

Dr. Vinay Chopra
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Dr. Yugam Chopra
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NAME : Mrs. KRISHNA CHOPRA
AGE/ GENDER : 85 YRS/FEMALE
COLLECTED BY : SURJESH
REFERRED BY :
BARCODE NO. : 01520239
CLIENT CODE. : KOS DIAGNOSTIC LAB
CLIENT ADDRESS : 6349/1, NICHOLSON ROAD, AMBALA CANTT

PATIENT ID : 1663100
REG. NO./LAB NO. : 012411060051
REGISTRATION DATE : 06/Nov/2024 01:50 PM
COLLECTION DATE : 06/Nov/2024 01:57PM
REPORTING DATE : 06/Nov/2024 03:13PM

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

HAEMATOLOGY COMPLETE BLOOD COUNT (CBC)

RED BLOOD CELLS (RBCS) COUNT AND INDICES

| | | | |
|---|-------------------|--------------|--|
| HAEMOGLOBIN (HB) <i>by CALORIMETRIC</i> | 12.3 | gm/dL | 12.0 - 16.0 |
| RED BLOOD CELL (RBC) COUNT <i>by HYDRO DYNAMIC FOCUSING, ELECTRICAL IMPEDENCE</i> | 4.71 | Millions/cmm | 3.50 - 5.00 |
| PACKED CELL VOLUME (PCV) <i>by CALCULATED BY AUTOMATED HEMATOLOGY ANALYZER</i> | 39.9 | % | 37.0 - 50.0 |
| MEAN CORPUSCULAR VOLUME (MCV) <i>by CALCULATED BY AUTOMATED HEMATOLOGY ANALYZER</i> | 84.6 | fL | 80.0 - 100.0 |
| MEAN CORPUSCULAR HAEMOGLOBIN (MCH) <i>by CALCULATED BY AUTOMATED HEMATOLOGY ANALYZER</i> | 26 ^L | pg | 27.0 - 34.0 |
| MEAN CORPUSCULAR HEMOGLOBIN CONC. (MCHC) <i>by CALCULATED BY AUTOMATED HEMATOLOGY ANALYZER</i> | 30.8 ^L | g/dL | 32.0 - 36.0 |
| RED CELL DISTRIBUTION WIDTH (RDW-CV) <i>by CALCULATED BY AUTOMATED HEMATOLOGY ANALYZER</i> | 14.6 | % | 11.00 - 16.00 |
| RED CELL DISTRIBUTION WIDTH (RDW-SD) <i>by CALCULATED BY AUTOMATED HEMATOLOGY ANALYZER</i> | 46.4 | fL | 35.0 - 56.0 |
| MENTZERS INDEX <i>by CALCULATED</i> | 17.96 | RATIO | BETA THALASSEMIA TRAIT: < 13.0 IRON DEFICIENCY ANEMIA: >13.0 |
| GREEN & KING INDEX <i>by CALCULATED</i> | 26.11 | RATIO | BETA THALASSEMIA TRAIT:<= 65.0 IRON DEFICIENCY ANEMIA: > 65.0 |

WHITE BLOOD CELLS (WBCS)

| | | | |
|--|------|------|--------------|
| TOTAL LEUCOCYTE COUNT (TLC) <i>by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY</i> | 7240 | /cmm | 4000 - 11000 |
| NUCLEATED RED BLOOD CELLS (nRBCS) <i>by AUTOMATED 6 PART HEMATOLOGY ANALYZER</i> | NIL | | 0.00 - 20.00 |
| NUCLEATED RED BLOOD CELLS (nRBCS) % <i>by CALCULATED BY AUTOMATED HEMATOLOGY ANALYZER</i> | NIL | % | < 10 % |



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| <u>DIFFERENTIAL LEUCOCYTE COUNT (DLC)</u> | | | |
| NEUTROPHILS <i>by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY</i> | 73 ^H | % | 50 - 70 |
| LYMPHOCYTES <i>by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY</i> | 19 ^L | % | 20 - 40 |
| EOSINOPHILS <i>by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY</i> | 2 | % | 1 - 6 |
| MONOCYTES <i>by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY</i> | 6 | % | 2 - 12 |
| BASOPHILS <i>by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY</i> | 0 | % | 0 - 1 |
| <u>ABSOLUTE LEUKOCYTES (WBC) COUNT</u> | | | |
| ABSOLUTE NEUTROPHIL COUNT <i>by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY</i> | 5285 | /cmm | 2000 - 7500 |
| ABSOLUTE LYMPHOCYTE COUNT <i>by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY</i> | 1376 | /cmm | 800 - 4900 |
| ABSOLUTE EOSINOPHIL COUNT <i>by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY</i> | 145 | /cmm | 40 - 440 |
| ABSOLUTE MONOCYTE COUNT <i>by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY</i> | 434 | /cmm | 80 - 880 |
| ABSOLUTE BASOPHIL COUNT <i>by FLOW CYTOMETRY BY SF CUBE & MICROSCOPY</i> | 0 | /cmm | 0 - 110 |
| <u>PLATELETS AND OTHER PLATELET PREDICTIVE MARKERS.</u> | | | |
| PLATELET COUNT (PLT) <i>by HYDRO DYNAMIC FOCUSING, ELECTRICAL IMPEDENCE</i> | 140000 ^L | /cmm | 150000 - 450000 |
| PLATELETCRIT (PCT) <i>by HYDRO DYNAMIC FOCUSING, ELECTRICAL IMPEDENCE</i> | 0.19 | % | 0.10 - 0.36 |
| MEAN PLATELET VOLUME (MPV) <i>by HYDRO DYNAMIC FOCUSING, ELECTRICAL IMPEDENCE</i> | 14 ^H | fL | 6.50 - 12.0 |
| PLATELET LARGE CELL COUNT (P-LCC) <i>by HYDRO DYNAMIC FOCUSING, ELECTRICAL IMPEDENCE</i> | 72000 | /cmm | 30000 - 90000 |
| PLATELET LARGE CELL RATIO (P-LCR) <i>by HYDRO DYNAMIC FOCUSING, ELECTRICAL IMPEDENCE</i> | 55 ^H | % | 11.0 - 45.0 |
| PLATELET DISTRIBUTION WIDTH (PDW) <i>by HYDRO DYNAMIC FOCUSING, ELECTRICAL IMPEDENCE</i> | 16.5 | % | 15.0 - 17.0 |

NOTE: TEST CONDUCTED ON EDTA WHOLE BLOOD





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RECHECKED




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CLINICAL CHEMISTRY/BIOCHEMISTRY
KIDNEY FUNCTION TEST (COMPLETE)

| | | | |
|--|-------|-------|---------------|
| UREA: SERUM <i>by UREASE - GLUTAMATE DEHYDROGENASE (GLDH)</i> | 39.88 | mg/dL | 10.00 - 50.00 |
| CREATININE: SERUM <i>by ENZYMATIC, SPECTROPHOTOMETRY</i> | 0.97 | mg/dL | 0.40 - 1.20 |
| BLOOD UREA NITROGEN (BUN): SERUM <i>by CALCULATED, SPECTROPHOTOMETRY</i> | 18.64 | mg/dL | 7.0 - 25.0 |
| BLOOD UREA NITROGEN (BUN)/CREATININE RATIO: SERUM <i>by CALCULATED, SPECTROPHOTOMETRY</i> | 19.22 | RATIO | 10.0 - 20.0 |
| UREA/CREATININE RATIO: SERUM <i>by CALCULATED, SPECTROPHOTOMETRY</i> | 41.11 | RATIO | |
| URIC ACID: SERUM <i>by URICASE - OXIDASE PEROXIDASE</i> | 3.93 | mg/dL | 2.50 - 6.80 |
| CALCIUM: SERUM <i>by ARSENAZO III, SPECTROPHOTOMETRY</i> | 8.99 | mg/dL | 8.50 - 10.60 |
| PHOSPHOROUS: SERUM <i>by PHOSPHOMOLYBDATE, SPECTROPHOTOMETRY</i> | 3.05 | mg/dL | 2.30 - 4.70 |

ELECTROLYTES

| | | | |
|---|--------------------------|--------|---------------|
| SODIUM: SERUM <i>by ISE (ION SELECTIVE ELECTRODE)</i> | 147.2 | mmol/L | 135.0 - 150.0 |
| POTASSIUM: SERUM <i>by ISE (ION SELECTIVE ELECTRODE)</i> | 4.06 | mmol/L | 3.50 - 5.00 |
| CHLORIDE: SERUM <i>by ISE (ION SELECTIVE ELECTRODE)</i> | 110.4^H | mmol/L | 90.0 - 110.0 |

ESTIMATED GLOMERULAR FILTRATION RATE

| | |
|--|------|
| ESTIMATED GLOMERULAR FILTRATION RATE (eGFR): SERUM <i>by CALCULATED</i> | 57.3 |
|--|------|

INTERPRETATION:

To differentiate between pre- and post renal azotemia.

INCREASED RATIO (>20:1) WITH NORMAL CREATININE:

1. Prerenal azotemia (BUN rises without increase in creatinine) e.g. heart failure, salt depletion, dehydration, blood loss) due to decreased glomerular filtration rate.




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- Catabolic states with increased tissue breakdown.
- GI haemorrhage.
- High protein intake.
- Impaired renal function plus
- Excess protein intake or production or tissue breakdown (e.g. infection, GI bleeding, thyrotoxicosis, Cushing's syndrome, high protein diet, burns, surgery, cachexia, high fever).
- Urine reabsorption (e.g. ureter colostomy)
- Reduced muscle mass (subnormal creatinine production)
- Certain drugs (e.g. tetracycline, glucocorticoids)

INCREASED RATIO (>20:1) WITH ELEVATED CREATININE LEVELS:

- Postrenal azotemia (BUN rises disproportionately more than creatinine) (e.g. obstructive uropathy).
- Prerenal azotemia superimposed on renal disease.

DECREASED RATIO (<10:1) WITH DECREASED BUN :

- Acute tubular necrosis.
- Low protein diet and starvation.
- Severe liver disease.
- Other causes of decreased urea synthesis.
- Repeated dialysis (urea rather than creatinine diffuses out of extracellular fluid).
- Inherited hyperammonemias (urea is virtually absent in blood).
- SIADH (syndrome of inappropriate antidiuretic hormone) due to tubular secretion of urea.
- Pregnancy.

DECREASED RATIO (<10:1) WITH INCREASED CREATININE:

- Phenacimide therapy (accelerates conversion of creatine to creatinine).
- Rhabdomyolysis (releases muscle creatinine).
- Muscular patients who develop renal failure.

INAPPROPRIATE RATIO:

- Diabetic ketoacidosis (acetoacetate causes false increase in creatinine with certain methodologies, resulting in normal ratio when dehydration should produce an increased BUN/creatinine ratio).
- Cephalosporin therapy (interferes with creatinine measurement).

ESTIMATED GLOMERULAR FILTRATION RATE:

| CKD STAGE | DESCRIPTION | GFR (mL/min/1.73m2) | ASSOCIATED FINDINGS |
|-----------|---------------------------------------|-----------------------|--|
| G1 | Normal kidney function | >90 | No proteinuria |
| G2 | Kidney damage with normal or high GFR | >90 | Presence of Protein , Albumin or cast in urine |
| G3a | Mild decrease in GFR | 60 -89 | |
| G3b | Moderate decrease in GFR | 30-59 | |
| G4 | Severe decrease in GFR | 15-29 | |
| G5 | Kidney failure | <15 | |




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COMMENTS:

1. Estimated Glomerular filtration rate (eGFR) is the sum of filtration rates in all functioning nephrons and so an estimation of the GFR provides a measure of functioning nephrons of the kidney.
2. eGFR calculated using the 2009 CKD-EPI creatinine equation and GFR category reported as per KDIGO guideline 2012
3. In patients, with eGFR creatinine between 45-59 ml/min/1.73 m² (G3) and without any marker of Kidney damage, It is recommended to measure eGFR with Cystatin C for confirmation of CKD
4. eGFR category G1 OR G2 does not fulfill the criteria for CKD, in the absence of evidence of Kidney Damage
5. In a suspected case of Acute Kidney Injury (AKI), measurement of eGFR should be done after 48-96 hours of any Intervention or procedure
6. eGFR calculated by Serum Creatinine may be less accurate due to certain factors like Race, Muscle Mass, Diet, Certain Drugs. In such cases, eGFR should be calculated using Serum Cystatin C
7. **A decrease in eGFR implies either progressive renal disease, or a reversible process causing decreased nephron function (eg, severe dehydration).**

ADVICE:

KDIGO guideline, 2012 recommends Chronic Kidney Disease (CKD) should be classified based on cause, eGFR category and Albuminuria (ACR) category. GFR & ACR category combined together reflect risk of progression and helps Clinician to identify the individual who are progressing at more rapid rate than anticipated




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AMMONIA (NH3)

| | | | |
|--|------|-------|---------|
| AMMONIA (NH3): BLOOD | 32.4 | µg/dL | 27 - 90 |
| by ENZYMATIC - GLDH, SPECTROPHOTOMETRY | | | |

INTERPRETATION:

Ammonia is elevated in the following condition:

1. Liver disease
2. urinary tract infection with distention and stasis
3. Reye syndrome
4. inborn errors of metabolism including deficiency of enzymes in the urea cycle
5. HHH syndrome (hyperammonemia - homocitrullinuria, hyperornithinemia)
6. Some normal neonates (usually returning to normal in 48 hours)
7. Total parenteral nutrition
8. Ureterosigmoidostomy
9. Sodium valproate therapy.
10. Ammonia determination is indicated in neonates with neurological deterioration, subjects with lethargy and/or emesis not explained, and in patients with possible encephalopathy.
11. Ammonia measurements are mainly of use in the diagnosis of urea cycle deficiencies (any neonate with unexplained nausea, vomiting, or neurological deterioration appearing after first feeding)




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ENDOCRINOLOGY

THYROID FUNCTION TEST: TOTAL

| | | | |
|--|-------|--------|--------------|
| TRIIODOTHYRONINE (T3): SERUM by CMIA (CHEMILUMINESCENT MICROPARTICLE IMMUNOASSAY) | 0.563 | ng/mL | 0.35 - 1.93 |
| THYROXINE (T4): SERUM by CMIA (CHEMILUMINESCENT MICROPARTICLE IMMUNOASSAY) | 5.34 | µg/dL | 4.87 - 12.60 |
| THYROID STIMULATING HORMONE (TSH): SERUM by CMIA (CHEMILUMINESCENT MICROPARTICLE IMMUNOASSAY) | 2.434 | 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 triiodothyronine (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 (e.g.: phenytoin, salicylates).
3. Serum T4 levels 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 hypothyroidism, 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 |
| 6 - 12 Months | 0.74 - 2.40 | 6 - 12 Months | 7.10 - 16.16 | 6 - 12 Months | 0.70 - 7.00 |




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| 1 - 10 Years | 0.92 - 2.28 | 1 - 10 Years | 6.00 - 13.80 |
| 11- 19 Years | 0.35 - 1.93 | 11 - 19 Years | 4.87- 13.20 |
| > 20 years (Adults) | 0.35 - 1.93 | > 20 Years (Adults) | 4.87 - 12.60 |
| RECOMMENDATIONS OF TSH LEVELS DURING PREGNANCY (μ U/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, iodine 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 goiter & Thyroiditis.
- 2.Over replacement of thyroid hormone in treatment of hypothyroidism.
- 3.Autonomously functioning Thyroid adenoma
- 4.Secondary pituitary or hypothalamic 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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