

Original Research Article

Etiopathological Evaluation of Pancytopenia in a Tertiary Care Hospital of Western Odisha

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Abstract: *Background:* Pancytopenia is an important clinicohaematological entity encountered in our day to day clinical practice. Pancytopenia refers to reduction in all the three major formed elements of blood, red blood cells, white blood cells and platelets. It's not a disease entity but a triad of findings that may result from a number of disease processes primarily or secondarily involving the bone marrow. The severity of pancytopenia and the underlying pathology determines the management and prognosis of patient. *Objective:* To study the etiopathology of pancytopenia, spectrum of haematological changes in various causes of pancytopenia. *Methods:* Study carried out on the patients admitted in the Dept. of Medicine, VIMSAR, Burla who had HB<10mg/dl, TLC <4000/cmm and Platelets <1lac/cmm. Haematological and other investigations: CBC, Peripheral smear examination, Reticulocyte count, Urine routine & microscopy, Renal function test, Serological investigation, Blood culture, HIV, HBV, HCV, Abdominal USG, Serum electrophoresis was done. Bone marrow aspiration using standard method was done whenever indicated avoiding the cases where causes of pancytopenia was obvious. A written informed consent obtained from all the patients after fully explained the purpose and procedure. *Results:* The observations are based on 100 cases of pancytopenia reported on routine haematological investigation in the Department of Medicine of VIMSAR, Burla having male to female ratio 0.92:1. 62% of patients presented with fever, easy fatigue were the 2nd most common complain present in 57%. Primary or idiopathic aplastic anemia was the most common etiological factor followed by malaria and sepsis which was sharp contrast with most of other study conducted in our country. *Conclusions:* Pancytopenia is not an uncommon haematological problem encountered in clinical practice and should be suspected on clinical ground when a patient presents with unexplained anemia, prolonged fever and tendency to bleed.

Keywords: Pancytopenia, idiopathic aplastic anemia, malaria sepsis.

INTRODUCTION

Pancytopenia can be manifestation of many serious and life threatening diseases with extensive differential diagnosis. Major causes of pancytopenia in developing countries are infectious diseases, aplastic anemia, hypersplenism and megaloblastic anemia [1]. Other causes may be myelodysplastic syndrome, subleukemic leukemia, aplastic crisis of SCD, multiple myeloma, paroxysmal nocturnal haemoglobinuria, HIV, TB, Malaria, Dengue, Brucellosis, Tropical splenomegally syndrome, and SLE. Presenting symptoms are usually attributable to anemia and thrombocytopenia. Anemia leads to fatigue, dyspnea and cardiac symptoms. Thrombocytopenia leads to petechial rashes and mucosal haemorrhage. Leucopenia is an uncommon cause of initial presentation leads to sharply increased susceptibility to infection [2]. The study is being conducted to assess etiology, clinical profile, haematological features and bone marrow finding in case of pancytopenia so that early and accurate diagnosis of the case will lead to prompt management which will reduce morbidity and mortality significantly.

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Pancytopenia is a striking feature of many serious and life threatening illness and may be caused by several disorders ranging from infectious causes to fatal aplastic anemia and leukemia. The mechanism of development of pancytopenia varies from decrease in haematopoietic cell production as in aplastic anemia, trapping of normal cells in hypertrophied and overactive reticuloendothelial system as in hypersplenism, ineffective haematopoiesis in megaloplastosis or replacement by abnormal/malignant tissue in the marrow [3, 4]. Although pancytopenia is a relatively common haematological entity and a serious clinical problem with exhaustive differential diagnosis, there is relatively little discussion on this abnormality in major textbooks of haematology and internal medicine [5]. A look at literature shows that there are not many comprehensive studies in this subject, though extensive studies have been done for its individual etiologies like aplastic anaemia, megaloblastic anemia, myelodysplastic syndrome and leukemia. As the severity of pancytopenia and the underlying pathology determine the management and prognosis of these patients, early identification of the correct etiopathology in a given case is crucial and helps in implementing timely and appropriate treatment [6].

Thus this study was conducted mainly with the twin aims of diagnosing the patients with pancytopenia and finding out the common disease entities responsible in Western Odisha and parts of Chhatisgarh.

METHODS

This observational and prospective study was carried out over a period of two years in the department of General Medicine, VIMSAR, Burla, which is a teaching institute and tertiary care hospital and research centre catering to population of western Odisha and eastern part of Chhatisgarh. All the patients, who had Hb<10mg/dl, TLC<4000/cmm & Platelets < 1lac/cmm were taken into the study. The following procedures were adopted in each case to arrive at a diagnosis: Present illness like weakness, fever, breathlessness, bleeding episode, palpitation etc, Past illness- Typhoid fever, Infective/viral hepatitis, Pancreatic insufficiency, Passing of red colour urine, repeated H/O Blood transfusion, haematemesis, melena, repeated fever, Drug History, Personal history, Family History, physical examination: pallor, Edema, Bleeding, Icterus, Ulceration of mouth, Pulse, BP, respiration, temperature, lymphadenopathy, abdominal vein engorgement, Systemic examination, Chest, lung, Nervous system, Joint, Haematological examination: CBC, Peripheral smear examination, Reticulocyte count, ESR Urine routine, Stool, Renal function test, LFT, Serological investigation , Blood culture, Abdominal USG etc. ANA and Bone marrow aspiration using standard method was done whenever indicated avoiding the cases where causes of pancytopenia was obvious. All the patients thus selected were investigated in a systematic manner, cause of pancytopenia was ascertained and data was analyzed as regard of etiology, clinical and haematological parameters.

RESULTS AND ANALYSIS

The variation in the frequency of various diagnostic entities causing pancytopenia in different population groups had been attributed to differences in methodology and stringency of diagnostic criteria, period of observation, geographic area, age pattern, nutritional status, and prevalence of infective disorders, genetic difference and varying exposure to myelotoxic agents [7]. In present study maximum numbers of cases were from 15-30 year age group which constituted 32% of cases. Among our 100 pancytopenia patients, 48 were male and 52 were female, having male to female ratio 0.92:1. (Fig-1) However in most of the other study a male preponderance was seen for example male to female ratio was 2.3:1 in study by Yadav *et al.* [8] 1.3:1 in Khodke *et al.* [9] 2:1 in study by Niazi *et al.* [10] 2.6:1 study by Jain *et al.* The most common cause was idiopathic aplastic anemia which constituted 21 cases followed by PFR + malaria 11 cases and sepsis 11 cases, cirrhosis of liver with hypersplenism 9 cases, HIV infection 8 cases, SCD and aplastic crisis 7 cases, tuberculosis 4 cases, viral hepatitis followed by aplastic crisis 4 cases, multiple myeloma 4 cases, drug induced 4 cases, megaloblastic anaemia 4 cases, SLE 3 cases, Enteric fever 2 cases, Dengue 2 cases, AML 2 cases, NHL 2 cases, NCPF and hyperplenism, MDS 1 case each. 62% of patients presented with fever, easy fatigue were the 2nd most common complain present in 57% of patients. 29% of patients presented with bleeding manifestations like haematemesis, melena, petechial rashes on skin and mucous membranes, epistaxis, menorrhagia etc. 20 presented with dyspnea. (Table-1) Most common clinical sign in our patients was pallor which was present in 100% cases followed by clinically detectable splenomegally in 24%, hepatomegally in 23%, Icterus 18%, Edema 16%, lymphadenopathy 12% and cyanosis 4% of cases (Table-2). Most of the cases had Hb level 5gm/dl to 7.4 g/dl constituting 47% of all, Hb level <5gm/dl were 28 and Hb level 7.5 g/dl to 9.0 g/dl constituted 25% of cases.

Primary aplastic anemia constituted 21 cases in present study where bone marrow aspiration and cytology confirmed the diagnosis, (Fig.2) which is very similar to study done by Yadav *et al.* [41] where aplastic anemia seen in 24% of cases. A higher incidence of aplastic anemia (29.5%), was reported by Kumar R *et al.*[7]. The infectious causes of pancytopenia was much higher in our study in comparison to others. 11% of cases were either PFR+malaria or PAN+malaria, Kulkarni Naveen *et al.* [11] found similar finding in his study with 10.13% malaria cases. The incidence of sepsis was 11% in our study. This high prevalence is due to this tertiary care hospital is catering poor peoples of western Odisha who are presenting late. We found 9 cases of cirrhosis of liver with hypersplenism as cause of

pancytopenia; prevalence of high alcohol intake may be the cause and also got 8 cases of PLHA and 7 cases of SCD with aplastic crisis. There is high prevalence of SCD in western Odisha.

4% cases of EPTB found in our study, where as 4% cases of multiple myeloma and the incidence of megoloblastic anemia was only 4% cases. 2 cases detected in each AML and NHL and one case of MDS found in our study.

Table-1: Presenting symptoms

Symptoms	Male	Female	Total
Fever	29	33	62
Fatigue	24	33	57
Bleeding	15	14	29
Dyspenea	11	9	20

Table-2: Clinical Signs

Sign	Male	Female	Total
Pallor	48	52	100
Splenomegally	16	8	24
Hepatomegally	9	14	23
Icterus	9	9	18
Edema	10	6	16
Lymphadenopathy	6	6	12
Cynosis	2	2	4

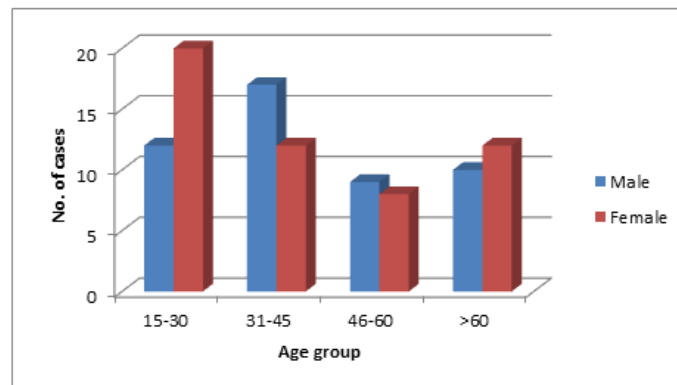


Fig-1: Age and Gender distribution

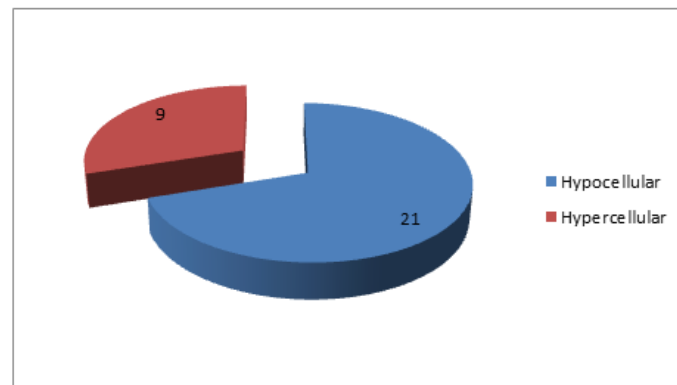


Fig-2: Bone marrow cellularity

SUMMARY AND CONCLUSION

In the present study, primary aplastic anemia was the most common cause which constituted 21% of all cases. Overwhelming parasitic infection and septicemia as a cause of pancytopenia particularly in developing countries should always be kept in mind. Early and aggressive treatment initiation should be priority in these patients, as if left untreated, the prognosis is bad. Detailed clinical history and meticulous physical examination along with baseline haematological

investigation provide valuable information in the evaluation of pancytopenia patients, helping in systemic planning of further investigation to diagnosis and ascertain the cause, avoiding unnecessary tests. The mechanism by which pancytopenia develops appears to be varied. It may be due to decrease in haemopoietic cell production in bone marrow, replacement by abnormal/ malignant cells, suppression of normal growth and differentiation, formation of defective cells that are rapidly removed from the circulation, sequestration/ destruction of cells by the action of antibodies, trapping of normal cells in a hypertrophied and overactive reticulo-endothelial system. As a large proportion of causes for pancytopenia are treatable and reversible, accurate diagnosis and timely intervention may be lifesaving and will certainly have impact on morbidity and mortality in these vulnerable patients. Knowing the exact etiology is thus important for specific and timely treatment. As the etiology of pancytopenia is varied so is the prognosis. In our study majority of the cases had treatable causes and so carried better prognosis. General physicians, who are not haematologists, are unlikely to be as well versed in the specific constellation of finding that characterizes individual haematological entities. Stringent diagnostic criteria and a general conceptual framework for ascertaining the cause of pancytopenia is therefore very valuable and a demand of time.

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