International Journal of Current Advanced Research
ISSN: O: 2319-6475, ISSN: P: 2319-6505, Impact Factor: SJIF: 5.995
Available Online at www.journalijcar.org
Volume 6; Issue 12; December 2017; Page No. 8155-8158
DOI: http://dx.doi.org/10.24327/ijcar.2017.8158.1301

Research Article

CLINICO-HEMATOLOGICAL ANALYSIS OF PANCYTOPENIA AT TERTIARY CARE CENTRE OF EASTERN PART OF UTTAR PRADESH, INDIA

Chandan Kumar., Lalit P. Meena*., Sandeep Kumar., AnjuBharti., Jaya Chakravarty., MadhukarRai and ShyamSundar

[1,2,5,6,7]Department of General Medicine, Institute of Medical Sciences, Banaras Hindu University,India
[3,4]Department of Pathology, Institute of Medical Sciences, Banaras Hindu University,India

A R T I C L E I N F O

Article History:
Received 18th September, 2017
Received in revised form 25th October, 2017
Accepted 8th November, 2017
Published online 28th December, 2017

Key words:
Pancytopenia, Megaloblastic anemia, MDS

A B S T R A C T

Introduction: Pancytopenia is quite common in day to day clinical practice with variable clinical presentation. It is not the disease, rather it is outcome of various disease and disease processes and the prognosis of which is decided by underlying pathology. **Objective: a)**To analyze the etiology and its distribution in causing pancytopenia **b)**To evaluate the clinical profile and its correlation in patients with pancytopenia. **Study method:** A prospective study was carried out among 141 cases of pancytopenia, evaluated clinically along with hematological parameter and bone marrow examination. **Results:** 141 cases of age group more than 15 years were included in study. Most of the patients were in younger age group i.e. 15-25 year age group with nearly equal occurrence in both sexes. The commonest cause among all etiology was found to be megaloblastic anemia (27%) followed by hypoplastic and visceral leishmaniasis.Most of the patients presented predominantly with generalized weakness, fever and exertional breathlessness. Pallor was almost universal finding in all patients.In most of the patients Hemoglobin found to be ranged between 4.2-7.5 g/dl with mean MCV 98.67, Total leucocyte count ranged between 1700-3255/mm^3 and Platelet count ranged between 20000-70500/mm^3. **Conclusion:** Being megaloblastic anemia the most common cause of pancytopenia and it is more common in female can be explained by their dietary habits, which is reversible cause with adequate management and the result will help in effective reinforcement of fortification of food and effective counselling regarding dietary habits as most coming from low socio economic groups. Hypoplastic anemia and visceral leishmaniasis are the 2nd & 3rd most common cause. This suggest the need of detail work up along with bone marrow examination while evaluation of all cases of pancytopenia.

INTRODUCTION

Pancytopenia is one of the common outcome of various underlying hematopoeitic (bone marrow suppression, neoplastic infiltration or ineffective erythropoiesis) and non-hematopoeiticdisease conditions (peripheral sequestration of blood cells in overactive reticuloendothelial system or peripheral destruction of blood cells secondary to underlying condition) in which all three cell lines decreases.[1] Pancytopenia results into the spectrum of variable clinical presentation from mild anemia, petechiae to severe life threatening condition like severe anemia and overwhelming infection.[2] The most common causes of pancytopenia are bone marrow failure, nutritional deficiency, malignancy, infections (both acute and chronic) and drug induced.[3]

Corresponding author:* **Lalit P Meena
Department of General Medicine, Institute of Medical Sciences, Banaras Hindu University

outcome of management due to various factors like geographical variation, variation in local customs and diet behavior and endemic infection and many more factors so we conducted the study to find out clinical and hematological analysis of patients presented with pancytopenia, which may help in diagnosis and therapeutic approach and also help in prevention of occurrence of pancytopenia.

Aim of the study

This study mean to analyze and evaluate the occurrence of pancytopenia and underlying etiology of various causes of pancytopenia in patients of age >15 years along with clinical and hematological correlation in eastern part of Uttar Pradesh, India.

METHOD OF STUDY

The study conducted during the period of 2 years between July, 2015 to June, 2017 in the Department of General Medicine in collaboration with Department of Pathology,

Institute of Medical Sciences, Banaras Hindu University, Varanasi (U.P). Total 141 patients fulfilling the inclusion criteria i.e. **a)** Age ≥15 years, **b)** pancytopenia (Hb<10g/dl, Total count<4000/mm^3, Platelet count<1Lac/mm^3) and given informed written consent were included in study. The study was approved by the ethical committee of institute. Patients who have previously transfused blood and blood components were excluded from study.

All the patients were subjected to thorough physical examination including the relevant clinical history.Complete hematological study like complete blood count, Reticulocyte count and red cell indiceswere done by taking blood sample in EDTA cuvette on auto-analyzer. Peripheral blood smear was studied by finger prick and studied under microscope manually. Serum study i.e. liver and kidney function tests, viral marker, iron profile and vit-B_{12} level was done in all cases. Bonemarrow aspiration study was done in all cases and when required Bone marrow biopsy in few selected cases was done also. Routine imaging like chest X-Ray, ultrasonography of abdomen and other special radio-imaging was done in selected cases if required. Few special tests like RK-39 kit test, serum ANA/Anti-dsDNA, Thyroid function test, and markers for hematological malignancy were ran in selected cases as per requirement.

Statistical analysis

All data were recorded, compiled and statistically analyzed on SPSS for window (version 16) using t-Test, Z-test and χ^2-test considering P-value <0.05 as significant.

RESULTS

Study on total 141 patients shows the occurrence of pancytopenia in both sexes were nearly equal with male female ratio 1.01:1. Pancytopenia occurrence was more common in younger age group [Figure 1].

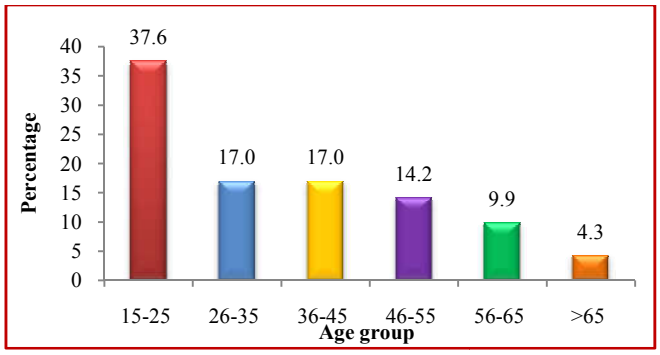

Fig 1 Graphical presentation of percentage distribution of pancytopenia in various age group

The commonest presenting symptom of pancytopenia was generalized weakness which was found in total 111 cases i.e. 78.72% cases followed by fever (65.95%) and breathlessness (43.97%) and the commonest sign on clinical examination was pallor (96.45%) followed by splenomegaly (34.04%).Hepato-splenomegaly was commonly seen in megaloblastic anemia, leukemia and malaria.

In peripheral blood smear study an isopoikilocytos is was more frequent peripheral blood picture findings as overlapping findings along with microcytic hypochromic or macrocytic hypochromic and normocytic normochromic red blood cells morphologies. Dimorphic RBCs were found only in 0.7% patients with pancytopenia.In bone marrow study revealed the hypercellular marrow (39.7%) followed by normocellular (37.6%). Hypocellular bone marrow was found in total 22.7% patients.The most common and predominant cause of pancytopenia was megaloblastic anemia, while Acute lymphoblastic leukemia, multiple connective tissue disorder and iron deficiency anemia were the least common causes of pancytopenia. [Table 1]

Table 1 Distribution of various causes of pancytopenia

	Total(%)	Male(%)	Female(%)
Megaloblastic anemia	38 (27.0%)	14(19.7%)	24(34.3%)
Hypoplastic	18(12.8%)	10(14.1%)	8(11.4%)
kalazar	16(11.3%)	11(15.5%)	5(7.1%)
MDS	12(8.5%)	07(9.9%)	5(7.1%)
AML	9(6.4%)	5 (7.0%)	4 (5.7%)
Malaria	8(5.7%)	07(9.9%)	1(1.4%)
Hypersplenism	8(5.7%)	03(4.2%)	5(7.1%)
HIV	7(5.0%)	05(7.0%)	2(2.9%)
Post viral BM sup.	5(3.5%)	01(1.4%)	4(5.7%)
Dual def. anemia	4(2.8%)	01(1.4%)	3(4.3%)
Drug induced BM suppression	4(2.8%)	03(4.2%)	1(1.4%)
Dengue	3(2.1%)	01(1.4%)	2(2.9%)
Multiple myeloma	2(1.4%)	2 (2.8%)	-
NHL	2(1.4%)	-	2(2.9%)
Enteric	2(1.4%)	01(1.4%)	01(1.4%)
SLE	2(1.4%)	-	2(2.9%)
MCTD	1(0.7%)	-	1(1.4%)
Iron def. anemia	1(0 .7%)	-	1(1.4%)
ALL	1(0.7%)	1 (1.4%)	-

DISCUSSION

There are lot of studies done in India or abroad showing the distribution in terms of frequency of various causes of pancytopenia and its distribution in different sexes, age group and clinical manifestation.[4] Here the current study was conducted to analyze the various causes of pancytopenia, its distribution in terms of age, sex and their clinical manifestations. The resulting statistical data obtained was consolidated and compared with pre-existing studies.

The distribution of pancytopenia patient in male and female in various study were compared with current study and in almost all previous studies the male predominance distribution of pancytopenia was there, like Tilak *et al* (1999) 1.138[4], Khunger *et al* (2002) 1.2[7], Santra *et al* (2010) 1.47[6], Savith A(2015) 1.6, Bhaskar *et al* (2013) 1.08, Mallik *et al* (2016) 1.67. Current study revealed occurrence of pancytopenia almost equal in both gender with male female ratio 1.014. Saying about age wise distribution of pancytopenia the findings were similar to previous studies i.e. pancytopenia occurrence was predominant in younger age group.

The common clinical presenting symptoms was generalized weakness (78.72%), breathlessness (43.97%), fever (65.95%) and bleeding manifestation varying from petechial spots to frank gastrointestinal bleed with percentage distribution (12.76%) which is comparable from previous studies as in Khodke *et al*.(2001) had fever(40%), weakness(30%) and bleeding manifestation(20%)[5]. Agarwal *et al*.(2015) fever (64.28%), generalized weakness(34.28%) and bleeding tendencies(34.28%).[Table 2]

Table 2 Comparison of studies showing symptoms in pancytopenia

Symptom Studies	Generalized weakness	Breathlessness	Fever	Bleeding
Khodke *et al* (2001)	30%	-	40%	20%

Naseem *et al* (2011)	-	-	65.5%	18%
Agarwal *et al* (2015)	34.28%	14.28%	64.28%	34.28%
Savith A(2015)	96%	-	64%	18%
Mallik *et al* (2016)	-	-	59.9%	41.9%
Current study	78.72%	43.97%	65.95%	12.76%

Most common sign in this study was pallor (96.45%), splenomegaly (34.04%) similar to almost all study i.e. pallor found in almost all patients in Tilak *et al* (1999)[4], Khodke *et al* (2001)[5], Khunger *et al* (2002)[7], Mallik *et al* (2015). Splenomegaly was found in 40% in Khodke *et al*[5].[Table 3]

Table 3 Common clinical examination findings comparison with existing studies

	Pallor	Icterus	Lymphadenopathy	Hepatomegaly	Splenomegaly
Khodke *et al* (2001)	100%	-	-	38%	40%
Santra *et al*(2010)	100%	-	6.31%	24.32%	44.14%
Naseem *et al* (2011)	100%	14.28%	-	51.8%	37.4%
Savith A (2015)	100%	-	-	-	20%
Mallik *et al* (2016)	97.9%	-	15.9%	58.9%	41.9%
Jella R(2016)	73.2%	-	51.8%	-	-
Current study	96.45%	19.86%	2.84%	16.31%	34.04%

Study shows the megaloblastic anemia most common cause with 27% contribution of all causes of pancytopenia, Hypoplastic/aplastic anemia 12.8%, followed by visceral leishmaniasis (11.3%) and myelodysplastic syndrome (8.5%), acute myeloid leukemia (6.4%) etc. In previous studies many variation in percentage distribution of various causes of pancytopenia as in Tilak *et al* (1999) megaloblastic anemia (68.8%) followed by aplastic anemia (7.8%) and malaria (3.9%), leukemia (2.6%), Khunger *et al* study had more or less similar picture as megaloblastic anemia (72%), aplastic anemia (14%), leukemia (5%), myelodysplastic syndrome (2%).[Table 4]

deficiency anemia which differs from previous studies i.e. khodke *et al* (20%), and Agarwal *et al* (35.71%) cases.

Out of 141 pancytopenia patients hypercellular marrow were found in 56 cases i.e. 39.7% cases, followed by normocellular bone marrow in 53 cases (37.6%) and hypocellular bone marrow in 32 cases i.e. in 22.7% patients of pancytopenia similar to Santra *et al*. study. In Agarwal *et al* study hypocellular bone marrow was seen in 44%, hypercellular bone marrow in 28% and 12% had normocellular bone marrow.In enteric fever induced pancytopenia cases bone marrow were found normocellular in all two cases i.e. 100% cases of enteric fever. The similar picture were seen in Kavitha *et al* (2015), which may be either normocellular or hypercellular as depicted in previous studies.

CONCLUSION

As we know pancytopenia is common hematological problem with varying spectrum of clinical presentation in day to day clinical practice. The presentation of pancytopenia may be generalized weakness and easy fatigability to life threatening infection or frank bleed. Pancytopenia must be suspected if there is unexplained anemia, pronged fever or if tendency to bleed in any patients.

The physical examination findings, complete blood count with RBC indices and general peripheral blood picture study provide valuable information in the workup of pancytopenia patients. Evaluation of peripheral blood picture reveals the most probable causes of pancytopenia like RBC morphology for example macrocytic picture suggest megaloblastic anemia, nucleated RBCs, blast cells suggest bone marrow infiltration or primary hematological disorder.

Table 4 Study comparison of Percentage distribution of causes of pancytopenia

	Tilak et al	Khodke et al	Khunger et al	Naseem et al	Mallik et al	Agarwal et al	Savith A	Current study
Megaloblastic anemia	68.8%	44	72	13.7	35.61	1.43	20	27
Iron def. anemia	-	-	-	-	-	1.43	-	0.7
Dual deficiency anemia	-	-	-	-	-	7.14	-	2.8
Hypoplastic	7.8	14	14		26.92	14.28	18	12.8
Kalazar	2.59	14	-	-	6.9	-	-	11.3
MDS	-	2	2	-	-	1.43	4	8.5
Post viral BM suppression	-	-	-	-	-	-	-	3.5
Drug induced BM suppression	-	2	-	-	-	11.43	-	2.8
Malaria	3.9	-	1	-	-	30	8	5.7
Dengue	-	-	-	-	-	-	4	2.1
Hypersplenism	-	-	2	-	-	-	-	5.7
CLD	-	-	-	-	-	10	-	0.9
SLE	-	-	-	-	-	-	6	1.4
MCTD	-	-	-	-	-	-	2	0.7
HIV	-	2	-	-	-	-	2	5
Acute leukemia (AML+ALL)	1.29	2	20	26.6	29.9	1.43	8	7.1
Multiple myeloma	1.29	4	-	-	0.24	-	2	1.4
NHL	2.59	-	1	-	0.48	-	-	1.4
Enteric	-	-	-	-	-	-	-	1.4

Anisopoikilocytosis was the most predominant findings in overall blood picture study and found along with other red blood cells morphology. It contributes 46.8% of all pancytopenia study, which were also observed in the study of Tilak *et al* and khunger *et al*, Khodke *et al*. Macrocytosis was the most predominant general blood picture study in case of megaloblastic anemia i.e. 92.1% of megaloblastic anemia cases and 32.6% of overall cases of pancytopenia. Dimorphic red blood cells were found rarely in 0.7% cases mostly in 7.89% cases with megaloblastic anemia and 25% cases of dual

Bone marrow aspiration cytology is an important diagnostic test providing an accurate, reproducible, readily available and various information without compromising economical cost and discomfort to the patients. Bone marrow examination is sufficient for the making of diagnosis of pancytopenia of nutritional origin, bone marrow infiltrative disorder (leukemia and other neoplastic involvement) and bone marrow failure.

The present study concludes that detailed primary hematological investigation along with bone marrow

examination in pancytopenia patients is quite helpful in planning of further investigation and management of pancytopenia.

This study also reveals that nutritional cause of pancytopenia is quite common in this region which is a potentially curable cause of pancytopenia. The under factor in most cases is low socio-economic status, dietary habits and local custom.

Referances

1. Williams WJ, Bentkr E, Erskv AJ. Haematology 3rd Ed. Singapore: McGraw Hill Book company; 1986:161.
2. Ishtiaq O, Baqai HZ, Anwer F, Hussai N. Patterns of pancytopenia patients in a general medical ward and a proposed diagnostic approach. *J Ayub Med Coll Abbottabad.* 2004; 16(1):8-13.
3. Khunger JM, Arculselvi S, Sharma U, Ranga S, Talib VH. Pancytopenia-A Clinico-haematological study of 200 cases. *Indian J PatholMicrobiol*. 2002; 45(3): 375-79.
4. Tilak V, Jain R. Pancytopenia – A Clinico hematologic analysis of 77 cases. *Indian J PatholMicrobiol.* 1999;42(4):399-404.
5. Khodke K, Marwah S, Buxi G, Vadav RB, Chaturvedi NK. Bone marrow examination in cases of pancytopenia. *J Academy Clin Med.* 2001; 2(1-2): 55-59.
6. Santra G, Das BK. A cross sectional study of the clinical profile and aetiological spectrum of pancytopenia in a tertiary care center. *Singapore Med J.* 2010;51(10): 806-12.
7. Khunger JM, Arculselvi S, Sharma U, Ranga S, Talib VH. Pancytopenia- A clinico- haematological study of 200 cases. *Indian J PatholMicrobiol* 2002; 45(3): 375-9.
8. Naseem S, Varma N, Das R, AhluwaliaJ, sachdev MPS, Marwaha RK. Pediatric patients with Bicytopenia/ pancytopenia: Review of eitiologies and clinicohematological profile at a tertiary center. *Indian J PatholMicrobiol.* 2011; 54(1):75-80
9. Jha A, Sayami G, Adhikari RC, Panta AD, Jha R. Bone marrow examination in cases of pancytopenia. *J Nepal Med Assoc.* 2008; 47(169) :12-17.
10. Khanduri U and Sharma A. Megaloblasticanemia : Prevalence and causative factors. *NatlMed J India*. 2007; 20: 172-175.
11. Agarwal R, Bharat V, Gupta B K, Jain S, Bansal R, Choudhary A, Tiwari G;clinical and hematological profile of pancytopenia.*International Journal of Clinical Biochemistry and Research, January – March 2015;Vol.2(1):48-53* 48
12. Jella R, Jella V. Clinicohematological analysis of pancytopenia. *Int J Adv Med* 2016;3:176-9.
13. Savith A, Mishra R; Pancytopenia- a clinical and etiological study. *Sch. J. App. Med. Sci.,* August 2015; 3(5B):1926-1928

How to cite this article:

Chandan Kumar *et al* (2017) 'Clinico-Hematological Analysis of Pancytopenia At Tertiary Care Centre of Eastern Part of Uttar Pradesh, India ', *International Journal of Current Advanced Research,* 06(12), pp. 8155-8158.
DOI: http://dx.doi.org/10.24327/ijcar.2017.8158.1301

****