International Journal of Research in Medical Sciences
Kikaniya NK et al. Int J Res Med Sci. 2025 Jun;13(6):2419-2425
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20251629

Original Research Article

Clinicohematological profile of hepatomegaly and or splenomegaly at tertiary care centre

Nikita K. Kikaniya[1]*, Pragati P. Phulgirkar[1], Anjali S. Kulkarni[1], Ishankkumar P. Gupta[2]

[1]Department of Pathology, GMCH Ch Sambhaji Nagar, Maharashtra, India
[2]Department of Medicine, GMCH Ch Sambhaji Nagar, Maharashtra, India

Received: 12 August 2024
Revised: 24 September 2024
Accepted: 14 May 2025

***Correspondence:**
Dr. Nikita K. Kikaniya,
E-mail: nikita.singh49@gmail.com

ABSTRACT

Background: Hepatomegaly and splenomegaly have varied causes, including infections, hematologic disorders, and malignancies. Timely diagnosis is essential for effective management. This study assessed the etiology, clinical presentation, and hematological profiles of patients with hepatomegaly and/or splenomegaly.
Methods: A total of 100 patients undergoing evaluation at a tertiary care hospital from January 2023 to June 2024 were included. Clinical history, examination, hematological tests, and imaging were conducted. Peripheral smear, bone marrow examination, and biochemical tests were performed as needed.
Results: The mean age was 33.66±21.45 years, with 53% females. Fatigue was the most common symptom (14%), and fever often accompanied other complaints. Splenomegaly was most frequent (52%), followed by hepatosplenomegaly (30%) and hepatomegaly (18%). Lymphadenopathy was noted in 12% of cases. Mean hematological values included Hb 7.47 gm%, TLC 27,114.28/cm^2, PLT 1.41 lac/cm^2, MCV 83.82 fl, MCH 29.45 pg, and MCHC 32.92 g%. CML was the most common peripheral smear finding (20%), followed by acute leukemia (8%), hemolytic anemia (5%), and sickle cell disease/thalassemia (4% each). Bone marrow exams also showed CML (20%) and erythroid hyperplasia (11%). Biochemical abnormalities appeared in 10% of patients. Final diagnoses most commonly included CML (19%) and erythroid hyperplasia (11%).
Conclusion: Hepatomegaly and splenomegaly present with diverse hematologic profiles. The high prevalence of CML highlights the need for early recognition and intervention, especially in younger and female patients.

Keywords: Hepatomegaly, Splenomegaly, Clinico-hematological profile, Acute Leukemia, Hemolytic Anemia, Chronic myeloid leukemia

INTRODUCTION

The liver plays a vital role in metabolism, immunity, digestion, detoxification, and vitamin storage. It has a dual blood supply from the portal vein (75%) and hepatic artery (25%).[1] The spleen is crucial for immunosurveillance and haematopoiesis, integrating innate and adaptive immunity in a specialized manner.[2] The liver and spleen are usually not palpable in healthy individuals. However, they may become palpable due to underlying diseases, often serving as the first sign of a disorder.[3] Hepatomegaly is defined as an enlargement of the liver beyond the expected size for a given age and may indicate intrinsic liver disease or a systemic condition.[4,5] Causes include inflammation (infections, collagen vascular diseases), infiltration (neoplasms), vascular enlargement (hepatic vein obstruction), and hematopoietic proliferation (congenital hemolytic anaemias).

Liver involvement is common in hematological disorders, with abnormal liver function tests, imaging findings, or clinical symptoms. Hemolytic anemia often presents with

jaundice and hepatosplenomegaly, while hematologic malignancies may lead to liver infiltration, hepatosplenomegaly, or multiple nodules, potentially progressing to fulminant hepatic failure.[6]

Similarly, splenomegaly is defined as a palpable spleen below the left costal margin and is often accompanied by hepatomegaly and systemic illness symptoms. Chronic conditions like chronic malaria, myeloproliferative diseases, and hemolytic anaemias cause massive splenomegaly, while acute conditions usually lead to mild enlargement. Causes include increased vascular space (congestive splenomegaly), inflammation (infection, collagen diseases), infiltration (neoplasms), and storage disorders. Pyrexia with hepatosplenomegaly is a common global medical concern.[7]

Hepatomegaly, splenomegaly, and hepatosplenomegaly in children may result from inborn errors of metabolism. Around 5-7% of Schistosoma mansoni infections progress to hepatosplenic schistosomiasis.[8] When hepatomegaly or splenomegaly is detected, associated signs like jaundice, anemia, lymphadenopathy, pyrexia, ascites, arthritis, rashes, nephromegaly, cardiomegaly, malabsorption, and mental retardation should be assessed to determine the underlying cause.[3] Diagnosis often requires haemoglobin studies, peripheral smears, bone marrow analysis, and specialized hematological tests, with bone marrow aspiration being crucial for unclear cases.[6] The present study aimed to identify various etiological factors, clinical presentation, and clinic-hematological profile of hepatomegaly and or splenomegaly cases admitted in tertiary care centre.

METHODS

After obtaining Institutional Ethical Committee approval and written informed consent from all patients, this prospective observational study was conducted in the Department of Pathology, at Tertiary Care Hospital, Maharashtra, India during a period of 18 months from January 2023 to June 2024. A total of 100 patients undergoing hematological evaluation for hepatomegaly and/or splenomegaly between January 2023 and June 2024 were included in the study. All clinically suspected cases, regardless of age and gender, presenting for routine hematological evaluation at our Tertiary Care Hospital or referred from peripheral centers were considered. Clotted samples and inadequately preserved peripheral and bone marrow smears were excluded from the study.

A complete clinical evaluation of the patient was done. This included accounting the clinical details and various investigations (haematological, Biochemical, radiological etc.). All the clinical information and Investigation was recorded in the case report form (CRF). A structured questionnaire related to sociodemographic profile, relevant symptoms, physical examination findings, hematological investigations were done. Blood was collected with aseptic precautions for routine and special hematological investigations.

Hematological evaluation included a complete blood count and red cell indices (MCV, MCH, MCHC, RDW) performed on a fully automated cell counter. Blood smears were stained with Leishman stain and examined in detail. Additional tests such as bone marrow aspiration, ESR, CRP, reticulocyte count, sickling test, Coombs test, and urine analysis were conducted in relevant cases. Biochemical evaluation included serum bilirubin, SGOT, SGPT, blood urea, and serum creatinine in relevant cases.

Other investigations, such as widal test, hepatitis profile, Malaria test, blood culture, Mantoux test, Hb electrophoresis, viral markers of hepatitis, sickle cell test were performed when clinically indicated. Radiological investigations such as X-ray, ultrasonography of abdomen, CT scan was performed in relevant cases depending upon the provisional diagnosis made on history and clinical examination.

Statistical analysis

Data were collected in a pre-designed pro forma in Microsoft Excel software (Microsoft Excel, 2010). Descriptive statistics were analyzed with SPSS version 23 software. Continuous variables were presented as mean and standard deviation and categorical variables were expressed as frequencies and percentages. Continuous variables and categorical variables were analyzed using unpaired t test and chi square test respectively. $P<0.05$ was taken to indicate a significant difference.

RESULTS

A total of 100 patients undergoing hematological evaluation for hepatomegaly and/or splenomegaly between January 2023 and June 2024 were included in the study. The most common age group among the study population was 31 to 40 years (19%), followed by 21 to 30 years (17%), with a mean age of 33.66±21.45 years, ranging from 3 months to 80 years. The study observed a predominance of female participants (53%), (Table 1).

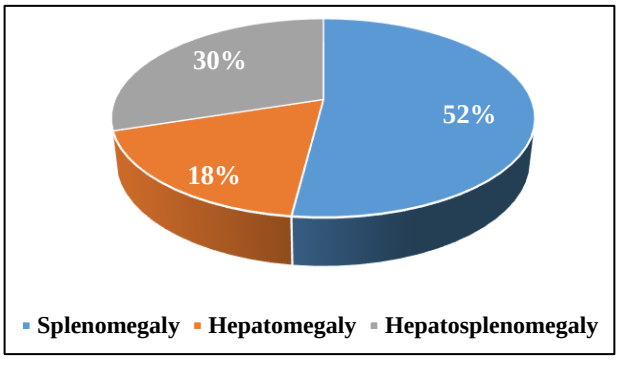

Figure 1: Prevalence of splenomegaly, hepatomegaly, and hepatosplenomegaly.

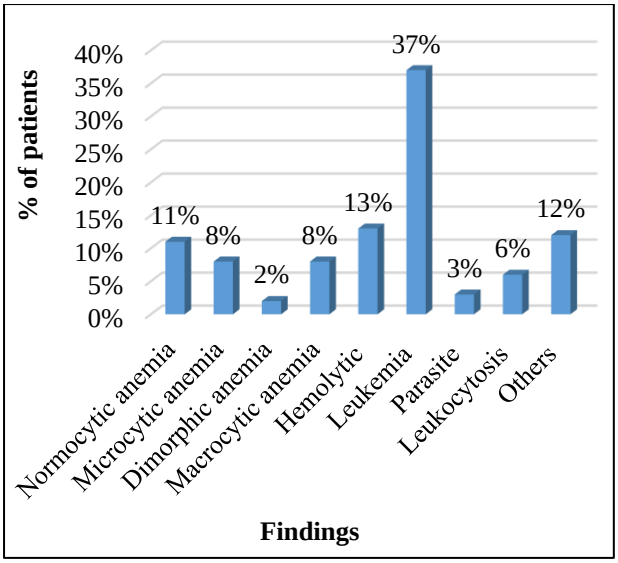

Figure 2: Routine peripheral smear test.

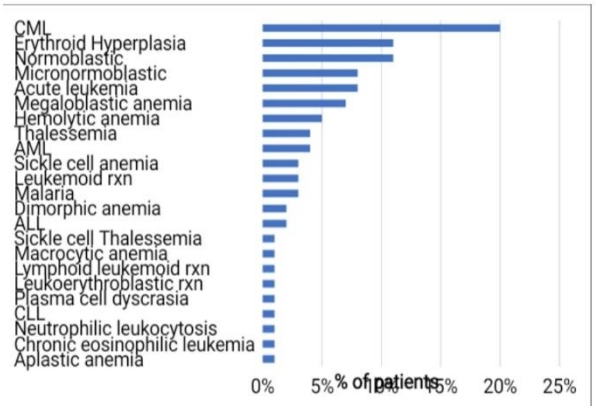

Figure 3: Bone marrow impression.

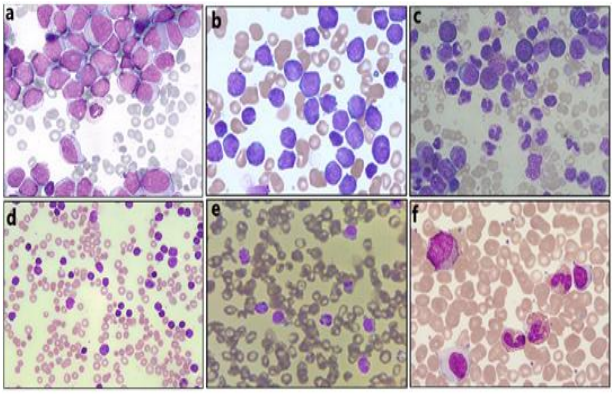

Figure 4: Peripheral smear of case of (a) acute myeloid leukemia showing increased number of blast cells; (b) acute lymohoblastic leukemia showing increased number of blast cells; (c) chronic myeloid leukemia showing myeloid precursors; (d) chronic lymphocytic leukemia showing increased number of mature lymphocytes; (e) plasma cell leukemia & (f) chronic eosinophilic leukemia (Leishman stain 1000X).

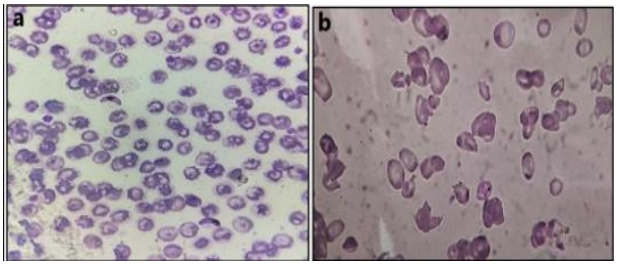

Figure 5: (a) Peripheral smear showing gametes of *Plasmodium falciparum* (Leishman stain 400X); (b) peripheral smear showing schizont of *Plasmodium vivax* (Leishman stain 1000X).

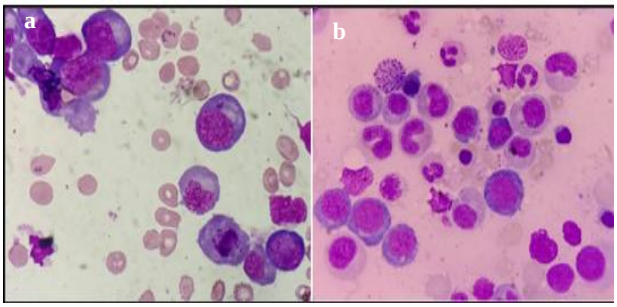

Figure 6 (a & b): Bone marrow with megaloblastic maturation and erythroid hyperplasia (Leishman stain 1000X).

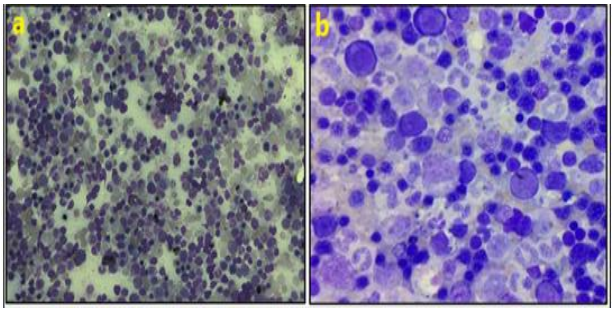

Figure 7: Bone marrow (a) micronormoblastic maturation (Leishman stain 400X); (b) micronormoblastic and megaloblastic maturation-Dimorphic anemia (Leishman stain 1000X).

There were three babies who developed respiratory complication 24 hours after birth (not related to prematurity) and required respiratory support. All these 3 babies survived and were discharged subsequently.

Of the two intrapartum stillbirths noted in the study, one was a severe IUGR at 30 weeks and the other had intrapartum fetal distress at 32 weeks leading to stillbirth. The abnormal waveform indices were compared with major adverse outcomes (Table 1).

Weakness and fatigue were the most common clinical features, seen in 14% of patients. Fever was a common symptom found in combination with other symptoms as

shown in Table 2. Splenomegaly was the most frequent finding, observed in 52% of patients.

Hepatomegaly was present in 18% of patients, while 30% had both hepatomegaly and splenomegaly (hepatosplenomegaly) (Figure 1). Additionally, 12% of patients had palpable lymphadenopathy. The mean hematological parameters were as follows. Hb-7.47 gm%, TLC-27114.28 cm^2, PLT-1.41 lac/cm^2, MCV-83.82 fl, MCH-29.45 pg, and MCHC-32.92 g% (Table 3).

The most common finding in the routine peripheral smear test was leukemia, observed in 37 cases (37.0%), followed by hemolytic changes in 13 cases (13.0%) and normocytic anemia was seen in 11 cases (11.0%). Other diagnoses included acute leukemia (8%), hemolytic anemia (5%), and sickle cell disease/thalassemia (4% each), (Figure 2).

Bone marrow examination findings showed that CML was the most common finding (20%), followed by erythroid hyperplasia (11%) as shown in Figure 3. The biochemical tests were abnormal in 10% of samples, while 90% were normal. Out of 10 patients, serum bilirubin was raised in 5 cases, SGOT and SGPT were raised in 3 cases, serum creatinine was raised in 2 cases.

Final diagnoses

Based on various tests, CML was the most common diagnosis (19%), followed by erythroid hyperplasia (11%) and normoblastic marrow. (11%), (Table 4).

Table 1: Demographic profile of the patients.

Demographic data		Frequency	%
Age group (in years)	<1	02	2.0
	1 to 10	12	12.0
	11 to 20	16	16.0
	21 to 30	17	17.0
	31 to 40	19	19.0
	41 to 50	16	16.0
	51 to 60	05	5.0
	61 to 70	06	6.0
	71 to 80	07	7.0
Gender distribution	Male	47	47.0
	Female	53	53.0

Table 2: Clinical presentation.

Clinical features	Frequency	%
Headache	01	1.0
Headache, fatigue	01	1.0
Jaundice, fatigue, fever	01	1.0
Abdominal pain, fatigue, breathlessness	01	1.0
Abdominal pain, fever	01	1.0
Chest pain, fever	01	1.0
Breathlessness	01	1.0
Cough, abdominal pain, weakness	02	2.0
Fever, weakness, fatigue	02	2.0
Vomiting	03	3.0
Abdominal pain, vomiting	03	3.0
Breathlessness, giddiness	03	3.0
Weakness, breathlessness	03	3.0
Abdominal pain	03	3.0
Cough	04	4.0
Appetite loss, fatigue	05	5.0
Fatigue	05	5.0
Fever chills, weakness, fatigue	05	5.0
Fever, headache	05	5.0
Fever, weakness	05	5.0
Giddiness, vomiting	06	6.0

Continued.

Clinical features	Frequency	%
Fever, cough	07	7.0
Paleness, fatigue	09	9.0
Weakness	09	9.0
Weakness, fatigue	14	14.0
Total	100	100.0

Table 3: Mean hematological parameters.

Hematological parameters	Mean	SD	Range
Hb (gm%)	7.47	2.19	2.1-14.5
TLC (cmm)	27114.28	24008.35	1.09-97000
PLT (lac/cmm)	1.41	1.67	0.13-12.95
MCV (fl)	83.82	13.5	50-118
MCH (pg)	29.45	2.62	20-36
MCHC (g%)	32.92	2.10	25-43

Table 4: Final diagnosis.

Findings	Frequency	%
Aplastic anemia	01	1.0
Chronic eosinophilic leukemia	01	1.0
Neutrophilic leukocytosis	01	1.0
CLL	01	1.0
Plasma cell dyscrasia	01	1.0
Leukoerythroblastic rxn	01	1.0
Lymphoid leukemoid rxn	01	1.0
Macrocytic anemia	01	1.0
Sickle cell Thalessemia	01	1.0
ALL	02	2.0
Dimorphic anemia	02	2.0
Malaria	03	3.0
Leukemoid rxn	03	3.0
Sickle cell anemia	03	3.0
AML	04	4.0
Thalessemia	04	4.0
Hemolytic anemia	05	5.0
Megaloblastic anemia	07	7.0
Acute leukemia	08	8.0
Micronormoblastic	08	8.0
Normoblastic	11	11.0
Erythroid hyperplasia	11	11.0
CML	20	20.0
Total	100	100.0

DISCUSSION

The most common age group in the study population was 31–40 years (19%), followed by 21–30 years (17%), with a mean age of 33.66±21.45 years, ranging from 3 months to 80 years. Previous studies have reported varying age distributions, with Sharma et al noting a peak incidence in the 11–20 years group, while Ghosh et al observed a predominance in the 41–50 years group (29%).[9,10]

The present study also revealed a female predominance (53%), consistent with findings from Singh et al (56%) and Gupta et al (68%), linking it to higher rates of autoimmune liver diseases and chronic viral hepatitis in women.[11,12] Weakness and fatigue (14%) were the most common symptoms, followed by fever (7%), cough (4%), abdominal pain (3%), and vomiting (3%), consistent with the study done by Zhang et al.[13] Jaundice (1%) and chest pain (1%) were less common, aligning with findings from Singh et al and Gupta et al.[11,12]

In the present study, splenomegaly was the most common finding (52%), consistent with studies by Parmar et al (52.63%) and Lee et al (53%).[13-15] Hepatomegaly was observed in 18% of patients, slightly lower than Gupta et al (24%) and Shah et al (21%).[12,16] Hepatosplenomegaly was found in 30% of patients, aligning with Patel et al (31%).[17] Palpable lymphadenopathy was noted in 12% of cases, comparable to Sharma et al (10%) and Patel et al (13%), highlighting associations with chronic infections.[9,18] The mean Hb in the present study was 7.47 gm%, indicating a high prevalence of anemia. This is slightly lower than Sharma et al (8.2 gm%) and Gupta et al (7.9 gm%).[9,12] The mean TLC was 27,114.28 cmm, suggesting leukocytosis, comparable to Kumar et al (25,000 cmm) and slightly higher than Patel et al (23,000 cmm).[18,19] The mean platelet count was 1.41 lac/cmm, similar to Lee et al (1.5 lac/cmm) and Wang et al (1.3 lac/cmm).[15,20] The mean MCV (83.82 fl) and MCH (29.45 pg) indicated normocytic, normochromic anemia, aligning with Sharma et al (MCV 85.3 fl) and Patel et al (MCH 30.1 pg).[9,18] The mean MCHC was 32.92 g%, comparable to Lee et al (33.4 g%) and Wang et al (32.8 g%).[15,20] These findings highlight the importance of hematological evaluation in hepatosplenomegaly for accurate diagnosis and management.

Peripheral blood smear tests are crucial in diagnosing hematological disorders. In the present study, chronic myeloid leukemia (CML) was the most common finding (20%), similar to Sharma et al. (18%).[21] Other diagnoses included acute leukemia (8%), hemolytic anemia (5%), and sickle cell disease/thalassemia (4% each), aligning with studies by Gupta et al, Lee et al, and Shah et al and Kumar et al.[12,15,16,19] Additionally, 11% of cases were unclassified (NCNC), comparable to Gupta et al (8%) and Lee et al (10%), highlighting the diagnostic challenges and need for advanced testing.[12,15]

Chronic myeloid leukemia (CML) was the most common finding in bone marrow examinations (20%), consistent with Sharma et al (18%) and Gupta et al (22%).[9,22] Erythroid hyperplasia was observed in 11% of cases, similar to Patel et al (13%).[18] Other diagnoses included acute leukemia (8%), megaloblastic anemia (8%), hemolytic anemia (5%), and sickle cell disease/thalassemia.

Additionally, 11% of patients had normoblastic marrow. These findings align with studies by Lee et al, Shah et al, Patel et al, Sharma et al and Gupta et al.[15-17,21,23] Understanding these hematological patterns is essential for accurate diagnosis and management.

In the present study, 10% of biochemistry tests were abnormal, while 90% were normal. Elevated serum bilirubin was found in 5 cases, SGOT and SGPT in 3 cases, and serum creatinine in 2 cases. Sharma et al reported abnormalities in 12% of cases, slightly higher than our findings, while Gupta et al found 9%, closely aligning with our results.[21,24] These findings suggest that some patients with hepatomegaly and splenomegaly may have underlying liver or metabolic issues, but normal results in most cases indicate the need to consider other causes like hematological and systemic diseases.

In the present study, the final diagnoses for a group of patients were determined based on various tests, including blood tests and bone marrow examinations, chronic myeloid leukemia (CML) was the most common diagnosis (20%), followed by erythroid hyperplasia (11%). Other diagnoses included acute leukemia (8%), megaloblastic anemia (8%), hemolytic anemia (5%), and sickle cell disease/thalassemia. Additionally, 11% of patients had normal bone marrow development. These findings align with previous studies (Sharma et al, Kumar et al, Shah et al, Gupta et al, Patel et al, Wang et al, with slight variations due to demographic and methodological factors. Understanding these differences is crucial for accurate diagnosis and optimal patient care.[9,16,18,19]

The study had limitations, including a small sample size of 100 patients, with some not undergoing bone marrow aspiration and others lost to follow-up. Diagnostic constraints were present due to the reliance on available tests in a government setup, limiting access to advanced techniques and newer biomarkers that could provide more detailed insights into underlying conditions.

CONCLUSION

The study highlights the diverse etiological spectrum and clinico-hematological profiles of patients with hepatomegaly and splenomegaly. A comprehensive diagnostic approach, including clinical examination, blood tests, bone marrow analysis, and biochemistry tests, is crucial for accurate diagnosis and management. The high prevalence of CML emphasizes the need for early detection and timely interventions. The presence of erythroid hyperplasia and other hematological disorders underscores the importance of vigilant monitoring and targeted treatments. Additionally, the demographic predominance of younger and middle-aged adults, especially females, suggests the need for tailored public health strategies and clinical practices to address this patient population effectively.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Kalra A, Yetiskul E, Wehrle CJ. Physiology, Liver. Updated 2023 May In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available at: https://www.ncbi.nlm.nih. Accessed on 12 December 2024
2. Mebius RE, Kraal G. Structure and function of spleen. Nat Rev Immunol. 2005;5(8):606-16.

3. Agarwal D, Mittal A. Hematology- a diagnostic tool in cases of splenomegaly. Int J Biomed Adv Res. 2016;7(9):413-7.
4. Krishna SR, Ramireddy K, Sri Lakshmi BNVB, Lakshmi Silpa KS. Clinicopathological Study of Hepatomegaly in Children Up to 12 yrs (including neonates). Int J Sci Res. 2015;4(3):1763-4.
5. Dayal RS, Mathur GP, Prasad R, Wahi PN. Hepatomegaly in infancy and childhood: a clinicopathological study of 98 cases. Indian Pediatr. 1966;3(4):129-38.
6. Murakami J, Shimizu Y. Hepatic manifestations in hematological disorders. Int J Hepatol. 2013;2:484903.
7. Ahammad F, Ali MY, Rahman SH, Fattah SA, Alam MT, Nahar S, Hassan MU. Aetiology of pyrexia with hepatosplenomegaly: Study of 50 cases in MMCH (Bangladesh). Faridpur Med Coll J. 2010;5(1):7-10.
8. Leite LA, Domingues AL, Lopes EP, Ferreira RD, Pimenta Filho AD. Relationship between splenomegaly and hematologic findings in patients with hepatosplenic schistosomiasis. Rev Bras Hematol Hemoter. 2013;35:332-6.
9. Sharma A, Gupta R, Singh S. Observations on the prevalence of hepatomegaly in children and young adults. J Ped Res. 2019;24(3):123-30.
10. Ghosh CK, Islam F, Ahmed E, Ghosh DK, Haque A, Islam QT et al. Etiological and Clinical Patterns of Isolated Hepatomegaly at Rajshahi, Bangladesh. Euroasian J Hepato-Gastroenterol. 2012;2(1):1-4.
11. Singh R, Patel A, Mehta K. Gender differences in the prevalence of hepatomegaly and splenomegaly: A study on the impact of autoimmune liver diseases and chronic viral hepatitis. Int J Hepatol Res. 2014;28(4):200-8.
12. Gupta A, Sharma P, Bansal R. Female predominance in non-alcoholic fatty liver disease and autoimmune hepatitis: A cohort study. J Hepatic Med. 2017;22(5):345-52.
13. Zhang X, Smith J, Lee K. Fatigue as a prevalent symptom among patients with liver and spleen enlargement: Correlation with severity and systemic involvement. J Hepatol Gastroenterol. 2020;45(3):123-34.
14. Parmar D, Likhar KS. Prevalence of splenomegaly in Sickle cell anemia patients in relation to Haemoglobin. F. IJRRMS. 2013;3(3):18–20.
15. Lee Y, Kim H, Park S, Lee J. Prevalence and clinical significance of splenomegaly in patients with various hematological disorders. Heliyon. 2021;7(5):5234.
16. Shah V, Patel S, Desai M. Hepatomegaly prevalence in patients with metabolic syndrome and non-alcoholic fatty liver disease in a tertiary care hospital. Heliyon. 2017;3(9):1945.
17. Patel S, Kumar R, Shah M. Prevalence and clinical impact of hepatosplenomegaly in systemic conditions. Heliyon. 2017;3(11):1976.
18. Patel R, Sharma S, Gupta A. Prevalence and clinical relevance of lymphadenopathy in systemic inflammatory and autoimmune conditions. Heliyon 2020;6(3):4198.
19. Kumar A, Singh R, Gupta N. Clinical characteristics of lymphadenopathy in patients with hepatosplenomegaly: A retrospective analysis. Heliyon. 2017;3(11):1987.
20. Wang X, Li Y, Zhang L. The prevalence of hepatomegaly in patients with heart failure: A clinical study. Heliyon. 2021;7(2):3756.
21. Sharma A, Gupta S, Verma N. Prevalence and clinical profile of Chronic Myeloid Leukemia among patients with splenomegaly in a tertiary care center. J Hematologic Disorders Therapy, 2018;6(2):123-30.
22. Gupta P, Verma S, Sharma A. Prevalence and clinical significance of lymphadenopathy in patients with hepatomegaly and splenomegaly. Heliyon. 2018;4(12):1567.
23. Gupta P, Kumar S, Verma, R. Analysis of hepatomegaly prevalence in a clinical population. J Clin Epidemiol. 2020;35(2):89-95.
24. Gupta P, Verma S, Sharma A. Hepatosplenomegaly in clinical practice: Prevalence and etiological profile. Heliyon. 2019;5(4):3145.

Cite this article as: Kikaniya NK, Phulgirkar PP, Kulkarni AS, Gupta IP. Clinicohematological profile of hepatomegaly and or splenomegaly at tertiary care centre. Int J Res Med Sci 2025;13:2419-25.