

Clinical Laboratory Test Used in the Evaluation of Disease States

Unit-10

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Clinical Laboratory Test Used

in the Evaluation of disease

States.

• 70 to 80% of Judgement diagnosis is Laboratory

results and analysis is based on E/

* Haematological Tests →

• Main parameters measured -

Biochemistry II D Pharm 2nd Year

Unit -10

Clinical Laboratory Test Used

in the evaluation of disease States.

* Introduction →

- \checkmark diagnosis, monitoring and screening, clinical laboratory test result \checkmark clinical vary essential parameter \checkmark elderly

- 70 to 80% of Judgement diagnosis \checkmark laboratory results and analysis \checkmark based elderly \checkmark

* 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.

- 1) Haemoglobin test →
 - Haemoglobin test red coloured part pigment part of blood if
 - start concentration of gm/l. if expressed part with it
 - * Normal range →

- 2) WBC count test
- 3) HCT test.
- 4) WBC differential test.
- 5) Platelet count test.

st-----

- Male → 14-18 g/dl or gm/l.
- Female → 12-16 g/dl or gm/l.
- children → 11 - 14 g/dl
- * Significance and Interpretation →
(chart)
- Low level of Haemoglobin indicate → Anaemia, Leukaemia.
- High level of Haemoglobin indicate → Polycythemia.
- 2) RBC count test →
 - Red blood cells blood if

presence of RBC

- RBC are red colour H.b are presence of RBC

* Normal range →

- Male → 4.5 to 5.5 million/mm³
- female → 3.5 to 5.5 million/mm³
- children → 4.0 to 5.5 million/mm³

* Significance and Interpretation →

- low level of RBC in blood indicate → Anaemia and Leukemia, (causes)
- High level of RBC in blood indicate → Polycythemia, cholestaemia

3) Hematocrit (Hct) test →

- It test RBCs are percentage of whole blood sample it

• 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 →

- ઝાલિર Hct ની value abnormal હોઈ
- ટૂંકી RBC ની count ની abnormal હોઈ
- ઝાલિર RBC ની count Normal હોઈ
- ટૂંકી RBC ની average size possibly small હોઈ
- shock, dehydration, haemorrhage etc. Hct ની value ની decrease ની સંબંધ છે

4) WBC count test →
(Total leucocyte count (TLC).

- WBCs colourless cells હોઈ
- ટૂંકી with nuclei.
- ટૂંકી size ની લાંબા હોઈ
- 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
- diphtheria
- Pneumonia
- Asthma etc.

s) Differential Leucocyte Count (DLC) -

- fast →
- WBCs following types are :-

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

* Significance →

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

*** Liver Function tests
and their clinical
Significance →**

1) Serum bilirubin test →

- It is haemoglobin or breakdown product of RBC and bile is its major pigment of RBC.

*** Normal Range →**

- Direct bilirubin →
0.1 - 0.4 mg/dl.

- Indirect bilirubin →
0.3 - 1.3 mg/dl.
 - * Significance →
 - Direct bilirubin or high level
Intrahepatic or indicates or/
 - Indirect bilirubin or high level
Intrahepatic cholestasis or/ indicate
or/
 - Bilirubin or/ total high level - Haemolysis,
Jaundice etc. indicate or/
- 2) Serum (Plasma) Protein test →

- Albumin and Globulins Prime
plasma protein or/
- or/ liver or/ or/ produced
or/
- * Normal Range →
 - Albumin → 3.5 to 5.1 gm/dl.
 - Globulin → 1.8 - 3.1 gm/dl.
- * Significance →
 - Low level indicates -
Oedema, shock, haemorrhage etc.

iii) High-density lipoprotein (HDL) or

Good cholesterol →

- If cholesterol LDL cholesterol or
- arterias में धार रक्त में खतरा
- oxid ई/

iv) Triglycerides →

- If circulatory fats धार ई में
- body में energy provide oxid ई

* Normal range →



Total cholesterol level is < 200 mg/dl.

- LDL cholesterol level is < 100 mg/dl.
- HDL cholesterol level is > 40 mg/dl.
- Triglycerides level is < 150 mg/dl.

* Significance →

- cholesterol or high level
- indicates oxid ई -

→ heart diseases, liver diseases, higher risk of Atherosclerosis and stroke

etc.....

4) Serum (SGOT) or (AST) test →

(SGOT - serum glutamic oxaloacetate
(transaminase)

(AST - Aspartate Transaminase)

- if enzyme liver and heart if liver and energy production if help order if

* Normal Range →

• SGOT → 0.40 u/L

* Significance →



• High level of SGOT indicates

- Liver diseases (like

- cirrhosis • Jaundice etc--

(cardiac diseases like congestive heart failure, shock etc--)

5) Serum Glutamate Pyruvate

Transaminase (SGOT) or

Alanine Transaminase (ALT)

test →

- if enzymes mainly liver

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calls in urea and 1/

• urea alanine and formation in helps
and 1/

* Normal range →

• 5 to 36 u/L

* Significance →

- STPT and high level liver
damage and indicate and 1/

Complete

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* kidney function test

And their clinical

Significance →

- Renal or kidney functions are following urine test

• Urine is evaluated for its color &

* Urine Analysis →

Urine is physically and chemically examined for its color.

1) Physical Examination →

a) colour →

- Normally urine is colour yellow
- Amber color is but its color depends on diet

* Significance →

• Urine is dark color dehydration is indicated

- Urine is red color urine is RBCs presence is show

b) Odour →

- Normal odour (smell) → like - Ammonia.
- Urine is smell various pathological conditions is show

* Significance →

- Diabetic patients of urine of small sweat on faintly etc, ketones on glucose and presence of acet etc

c) PH →

- Usually urine, slightly acidic etc etc
- PH range between 4.5 to 8.

* Chemical Examination →

a) Proteins →

- Urine of acute abnormal Albumin and globulin are presence Proteinuria are indicate are etc

b) Glucose →

- Urine of acute high level of glucose - glycosuria are indicate are etc

c) Other sugars →

- Urine of acute fructose are presence fructosuria are indicate are etc

- Liver is glycogen, vitamin-B, D & B12 & trace element iron stored etc

5) Protective function →

- Liver, xenobiotics or metabolism or liver responsible etc
- Liver body of foreign and dangerous materials if protect etc

6) Circulatory function →

- Liver blood volume and regulate etc

* Liver Function tests and their clinical significance →

1) Serum bilirubin test →

- if haemoglobin or break-down product etc and bile or green major pigment etc

* Normal Range →

- Direct bilirubin → 0.1 - 0.4 mg/dl.

* Thyroid Function Test →

- Many different types of blood test are for thyroid gland functioning are check and if performed by with the following some thyroid function test are :-
 - 1) TSH test.
 - 2) T₃ test.
 - 3) T₄ test.
 - 4) TBB test.
 - 5) calcitonin test

↳ Thyroglobulin test.

etc:-

① TSH (Thyroid stimulating hormone) test →

- For test are use blood sample of TSH level and check and if any and if thyroid function and examine and are

* Normal Range →

• 0.4 to 4.0 mU/L

* Significance →

• TSH and high level thyroid gland or and sufficient thyroid hormone production and indicates and and and (Hypothyroidism).

• low TSH level - excessive thyroid hormone production (Hyperthyroidism)

and indicates and and and

② T₃ and T₄ thyroid hormone test →

• and test and use blood and

Thyroid hormone and production level and check and and and and and

* Normal range →

• 100 - 200 ng/dl.

* Significance →

• High T₃ level indicates - (Hyperthyroidism)

• low T₃ level indicate -

(Hypothyroidism)

③ T₄ (Thyroxine) test →

- T₄ is a predominant type of thyroid hormone in the blood circulation
- * Normal range →
 - for an adult - 5.0 - 11.0 µg/dl
- * significance →
 - High TSH and low T₄ indicates (Hypothyroidism)
 - High T₄ indicates (Hyperthyroidism)

④ T₃U (Thyroid binding globulin) test →

- T₃U test is used to evaluate the amount of available and free thyroid hormone in the body
- * Normal range →
 - 18 to 29 µg/dl.
- * significance →
 - T₃U is high level given disease hypothyroidism

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It indicates order of

- TRIs are low level hypothyroidism indicate order of

complete

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* Test Associated with Cardiac

disorders →

- following test are heart are functioning capacity are evaluate करके से परीक्षा performed परीक्षा करे है।
- 1) Pulse Rate on heart rate test.
- 2) Blood cholesterol test.
- 3) cPK on ck test
- 4) LDH on LD test.
- etc.....

① Pulse Rate on heart rate →

<u>fetus</u>	140-150/minute.
<u>Neonatal</u>	130-140/minute.
<u>one year</u>	115-130/minute.
<u>2-3 year</u>	100-115/minute.
<u>7-14 year</u>	80-90/minute.
<u>over 15 years.</u>	70-80/minute.

Normal value

* Significance →

- Increased value are - emotional, fever, excitement, exercise or after observed

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सर्वर मरुतु ई/

- Heart Rate increase ई/ ऑ/
- Tachycardia ऑ/ ई/
- Heart rate decrease ई/ ऑ/
- Bradycardia ऑ/ ई/

② Blood cholesterol test →

Neonates	15-40 mg/dl
20-30 years	145-275 mg/dl.
30-40 years.	165-295 mg/dl.
40-50 years	170-315 mg/dl.
above 50	175-350 mg/dl.

Normal values

* Significance →

- High level of cholesterol indicates - diabetes mellitus, obstructive Jaundice, obesity
- Low level of cholesterol indicates - Hypothyroidism.

③ Creatine Phosphokinase

- ऑ/ creatine kinase (CPK)
- test →
- ऑ/ enzymes, heart muscles skeletal muscles and brain

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tissues में वनर गरर ई।

- रू- intacallan energy transport
रू- ररर- key role plays गरर ई।

* Normal range →

- 40-120 mcg/L

* Significance →

- High level of cPK indicates-

brain injury, stroke, heart attack

Lung tissue death trauma etc-

4) Lactic acid dehydro-

genase (LDH) →

- सर- test गर- ^{use} blood on-

other body fluids में LDH

level गर- evaluate गर-

में रू- गरर ई damage

tissue गर- diagnose गर-

में रू- रर/

* Normal range →

- male → 135 to 225 U/L

- female → 135 to 214 U/L

* Significance →

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- LDH₁ and LDH₂ are high level myocardial infarction indicators and etc.....

*** Pulmonary Function Tests →**

- Spiro tests are used to check one's or two lungs effectively functioning or not etc.

*** test →**

1) spirometry →

- It is test determine or not etc. ^{person} maximum inhaled and exhaled air etc.

2) Lung capacities →

- It primary lungs or volume are sum etc.

3) Tidal Volume (VT) →

- It quiet breathing or air etc.

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* Normal Volume →

- 500 ml.

4) Inspiratory Reserve Volume

(IRV) →

- \uparrow air or maximal Volume \uparrow \downarrow air \downarrow inhaled from quiet breathing.

* Normal Value →

- 1800 to 2000 ml.

5) Expiratory Reserve Volume

(ERV) →

- \uparrow air or maximal Volume \downarrow \downarrow air \downarrow exhaled from quiet breathing.

6) Total Lung capacity (TLC) →

- \uparrow air or \uparrow Volume or \downarrow air (sum) \downarrow etc---

complete

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By Dr Firoz khan

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