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**Program : BS MLT**

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**Course : WBCs and Platelets Disorders**

**Q1. What is leukopoiesis and also explain its types.?**

**Ans: Leukopoesis:**

* The production of white blood cell ( WBC or leukocyte)
* Leukopoeisis is a form of hematopoiesis
* They are formed in bone marrow and located in bones in adults and hematopoietic organs in the fetus

Types :

1. Granulocytopoiesis
2. A- granulopoiesis

**Granulocytopoiesis :**

The process in which granulocytes ( neutrophils) , basophils and eosinophils are formed

1. Neutrophils:
2. Cell size 10-14 micrometers
3. Nucleus in centre or eccentric 2-6 lobes
4. Deep Purple blue colour
5. Cytoplasm faint pink in colour
6. Granules violet pink in colour

**Normal values :**

* Differential: 40-75%
* Absolute : 2000-7500/ microliter

1. **Eosinophils:**
2. Cell size 10-14 micrometer
3. Nucleus are in centre : 2-3 lobes spectacle shape
4. Purplish blue in colour
5. Cytoplasm bright pink in colour
6. Granules are large , coarse , red

**Normal values ;**

* Differential : 16%
* Absolute : 40-440/microliter of blood

1. **Basophils :**
2. Cel size : 10-14 micrometer
3. Nucleus : central, 2-3 lobes purple blue
4. Cytoplasm: acidophilic , bright pink in colour and full of granules
5. Granules : very coarse , Deep Purple or blue

**Normal value:**

* Differential : 0-1%
* Absolute : 0-100/ microliter of blood

(**B) A- Granulocytopoiesis:**

The process in which A- granulocyte ( monocyte and lymphocytes ) are produced.

1 **Monocytes:**

1. Cell size : 12-20 micrometer
2. Nucleus : central, round or oval pale bluish in colour
3. Cytoplasm : abundant , pale blue, clear

**Normal values:**

* Differential : 2-10%
* Absolute : 500-800/ microliter of blood

2 **lymphocytes:**

1. Cell size : LL : 12-16 micrometer SL : 7-10 micrometer
2. Nucleus : eccentric, large , round, Deep Purple blue in colour
3. Cytoplasm : scanty light blue in colour

**Normal values :**

* Differential : 20-40/ microliter
* Absolute : 1500-4000/microliter of blood

**Q2 : compare all phases ( chronic, accelerated , blast of chronic myeloid leukaemia) .?**

**Ans :**

1. **Chronic phase :**

* Approximately 85% of patients arein the chronic phase at the time of diagnosis
* No anemia
* Thrombocytes
* No splenomagately
* Blast less than 10%
* Duration is variable
* May progress to an accelerated phase

1. **Accelerated phase:**

* 10-19% blast in the blood or bone marrow
* 72% basophils in the blood or bone marrow
* Platelets count less than < 100,000, unrelated to therapy
* Platelets count greater than > 10,000,000 unresponsive to therapy
* Marked splenomegaly and increasing WBC count, unresponsive to therapy
* In addition to the Philadelphia chromosome other chromosomal abnormality may be present

**© Blast crises :**

* Final phase in the evolution of chronic myeloid leukaemia
* Behave like an acute leukaemia
* Rapid progression and short survival
* Diagnosis based on the presence of greater than 72% myeloblast or lymphoblast in the blood or bone marrow
* Large cluster of the blast in th the bone marrow on biopsy
* Development of chloroma

**Q(3) Explain leukaemia and its couses .**

**Ans :**

**Def :** leukaemia is a type of blood cancer or bone marrow characterised by abnormal increase of immature WBC called blast.

**Couses :**

**1 working with certain chemicals:**

* Exposure to high level of benzene in work place can cause leukemia
* Expose to formaldehyde also risk to leukemia

**2 High level of radiation:**

* People exposed to very high level of radiation are much more likely than others to develop leukemia

**3 Smoking:**

* Tobacco products are the single major avoidable cause of leukaemia

1. **Down syndrome and other genetic diseases:**

Some diseases caused due to chromosomes may increase the risk of leukaemia.

**Q(4) difference between acute and chronic leukaemia.?**

**Ans (a) acute leukemia :**

* Acute leukaemia develops from early cells , called blasts
* Blasts are young cells that divide frequently
* They target immature cells causing symptoms to appear quickly
* In acute leukemia , cells don't stop dividing like their normal counterparts do.

**(b) Chronic leukemia :**

In chronic leukaemia the leukaemia cells come from mature abnormal cells. The cells thrives for too long and accumulate the cell grow slowly. It's not unusual in chronic cases for symptoms to long time to even appear.

**Q(5) discuss Rai classification of chronic lymphocytic leukaemia.?**

Chronic lymphocytic leukemia is divide in five stages . From zero to four

**Stage 0( zero) ;**

* In this stage the lymphocytes of a patient increase. But no physical sign and symptoms appear
* Survival 12.5 years

**Stage 1 :**

* In this stage the lymphocytes of a patient will increase as well as lymph-nodes also enlarged
* No sign of anemia, enlarging of spleen or low level of platelets
* Survival 8.5 years

**Stage 2 :**

* In this stage lymphocytes will increase
* Enlargement of spleen
* Lymph node may or may not enlarged
* Survival 6 years

**Stage 3 :**

* Lymphocytes will increase
* Sign of anemia appear or anemia occurs
* Lymph nodes may or may not enlarged
* Enlarge of spleen
* Survival 1.5 years

**Stage 4 :**

* Lymphocytes will increase
* Platelets will be decrease
* Lymph nodes may or may not enlarged
* Survival 1.5 years

**Q6 : explain chronic myeloid leukaemia causes and symptoms .?**

**Ans : chronic myeloid leukaemia:**

Chronic myeloid leukaemia is a type of cancer that affects the blood forming cells and bone marrow.

**Sign and symptoms**

* Weakness
* Weight loss fever
* Bone pain
* Fatigue
* Night sweating
* Spleen enlargement

**Couses :**

CML is caused by rearrangement of genetic material between chromosome 9 and 22 . This translocation written as t (9: 22) fuses part of the ABL I from chromosome 9 with part of the BCR gene from chromosome 22 creating an abnormal fusion gene called **BCR-ABL I.**

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