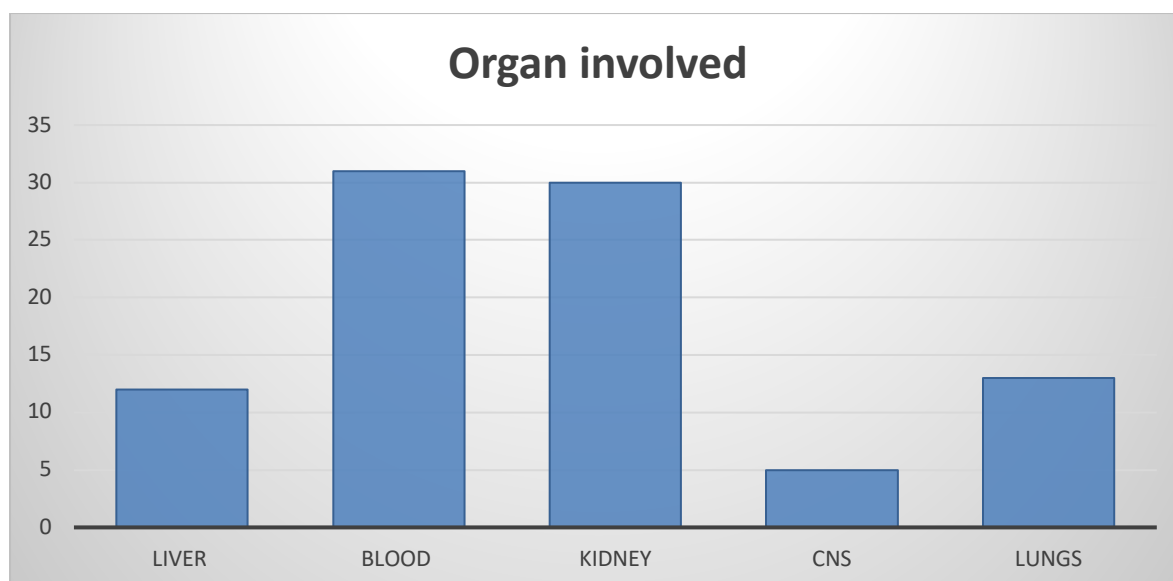
Graph 6: Blood product



Graph 7: Final outcome



Graph 8: Different diagnosis vs final outcome



Graph 9: Organ involved

Discussion

Age group: In the present study, 16 to 25 years (46%) was the most common age group amongst study population followed by 26 to 35 years (30%), more than 45 years (15%) and 36 to 45 years (9%). This findings is in agreement with the study conducted by Yasmeen Khatib et al., in which there were 68 cases (22.67%) seen in the 21-30 year age group followed by 58 patients in the 31-40 year age group(19.33%). [4]

This findings is also in agreement with the study conducted by Smita Masamatti et al., in which the commonest age group affected was between 18 to 36 years (48.27%), the reason for this increased incidence in males and younger age group in the given locality has been attributed to the prolonged outdoor activities and increased chances of exposure to mosquitoes and also majority of the women being homemaker. [5] In another study by Shah et al maximum cases of thrombocytopenia were also found in the 21-30 years age group and male preponderance was seen as in our study. [6]

Sex: In the present study, there was male predominance (81%) amongst study population as compared to female (19%). This findings is in agreement with the study conducted by Yasmeen Khatib et al., in which there were 176(58.67%) males and 124(41.33%) females.[4] According to another study by Badvi A. J. et al, male to female ratio was 64:36 and 77% of patients were in age group under 10 years. 94 Similar sex distribution was seen in certain local and international studies. [8-10]

Clinical features: In the present study, fever (100%) was the most common clinical features amongst study population followed by chills/rigors (98%), vomiting (40%) and headache (27%). This

finding is in agreement with the study conducted by Yasmeen Khatib et al., in which the main presenting features in patients were fever 205 cases (68.3%).[4]

In another study by Ahmed S et al study, frequently noted clinical features included fever (97%), vomiting (68%), abdominal pain (68%) and rashes (65%). Gastrointestinal bleeding (61%) and epistaxis (26%) were commonest haemorrhagic manifestations. [9]

In the present study, bleeding manifestations was present in 19 % of study population. This finding is also seen in a study conducted by Yasmeen Khatib et al., in which the clinical presentation with bleeding tendencies was seen in 70 cases (23.3%). [4] Shah et al have reported them in 30% of their cases. [6] Signs of bleeding were reported in 24% children and in 23% adults by Kuhne T et al. [8]

Examination findings: In the present study, Splenomegaly, Hepatomegaly and Hepatosplenomegaly was present in 7%, 10% and 13% of study population respectively. This findings is in agreement with the study conducted by Yasmeen Khatib et al., in which hepatomegaly 48 cases (16%), splenomegaly 46 cases (15.3%).[4] Similarly Shelke YP et al., reported hepatomegaly in 11.8% and splenomegaly in 4.4% of patients with AFI. [11]

Peripheral smear findings: In the present study, P. Vivax (26%) was the most common peripheral smear findings amongst study population followed by P. Falciparum (1%) and Mixed malaria (1%). This findings is in agreement with the study conducted by Guruprasada Shetty et al study, plasmodium vivax found in 66%, plasmodium falciparum in 16% and mixed in 18% of cases. [12] This findings is in agreement with the study conducted by Naveen Kulkarni et al., vivax malaria,

falciparum and mixed infections were noted in 53.2%, 26.6% and 19% cases respectively. [13]

In the present study, NS1 positive (47%) was the most common Diagnostic test for Dengue amongst study population followed by IgG positive (6%) and IgG & IgM (1%). This finding is in agreement with the study conducted by Shubhankar Mishra et al., the majority of the patients were positive for NS1 followed by IgM as a large number of patients presented within 4 days of fever. [14] Similarly in the study conducted by Bhardwaj LM et al. in which majority of cases presented in the first week of fever and had Ns1Ag positive (85.36%). [15]

Platelet count: In the present study, most of the study population had platelet count of 50000-1lakh/cumm (39%) followed by 1-1.5 lakh/cumm (37 %) and less than 50,000/cumm (24%). This findings is in agreement with the study conducted by Yadav et al., most of the study population had platelet distribution 50,001-1,00,000/cumm was seen in 53.8% cases. [16] Similarly in the study by S Sumangala reported 43% of study population had platelet count less than 50000. [17]

USG Abdomen and Pelvis: In the present study, on USG Abdomen/Pelvis, Hepatomegaly (17%) was the most common findings amongst study population followed by Hepatosplenomegaly (15%) and Splenomegaly (10%). This findings is in agreement with the study conducted by Patne SV et al. in which hepatomegaly (13.33%), hepatosplenomegaly (7.5%) and Splenomegaly (16.66%) was observed. [18]

Final diagnosis: In the present study, Dengue (53%) was the most common cause of thrombocytopenia amongst study population followed by Malaria (27%), Leptospirosis (13%), Septicemia (4%), Enteric fever (3%). This findings are also seen in the study conducted by Smita Masamatti et al., in which the commonest etiology for fever with thrombocytopenia was Dengue (48.28%), followed by septicemia (19.83%), typhoid (15.52%). It was more common among males (64.82%) than in females (35.18%). [5]

In another study by Badvi A. J. et al study, enteric fever contributed to about 5% of cases of febrile illness which is similar to the present study. [7] Dengue and malaria were the common causes due to the higher prevalence of these infections during the study period (October), which may be the reason for variation between different studies. The pathogenesis of thrombocytopenia in dengue fever is not clearly understood. Increased peripheral destruction of antibody coated platelets is strongly suspected as the possible mechanism. Other modes include acute bone marrow suppression leading to amegakaryocytic condition, mild DIC like presentation and enhanced platelet destruction by the reticuloendothelial system. [19]

Blood Transfusion: In the present study, blood transfusion requirement was observed most commonly in dengue (43.8 %) followed by leptospirosis (25.0%), septicemia (18.8%) and malaria (12.5%) and the difference were statistically significant (P value – 0.01).

Blood transfusion was given in 16% of study population. In a study by Anubha Sharma blood product transfusion was given in 38% of cases. [19] In the present study, 94% of the study population had less than 10 days of hospital stay while more than 10 days of hospital stay was observed in 6% of study population

Final outcome: In the present study, 89% of the study population were discharged while death was occurred in 11% of study population. Patil et al in their study noticed mortality in 5% of patients with major etiology i.e. septicemia in 60% patients followed by malaria and viral fever. [20] In the study by Lohitashwa et al septicemia accounted for 78% and dengue for 22% of mortality. [21] Kumar et al study on fever found 9.47% mortality where 83.33% were due to septicemia with multiorgan dysfunction and 16.67% were due to complicated malaria. [21]

Coagulation profile vs Final diagnosis: In the present study, deranged prothombin time was observed most commonly in dengue (45.8%) followed by malaria (37.5%), leptospirosis (6.3%), septicemia (4.2%) and enteric fever (6.3%) and the difference was statistically significant (P value – 0.04). Similarly in the study by Tejas N. Modi et al., Viremia 241(61.32%) constitutes the commonest a etiology of febrile of which 220(55.98%) were of dengue fever and 21(5.34%) viral infection other than dengue, followed by Malaria 102(25.95%), Septicemia 21(5.34%), Megaloblastic anemia 11(2.79%), Hematological malignancy 11(2.79%) and Enteric fever 6(1.58%). [22]

In the present study, deranged INR was observed most commonly in dengue (44.4%) followed by malaria (27.8%), leptospirosis (13.9%), septicemia (8.3%) and enteric fever (5.6%) and the difference was statistically insignificant (P value – 0.181).

Outcome vs Final diagnosis: In the present study, death was occurred most commonly in dengue (36.40%) followed by leptospirosis (36.40%) and septicemia (27.30%) and the difference was statistically significant (P value -0.0001). The common causes of death were dengue hemorrhagic fever, leptospirosis with ARDS, septicemia with shock.

Organ involved: In the present study, blood system (31%) was the most common system in MODS followed by kidney (30%), lungs (13%), liver (12%) and CNS (5%). This finding was in agreement with the study conducted by Bhanukumar Muthalath et al., [23] involvement of haematopoietic system in

78.7% of patients followed by hepatobiliary (68%) and renal system (52%).

Mortality was observed most commonly in patients with more than 3 organ involvement (54.5%) followed by three organ (36.4%) and two organ (9.1%). This findings was in agreement with the study conducted by Dash L et al., in which out of 77 cases of organ dysfunction, 31 (40.25%) had more than two organ dysfunction with 25 (80.64%) death and 24 patients had one organ dysfunction with only 1 (4.16%) death. Mortality was higher with increase no of organ dysfunction. This is similar to the result observed by Bhattacharya PK et al. [25]

Summary

- The most common age group amongst study population was 16 to 25 years (46%) followed by 26 to 35 years (30%), more than 45 years (15%) and 36 to 45 years (9%).
- There was male predominance (81%) amongst study population as compared to female (19%).
- Fever (100%) was the most common clinical features amongst study population followed by Chills/Rigors (98%), Vomiting (40%) and Headache (27%).
- Icterus, Pallor and Subconjunctival hemorrhage was present in 12% 10% and 7% of study population respectively.
- Bleeding Manifestations was present in 19% of study population.
- Splenomegaly, Hepatomegaly and Hepatosplenomegaly was present in 7%, 10% and 13% of study population respectively.
- Deranged creatinine was present in 29% of study population.
- Vivax Malaria (26%) was the most common peripheral smear findings amongst study population followed by Falciparum Malaria (1%) and Mixed malaria (1%).
- NS1 positive (47%) was the most common diagnostic test for Dengue amongst study population followed by IgG positive (6%) and IgG & IgM (1%).
- Leptospirosis was positive in 13% of study population.
- Widal was positive in 2% of study population.
- INR was derranged in 36% of study population.
- Acinetobacter species, E.Coli, Klebsiella and S. typhi was found in 1%, 1%, 1% and 1% of study population on blood culture findings respectively.
- On USG Abdomen/Pelvis, Hepatomegaly (17%) was the most common findings amongst study population followed by Hepatosplenomegaly (15%) and Splenomegaly (10%).
- Dengue (53%) was the most common cause of fever amongst study population followed by Malaria (27%), Leptospirosis (13%), Septicemia (4%), Enteric fever (3%).

- Most of the study population had platelet count of 50000-1 lakh/cumm (39%) followed by 1-1.5 lakh/cumm (37%) and less than 50,000/cumm (24%).
- Blood Transfusion was given in 16% of study population.
- RDP, FFP, PCV and SDP were Blood Product transfused amongst which RDP the most common (15%) was followed by FFP (5%).
- In 94% of the study population had less than 10 days of hospital stay while more than 10 days of hospital stay was observed in 6% of study population with minimum and maximum hospital stay was 6 days and 17 days respectively.
- In 89% of the study population were discharged while death was occurred in 11% of study population.
- Death occurred most commonly in dengue (36.40%) and leptospirosis (36.40%) each and septicemia (27.30%) and the difference was statistically significant (p value – 0.0001). the common causes of death were dengue hemorrhagic fever leptospirosis with ards and septicemia with shock.
- Haematological system (31%) was the most common system in MODS followed by kidney (30%), lungs (13%), liver (12%) and CNS (5%).
- Mortality was observed most commonly in patients with more than 3 organ involvement (54.5%) followed by three organ (36.4%) and two organ (9.1%).

Conclusion

- Acute febrile illness (AFI) is one of the commonest indications for hospitalization and can present with varying severity including single or multiple organ dysfunction syndrome (MODS).
- Bleeding manifestations, Crepitations, Altered sensorium, Splenomegaly, Hepatomegaly and Hepatosplenomegaly were most common clinical features in patients with MODS.
- Most common etiology of MODS were Dengue and Leptospirosis and septicemia.
- Heamatological system was the most common system in MODS followed by kidney, lungs, liver and CNS.
- Mortality was observed most commonly in patients with more than 3 organ involvement followed by three organ and two organ. It was observed that as the number of organ involvement increases in MODS, the risk of mortality also increases.

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