Introduction to Pathology Of Blood And Urine

Unit -13

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Introduction to Pathology of Blood And Urine

* Blood →

- Blood का study जो disease, causes and progression से related होता है उसे Pathology of blood कहते हैं।
- वो test जो Blood की Pathology के लिए performed किये जाते है उन्हे Haemato-

Biochemistry || D Pharm 2nd Year

Unit - 13

Introduction to Pathology of Blood And Urine

* Blood →

- Blood एक fluid connective tissue होता है जो body में circulate होता है।
- Blood का average volume adult में 5 liters होता है।

* Pathology of blood →

- Blood की study जो disease, causes and progression से related होता है उसे Pathology of blood कहते है।
- वो test जो Blood की Pathology के लिए performed किये जाते है उन्हे Haemato-logical tests कहते है-

* Haematological Tests →

- Main parameters measured-

1) Hb concentration. test
2) RBC count. test

3) WBC count test

4) HCT test.

5) WBC differential test.

6) Platelet count test.

etc.....

1) Haemoglobin test →

- Haemoglobin एक red coloured का pigment होता है blood में
- इसकी concentration को gm% में expressed किया जाता है।

* Normal range →

- Male → 14 – 18 g/dl or gm%
- female → 12 – 16 g/dl or gm%
- children → 11 – 14 g/dl

* Significance and Interpretation (વ્યાખ્યા) →

- low level of Haemoglobin indicate → Anaemia, leukaemia.
- High level of Haemoglobin indicate → Polycythaemia.

2) R.B.C count test →

- Red blood cells blood में

present होती है।

- R.B.C का red colour H.b की presence से होता है।

* Normal range →
  - Male → 4.5 to 5.5 million/mm^3
  - female → 3.5 to 5.5 million/mm^3
  - children → 4.0 to 5.5 million/mm^3.

* Significance and Interpretation →
  - low level of RBC in blood indicate → Anaemia and leukaemia. (ल्यूकेमिया)
  - High level of RBC in blood indicate → Polycythaemia, cholera. (हैजा)

3) Hematocrit (Hct) test →

- यह test R.B.Cs की percentage को indicate करता है whole blood sample में।
- for example 40% Hct indicates that a 100 ml blood sample has 40 ml of blood cells.

* Normal range →
  - Male → 40 to 50%
  - female → 37 to 47%

* Significance →

- ઉપર Hct ની value abnormal હોય
- ઉપર RBC ની count ની abnormal
  હોય ત્યારે
- ઉપર RBC ની count Normal હોય
  ત્યારે RBC ની average size possibly
  small હોય
- shock, dehydration, haemorrhage etc.
  Hct ની value ની decrease
  thrombocytopenia હોય

4) WBC Count Test →
(Total leucocyte count (TLC).

- WBCs colourless cells હોય
  છે with nuclei.
- ચેની size ને longer હોય છે
  but less in number than
  RBCs.

* Normal Range →

- Male → 4500 to 11000/ml
- female → 4500 to 11000/ml.

* Significance →

- low level of WBCs indicate-
  → Typhoid, Anxiety, Hepatitis.
  → Influenza, measles etc.

- High level of WBCs indicates-
- Leukaemia
- Pneumonia (Severe)
- diphtheria
- Asthma etc...

Neutrophils	60 - 70%
Eosinophils	1 - 4%
Basophils	0 - 2%
Monocytes	5 - 10%
Lymphocytes	20 - 30%

5) Differential Leucocyte Count (DLC) -

Test → WBCs following types of cells %

* Significance →
  - High Neutrophil count indicates severe bacterial infections (like - Pneumonia)
  - High eosinophils count indicates allergic conditions (like - Asthma etc...

5) Platelet Count test →

- Platelets blood clotting की involved होती है।

* Normal range →

- 1.5 to 4.5 lac

* Significance →

- low range of platelets indicates → • leukaemia • bone marrow problems.
- Dengue fever • HIV etc.

* Lymphocytes →

- Lymphocytes, white blood cells होती है जो immune system के अहम key part होते हैं।
- ये body को infection से against defend करती है antibodies को produce करके।

* The most common lymphocy-tes are →

High Range (count) of Platelets indicates →

- Bone marrow problems
- Bleeding etc--
- Cancer

etc---

complete

a) B- lymphocytes.
b) T - lymphocytes.
c) Small lymphocytes.
d) large lymphocytes.
e) Natural killer cells.
etc.....

* Count of Lymphocytes →
  - B- lymphocytes
    → 100-600 cells/μL of blood
  - T- lymphocytes
    → 500 - 1200 cells/ mm^3
    (cubic millilitres)

* Lymphocytes Role in Health →
  → ही antibodies ना produce करवी हे।
  → infected cells ना destroy करवी हे।
  → kill human cells.
  → Lymphocytes B and Y-Serum globulin ना produce करवी हे।
  → Lymphocytes - Bacteria, fungi, virus etc. ना against fight करवी हे।
  etc--

* Lymphocytes Role in disease →

(Abnormal count)

- High Lymphocyte count indicates करता है -
  - → Autoimmune disorder.
  - → leukaemia.
  - → Infection
  - → Lymphocytiosis.
  - etc...

* Platelets →

- इन्हें thrombocytes भी कहते हैं।
- ये very small cells होती हैं जो mainly blood clotting के लिए responsible होते हैं।
- ये bone marrow में formed होती हैं।

* Normal Platelets count →

- 150,000 to 450,000/micro-liter.

* Role in health →

- ये blood clotting में एक important role अदा करती हैं।

- Maintain haemostasis.
- clot retraction.
- Bleeding on vessel wall and prevent onset.

etc.....

* Role in disease →
  - Low level leads to —
    - Blood in urine.
    - Improper blood clotting.
    - Heavy blood loss.
  - High level cause →
    - Dangerous clot in blood vessels.
    - Heart attack

etc....

complete

* Erythrocytes →

- ક્ષ-કૂટ red blood cells થી બનેલ છે.
- RBCs. disc-shaped અને દ્વિઅંતર્ગોળ છે.
- આ Haemoglobin contain કરતું હોય છે જે body ના બધા cells માં oxygen ને transport કરવાનું કામ કરે છે.
- Haemoglobin, જેમાં iron contain કરતું હોય છે and blood ને red colour આપે છે.

* Normal RBCs count →

- In males - 4.5 to 5.5 million per micro. litre (mcL)
- In females → 4 to 5 million per micro. litre (mcL)

* Abnormalities of RBCs →

- Red blood cells ના 3 types ની abnormalities પડી શકે છે -

1) Anisocytosis →

- Variations in size are as follows -

a) Macrocytosis →

- આમાં RBC નું size ,

ho normal size કરતાં વધારે હોય તેને macrocytosis કહે છે.

* causes →

→ liver disease.

→ Megaloblastic anaemia.

→ Aplastic anaemia.

→ etc.....

(b) Microcytosis →

- જ્યારે RBC ની size blood માં normal size કરતાં less હોય તેને microcytosis કહે છે.

* causes →

→ Iron deficiency anaemia.

→ Thalassaemia.

etc.....

(c) Poikilocytosis →

- Shape માં abnormality following types માં હોય તેને કહેવાય છે —

→ Ovalocytes.

→ Sphenocytes.

→ Pencil cells.

→ Target cells

→ sickle cells

* Significances →

1) Low count of RBCs indicates -

→ Anaemia.

→ Iron deficiency anaemia.

→ Magaloblastic anaemia (deficiency of vit- B9 , vit-B12)

complete

2) Haemoglobinopathies

(sickle cell means misshape of RBCs)

etc----

* Normal And Abnormal Constituents of Urine →

* Normal constituents of Urine →

* what is Urine →

→ Urine એક sterile liquid હોય છે જે body માં produced હોય છે/

→ જે Urethra દ્વારા body માં excreted હોય છે -

→ Normal Urine માં 95% water and 5% other constituents હોય છે -

1) Urea (9.3 gm/L)
2) sodium (1.17 gm/L)
3) Potassium (0.750 gm/L)
4) chloride. (1.87 gm/L)
5) creatinine (0.670 gm/L)
6) other dissolved ions, inorganic and organic

compounds (Proteins, hormones and metabolites).

* Morphology of Urine →

- colour → Yellow - amber.
- odour → like Ammonia.
- Taste → salty.
- density → Between 0.001 - 0.035

* Abnormal constituents of Urine →

- Urine માં following constituents હોઈ

ક્યારે abnormality pathological conditions માં show કરતી ક્યારે –

Abnormal constituents	significance diseases
• Proteins (Albumin, Globulin)	• Proteinuria.
• Glucose	• Glycosuria.
• Blood	• Haematuria.
• Bilirubin and bile salt	• Bilirubinuria.
• ketone bodies	• ketonuria.
• Pus	• Pyuria.

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THANK YOU.

By Dr Firoz khan

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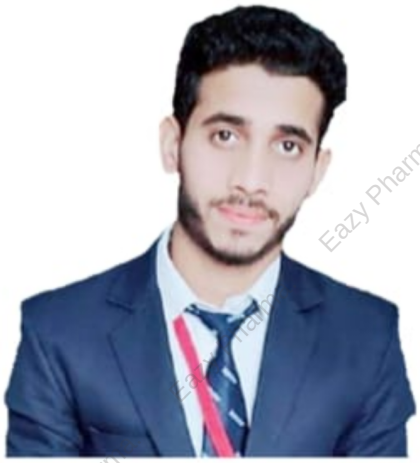

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