



**PANCYTOPENIA: A PROSPECTIVE CLINICO-PATHOLOGICAL STUDY IN A  
TERTIARY CARE CENTRE JAMMU**

\*Roopali J., Mehnaz C. and Singh K.

Government Medical College, Jammu, India.

\*Corresponding Author: Dr. Roopali J.

Government Medical College, Jammu, India.

Article Received on 28/08/2019

Article Revised on 18/09/2019

Article Accepted on 08/10/2019

**ABSTRACT**

**Introduction:** Pancytopenia is defined as a triad of findings that result from decrease in hemoglobin <10gm/dl (anemia), white blood cell count <4000/mm<sup>3</sup> (leucopenia) and platelet count <100,000/mm<sup>3</sup> (thrombocytopenia). The present study was carried out in patients diagnosed with pancytopenia visiting to our hospital in order to find the incidence of various etiological factors with clinical details, hematological findings and bone marrow (BM) aspiration whenever possible. **Method and Material:** The present prospective study was undertaken for a period of 1 years, from September 2017 to September 2018, at Postgraduate Department of Pathology, Government Medical College, Jammu, India. Patients of all age groups and both sexes were included. Bone marrow aspiration was subsequently carried out under aseptic precaution after obtaining written consent from the patient or guardian. Patients on chemotherapy and immunosuppressive treatment were excluded. **Results:** Out of 79 cases 43 were females and 36 were males. The age varied from (1.5-83) years. The major presentation of the patients with pancytopenia was megaloblastic anemia. The most common clinical symptom was generalised weakness. **Conclusion:** Pancytopenia is most common hematological condition in routine clinical practice. Therefore, the clinical findings and the hematological analysis along with bone marrow aspiration examination are very important for an early diagnosis as most of the causes are treatable and an early intervention can be taken which in return decreases the burden on the patient and enhance the survival rate.

**KEYWORDS:** Pancytopenia, Haemoglobin, Total leucocyte count, Platelet.

**INTRODUCTION**

Pancytopenia is defined as a triad of findings that result from decrease in hemoglobin <10gm/dl (anemia), white blood cell count <4000/mm<sup>3</sup> (leucopenia) and platelet count <100,000/mm<sup>3</sup> (thrombocytopenia).<sup>[1]</sup>

The etiology of pancytopenia varies depending on the age, nutritional status, geographical location and the prevalence of infections in a particular area. Some are treatable, however, in some early diagnosis and supportive treatment can decrease morbidity and mortality rate.<sup>[2,3]</sup>

Clinically patient presents with pallor, dyspnea, bleeding and increased tendency to infections which can vary according to the geographical area and genetic mutations.<sup>[4]</sup>

The present study was carried out in patients diagnosed with pancytopenia visiting to our hospital in order to find the incidence of various etiological factors with clinical details, hematological findings and bone marrow (BM) aspiration whenever possible.

**METHOD AND MATERIAL**

The present prospective study was undertaken for a period of 1 years, from September 2017 to September 2018, at Postgraduate Department of Pathology, Government Medical College, Jammu, India. Patients of all age groups and both sexes were included. Case selection was based on clinical features and supported by laboratory evidence, which included peripheral blood counts for hemoglobin, leukocytes and platelets. Inclusion criteria were presence of all 3 of the following: hemoglobin, <10 g/dL; total leukocyte count (TLC), <4,000 /mm<sup>3</sup>; platelet count, <100,000/mm<sup>3</sup>.

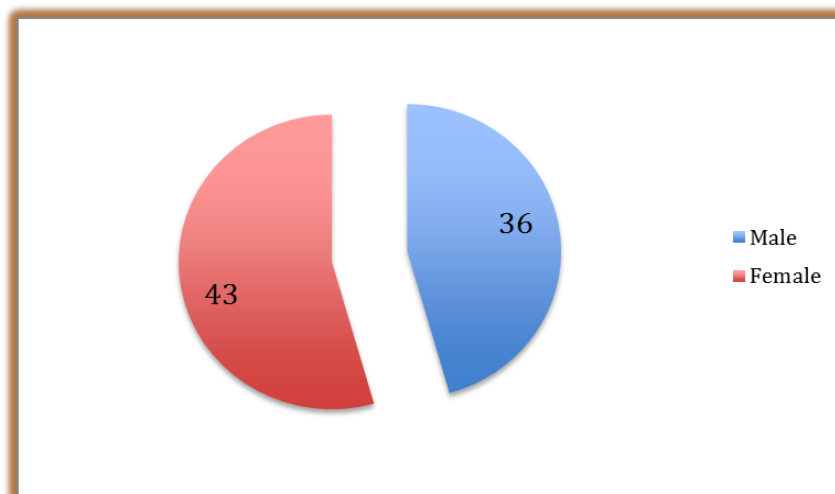
Two milliliters of EDTA (ethylene diamine tetra-acetic acid) anticoagulated blood was collected and processed through automated hematology analyzer; and hematological parameters were obtained, which included hemoglobin, red blood cell count, total leukocyte count, differential leukocyte count, platelet count, mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC), packed cell volume (PCV). Peripheral smear was stained by Leishman stain for all the cases and examined in detail.

Bone marrow aspiration was subsequently carried out under aseptic precaution after obtaining written consent from the patient or guardian.

Patients on chemotherapy and immunosuppressive treatment were excluded.

**AIM AND OBJECTIVE:** To identify the prevalence of pancytopenia and analyze the clinico-hematological features associated with it.

**RESULTS:** Out of 79 cases 43 were females and 36 were males. The age varied from (1.5-83) years. (figure 1).



**Figure 1: Distribution of pancytopenia in males and females.**

The major presentation of the patients with pancytopenia was megaloblastic anemia, which comprised of 59

(74.68%) of the cases. This was followed by acute leukemia in 9 (11.39%) cases (Table 1).

**Table 1: Incidence of various causes of pancytopenia.**

CAUSES	NO. OF CASES	PERCENTAGE
Megaloblastic anemia	59	74.68%
Acute leukemia	9	11.39%
Dual deficiency	5	6.32%
MDS	2	2.53%
Aplastic anemia	2	2.53%
Multiple myeloma	2	2.53%

Among the common clinical symptoms, the most common one was generalised weakness (100%) followed

by pallor (90%). Fever, Dyspnea and hepatomegaly were also seen in considerable number of cases. (Table 2)

**Table 2: Haematological parameters in three subgroups of pancytopenia.**

Causes	Parameters		
	Haemoglobin (G/Dl)	Total Leucocyte Count (Mm <sup>3</sup> )	Platelet (Mm <sup>3</sup> )
Megaloblastic anemia	1.6-9.4	1600-3800	12000-94000
Acute leukemia	2.4-8	2000-3800	20000-60000
Dual deficiency	1.8-4	5400	26000-98000
MDS	5.7-7	1000-3800	35000-70000
Aplastic anemia	2-8.3	600-3800	10000-85000
Multiple myeloma	5.3-5.7	1000-4000	24000-35000

## DISCUSSION

A total of 79 cases of pancytopenia were studied. Pancytopenia is a common peripheral blood picture finding where red blood cells, white blood cells and platelets are decreased leading to anemia, leucopenia and thrombocytopenia, respectively. It is not a disease but a triad of findings which result from a number of disease

processes primarily or secondarily involving the bone marrow.

The present study with a total of 79 patients of pancytopenia was conducted to identify the prevalence of pancytopenia and analyze the clinico-hematological features associated with it.

The prevalence of pancytopenia was more in females (54.43%) than in males (45.56%) in our study. Female preponderance of 54.28% was seen in a similar study by Agarwal et al<sup>[5]</sup> as was seen in another study by Kumar et al.<sup>[6]</sup> In contrast, Prasad et al<sup>[7]</sup> and Reddy et al<sup>[8]</sup> in their study found a slight male preponderance.

In our study megaloblastic anemia was the most common cause which is in sharp contrast to studies undertaken by

Khunger et al<sup>[12]</sup>, and Yadav et al<sup>[11]</sup> in contrast to study undertaken in Nepal by Lakhey A et al<sup>[13]</sup> showed hypoplastic marrow to be the most common cause.

The commonest clinical complaint was weakness (80.1%) in our study which is similar to the findings observed by Thakkar et al<sup>[9]</sup> and Niazi et al<sup>[10]</sup> (Table 3)

**Table 3: Comparison of causes of pancytopenia in various studies.**

STUDY	YEAR	NO. OF CASES	M:F	COMMON CAUSES
Khodke K et al <sup>[14]</sup>	India (2001)	50	1.3:1	Megaloblastic anemia
Tilak V et al <sup>[15]</sup>	India (1999)	77	1.1:1	Megaloblastic anemia
Jain A et al <sup>[16]</sup>	India (2013)	250	2.6:1	Hypersplenism
Kumar et al <sup>[6]</sup>	India (2012)	48	1:1.8	Hypoplastic marrow
Present study	India (2018)	79	1:1.2	Megaloblastic anemia

## CONCLUSION

Pancytopenia is most common hematological condition in routine clinical practice. In our study, megaloblastic anemia was the major contributor to cause this condition followed by acute leukemia. Other causes such as dual deficiency, multiple myeloma etc were also present. In terms of clinical presentations, the most common was, generalized weakness.

Therefore, the clinical findings and the hematological analysis along with bone marrow aspiration examination are very important for an early diagnosis as most of the causes are treatable and an early intervention can be taken which in return decreases the burden on the patient and enhance the survival rate.

## BIBLIOGRAPHY

- Dasgupta A, Padma SK, Sajitha K, Shetty J. Etiological Evaluation of Pancytopenia in a Tertiary Care Hospital. *Annals of Pathology and Laboratory Medicine*, 2016; 3(5): A441-50.
- Thakkar BB, Bhavsar UN, Trivedi NJ, Agnihotri AS. A study of pancytopenia in adult patients more than 12 years of age in North West region of saurashtra. *Nat J Med Res*, 2013; 3: 48-52.
- Jalbani A, Ansari IA, Shah AH, Gurbakhshani KM, Chutto M, Solangi GA. Pancytopenia; Study of 40 patients at CMC Hospital Larkana. *Professional Med J*, 2010; 17: 105-10.
- Yadav BS, Varma A, Kiyawat P. Clinical profile of pancytopenia: a tertiary care experience. *Intern J Bioassays*, 2015; 4(01): 3673-7.
- Agarwal R, Bharat V, Gupta BK, Jain S, ansal R, Choudhary A, Tiwari G. Clinical and hematological profile of pancytopenia. *Intern J Clin Biochem Res*, 2015; 2(1): 48-53.
- Kumar DB, Raghupathi AR. Clinicohematologic analysis of pancytopenia: Study in a tertiary care centre. *Basic and Applied Pathol*, 2012; 5: 19-21.
- Prasad BH, Sarode S, Kadam DB. Clinical profile of pancytopenia in adults. *Int J Sc Res*, 2013; 2(7): 355-7.
- Reddy GPK, Mallikarjuna Rao KV. Clinical features and risk factors of pancytopenia: a study in a tertiary care hospital. *Int J Adv Med*, 2016; 3(1): 68-72.
- Thakkar BB, Bhavsar UN, Trivedi NJ, Agnihotri AS. A Study of Pancytopenia in Adult Patients more than 12 years of age in North West region of Saurashtra, 2013; 3(1): 48-52.
- Niazi M, Raziq F. The incidence of underlying pathology in Pancytopenia- An experience of 89 cases. *JPMI*, 2004; 18(1): 76-79.
- Yadav BS, Varma A, Kiyawat P. Clinical profile of pancytopenia: a tertiary care experience. *Intern J Bioassays*, 2015; 4(01): 3673-7.
- Khunger JM, Arulselvi S, Sharma V et al. Pancytopenia a clinic haematological study of 200 cases. *Indian J Pathol Microbiol*, 2002; 45: 475-9.
- Lakhey A., Talwar, O.P., Singh, V.K. and Shiva Raj, K.C. Clinico-Hematological Study of Pancytopenia. *Journal of Pathology of Nepal*, 2012; 2: 207-210.
- Khodke K, Marwah S, Buxi G, Yadav RB, Chaturvedi NK. Bone marrow examination in cases of pancytopenia. *J Indian Acad Clin Med*, 2001; 2: 55-9.
- Tilak V, Jain R. Pancytopenia- A clinic-hematologic analysis of 77 cases. *Indian J Pathol Microbiol*, 1999; 42: 399-404.
- Jain A, Naniwadekar M. An etiological reappraisal of pancytopenia-largest series reported to date from a single tertiary care teaching hospital. *BMC Hematology*, 2013; 13: 1-9.