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RESEARCH ARTICLE

SPECTRUM OF FEBRILE THROMBOCYTOPENIA AMONG CHILDREN IN A TROPICAL COUNTRY: A HOSPITAL BASED OBSERVATIONAL STUDY IN DHAULADHAR REGION

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Abstract

Background: Pediatric admissions often involve febrile thrombocytopenia. Infections are the main cause; however noninfectious reasons occur. This study estimated the prevalence of thrombocytopenia in pediatric fever patients, its etiologies, presentations, and the association between platelet count and disease severity and prognosis.

Methods: Retrospective observational study done by collecting data fromhospital records of children admitted inRPGMC Tanda from January 2021 to December 2022. Children in the age group of 6 months to15 years with fever and thrombocytopenia at admission were included in the study. Children on treatment with antiplatelet drugs, other chronic diseases and infants less than 6 months were excluded.

Results: 48% had high-grade fever at presentation. Fever averaged 4–6 days and peaked at 14 days. Constitutional symptoms (vomiting, abdominal pain) followed. Respiratory and diarrheal manifestations were rare. Seizures and altered sensorium were present in 4%. The next most common clinical finding was hepatomegaly with right hypochondrial tenderness (44%), followed by fluid leak (ascites, pleural effusion) (40%), periorbital puffiness (30%), subcutaneous bleeds (20%), conjunctival congestion (14%) and splenomegaly (14%).

Conclusions: Dengue-endemic children have febrile thrombocytopenia. Thrombocytopenia with abdominal pain, vomiting, or oliguria suggests dengue. Enteric fever, scrub typhus, and chikungunya induce similar symptoms. Leukemia, idiopathic thrombocytopenic purpura, hemolytic uremic syndrome, and sepsis can induce febrile thrombocytopenia. Blood and antibiotics are unusual.

Introduction:-

Fever-associated thrombocytopenia (platelet count <1,000 cells/cu.mm) is febrile. Malaria, leptospirosis, rickettsia infections (scrub typhus), septicemia, typhoid, borreliosis, arboviral infections like dengue or yellow fever, rodent-borne virus infections like Hanta and Lassa fever, HIV, visceral leishmaniasis, leukaemia, lymphomas, idiopathic thrombocytopenic purpura, and thrombotic thrombocytopenic purpura-hemolytic uremi are common causes of fever and thrombocytopenia. Certain regions have endemic illnesses, and seasonal epidemics occur worldwide.

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The study collected epidemiological data on thrombocytopenia in paediatric fever cases in South India. This study investigated the genesis, manifestations, and platelet count-severity-prognosis association of febrile thrombocytopenia in tropical children. This information can be used to create a clinical examination-based investigation protocol for children with febrile thrombocytopenia to construct a cost-effective management strategy with few tests and correct protocol-based therapy.

Methods:-

Retrospective observational research methods were used to collect data from hospital records of children who were admitted with fever to the pediatric ward of Dr. RPGMC, Tanda between January 2021 and December 2022. A set of inclusion and exclusion criteria were to be used to choose the patients. The study included kids between the ages of 6 months and 15 years who had fever at the time of admission and thrombocytopenia (platelet count 1,00,000 cells/cu.mm). Children receiving therapy for thrombocytopenia-inducing medications, children with a history of chronic disorders like cancer, chronic liver disease, or chronic kidney disease, and infants younger than 6 months of age were also disqualified from the trial.

Medical records and the full medical history of a select group of patients were used to gather data, and a systematic proforma was used to record clinical findings and tests. Summarized statistics were produced from the collected data using the MS Excel programmed and are shown below as proportions. The institutional ethical committee board granted ethical approval.

Results:-

Common symptomatology of febrile thrombocytopenia.

Table 1 shows that the 50 children in the age group of 6 months to 15years, fulfilled the study criteria for febrilethrombocytopenia. The predominantage group was 6 to 10 years (36%), followed by 11 to 15years (34%) and 1 to 5 years (30%). Male:Female ratio was almost equal at 1.1:1.The most common symptomatology at presentation wasfever which was present in all cases. Table 1 nearly halfof them (48%) had high grade fever on presentation. Theaverage duration of fever was 4 to 6 days with themaximum duration being 14 days. Constitutionalsymptoms and warning symptoms (vomiting, abdominalpain) were the next common symptoms at presentation.Other uncommon presentations included those withrespiratory symptoms and loose stools. Around 4% had neurological symptoms like seizure or altered sensorium atpresentation.

Clinical signs in febrile thrombocytopenia cases

Table 2 shows hepatomegaly with right hypochondrial tenderness was the next common clinical finding in 44%, followed by fluid leak (ascites, pleural effusion) in 40%, periorbital puffiness (30%), subcutaneous bleeds (20%), conjunctival congestion (14%) and splenomegaly (4%) as shown table 2 below.

Basic lab investigations in febrile thrombocytopenia cases

Table 3 shows dengue fever with warnings signs also called as dengue hemorrhagic fever (DHF) was mostly associated with hemoconcentration and elevated transaminases. Few children (4/50) had hemoglobin less than 10 at admission, among which 10 were later diagnosed to have leukemia or hemolytic uremic syndrome. Only 2 of the 4 had positive serology for dengue and they were all stable without any warning signs. The average maximum hematocrit during the hospital stay of all febrile thrombocytopenia cases was 37.12 and it came down to 36.17 at discharge. The hematocrit values were very high in adolescent.

Platelet count at admission in febrile thrombocytopenia case

Table 4 shows the incidence was more common in boys than girls. 5 children who had platelet count less than 10,000 only 2 had significant gastrointestinal bleeding manifestation. Others had only mucocutaneous bleeds or skin bleeds only. Nearly 30% had platelet counts 20,000 to 50,000. A significant low platelet count (<20,000) with high total counts was also noted in scrub typhus, leukemia and sepsis, the latter 2 being associated with poor prognosis.

Discussion:-

Most kid hospitalizations start with fever. The aetiology of thrombocytopenia in a feverish child may require further testing. Dengue, chikungunya, Plasmodium, and Salmonella typhi can cause febrile thrombocytopenia in tropical countries. The treatment approach for different infections depends on the causative agent. All countries have rare

noninfectious causes of febrile thrombocytopenia. Platelet counts below 150000/µl are considered thrombocytopenia, while below 50000/µl are considered severe.[1]

50 children aged 6 months to 15 years met febrile thrombocytopenia study criteria. The most common age group was 6–10 years (36%), followed by 11–15 years (34%), and 1–5 years (5%). (30 percent). Nearly 70% of study children have dengue serology. Dengue has expanded 230-fold with geographic expansion, making it a public health issue in many developing countries.[2]Dengue virus has become endemic in several regions, causing year-round infections. Nearly two thirds were aged 6–15. Two-thirds of these youngsters improved on oral or intravenous fluid therapy alone, according to WHO dengue guideline. Children with fever less than 4 days and leucopenia and thrombocytopenia at admission were not given antibiotics. Drug stewardship is crucial in developing nations to prevent antibiotic resistance and viral illness overuse. Imaging procedures like ultrasonography abdomen were not commonly done in fevers above 3 days. Only unwell children and unconfirmed diagnoses were done.

In a pediatric study done by **Ramabhatta et al atBangalore**, 20% of children with fever had associatedthrombocytopenia.[3] A total of 306 children were includedin the study and 280 children definite diagnosis was madeout, of which more than 80% had dengue fever. A studydone at the university of Munich hospital by **Herbinger etal** showed increased incidence of EBV, CMV along witharboviral infections.[4] Another study by **Malik et al**showed that complicated Enteric fever is an importantcause for febrile thrombocytopenia in developingcountries.[5] In our study, 69% of the children had denguefever while enteric fever was the second common causefor febrile thrombocytopenia. In a similar pediatric studydone by **Nair et al** published from North India, viralfevers other than Dengue and chikungunya were morecommon while Enteric fever had an incidence of around12%.[6] We did not evaluate for other viruses likechikungunya, Ebstein Barr virus due to cost issues andunavailability of the tests in our institute. But most of thecases of febrile thrombocytopenia had positive dengueserology in our study (69%) and only 8% were viral feverwith negative dengue serology.

In a study by **Phakhounthong et al**,[7] most significant factor inpredicting severe dengue was low hematocrit, followedby a GCS of 11 or hematocrit was greater than 28 orplatelet count of 146,000 per mm. The correlationbetween degree of thrombocytopenia and severity of thedisease is not directly analyzed in our study but skinbleeds were seen in only 20% of the study group and itwas mostly present when platelet counts was less than20,000. But in children with features of severe dengue,50% had significant bleeding manifestations likehematemesis, Malena, and pulmonary hemorrhage. Thetendency to bleed was not correlating to the platelet countas few children had bleeding manifestations despitehaving platelet counts more than 50,000. The bleedingmanifestations were not directly proportional to thedegree of thrombocytopenia and the need for bloodproducts transfusion was predominantly forhemodynamic compromise. We could also infer that sickchild had significant rise in transaminases, hematocrit,and deranged coagulation profile. Also, in few adult studieslike those done by **Harsha and Radhika et al** showed thatinfections like dengue, septicemia and malaria were thepredominant causes of febrile thrombocytopenia[8]In astudy by **Subramanian et al** bleeding manifestations werenoted predominantly in children with counts 20000 to100000/µl and they contributed to nearly 70% of all thebleeding manifestations.[9] In a study by **Kshirsagar et al**,[10]thrombocytopenia, elevated serum hepatic enzymes,abnormal renal function tests, low sodium,hypoalbuminemia, hypoglycemia, abnormal radiologicalfindings were found to be the predictors of severity.11 Ourstudy was not designed to develop the predictors fordisease severity but the severe cases had evidence of fluidoverload or multiorgan dysfunction like oliguria,respiratory distress or encephalopathy or shock within thefirst 24 to 48 hours of admission itself.

Conclusion:-

Children in dengue-endemic areas often have febrile thrombocytopenia during rainy seasons. Dengue, enteric fever, scrub typhus, and chikungunya may potentially cause similar symptoms. Leukemia, idiopathic thrombocytopenic purpura, hemolytic uremic syndrome, and sepsis may cause febrile thrombocytopenia, but a peripheral smear or serial hemograms will help us diagnose it. 15% of feverish children developed febrile thrombocytopenia, 70% of which were dengue and 5% noninfectious. Two thirds of the children needed simply fluid therapy, and thrombocytopenia was unrelated to viral fever. Most unwell children had elevated transaminases and hematocrit. Most viral fevers include leukopenia, however WHO recommends treating thrombocytopenia and warning signals such abdominal discomfort, vomiting, and oliguria. Antibiotics and radiologic testing used wisely can treat tropical illnesses cost-effectively.

Table 1:- Common symptomatology of febrilethrombocytopenia.

Variable	Symptoms
Fever High Grade	24 (48%)
Low grade (<101*F)	26 (52%)
Duration	Average 4 to 6days, max 14 days
Myalgia, poor appetite, headache	22 (44%%)
Cough/Cold	3 (6%)
Pain Abdomen and Vomiting	23 (46%)
Loose Stool	2 (4%)
Facial puffiness	12 (24%)
Melena	9(18%)
Hematemesis	2 (4%)
Oliguria	15 (30%)
Other mucosal bleeds (gum bleeds/epistaxis/skin bleeds)	11 (22%)
Atypical CNS (seizures, encephalopathy)	2 (4%)

Table 2:- Clinical signs in febrile thrombocytopeniacases.

Clinical Sign	Cases
Periorbital puffiness	15
Conjunctival congestion	7
Petechiae/purpura	12
Erythematous skin rash	20
Hepatomegaly/righthypochondriac tenderness	22
Splenomegaly	2
Ascites/pleural effusion	20

Table 3:- Basic lab investigations in febrilethrombocytopenia cases.

Lab Investigation	Value
Hemoglobin	5 to 17.2(mean12.1±1.85), median11.9 mode 11.7
Total leucocyte count	Median 5100, range2200-70300
Hematocrit at admission	38±5.33 (mean/SD)
Maximum hematocrit	37.12±5.23
Hematocrit at discharge	36.17±5.4

Table 4:- Platelet count at admission in febrile thrombocytopenia case.

Platelet count (per cu.mm)	No. of children
<10000	5
10-20000	13
20000-50000	11
51000-80000	9
80000 to 100000	12

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