



## SNS COLLEGE OF PHARMACY AND HEALTH SCIENCES

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### IRON DEFICIENCY ANEMIA

#### INTRODUCTION

Anemia is a condition in which the decreased number of healthy red blood cells is seen in the body. Iron deficiency anemia: anemia caused by deficiency of iron. It is a most common type of anemia in the world. Also known as Microcytic hypochromic anemia.

#### EPIDEMIOLOGY

Iron deficiency anemia affected about 1.48 billion people in 2015.  
Women and young children are commonly affected.  
54,000 deaths are seen in 2015 due to iron deficiency anemia.

#### ETIOLOGY

There are 4 main causes of IDA:

- Decreased intake
- Decreased absorption
- Increased demand
- Increased loss

##### **Decreased intake**

It is the most common cause of IDA in worldwide.

Mainly in infants due to:

Decreased iron in breast milk

And commonly seen in vegetarians.

##### **Decreased absorption**

It is due to decreased acid production in case of gastrectomy.

In also with inflammatory bowel disease and celiac disease.

This both is due to inflammation and destruction of duodenal cells.

##### **Increased demand**

Increased demand occur in children and adolescents: due to rapid growth and increased blood volume.

Also in case of pregnancy: because of increased iron requirement in fetal development.

##### **Increased loss**

Increased loss is due to Chronic slow bleeding.

In females: because of frequent or heavy menstrual bleeding.

Bleeding gastric ulcer.

In elderly: colon cancer cause bleeding leads to IDA.

H.pylori infection leads to gastric ulcer and gastrointestinal bleeding.

Hookworms: In intestines, hookworms sucks the blood which leads to loss of blood.

## **PATHOPHYSIOLOGY**

Anemia can be developed by any of the three factors:

- Blood loss
- Increased RBC destruction
- Decreased RBC production

### **Blood loss**

It is a most common cause of IDA; which includes

Heavy Menstrual bleeding in women.

Gastrointestinal bleeding

Gastrointestinal bleeding is due to :

Peptic ulcer disease

NSAIDS

Inflammatory bowel disease.

### **Increased RBC production**

It may be caused by RBC malformations which includes: sickle cell anemia, Thalassemia which is congenital.

Acquired: Autoimmune Disease

Microangiopathy: A disease of the capillaries (very small blood vessels), in which the capillary walls become so thick and weak that they bleed, leak protein, and slow the flow of blood

Thrombotic thrombocytopenic purpura (TTP): is a blood disorder in which platelet clumps form in small blood vessels. This leads to a low platelet count (thrombocytopenia).

### **Decreased RBC production**

Decreased RBC production may be developed due to:

Aplastic anemia

Vitamin deficiency (Vitamin B12 and folate)

Anemia of inflammation

### **Aplastic anemia**

A rare condition in which the body stops producing enough new blood cells.

Aplastic anemia occurs due to:

Bone marrow dysfunction: which occurs due to chemicals, radiation, chemotherapy.

This bone marrow dysfunction leads to bone marrow suppression.

### **Vitamin deficiency**

This may occur due to either Vitamin B12 or folate deficiency.

1. Folate deficiency:

This may be due to malnourishment and alcohol abuse.

Alcohol may disrupt metabolism and storage of folate in liver.

Folate deficiency is a potential cause of anemia.

Normally, folic acid is necessary in production of nucleic acids (guanine and alanine) which is necessary for DNA synthesis in RBC cells.

Here, decreased amount of folic acid leads to decreased RBC production.

2. Vitamin B12 deficiency:

Normally, vitamin B12 absorption takes with the help of intrinsic factors such as acid and enzymes which is released by parietal cells.

Decreased intrinsic factor is due to autoimmune disease, congenital Disease, chronic gastritis, gastrectomy.

This decreased intrinsic factor decreases the absorption of vitamin B12.

Vitamin B12 release co- enzyme which is necessary for DNA synthesis for the development of normal RBC production.

So, this vitamin B12 deficiency leads to decreased RBC production.

### **Anemia of inflammation**

Inflammation may be infection, malignancy, autoimmune disease, burns or trauma.

This inflammation is mediated by cytokines such as IL-1, IL-6, TNF, INF.

Cytokines release may produce three various stages such as:

Bone marrow suppression: bone marrow suppression leads to decreased RBC production

Autolysis of RBC: breaking or lysis of RBC by cytokines.

Decreased availability of RBC: cytokines decrease ferritin storage in spleen which decrease availability of RBC.

### **DIAGNOSIS**

Determination of Parameters in blood

- Haemoglobin: decreased Haemoglobin level
- MCV: decreased MCV due to decreased RBC
- Red blood cell distribution width (RDW): RBC seen in different sizes.

### **TREATMENT**

Oral iron supplements

- Ferrous sulphate
- Ferrous gluconate
- Ferrous fumarate