

Original Research Article

ETIOLOGY, CLINICAL PROFILE, MORBIDITY AND MORTALITY OF PATIENTS WITH THROMBOCYTOPENIA PRESENTING TO A TERTIARY CARE HOSPITAL: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Thrombocytopenia, characterized by low platelet counts, is a common hematologic condition associated with abnormal bleeding. This study investigates its diverse causes and clinical impact in patients at a tertiary care center, aiming to identify associated morbidity and mortality risks. Early recognition of thrombocytopenia's etiology is crucial for managing bleeding complications effectively.

Materials and Methods: This is a descriptive cross-sectional study conducted at Bangalore Medical College and Research Institute aimed to investigate the etiology, clinical profile, morbidity, and mortality of thrombocytopenic patients at a tertiary care hospital in South India. Over a four-month period from April to July 2024, 118 eligible patients from various departments were enrolled based on a platelet count below 1.5 Lakhs/mm³. Data collection involved detailed demographic information, symptomatology related to bleeding manifestations, physical examination, and comprehensive laboratory investigations. Treatment followed standard hospital protocols, including the administration of blood products as clinically indicated. Statistical analysis was performed using SPSS.

Results: In this study of 118 patients, 62.7% were male and 37.3% were female, with the most common age group being 18-30 years (33.1%). Most patients (62%) hailed from rural areas. Fever (83.9%) and cough (21.2%) were predominant symptoms, while bleeding manifestations occurred in 38.98% of cases, including petechiae and bleeding gums. Dengue fever (24.5%) and sepsis (16.1%) were the leading diagnoses. Diabetes mellitus and hypertension affected 13.6% and 11% of patients, respectively. Most patients (82.4%) did not require blood products, though 8.4% needed PRBCs and 8.4% required platelet transfusions. Isolated thrombocytopenia (64.4%) was the most common peripheral smear finding. The majority (85.5%) recovered, while 2.6% died primarily due to septic shock while the rest were started on long term treatment based on their diagnosis.

Conclusion: In our study, thrombocytopenia predominantly affected young males presenting with fever, fatigue, and myalgia. Dengue emerged as the leading cause, followed by sepsis and malaria, often associated with bleeding. Vitamin B12, and folate deficiencies were common non-infective causes of Thrombocytopenia. Diabetes posed a higher risk for bleeding complications. Isolated thrombocytopenia was the most frequent blood picture observed. While some cases were severe, the majority of patients recovered fully, highlighting a favorable prognosis. Further extensive research is needed to better understand the diverse causes and treatments of thrombocytopenia.

Keywords: Thrombocytopenia, Fever, Dengue, Sepsis

INTRODUCTION

Thrombocytopenia can be defined as a subnormal number of platelets in the circulating blood and is the most common cause of abnormal bleeding.^[1] Thrombocytopenia is defined as platelet count less than 1,50,000 per microlitre.^[2] Despite the number and diversity of disorders that may be associated etiologically, thrombocytopenia results only from the four processes- a) artifactual thrombocytopenia (falsely low platelet counts) which is mostly due to giant platelets, platelet satellitism, platelet clumping caused by anticoagulant-dependent immunoglobulin (pseudothrombocytopenia) b) deficient platelet production due to hypoplasia of megakaryocytes, ineffective thrombopoiesis, disorders of thrombopoietic control, hereditary thrombocytopenia c) accelerated platelet destruction caused by immunological processes like autoimmune, idiopathic, secondary causes like infections, pregnancy, collagen vascular diseases, lymphoproliferative disorders, drugs, alloimmune causes like neonatal thrombocytopenia and posttransfusion purpura; non-immunologic processes like i) thrombotic microangiopathies- disseminated microvascular coagulation; thrombotic thrombocytopenic purpura; hemolytic- uremic syndrome; platelet damage by abnormal vascular surface; miscellaneous causes like infection and massive blood transfusion d) abnormal distribution or pooling of the platelets within the body due to disorders of the spleen (neoplastic, congestive, infiltrative, infectious, of unknown cause), hypothermia and dilution of platelets with massive transfusion.^[1]

Thrombocytopenia causes abnormality in platelet plug formation which can result in abnormality of primary homeostasis and can cause prolonged bleeding time which can manifest as petechiae, purpura and bleeding.^[3]

Thrombocytopenia is a commonly observed condition in clinical practice, and its diagnosis is often challenging due to numerous aetiologies and variations in clinical presentation.^[3] Studies have shown significant association between malaria and thrombocytopenia at around 67% of cases presenting to a tertiary care centre,^[4] Dengue is also associated with thrombocytopenia which may result in severe fall in platelet count and lead to high mortality due to bleeding manifestations. A study conducted by Casthilo BM et al estimated the presence of thrombocytopenia to be present in around 40% of patients presenting with Dengue.^[9]

A study conducted by Aroor et al identified that the mean duration of illness was 5 days and mean duration of hospital stay was 6 days.^[10]

The current study aims to identify the etiology of Thrombocytopenia among patients admitted in a tertiary care centre and the morbidity (bleeding and transfusions) and mortality associated with it. Early

identification of thrombocytopenia and its causes can help prevent life-threatening hemorrhagic manifestations.^[3]

MATERIAL AND METHODS

The present study is a Descriptive Cross-Sectional Hospital based study conducted in the Department of General Medicine, Bangalore Medical College and Research Institute, a tertiary care hospital of South India. The aim of the study was to determine the etiology, clinical profile, morbidity and mortality of patients with thrombocytopenia presenting to a tertiary care hospital. This study was conducted for a period of 4 months from April to July 2024 with the objective of estimating the platelet count of patients presenting to OPD/IPD of various departments of BMCRI and to identify its etiology, clinical manifestations and assess the morbidity in terms of bleeding manifestations and need for blood products and mortality of the patients with thrombocytopenia. 118 patients who presented to the OPD and IPD of the Hospital and who gave valid consent and met inclusion criteria like age more than 18 years and had thrombocytopenia (platelets less than 1.5Lakhs/mm³) at admission or during the hospital stay and were included in the study. Patients less than 18 years of age were excluded from the study. The study gave special emphasis on studying any qualitative defects in the platelet functions. Patients with thrombocytopenia were included in the study irrespective of their presenting symptoms and working diagnosis. Data was collected after informed consent using a pretested semi-structured instrument in a study proforma which was entered in Microsoft excel and analysed using SPSS software.

Detailed demographic details, history of presenting complaints and specifically symptoms of various bleeding manifestations like bleeding gums, hematemesis, bleeding per rectum, melena, hematuria, menorrhagia were asked in detail, signs like petechiae, purpura, ecchymosis, General physical examination including vitals, pallor, icterus, clubbing, generalized lymphadenopathy, pedal edema, raised JVP and systemic examination to look for hepatomegaly and splenomegaly were done. Baseline investigations like Complete Blood Count including RBC indices, Peripheral smear, ECG, Chest X-ray, PT/INR, Urine routine and microscopy, HIV, HBsAg, HCV was done for all patients. For all the patients, if indicated by the clinical presentation and if warranted for the diagnosis, during the hospital course, various other relevant investigations were done like CRP, ESR, Serum Procalcitonin, Dengue Profile (NS1 antigen, IgM, IgG), Malaria Card Test and Peripheral smear for malarial parasite, Weil Felix Test, Widal test, Leptospira IgM, Serum Vitamin B12 and Serum Folate Levels, Bone Marrow Cytology and Biopsy, USG Abdomen and Pelvis, UGI scopy, ANA profile etc.

All the patients received treatment as per standard operating protocol of the hospital and also received blood products like Platelets and Packed Red Blood Cells and Fresh Frozen Plasma as and when clinically indicated during management.

Statistical Analysis

The collected data was analysed with IBM SPSS Statistics for Windows, Version 29.0. (Armonk, NY: IBM Corp).

RESULTS

The present study included 118 patients out of which 62.7%(74) were male patients and 37.3%(44) were female patients. Most of the patients [39 (33.1%)] were between the age of 18 and 30 years. The age group between 30-40 years of age was the next most common age group with 29 (24.6%) patients. 62% of our patients were from Rural areas and the remaining 38% from the Urban areas. (Chart 1 and 2).

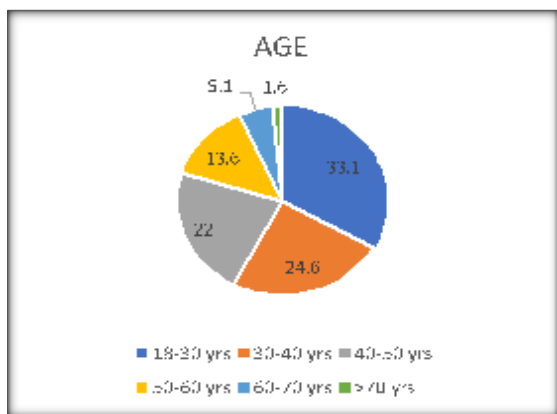


Figure 1: Age Wise Distribution

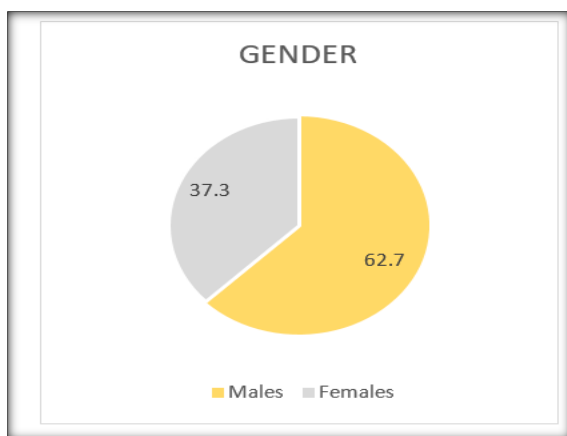


Figure 2a: Gender Wise Distribution

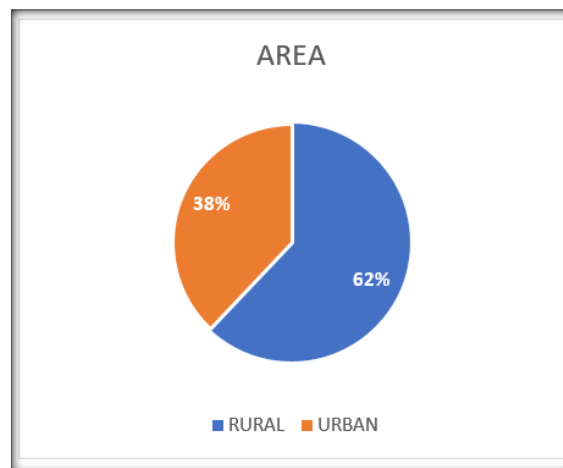


Figure 2b: Area wise distribution

Around 83.9% of the study population suffered with fever which was the most common presenting complaint followed by cough which was present in 21.2% of the subjects. Cold, myalgia, easy fatigability, nausea, vomiting, headache and bleeding manifestations were the other common presenting symptoms. (Figure 3)

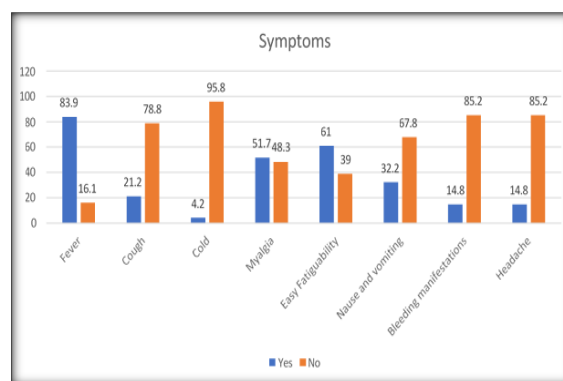


Figure 3: Presenting Symptoms

The incidence of bleeding manifestations was 38.98%. The spectrum of bleeding manifestations observed, included petechiae, bleeding gums, haematemesis, bleeding per rectum and epistaxis in the decreasing order of frequency. (Figure 4)

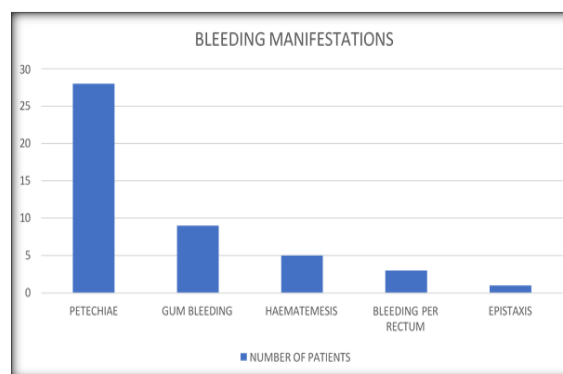


Figure 4: Bleeding manifestations among study population

42 (35.6%) patients required less than 5 days of hospitalization, a majority of them, i.e 68 (57.6%) stayed between 5-10 days in the hospital and only 8 (6.8%) patients required more than 10 days of hospital stay. (Figure 5)

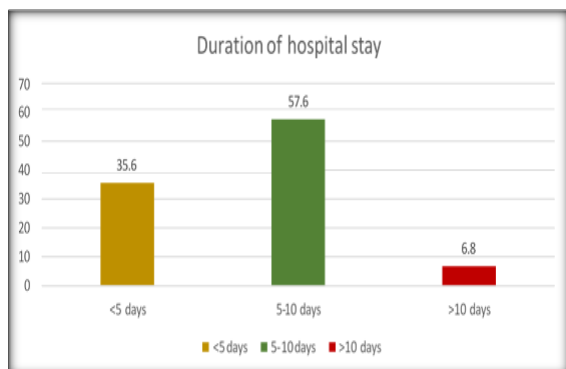


Figure 5: Duration of Hospital Stay

The study revealed a range of diagnoses: Dengue Fever was the most common, affecting 24.5% of patients, followed by Sepsis at 16.1%. Vitamin B12 Deficiency and Malaria were each present in 11.8% and 11% of cases, respectively. Folate Deficiency was noted in 9.3% of patients. Acute Febrile Illness and Decompensated Chronic Liver Disease (DCLD) each accounted for 5.8%. Tuberculosis was found in 4.2% of the study population. Less common diagnoses included Systemic Lupus Erythematosus (SLE) at 2.4%, and several conditions like Colonic Malignancy, Extrahepatic Portal Vein Thrombosis, Leptospirosis, Myelodysplastic Syndrome, HIV, Scrub Typhus, and Rocky Mountain Spotted Fever, each occurring in less than 1% of patients. (Figure 6)

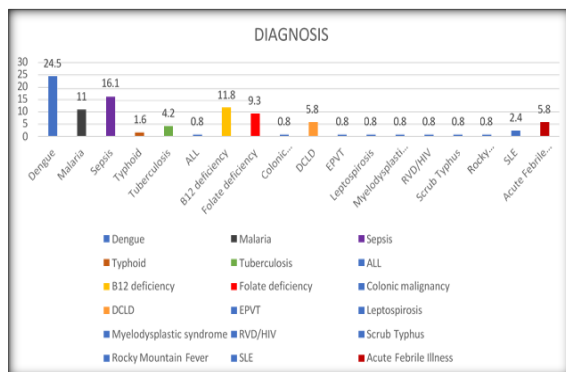


Figure 6: Diagnosis

Diabetes Mellitus was present in 13.6% of the patients and 11% of the patients were Hypertensive. (Chart 7) In our study, the majority of patients (82.4%) did not require any blood products, indicating that most individuals were managed effectively without the need for transfusions. However, 8.4% of the patients required packed red blood cells (PRBCs) and 8.4% required platelet transfusion, reflecting the need for targeted support in more severe cases of anemia or thrombocytopenia.

A smaller proportion, just 0.8%, required fresh frozen plasma (FFP), suggesting that coagulopathy was less frequently an issue. (Table 8)

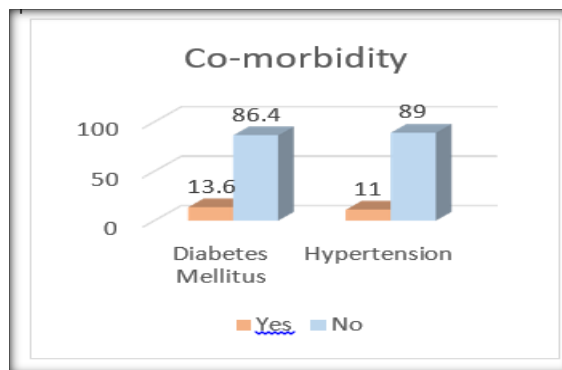


Figure 7: co-morbid illnesses

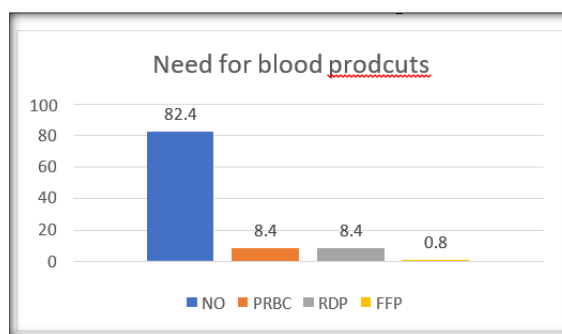


Figure 8: Need for blood products

The peripheral smear analysis revealed that isolated thrombocytopenia was the most prevalent finding, affecting 64.4% of patients. Thrombocytopenia with leukocytosis was seen in 16.1%, suggesting concurrent elevated white blood cell counts. Macrocytic anemia with thrombocytopenia was present in 9.3% of patients, while Hemolytic Anemia with thrombocytopenia and Iron deficiency Anemia with thrombocytopenia were each observed in 4.3%. Only 1.6% had thrombocytopenia with leukopenia. (Table 9)

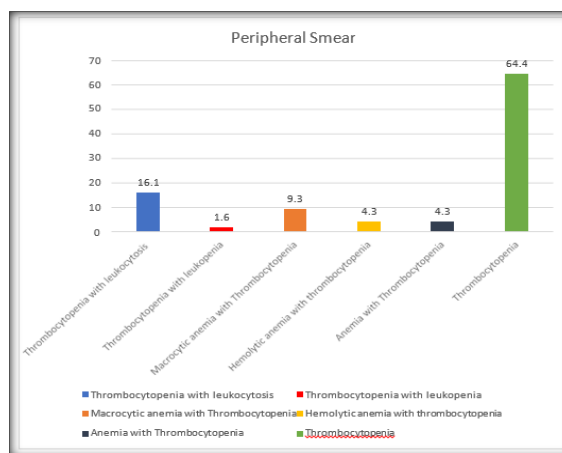


Figure 9: Peripheral Smear findings among study population

The majority of the study population, 85.5%, recovered, 11.9% of patients were diagnosed with conditions that required treatment for longer duration and were initiated on such medications and discharged in hemodynamically stable state. Unfortunately, 2.6% of patients died, primarily due to septic shock. (Table 10)

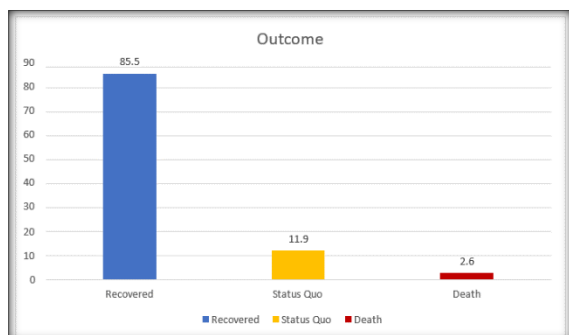


Figure 10: Outcome of the study population

DISCUSSION

The demographic distribution revealed a predominantly young cohort, with significant representation in the 18-30 and 30-40 age groups, comprising 33.1% and 24.6% of the population respectively. Thus elderly population was less commonly involved. This demographic skew towards younger adults may influence the prevalence and severity of infectious diseases observed in the study, as younger individuals are often more mobile and potentially exposed to various pathogens. This similar finding is noted by Shah HR,^[11] in his study. A study conducted by Choudhary et al found that thrombocytopenia was more common among patients of age 46-55 years.^[2] Geographically, the majority of participants (61.01%) hailed from urban areas, underscoring the urban-centric nature of the study and potential disparities in healthcare access and outcomes between urban and rural settings. Gender distribution showed a notable male predominance, with 62.7% of participants being male. This gender disparity may reflect differences in health-seeking behavior or occupational exposure patterns, which could impact disease prevalence and outcomes. The gender distribution is consistent with the study conducted by Shah HR,^[11] in which there were 54% male and 46% females and the study by Choudhary et al where males were more severely affected than females.^[2] Clinically, fever was the most prevalent symptom, affecting 83.9% of patients, followed by myalgia (51.7%) and easy fatigability (61%). A study by Sharma et al. found that the fever was the commonest presenting complaint among patients presenting with thrombocytopenia.^[4]

The incidence of bleeding manifestations was 38.98%. The spectrum of bleeding manifestations

observed, included minor bleeding manifestations 32% (petechiae, bleeding gums) and major bleeding manifestations 18.98% (hematemesis, bleeding per rectum, hematuria, intracranial bleeding and epistaxis) in the decreasing order of frequency. There was overlap of cases with minor and major bleeding manifestations. Around 60% with minor bleeding manifestations and 35% with major bleeding manifestations were due to Dengue. This finding is similar to the study conducted by Bhalara SK,^[12] where dengue was the cause of bleeding in 26% of the cases. In the study conducted by Godhani et. Al,^[3] 38% of the patients developed bleeding manifestations, similar to the 36% bleeding manifestation in the study by Sharma et al.^[4] Chairulfatah A,^[13] demonstrated in his study that Severe Thrombocytopenia in dengue is associated with bleeding manifestations but in our study patients of dengue having mild and moderate thrombocytopenia were associated with bleeding. This predicts that platelet count alone is a poor predictor of bleeding in dengue patients and is consistent with the study by Godhani et. al.^[3] Infections like dengue, malaria and sepsis which are the commonest cause of thrombocytopenia in our study suggest that there could be associated functional defect in the platelets as suggested by the bleeding manifestations even in mild to moderate thrombocytopenia. The mean platelet with minor bleeding manifestations (petechiae, gum bleeding) was 48,000 and major bleeding manifestations (hematuria, malena, hematemesis, bleeding per rectum, intracranial bleeding) was 16,000.

The majority of patients stayed in the hospital for 5-10 days (57.6%), while 35.6% of patients had stays of less than 5 days. A smaller proportion, 6.8%, were hospitalized for more than 10 days. This is similar to the study by Aroor et al,^[10] where the mean duration of hospital stay was 5 days.

Dengue Fever was the most common diagnosis, affecting 24.5% of patients. Sepsis was identified in 16.1% of cases, and Malaria in 11%. Other diagnoses included Vitamin B12 Deficiency (11.8%) and Folic Acid Deficiency (9.3%). Less common diagnoses included Acute Lymphoblastic Leukemia, HIV infection, and several other conditions, each affecting less than 1% of the population. The results are consistent with that of Shah HR,^[11] and Bhalara SK,^[12] where infection was the commonest cause of thrombocytopenia. However Malaria was the leading cause in the study by Shah HR unlike our study where Dengue is the commonest infection. In a study by Choudhary et al. Megaloblastic anemia and Infections were the most common causes of thrombocytopenia. A study by Patel et al stated among the non-infective etiologies, megaloblastic anaemia was the commonest cause.^[5]

Diabetes Mellitus was present in 13.6% of the patients, while 11% had hypertension. The majority of patients did not have these co-morbidities, with

86.4% being free of diabetes and 89% without hypertension. A majority of patients (82.4%) did not require any blood products. Of those who did, 8.4% needed Packed Red Blood Cells (PRBC), another 8.4% required Random Donor Platelets (RDP), and 0.8% needed Fresh Frozen Plasma (FFP). 50% of patients with diabetes and 30% of hypertensive patients had severe thrombocytopenia and bleeding manifestations which was much higher in comparison to the patients with no co-morbid illnesses. Thrombocytopenia alone was the most common finding, present in 64.4% of patients. Other significant findings included thrombocytopenia with leukocytosis (16.1%) and macrocytic anemia with thrombocytopenia (9.3%). Hemolytic anemia with thrombocytopenia and anemia with thrombocytopenia were each observed in 4.3% of patients. These findings are consistent with that of Shah HR,^[11] where almost half patients had isolated thrombocytopenia and 25% patients had selective thrombocytopenia.

The majority of patients recovered fully, with a recovery rate of 85.5%. A smaller proportion of patients were in a status quo state (11.9%), and 2.6% of the patients died. This distribution reflects a generally positive outcome for the majority of the study population.

CONCLUSION

Our study shows that more young people and predominantly males were more likely to present with thrombocytopenia. Most of these patients with thrombocytopenia are likely to present with complaints of fever, easy fatiguability and myalgia. Dengue was the commonest cause for thrombocytopenia followed by sepsis and malaria. Dengue was also the cause for both minor and major bleeding manifestations in our study. Iron deficiency Anemia followed by Vitamin B12 and Folate deficiency was a common cause of Anemia and Vitamin B12 deficiency was one of the significant non-infective etiologies of thrombocytopenia. The presence of diabetes was found to have higher risk of bleeding manifestations. Isolated Thrombocytopenia was the commonest blood picture in our study. Rarer diagnosis included hematological malignancy, connective tissue disorders, rickettsial fever,

leptospirosis. Despite the severity of some cases, the majority of patients recovered fully, emphasizing favorable outcome. The reasons of thrombocytopenia are variable. To have a better understanding of the various etiologies of thrombocytopenia and its treatment more extensive research into the subject is required.

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