

Pancytopenia and its Evolution Profile of Patients : A Study

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Abstract—

When a person has low counts for red blood cells, white blood cells, and platelets then this condition is known as Pancytopenia. Pancytopenia is generally occurring due to a problem with the bone marrow that produces the blood cells. However, there can be many other reasons. The condition of pancytopenia is not a disease, but a description of the laboratory findings of low blood cells.

Keywords- Pancytopenia, red blood cell, platelets.

I. INTRODUCTION

Pancytopenia refers to simultaneous presence of anaemia, leukopenia and thrombocytopenia. Multiple disorders either primarily or secondarily affecting bone marrow, manifest with several haematological derangements and is generally known as pancytopenia.

Pancytopenia is an important challenge in present clinical practice by hematological entity. There are several swings in its pattern, treatment procedures, and outcome.

II. SYMPTOMS OF PANCYTOPENIA

It is important to take the knowledge about working of three different types of blood cells do to recognize pancytopenia's symptoms.

For example, red blood cells carry oxygen. Therefore, if a person does not have enough red blood cells due to pancytopenia, they may have difficulty breathing and feel fatigued [1].

Platelets are responsible for helping blood to clot, during wound healing. If a person's platelets are low, they may bleed more easily.

White blood cells help to fight infection. Therefore, if a person has a low white blood cell count, they may be more prone to infection.

Additional symptoms associated with pancytopenia include:

- easy bleeding, such as from gums or nose
- easy bruising
- fast heart rate
- pale skin color
- rashes
- unexplained fatigue
- weakness

A person should go or be taken to the emergency room immediately if they have the following symptoms, all of which can occur suddenly:

- confusion
- loss of consciousness
- seizures
- shortness of breath
- significant blood loss

III. PANCYTOPENIA CAUSES

Pancytopenia begins when there is some problem with bone marrow. This springy tissue inside bones is the place platelets are produced. Diseases and presentation to specific drugs and chemicals compounds can prompt this bone marrow harm.

Causes could include:

- cancer that destroys the bone marrow cells
- failure to make stem cells that turn into blood cells
- fibrosis or scarring of bone marrow cells
- immune system destroying healthy bone marrow cells
- suppression of bone marrow function due to illness or medications

Some of the conditions that can cause pancytopenia include:

- aplastic anemia
- autoimmune conditions
- cancer
- chemotherapy treatments
- exposure to toxins or pollutants, such as radiation or arsenic
- Fanconi's anemia
- infection
- leukemia, which impacts bone marrow function
- megaloblastic anemia
- lupus
- deficiency of folate or vitamin B12 for making bone marrow
- taking medications that affect bone marrow function
- viruses, such as Epstein-Barr, HIV or hepatitis C [2]

IV. LITERATURE REVIEW

According to [3] the physical findings and peripheral blood picture provides precious information in the work of pancytopenia patients. In this paper a Prospective Hospital Based Study conducted on 100 Cases in the age group above the 18 years with pancytopenia attended in medical OPD in MGMCH, Jaipur during the period of December 2015 onwards. Study [3] showed that the 55% incidence of pancytopenia was present in 18-35 years of age group and male to female ratio was 1.7:1. All patients have clinical presentation

was pallor, followed by 96% generalized weakness, 92% anorexia, 91% fatigability. The incidence of macrocytic anaemia was (67%) more in peripheral blood film and normocellularity is the commonest association constituting 71% followed by Megakaryocytic (21%) in bone marrow examination.

Study of paper [4] presented that A prospective study of 12 months' duration was carried out, which included patients of all age groups. Of the 60 patients presenting with pancytopenia, bone marrow aspiration and biopsy were done on 30 cases, after taking an informed consent.

The study of the authors concluded that the most common etiology of pancytopenia in the study was normoblastic erythroid hyperplasia (30%), followed by megaloblastic anemia (20%). This was followed by acute myeloid leukemia (13.3%) and closely by micronormoblastic erythroid maturation (10%) and miscellaneous etiologies. Conclusion: The varied causes of pancytopenia can be attributed to the geographic area, genetic differences, stringency of diagnostic criteria, and differences in the methodology used. There are varying trends in its clinical pattern, treatment modalities, and outcomes. The severity of pancytopenia and the underlying pathology determines the management and prognosis [4].

V. LABORATORY INVESTIGATIONS IN PANCYTOPENIA

SYMPTOMS	OCCURENCE
Duration of symptoms	MDS (long) Severe Aplastic Anemia (short history)
Family history	Congenital or Hereditary disease
Age of the patients	MDS in Adult
Previous treatments/ Exposures	Radiotherapy or Chemotherapy MDS, AML
Drugs	Toxic effect
Chronic alcohol abuse	Hepatopathy
Pain crisis, black urine crisis	Paroxysmal nocturnal haemoglobinuria
Bleeding, infections	Estimation of the degree of pancytopenia. Eventually additional hemostatic problems.

Figure 1: symptoms and occutence of pancytopenia

VI. ETIOLOGICAL CLASSIFICATION OF PANCYTOPENIA

A wide range of disorders result in pancytopenia. For the sake of clarity, etiological factors have been partitioned into seven different groups [5,6].

1. Aplastic Anaemia
2. Disorders Infiltrating the Bone Marrow
3. Disorders Involving the Spleen
4. Vitamin B12 or Folate Deficiency
5. Disseminated Lupus Erythematosus
6. Paroxysmal Nocturnal Haemoglobinuria
7. Miscellaneous Disorders (With Cellular Marrow)

VII. PATHOPHYSIOLOGY OF PANCYTOPENIA

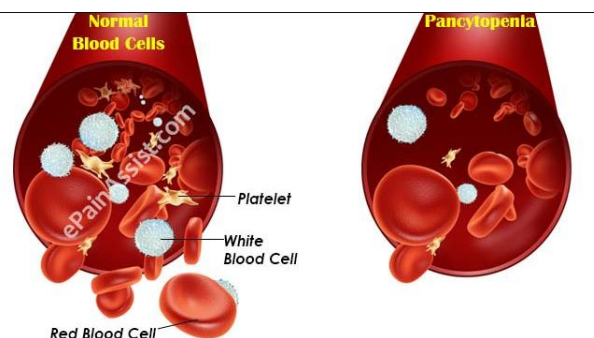


Figure 1: normal blood cells and pancytopenia blood cells

A few periconceptional biochemical parameters are connected with early pregnancy loss. The impacts of maternal periconceptional wellbeing on embryonic improvement and ensuing pregnancy result ought to be additionally investigated [7].

Pancytopenia can be because of decline in hemtaopoietic cell generation in the bone marrow e.g. by diseases, poisons, malignant cell infiltration or suppression or can have normocellular or even hypercellular marrow, with no strange cells, e.g. ineffectual hematopoiesis and dysplasia, development capture of all cell lines and fringe sequestration of blood cells [8].

In different circumstances, the marrow might be typically cellular or even hypercellular and no anomalous cells might be available. The components prompting pancytopenia in these conditions might be because of ineffectual haemopoiesis with cell dismiss in the marrow, development of defective cells that are quickly expelled from the circulation, sequestration or destruction of cells by the activity of antibodies, and trapping of typical cells in a hypertrophied and overactive reticuloendothelial framework [7].

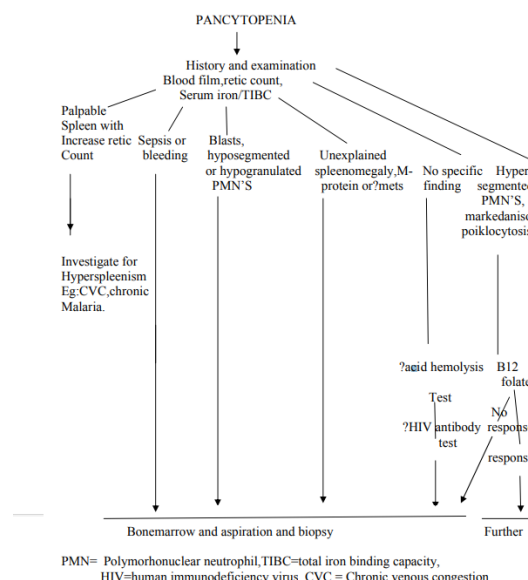


Figure 3: Diagnostic approach to the Pancytopenic patient [9]

VIII. EFFECT OF PANCYTOPENIA

Pancytopenia is a generally regular hematological substance. It is a striking element of different serious and life-

threatening sicknesses, going from basic medication instigated bone marrow hypoplasia, megaloblastic anemia to fatal bone marrow aplasias and leukemias.

IX. DIAGNOSIS AND EVALUATION

After confirming that patient definitely has pancytopenia, the first step is often a bone marrow biopsy.

The objective in treating pancytopenia is to discover and treat the basic reason. On the off chance that the reason isn't known, or on the off chance that it is normal, for example, with chemotherapy, treatment is gone for limiting the side effects related to decreasing of blood cells. A few treatments that might be utilized include:

- Drugs that encourage the bone marrow. For chemotherapy-induced neutropenia and some other causes, the growth factors Leukine, Neupogen, or Neulasta may be used to stimulate the formation of white blood cells. For chemotherapy-induced anemia, there are also several medications that may be advised.
- Blood transfusions
- Immunosuppressive drugs if it is due to an autoimmune condition.
- Bone marrow transplant or stem cell transplant [10].

X. CONCLUSION

Pancytopenia happens when a man has a decrease in each three teepees of blood cell. This happens when something isn't right with the bone marrow, where blood cells are created. There are several symptoms and causes of pancytopenia as studied earlier.

Pancytopenia isn't a remarkable hematological issue experienced in clinical practice and ought to be suspected on

clinical grounds when a patient presents with unexplained anemia, prolonged fever and trend to drain.

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