Dr. Vinay Chopra
MD (Pathology & Microbiology)
Chairman & Consultant Pathologist

Dr. Yugam Chopra
MD (Pathology)
CEO & Consultant Pathologist



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|---|---|---|---|
| **NAME** | **: Mrs. KAMLESH KALRA** | | |
| **AGE/ GENDER** | : 68 YRS/FEMALE | **PATIENT ID** | : 1620153 |
| **COLLECTED BY** | : | **REG. NO./LAB NO.** | **: 012409210004** |
| **REFERRED BY** | : | **REGISTRATION DATE** | : 21/Sep/2024 07:15 AM |
| **BARCODE NO.** | : 01517370 | **COLLECTION DATE** | : 21/Sep/2024 07:51AM |
| **CLIENT CODE.** | : KOS DIAGNOSTIC LAB | **REPORTING DATE** | : 21/Sep/2024 01:12PM |
| **CLIENT ADDRESS** | : 6349/1, NICHOLSON ROAD, AMBALA CANTT | | |

| Test Name | Value | Unit | Biological Reference interval |
|---|---|---|---|
| **CLINICAL CHEMISTRY/BIOCHEMISTRY** | | | |
| **KIDNEY FUNCTION TEST (COMPLETE)** | | | |
| UREA: SERUM<br>*by UREASE - GLUTAMATE DEHYDROGENASE (GLDH)* | 25.91 | mg/dL | 10.00 - 50.00 |
| CREATININE: SERUM<br>*by ENZYMATIC, SPECTROPHOTOMETERY* | 0.87 | mg/dL | 0.40 - 1.20 |
| BLOOD UREA NITROGEN (BUN): SERUM<br>*by CALCULATED, SPECTROPHOTOMETRY* | 12.11 | mg/dL | 7.0 - 25.0 |
| BLOOD UREA NITROGEN (BUN)/CREATININE RATIO: SERUM<br>*by CALCULATED, SPECTROPHOTOMETRY* | 13.92 | RATIO | 10.0 - 20.0 |
| UREA/CREATININE RATIO: SERUM<br>*by CALCULATED, SPECTROPHOTOMETRY* | 29.78 | RATIO | |
| URIC ACID: SERUM<br>*by URICASE - OXIDASE PEROXIDASE* | 4.85 | mg/dL | 2.50 - 6.80 |
| CALCIUM: SERUM<br>*by ARSENAZO III, SPECTROPHOTOMETRY* | 9.14 | mg/dL | 8.50 - 10.60 |
| PHOSPHOROUS: SERUM<br>*by PHOSPHOMOLYBDATE, SPECTROPHOTOMETRY* | 3.1 | mg/dL | 2.30 - 4.70 |
| **ELECTROLYTES** | | | |
| SODIUM: SERUM<br>*by ISE (ION SELECTIVE ELECTRODE)* | 136.5 | mmol/L | 135.0 - 150.0 |
| POTASSIUM: SERUM<br>*by ISE (ION SELECTIVE ELECTRODE)* | 3.75 | mmol/L | 3.50 - 5.00 |
| CHLORIDE: SERUM<br>*by ISE (ION SELECTIVE ELECTRODE)* | 102.38 | mmol/L | 90.0 - 110.0 |
| **ESTIMATED GLOMERULAR FILTERATION RATE** | | | |
| ESTIMATED GLOMERULAR FILTERATION RATE (eGFR): SERUM<br>*by CALCULATED* | 72.5 | | |

***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

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glomerular filtration rate.
2. Catabolic states with increased tissue breakdown.
3. GI haemorrhage.
4. High protein intake.
5. Impaired renal function plus
6. 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).
7. Urine reabsorption (e.g. ureter colostomy)
8. Reduced muscle mass (subnormal creatinine production)
9. Certain drugs (e.g. tetracycline, glucocorticoids)

**INCREASED RATIO (>20:1) WITH ELEVATED CREATININE LEVELS:**
1. Postrenal azotemia (BUN rises disproportionately more than creatinine) (e.g. obstructive uropathy).
2. Prerenal azotemia superimposed on renal disease.

**DECREASED RATIO (<10:1) WITH DECREASED BUN :**
1. Acute tubular necrosis.
2. Low protein diet and starvation.
3. Severe liver disease.
4. Other causes of decreased urea synthesis.
5. Repeated dialysis (urea rather than creatinine diffuses out of extracellular fluid).
6. Inherited hyperammonemias (urea is virtually absent in blood).
7. SIADH (syndrome of inappropiate antidiuretic harmone) due to tubular secretion of urea.
8. Pregnancy.

**DECREASED RATIO (<10:1) WITH INCREASED CREATININE:**
1. Phenacimide therapy (accelerates conversion of creatine to creatinine).
2. Rhabdomyolysis (releases muscle creatinine).
3. Muscular patients who develop renal failure.

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

**ESTIMATED GLOMERULAR FILTERATION 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 fullfill 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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## IMMUNOPATHOLOGY/SEROLOGY

### ANTI CYCLIC CITRULLINATED PEPTIDE CCP2 (HIGHLY SENSITIVE)

| | | | |
|---|---|---|---|
| ANTI CYCLIC CITRULLINATED PEPTIDE (CCP) ANTIBODY: SERUM | < 0.5 | AU/mL | 0.00 - 5.00 |

*by CMIA (CHEMILUMINESCENCE IMMUNOASSAY)*

***INTERPRETATION:***

1. ANTI-CCP antibodies are potentially important surrogate marker for diagnosis and prognosis in rheumatoid arthritis (RA).
2. Anti-CCP is of two types: Anti-CCP1 & Anti-CCP2.
***3. Anti-CCP2 is HIGHLY SENSITIVE (71%) & more specific (98%) than Anti-CCP1.***
4. Anti-CCP2 predict the eventual development in Rheumatoid Arthritis (RA), when found in undifferentiated arthritis
5. Anti-CCP2 may be detected in healthy individual's years before onset of clinical Rheumatoid Arthritis as well as to differentiate elderly onset Rheumatoid Arthritis from Polymyalgia Rheumatic & Erosive SLE.
***6. The positive predictive value of Anti-CCP antibodies for Rheumatoid Arthritis is far greater than Rheumatoid factor. Up to 30% patients with seronegative Rheumatoid Arthritis also show Anti CCP antibodies***

**RHEUMATOID ARTHIRITIS:**

1. Rheumatoid Arthritis is a systemic autoimmune disease that is multi-functional in origin and is characterized by chronic inflammation of the membrane lining (synovium) joints which leads to progressive joint destruction and in most cases to disability and reduction of quality life.
2. The disease spreads from small to large joints, with greatest damage in early phase.
3. The diagnosis of RA is primarily based on clinical, radiological & immunological features. The most frequent serological test is the measurement of RA factor.
4. RA factor is not specific for rheumatoid arthritis, as it is often present in healthy individuals with other autoimmune diseases and chronic infections.
5. ANTI-CCP have been discovered in joints of patients with RA, but not in other form of joint disease.

*** End Of Report ***

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