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| | | | |
|---|---|---|---|
| **NAME** | **: Mr. P.K SINGH** | | |
| **AGE/ GENDER** | : 46 YRS/MALE | **PATIENT ID** | : 1557837 |
| **COLLECTED BY** | : | **REG. NO./LAB NO.** | **: 012407230022** |
| **REFERRED BY** | : DR RAJESH GUPTA | **REGISTRATION DATE** | : 23/Jul/2024 10:31 AM |
| **BARCODE NO.** | : 01513658 | **COLLECTION DATE** | : 23/Jul/2024 10:35AM |
| **CLIENT CODE.** | : KOS DIAGNOSTIC LAB | **REPORTING DATE** | : 23/Jul/2024 11:17AM |
| **CLIENT ADDRESS** | : 6349/1, NICHOLSON ROAD, AMBALA CANTT | | |

# HAEMATOLOGY

## COMPLETE BLOOD COUNT (CBC)

| Test Name | Value | Unit | Biological Reference interval |
|---|---|---|---|
| **RED BLOOD CELLS (RBCS) COUNT AND INDICES** | | | |
| HAEMOGLOBIN (HB)<br>*by CALORIMETRIC* | 12.9 | gm/dL | 12.0 - 17.0 |
| **RED BLOOD CELL (RBC) COUNT**<br>***by HYDRO DYNAMIC FOCUSING, ELECTRICAL IMPEDENCE*** | **5.3$^{H}$** | **Millions/cmm** | **3.50 - 5.00** |
| PACKED CELL VOLUME (PCV)<br>*by CALCULATED BY AUTOMATED HEMATOLOGY ANALYZER* | 41 | % | 40.0 - 54.0 |
| **MEAN CORPUSCULAR VOLUME (MCV)**<br>***by CALCULATED BY AUTOMATED HEMATOLOGY ANALYZER*** | **77.2$^{L}$** | **fL** | **80.0 - 100.0** |
| **MEAN CORPUSCULAR HAEMOGLOBIN (MCH)**<br>***by CALCULATED BY AUTOMATED HEMATOLOGY ANALYZER*** | **24$^{L}$** | **pg** | **27.0 - 34.0** |
| **MEAN CORPUSCULAR HEMOGLOBIN CONC. (MCHC)**<br>***by CALCULATED BY AUTOMATED HEMATOLOGY ANALYZER*** | **31.1$^{L}$** | **g/dL** | **32.0 - 36.0** |
| RED CELL DISTRIBUTION WIDTH (RDW-CV)<br>*by CALCULATED BY AUTOMATED HEMATOLOGY ANALYZER* | 15.3 | % | 11.00 - 16.00 |
| RED CELL DISTRIBUTION WIDTH (RDW-SD)<br>*by CALCULATED BY AUTOMATED HEMATOLOGY ANALYZER* | 44.4 | fL | 35.0 - 56.0 |
| MENTZERS INDEX<br>*by CALCULATED* | 14.57 | RATIO | BETA THALASSEMIA TRAIT: < 13.0<br>IRON DEFICIENCY ANEMIA: >13.0 |
| GREEN & KING INDEX<br>*by CALCULATED* | 21.98 | RATIO | BETA THALASSEMIA TRAIT: < = 65.0<br>IRON DEFICIENCY ANEMIA: > 65.0 |
| **WHITE BLOOD CELLS (WBCS)** | | | |
| TOTAL LEUCOCYTE COUNT (TLC)<br>*by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY* | 7860 | /cmm | 4000 - 11000 |
| NUCLEATED RED BLOOD CELLS (nRBCS)<br>*by CALCULATED BY AUTOMATED HEMATOLOGY ANALYZER & MICROSCOPY* | NIL | | 0.00 - 20.00 |
| NUCLEATED RED BLOOD CELLS (nRBCS) %<br>*by CALCULATED BY AUTOMATED HEMATOLOGY ANALYZER & MICROSCOPY* | NIL | % | < 10 % |
| **DIFFERENTIAL LEUCOCYTE COUNT (DLC)** | | | |

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| Test Name | Value | Unit | Biological Reference interval |
|---|---|---|---|
| NEUTROPHILS<br>*by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY* | 54 | % | 50 - 70 |
| LYMPHOCYTES<br>*by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY* | 37 | % | 20 - 40 |
| EOSINOPHILS<br>*by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY* | 4 | % | 1 - 6 |
| MONOCYTES<br>*by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY* | 5 | % | 2 - 12 |
| BASOPHILS<br>*by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY* | 0 | % | 0 - 1 |
| **ABSOLUTE LEUKOCYTES (WBC) COUNT** | | | |
| ABSOLUTE NEUTROPHIL COUNT<br>*by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY* | 4244 | /cmm | 2000 - 7500 |
| ABSOLUTE LYMPHOCYTE COUNT<br>*by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY* | 2908 | /cmm | 800 - 4900 |
| ABSOLUTE EOSINOPHIL COUNT<br>*by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY* | 314 | /cmm | 40 - 440 |
| ABSOLUTE MONOCYTE COUNT<br>*by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY* | 393 | /cmm | 80 - 880 |
| ABSOLUTE BASOPHIL COUNT<br>*by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY* | 0 | /cmm | 0 - 110 |
| **PLATELETS AND OTHER PLATELET PREDICTIVE MARKERS.** | | | |
| **PLATELET COUNT (PLT)**<br>***by HYDRO DYNAMIC FOCUSING, ELECTRICAL IMPEDENCE*** | **129000$^{L}$** | **/cmm** | **150000 - 450000** |
| PLATELETCRIT (PCT)<br>*by HYDRO DYNAMIC FOCUSING, ELECTRICAL IMPEDENCE* | 0.15 | % | 0.10 - 0.36 |
| **MEAN PLATELET VOLUME (MPV)**<br>***by HYDRO DYNAMIC FOCUSING, ELECTRICAL IMPEDENCE*** | **14$^{H}$** | **fL** | **6.50 - 12.0** |
| PLATELET LARGE CELL COUNT (P-LCC)<br>*by HYDRO DYNAMIC FOCUSING, ELECTRICAL IMPEDENCE* | 62000 | /cmm | 30000 - 90000 |
| **PLATELET LARGE CELL RATIO (P-LCR)**<br>***by HYDRO DYNAMIC FOCUSING, ELECTRICAL IMPEDENCE*** | **58.1$^{H}$** | **%** | **11.0 - 45.0** |
| PLATELET DISTRIBUTION WIDTH (PDW)<br>*by HYDRO DYNAMIC FOCUSING, ELECTRICAL IMPEDENCE* | 16.3 | % | 15.0 - 17.0 |

NOTE: TEST CONDUCTED ON EDTA WHOLE BLOOD

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| Test Name | Value | Unit | Biological Reference interval |
|---|---|---|---|

RECHECKED

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| **CLIENT CODE.** | : KOS DIAGNOSTIC LAB | **REPORTING DATE** | : 23/Jul/2024 12:12PM |
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| Test Name | Value | Unit | Biological Reference interval |
|---|---|---|---|

## ERYTHROCYTE SEDIMENTATION RATE (ESR)

| | | | |
|---|---|---|---|
| **ERYTHROCYTE SEDIMENTATION RATE (ESR)** | **35$^{H}$** | **mm/1st hr** | **0 - 20** |

***by MODIFIED WESTERGREN AUTOMATED METHOD***

**INTERPRETATION:**

1. ESR is a non-specific test because an elevated result often indicates the presence of inflammation associated with infection, cancer and auto-immune disease, but does not tell the health practitioner exactly where the inflammation is in the body or what is causing it.
2. An ESR can be affected by other conditions besides inflammation. For this reason, the ESR is typically used in conjunction with other test such as C-reactive protein
3. This test may also be used to monitor disease activity and response to therapy in both of the above diseases as well as some others, such as systemic lupus erythematosus

**CONDITION WITH LOW ESR**

A low ESR can be seen with conditions that inhibit the normal sedimentation of red blood cells, such as a high red blood cell count (polycythaemia), significantly high white blood cell count (leucocytosis) , and some protein abnormalities. Some changes in red cell shape (such as sickle cells in sickle cell anaemia) also lower the ESR.

**NOTE:**

1. ESR and C - reactive protein (C-RP) are both markers of inflammation.
2. Generally, ESR does not change as rapidly as does CRP, either at the start of inflammation or as it resolves.
3. **CRP is not affected by as many other factors as is ESR, making it a better marker of inflammation.**
4. If the ESR is elevated, it is typically a result of two types of proteins, globulins or fibrinogen.
5. Women tend to have a higher ESR, and menstruation and pregnancy can cause temporary elevations.
6. Drugs such as dextran, methyldopa, oral contraceptives, penicillamine procainamide, theophylline, and vitamin A can increase ESR, while aspirin, cortisone, and quinine may decrease it

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| Test Name | Value | Unit | Biological Reference interval |
|---|---|---|---|

## CLINICAL CHEMISTRY/BIOCHEMISTRY

### GLUCOSE RANDOM (R)

| | | | |
|---|---|---|---|
| **GLUCOSE RANDOM (R): PLASMA**<br>*by GLUCOSE OXIDASE - PEROXIDASE (GOD-POD)* | **168.79$^{H}$** | **mg/dL** | **NORMAL: < 140.00**<br>**PREDIABETIC: 140.0 - 200.0**<br>**DIABETIC: > 0R = 200.0** |

***INTERPRETATION***

**IN ACCORDANCE WITH AMERICAN DIABETES ASSOCIATION GUIDELINES:**

1. A random plasma glucose level below 140 mg/dl is considered normal.
2. A random glucose level between 140 - 200 mg/dl is considered as glucose intolerant or prediabetic. A fasting and post-prnadial blood test (after consumption of 75 gms of glucose) is recommended for all such patients.
3. A random glucose level of above 200 mg/dl is highly suggestive of diabetic state. A repeat post-prandial is strongly recommended for all such patients. A fasting plasma glucose level in excess of 125 mg/dl on both occasions is confirmatory for diabetic state.

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## LIVER FUNCTION TEST (COMPLETE)

| Test Name | Value | Unit | Biological Reference interval |
|---|---|---|---|
| BILIRUBIN TOTAL: SERUM<br>*by DIAZOTIZATION, SPECTROPHOTOMETRY* | 0.4 | mg/dL | INFANT: 0.20 - 8.00<br>ADULT: 0.00 - 1.20 |
| BILIRUBIN DIRECT (CONJUGATED): SERUM<br>*by DIAZO MODIFIED, SPECTROPHOTOMETRY* | 0.16 | mg/dL | 0.00 - 0.40 |
| BILIRUBIN INDIRECT (UNCONJUGATED): SERUM<br>*by CALCULATED, SPECTROPHOTOMETRY* | 0.24 | mg/dL | 0.10 - 1.00 |
| **SGOT/AST: SERUM**<br>***by IFCC, WITHOUT PYRIDOXAL PHOSPHATE*** | **58.02$^{H}$** | **U/L** | **7.00 - 45.00** |
| **SGPT/ALT: SERUM**<br>***by IFCC, WITHOUT PYRIDOXAL PHOSPHATE*** | **115.58$^{H}$** | **U/L** | **0.00 - 49.00** |
| AST/ALT RATIO: SERUM<br>*by CALCULATED, SPECTROPHOTOMETRY* | 0.5 | RATIO | 0.00 - 46.00 |
| ALKALINE PHOSPHATASE: SERUM<br>*by PARA NITROPHENYL PHOSPHATASE BY AMINO METHYL PROPANOL* | 93 | U/L | 40.0 - 150.0 |
| **GAMMA GLUTAMYL TRANSFERASE (GGT): SERUM**<br>***by SZASZ, SPECTROPHTOMETRY*** | **75$^{H}$** | **U/L** | **0.00 - 55.0** |
| TOTAL PROTEINS: SERUM<br>*by BIURET, SPECTROPHOTOMETRY* | 7.83 | gm/dL | 6.20 - 8.00 |
| ALBUMIN: SERUM<br>*by BROMOCRESOL GREEN* | 4.7 | gm/dL | 3.50 - 5.50 |
| GLOBULIN: SERUM<br>*by CALCULATED, SPECTROPHOTOMETRY* | 3.13 | gm/dL | 2.30 - 3.50 |
| A : G RATIO: SERUM<br>*by CALCULATED, SPECTROPHOTOMETRY* | 1.5 | RATIO | 1.00 - 2.00 |

***INTERPRETATION***

***NOTE***:- **To be correlated in individuals having SGOT and SGPT values higher than Normal Referance Range.**

**USE**:- Differential diagnosis of diseases of hepatobiliary system and pancreas.

**INCREASED:**

| | |
|---|---|
| DRUG HEPATOTOXICITY | > 2 |
| ALCOHOLIC HEPATITIS | > 2 (Highly Suggestive) |
| CIRRHOSIS | 1.4 - 2.0 |
| INTRAHEPATIC CHOLESTATIS | > 1.5 |
| HEPATOCELLULAR CARCINOMA & CHRONIC HEPATITIS | > 1.3 (Slightly Increased) |

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| Test Name | Value | Unit | Biological Reference interval |
|---|---|---|---|

**DECREASED:**

1. Acute Hepatitis due to virus, drugs, toxins (with AST increased 3 to 10 times upper limit of normal)
2. Extra Hepatic cholestatis: 0.8 (normal or slightly decreased).

**PROGNOSTIC SIGNIFICANCE:**

| | |
|---|---|
| NORMAL | < 0.65 |
| GOOD PROGNOSTIC SIGN | 0.3 - 0.6 |
| POOR PROGNOSTIC SIGN | 1.2 - 1.6 |

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| Test Name | Value | Unit | Biological Reference interval |
|---|---|---|---|
| **UREA** | | | |
| UREA: SERUM<br>*by UREASE - GLUTAMATE DEHYDROGENASE (GLDH)* | 20.01 | mg/dL | 10.00 - 50.00 |

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| Test Name | Value | Unit | Biological Reference interval |
|---|---|---|---|
| **CREATININE** | | | |
| CREATININE: SERUM<br>*by ENZYMATIC, SPECTROPHOTOMETRY* | 1.09 | mg/dL | 0.40 - 1.40 |

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| Test Name | Value | Unit | Biological Reference interval |
|---|---|---|---|
| **LITHIUM** | | | |
| LITHIUM: SERUM<br>*by ISE (ION SELECTIVE ELECTRODE)* | 1.15 | mmol/L | 0.30 - 1.50 |

***INTERPRETATION:***

| | | |
|---|---|---|
| Therapeutic | mmol/L | 0.6 - 1.2 |
| Potentially toxic | mmol/L | 1.5 - 2.5 |
| Severely toxic | mmol/L | > 2.5 |

1.Serum Lithium levels are useful for monitoring therapy of patients with bipolar disorders, including recurrent episodes of mania and depression and for evaluation of toxicity
2.Lithium alters the intraneuronal metabolism of catecholamines by an unknown mechanism. It is used to suppress the manic phase of manic-depressive psychosis.
3.Lithium is distributed throughout the total water spaces of the body and is excreted primarily by the kidney.
4.Toxicity from lithium salts leads to ataxia, slurred speech, and confusion.
5.Since the concentration of lithium in the serum varies with the time after the dose, blood for lithium determination should be drawn at a standard time, preferably 8 to 12 hours after the last dose (trough values).

***NOTE:*-Values above 1.6 mmol/L (trough values) are generally considered toxic and are indicative of dose modulation.**

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| Test Name | Value | Unit | Biological Reference interval |
|---|---|---|---|

## ENDOCRINOLOGY

### THYROID FUNCTION TEST: TOTAL

| | | | |
|---|---|---|---|
| TRIIODOTHYRONINE (T3): SERUM<br>*by CMIA (CHEMILUMINESCENT MICROPARTICLE IMMUNOASSAY)* | 1.024 | ng/mL | 0.35 - 1.93 |
| THYROXINE (T4): SERUM<br>*by CMIA (CHEMILUMINESCENT MICROPARTICLE IMMUNOASSAY)* | 7.11 | µgm/dL | 4.87 - 12.60 |
| THYROID STIMULATING HORMONE (TSH): SERUM<br>*by CMIA (CHEMILUMINESCENT MICROPARTICLE IMMUNOASSAY)* | 2.843 | µIU/mL | 0.35 - 5.50 |

**3rd GENERATION, ULTRASENSITIVE**

***INTERPRETATION:***

*TSH levels are subject to circadian variation, reaching peak levels between 2-4 a.m and at a minimum between 6-10 pm. The variation is of the order of 50%.Hence time of the day has influence on the measured serum TSH concentrations.*TSH stimulates the production and secretion of the metabolically active hormones, thyroxine (T4)and trilodothyronine (T3).Failure at any level of regulation of the hypothalamic-pituitary-thyroid axis will result in either underproduction (hypothyroidism) or overproduction(hyperthyroidism) of T4 and/or T3.

| CLINICAL CONDITION | T3 | T4 | TSH |
|---|---|---|---|
| Primary Hypothyroidism: | Reduced | Reduced | Increased (Significantly) |
| Subclinical Hypothyroidism: | Normal or Low Normal | Normal or Low Normal | High |
| Primary Hyperthyroidism: | Increased | Increased | Reduced (at times undetectable) |
| Subclinical Hyperthyroidism: | Normal or High Normal | Normal or High Normal | Reduced |

**LIMITATIONS:-**

1. T3 and T4 circulates in reversibly bound form with Thyroid binding globulins (TBG),and to a lesser extent albumin and Thyroid binding Pre Albumin so conditions in which TBG and protein levels alter such as pregnancy, excess estrogens, androgens, anabolic steroids and glucocorticoids may falsely affect the T3 and T4 levels and may cause false thyroid values for thyroid function tests.
2. Normal levels of T4 can also be seen in Hyperthyroid patients with :T3 Thyrotoxicosis, Decreased binding capacity due to hypoproteinemia or ingestion of certain drugs (eg: phenytoin , salicylates).
3. Serum T4 levles in neonates and infants are higher than values in the normal adult , due to the increased concentration of TBG in neonate serum.
4. TSH may be normal in central hypothyroidism , recent rapid correction of hyperthyroidism or hypothroidism , pregnancy , phenytoin therapy.

| TRIIODOTHYRONINE (T3) | | THYROXINE (T4) | | THYROID STIMULATING HORMONE (TSH) | |
|---|---|---|---|---|---|
| **Age** | **Refferance Range (ng/mL)** | **Age** | **Refferance Range ( µg/dL)** | **Age** | **Reference Range ( µIU/mL)** |
| **0 - 7 Days** | **0.20 - 2.65** | **0 - 7 Days** | **5.90 – 18.58** | **0 - 7 Days** | **2.43 - 24.3** |
| **7 Days - 3 Months** | **0.36 - 2.59** | **7 Days - 3 Months** | **6.39 - 17.66** | **7 Days - 3 Months** | **0.58 - 11.00** |
| **3 - 6 Months** | **0.51 - 2.52** | **3 - 6 Months** | **6.75 – 17.04** | **3 Days – 6 Months** | **0.70 - 8.40** |

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| | | | |
|---|---|---|---|
| **NAME** | **: Mr. P.K SINGH** | | |
| **AGE/ GENDER** | : 46 YRS/MALE | **PATIENT ID** | : 1557837 |
| **COLLECTED BY** | : | **REG. NO./LAB NO.** | **: 012407230022** |
| **REFERRED BY** | : DR RAJESH GUPTA | **REGISTRATION DATE** | : 23/Jul/2024 10:31 AM |
| **BARCODE NO.** | : 01513658 | **COLLECTION DATE** | : 23/Jul/2024 10:35AM |
| **CLIENT CODE.** | : KOS DIAGNOSTIC LAB | **REPORTING DATE** | : 23/Jul/2024 11:59AM |
| **CLIENT ADDRESS** | : 6349/1, NICHOLSON ROAD, AMBALA CANTT | | |

| Test Name | | | Value | Unit | Biological Reference interval |
|---|---|---|---|---|---|
| 6 - 12 Months | 0.74 - 2.40 | 6 - 12 Months | 7.10 – 16.16 | 6 – 12 Months | 0.70 - 7.00 |
| 1 - 10 Years | 0.92 - 2.28 | 1 - 10 Years | 6.00 - 13.80 | 1 – 10 Years | 0.60 - 5.50 |
| 11- 19 Years | 0.35 - 1.93 | 11 - 19 Years | 4.87- 13.20 | 11 – 19 Years | 0.50 – 5.50 |
| > 20 years (Adults) | 0.35 - 1.93 | > 20 Years (Adults) | 4.87 - 12.60 | > 20 Years (Adults) | 0.35– 5.50 |
| RECOMMENDATIONS OF TSH LEVELS DURING PREGNANCY ( µIU/mL) | | | | | |
| 1st Trimester | | | 0.10 – 2.50 | | |
| 2nd Trimester | | | 0.20 – 3.00 | | |
| 3rd Trimester | | | 0.30 – 4.10 | | |

**INCREASED TSH LEVELS:**

1.Primary or untreated hypothyroidism may vary from 3 times to more than 100 times normal depending upon degree of hypofunction.
2.Hypothyroid patients receiving insufficient thyroid replacement therapy.
3.Hashimotos thyroiditis
4.DRUGS: Amphetamines, idonie containing agents & dopamine antagonist.
5.Neonatal period, increase in 1st 2-3 days of life due to post-natal surge

**DECREASED TSH LEVELS:**

1.Toxic multi-nodular goitre & Thyroiditis.
2.Over replacement of thyroid harmone in treatment of hypothyroidism.
3.Autonomously functioning Thyroid adenoma
4.Secondary pituatary or hypothalmic hypothyroidism
5.Acute psychiatric illness
6.Severe dehydration.
7.DRUGS: Glucocorticoids, Dopamine, Levodopa, T4 replacement therapy, Anti-thyroid drugs for thyrotoxicosis.
8.Pregnancy: 1st and 2nd Trimester

*** End Of Report ***

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