MC-5505

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Patient Name	**: Mr.S KIRAN**	Ref Doctor	: SELF
Age/Gender	: 28 Y 0 M 0 D /Male	Sample Collection	: 11/Dec/2023 01:03PM
Visit ID	: AMC12150	Registration	: 11/Dec/2023 12:47PM
Barcode No	**: 010021663**	Reported	: 11/Dec/2023 01:58PM
Client Name	:HEALWORLD HOSPITAL		

DEPARTMENT OF BIOCHEMISTRY

LIVER FUNCTION TEST

Total Bilirubin	0.4	mg/dL	0.2-1.2	Diazonium Salt
Conjugated (D. Bilirubin)	0.1	mg/dL	0.0-0.3	Diazo Reaction
Unconjugated (I.D.Bilirubin)	0.3	mg/dl	0.1-1.0	Calculated
Alkaline Phosphatase	78	U/L	30-128	Electrophoresis
Alanine Aminotransferase(ALT/SGPT)	10	U/L	upto 32	IFCC with pyridoxal-5- phosphate
Aspartate Transaminase (AST/SGOT)	19	U/L	5.0-35.0	Spectrophotometry
Gamma Glutamyl Transferase(GGT)	11	U/L	Upto 60	g-Glut-3-carboxy-4 nitro
Total Protein	6.9	gm/dl	6.4-8.3	Biuret
Albumin	4.1	g/dl	3.5-5.4	Bromocresol Green (BCG)
Globulin	2.8	g/dl	2.5-3.5	Calculated
Albumin/Globulin Ratio	1.46	Ratio	1.0-2.1	Calculated

Note:

- In an asymptomatic patient, Non-alcoholic fatty liver disease (NAFLD) is the most common cause of increased AST, ALT levels. NAFLD is considered as hepatic manifestation of metabolic syndrome.
- In most type of liver disease, ALT activity is higher than that of AST; exception may be seen in Alcoholic Hepatitis, Hepatic Cirrhosis, and Liver neoplasia. In a patient with Chronic liver disease, AST:ALT ratio>1 is highly suggestive of advanced liver fibrosis.
- In known cases of Chronic Liver disease due to Viral Hepatitis B & C, Alcoholic liver disease or NAFLD, Enhanced liver fibrosis (ELF) test may be used to evaluate liver fibrosis.
- In a patient with Chronic Liver disease, AFP and Des-gamma carboxyprothrombin (DCP)/PIVKA II can be used to assess risk for development of Hepatocellular Carcinoma.

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DEPARTMENT OF BIOCHEMISTRY

CALCIUM

Calcium	9.20	mg/dl	8.6-10.3	Spectrophotometry

INTERPRETATION:

- Calcium level is increased in patients with hyperparathyroidism, Vitamin D intoxication, metastatic bone tumor, milk-alkali syndrome, multiple myeloma, Paget's disease.
- Calcium level is decreased in patients with hemodialysis, hypoparathyroidism (primary, secondary), vitamin D deficiency, acute pancreatitis, diabetic Keto-acidosis, sepsis, acute myocardial infarction (AMI), malabsorption, osteomalacia, renal failure, rickets.

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LIPID PROFILE

Total Cholesterol	152	mg/dl	Desirable:<200 Borderline:200-239 High risk:>240	CHOD-POD
Cholesterol-HDL	45	mg/dl	Low:<40 Optimal:40-60 Desirable:>60	Enzymatic Colorimetric)
Cholesterol-LDL	88	mg/dl	Normal:<100 Above Optimal:100-129 Borderline High:130-159 High:160-189 Very High:>190	Calculated
Cholesterol- VLDL	19	mg/dl	7-40	Calculated
Triglycerides	95	mg/dl	Normal:<150 BorderLine:150-199 High:200-499 Very High:>500	Glycerol phosphate oxidase/peroxidase
Total Cholesterol /HDL Ratio	3.38		Desirable: <4 BorderLine : 4.1-6.0 High Risk : >6.0	Calculated
LDL / HDL Ratio	2.0	Ratio	0.0-3.5	Calculated

NOTE:

- Measurements in the same patient can show physiological & analytical variations. Three serial samples 1 week apart are recommended for Total Cholesterol, Triglycerides, HDL & LDL Cholesterol.
- Lipid Association of India (LAI) recommends screening of all adults above the age of 20 years for Atherosclerotic Cardiovascular Disease (ASCVD) risk factors especially lipid profile. This should be done earlier if there is family history of premature heart disease, dyslipidemia, obesity or other risk factors.

ASCVD Risk Stratification & Treatment goals in Indian population:

- Indians are at very high risk of developing ASCVD, they usually get the disease at an early age, have a more severe form of the disease and have poorer outcome as compared to the western populations.
- Many individuals remain asymptomatic before they get heart attack, ASCVD risk helps to identify high risk individuals even when

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there is no symptom related to heart disease.

- ASCVD risk category helps clinician to decide when to consider therapy and what should be the treatment goal.

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DEPARTMENT OF BIOCHEMISTRY

Glycosylated Hemoglobin (GHB/HbA1C)

Glycosylated Hemoglobin (GHB/HbA1C)	5.10	%	Non Diabetic:<6 Excellent control:6-7 Fair to Good control:7-8 Unsatisfactory control:8-10 Poor Control:>10	High-performance Liquid Chromatography (HPLC)
Estimated Average Glucose	100	mg/dl	Excellent Control : 90-120 Good Control:121-150 Average Control:151-180 Action Suggested:181-210 Poor Control:>211	Calculated

1. HbA1C has been endorsed by clinical groups and American Diabetes Association guidelines 2017 for diagnosing diabetes using a cut off point of 6.5%
2. Low glycated haemoglobin in a non diabetic individual are often associated with systemic inflammatory diseases, chronic anaemia (especially severe iron deficiency and haemolytic), chronic renal failure and liver diseases. Clinical correlation suggested.
3. In known diabetic patients, following values can be considered as a tool for monitoring the glycemic control.

Excellent control-6-7 %
Fair to Good control – 7-8 %
Unsatisfactory control – 8 to 10 %
Poor Control – More than 10 %
Note: Source for Reference Range: American Diabetes Association Guidelines

INCREASED IN

1. Chronic renal failure with or without hemodialysis.
2. Iron deficiency anemia. Increased serum triglycerides.
3. Alcohol.
4. Salicylate treatment.

DECREASED IN

1. Shortened RBC life span (hemolytic anemia, blood loss), Pregnancy.
2. Ingestion of large amounts (>1g/day) of vitamin C or E.
3. Hemoglobinopathies (e.g.: spherocytes) produce variable increase or decrease.
4. Results of %HbA1c are not reliable in patients with chronic blood loss and consequent variable erythrocyte life span.

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DEPARTMENT OF BIOCHEMISTRY

KIDNEY FUNCTION TEST				
Serum Urea	12	mg/dL	Upto 50	Spectrophotometry
Serum Creatinine	**0.5**	mg/dl	0.7-1.4	JAFFE-Kinetic
Serum Uric Acid	**2.2**	mg/dL	3.4-7.0	Spectrophotometry
Blood Urea NItrogen(BUN)	5.61	mg/dl	5-25	Calculated
Bun/Creatinine Ratio	11.22		6-22	Calculated
Sodium	137	mmol/L	136-146	ISE Indirect
Potassium	3.9	mmol/L	3.5-5.1	ISE Indirect
Chloride	105	mmol/L	98-107	ISE Indirect

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DEPARTMENT OF BIOCHEMISTRY

EGFR (ESTIMATED GLOMERULAR FILTRATION RATE)

Serum Creatinine	**0.5**	mg/dl	0.7-1.4	JAFFE-Kinetic
eGFR	**143.0**		90 - 120 mL/min/1.73 m2	Calculated (CKD-EPI Creatinine Equation)

Interpretation:

Stage	GFR*	Description
1	**90+**	Normal kidney function but urine findings or structural abnormalities or genetic trait point to kidney disease
2	**60-89**	Mildly reduced kidney function, and other findings (as for stage 1) point to kidney disease
3A **3B**	**45-59** **30-44**	Moderately reduced kidney function
4	**15-29**	Severely reduced kidney function
5	**<15 or on dialysis**	Very severe, or **end-stage** kidney failure

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DEPARTMENT OF BIOCHEMISTRY

PHOSPHORUS

Phosphrous	3.5	mg/dl	2.4-5.0	Molybdate-UV/ Endpoint Method

Interpretation:

Increased Phosphorus or Hyperphosphatemia:

- Renal diseases with increased blood urea (BUN) and creatinine
- Hypoparathyroidism with raised phosphate and decreased calcium. But renal function will be normal
- Liver diseases and cirrhosis
- Acromegaly
- Increased dietary intake
- Sarcoidosis
- Acidosis
- Hemolytic anemia

Decreased Level Of Phosphorus or Hypophosphatemia:

- Decreased intestinal absorption
- Rickets (Vit.D deficiency)
- Vomiting and severe diarrhea
- Severe malnutrition and malabsorption
- Acute alcoholism

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DEPARTMENT OF BIOCHEMISTRY

IRON PROFILE-1

Iron	**15**	µg/dL	33-193	FerroZine-without deproteinization.
Iron Binding Capacity - Total (TIBC)	**489**	µg/dL	250-450	Spectrophotometry
Transferrin	**348.2**	ug/dL	176 - 280	Immunoturbidimetry
Transferrin Saturation	**3.1**	%	20-50	Calculation

INTERPRETATION:

SERUM IRON INCREASED IN:

-Hemosiderosis of excessive iron intake (e.g. repeated blood transfusion, iron therapy, iron containing vitamins).
-Decreased formation of RBCs (thalassemia, pyridoxal deficiency anaemia).
-Increased destruction of RBCs (hemolytic anaemia).
-Acute liver damage
-Acute iron toxicity

SERUM IRON DECREASED IN:

-Iron deficiency anaemia
-Normochromic anaemia of infections & chronic diseases
-Nephrosis
-Menorrhagia
-Diurnal variation: Normal in mid morning, low values in mid afternoon, and very low values near midnight.

TIBC/UIBC INCREASED IN:

-Iron deficiency anemia
-Acute & Chronic blood loss
-Acute liver damage
-Progesterone birth control pills

TIBC/UIBC DECREASED IN:

-Hemochromatosis
-Cirrhosis of the liver
-Thalassemia
-Anemia of infective & chronic disease
-Nephrosis

TRANSFERRIN SATURATION INCREASED IN:

- High Values in iron overload
- Raised transferrin saturation is an early indicator of Iron accumulation in hemochromatosis.

TRANSFERRIN SATURATION DECREASED IN:

- Low Values in iron deficiency

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Barcode No	**: 010021665**	Reported	: 11/Dec/2023 03:01PM
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DEPARTMENT OF HAEMATOLOGY

ESR (ERYTHROCYTE SEDIMENTATION RATE) (SODIUM CITRATE PLASMA)				
Erythrocytes Sedimentation Rate (ESR)	**40**	mm/1st hr	1-10	Westergren

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DEPARTMENT OF HAEMATOLOGY

COMPLETE BLOOD PICTURE				
Hemoglobin(HB)	**8.2**	g/dl	13.0-17.0	Spectrophotometry, Cyanide free SLS
Erythrocyte count (RBC COUNT)	4.8	million/cmm	4.5-5.5	Impedance
Packed Cell Volume(Hematocrit)	**27.9**	%	40-50	Cell Counter
Platelet Count	**4.58**	Lakh/cumm	1.50 - 4.10	Impedance/microscopy
Red Blood Cell Indices				
Mean Cell Volume (MCV)	**58**	fL	83-101	Automated/Calculated
Mean Cell Haemoglobin (MCH)	**16.9**	pg	27-32	Automated/Calculated
Mean Corpuscular Hb Concn. (MCHC)	**29.2**	g/dl	31.5-34.5	Automated/Calculated
Red Cell Distribution Width (RDW)- CV	**22.4**	%	11.5-14.5	Automated/Calculated
Total Count and Differential Count				
Total Leucocyte Count (WBC)	8,990	Cells/cumm	4000-11000	Impedance/microscopy
Neutrophils	64.69	%	40-80	Impedance/microscopy
Lymphocytes	21.91	%	20-40	Impedance/microscopy
Eosinophils	4.51	%	01-06	Impedance/microscopy
Monocytes	8.31	%	02-10	Impedance/microscopy
Basophils	0.57	%	00-02	Impedance/microscopy
Absolute Neutrophil Count	5.82	x10^3 Cells/uL	2.0-7.0	
Absolute Lymphocyte Count	1.97	x10^3 Cells/uL	1.0-3.0	
Absolute Eosinophil Count	0.41	x10^3 Cells/uL	0.02-0.5	
Absolute Monocyte Count	0.75	x10^3 Cells/uL	0.2-1.0	
Absolute Basophil Count	0.05	x10^3 Cells/uL	0-0.1	

RBC: Microcytic Hypochromic
WBC: Within normal limits

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DEPARTMENT OF HAEMATOLOGY

Platelets: Mild thrombocytosis

Advised serum iron studies.
Kindly Correlate Clinically.

Reference: Dacie and Lewis Practical Hematology, 12th Edition

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DEPARTMENT OF CLINICAL PATHOLOGY

CUE(Complete Urine Examination) (URINE)				
PHYSICAL EXAMINATION				
Colour	YELLOW			
Appearance	Slightly Hazy			
CHEMICAL EXAMINATION				
pH	5.5		5.0-8.5 New Born:5.0-7.0	
Specific gravity	1.025		1.000-1.030	
Proteins	**Trace**			
Glucose	Nil			
Ketonebodies	Negative		Negative	
Blood	Negative		Negative	
Bilirubin	Negative		Negative	
Urobilinogen	Normal		Normal	
Nitrites	Negative		Negative	
MICROSCOPIC EXAMINATION				
Pus cells	8-10	Cells/Hpf	0-5	Microscopy
Epithelial Cells	6-8	Cells/Hpf	0-5	Microscopy
RBCs	1-2	Cells/Hpf	Nil	Microscopy
Crystals	Nil		Nil	Microscopy
Casts	Nil		Nil	Microscopy
Bacteria	Seen			Microscopy
Others	Nil			Microscopy

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DEPARTMENT OF IMMUNOASSAY

THYROID PROFILE - II

Tri-Iodothyronine Total (TT3)	132.61	ng/dL	>18 yrs: 60 -181 Pregnancy 1st Trimester: 81-190 2nd &3rd trimester:100-260	Chemiluminescence
Triiodothyronine-Free (FT3)	3.59	pg/ml	2.30-4.20	Chemiluminescence
Thyroxine Total (TT4)	9.7	µg/dL	4.6-10.9~Pregnancy 1st Trimester: 4.6-16.5 2nd &3rd trimester:4.6-18.5	Chemiluminescence
Thyroxine-Free (FT4)	1.05	ng/dl	0.89-1.76	Chemiluminescence
Thyroid Stimulating Hormone (TSH)	0.83	µIU/mL	9 Yrs – 55 Yrs : 0.35–5.50	Chemiluminescence

INTERPRETATION:

- Serum T3, T4 and TSH are the measurements form three components of thyroid screening panel and are useful in diagnosing various disorders of thyroid gland function.
- Primary hyperthyroidism is accompanied by elevated serum T3 and T4 values along with depressed TSH levels.
- Primary hypothyroidism is accompanied by depressed serum T3 and T4 values and elevated serum TSH levels.
- Normal T4 levels accompanied by high T3 levels are seen in patients with T3 thyrotoxicosis. Slightly elevated T3 levels may be found in pregnancy and in estrogen therapy while depressed levels may be encountered in severe illness, malnutrition, renal failure and during therapy with drugs like propanolol and propylthiouracil.
- Although elevated TSH levels are nearly always indicative of primary hypothyroidism, rarely they can result from TSH secreting pituitary tumors (secondary hyperthyroidism).
- Low levels of Thyroid hormones (T3, T4 & FT3, FT4) are seen in cases of primary, secondary and tertiary hypothyroidism and sometimes in non-thyroidal illness also.
- Increased levels are found in Grave's disease, hyperthyroidism and thyroid hormone resistance.
- TSH levels are raised in primary hypothyroidism and are low in hyperthyroidism and secondary hypothyroidism.

REFERENCE RANGE :

PREGNANCY	TSH in uIU/mL
1st Trimester	0.60 - 3.40
2nd Trimester	0.37 - 3.60
3rd Trimester	0.38 – 4.04

Age	TSH in uIU/mL
0 – 4 Days	1.00 - 39.00

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2 Weeks to 5 Months	1.70 – 9.10
6 Months to 20 Yrs.	0.70 – 6.40
>55 Yrs.	0.50 - 8.90

(References range recommended by the American Thyroid Association)

Comments:

- During pregnancy, Free thyroid profile (FT3, FT4 & Ultra-TSH) is recommended.
- TSH levels are subject to circadian variation, reaches peak levels between 2-4 AM and at a minimum between 6-10 PM. The variation of the day has influence on the measured serum TSH concentrations.

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H.NO:2-2-1118/12 & 13, SHIVAM ROAD, NEW NALLAKUNTA ,HYDERABAD - 500 004

MC-5505

aira Diagnostics
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Patient Name	**: Mr.S KIRAN**	Ref Doctor	: SELF
Age/Gender	: 28 Y 0 M 0 D /Male	Sample Collection	: 11/Dec/2023 01:03PM
Visit ID	: AMC12150	Registration	: 11/Dec/2023 12:47PM
Barcode No	**: 010021663**	Reported	: 11/Dec/2023 02:24PM
Client Name	:HEALWORLD HOSPITAL		

DEPARTMENT OF IMMUNOASSAY

25-Hydroxy Vitamin D Total (D2 & D3)

25-Hydroxy Vitamin D Total (D2 & D3)	**7.80**	ng/ml	Deficient: <20 Insufficient: 20 to <30 Sufficient: 30-100 Upper Safety Limit: >120	Chemiluminescence

INTERPRETATION:

LEVEL	REFERENCE RANGE
Deficiency (serious deficient)	< 20 ng/ml
Insufficiency (Deficient)	20-30 ng/ml
Sufficient (adequate)	30-100 ng/ml
Upper Safety Limit	>100 ng/ml

DECREASED LEVELS: Deficiency in children causes Rickets and in adults leads to Osteomalacia. It can also lead to Hypocalcemia and Tetany.
Inadequate exposure to sunlight.
Dietary deficiency.
Vitamin D malabsorption.
Severe Hepatocellular disease.
Drugs like Anticonvulsants.
Nephrotic syndrome.
INCREASED LEVELS: Vitamin D intoxication.
COMMENTS:
1.Vitamin D (Cholecalciferol) promotes absorption of calcium and phosphorus and mineralization of bones and teeth. Vitamin D status is best determined by measurement of 25 hydroxy vitamin D, as it is the major circulating form and has longer half life (2-3 weeks) than 1, 25 Dihydronxy vitamin D (5-8 hrs).
2.The assay measures D3 (Cholecaciferol) metabolites of vitamin D.
3.25 (OH) D is influenced by sunlight, latitude, skin pigmentation, sunscreen use and hepatic function.
4.Optimal calcium absorption requires vitamin D 25 (OH) levels exceeding 75 nmol/L.
5.It shows seasonal variation, with values being 40-50% lower in winter than in summer.
6.Levels vary with age and are increased in pregnancy.
7.This is the recommended test for evaluation of vitamin D intoxication.

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QUALITY CONTROL APPROVED

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DEPARTMENT OF IMMUNOASSAY

VITAMIN B12

Vitamin B12	267	pg/mL	Deficiency:< 145 Indeterminate:145 –180 Normal: 180 - 914	CLIA

Interpretation:
Vitamin B12, also known as cyanocobalamin, is a water soluble vitamin that is required for the maturation of erythrocytes and coenzyme form for more than 12 different enzyme systems. Groupsat risk for vitamin B12 deficiency include those,
(1) older than 65 years of age (2) with malabsorption (3) who are vegetarians (4) with autoimmune disorders(5) taking prescribed medication known to interfere with vitamin absorption or metabolism, including nitrous oxide, phenytoin, dihydrofolate reductase inhibitors, metformin and proton pump inhibitors (6) infants with suspected metabolic disorders.
The most common cause of Vitamin B12 deficiency is pernicious anemia. Deficiency of Vitamin B12 is associated with megaloblastic anemia and neuropathy. Excess Vitamin B12 is excreted in urine. No adverse effects have been associated with excess vitamin B12 intake from food or supplements in healthy people.

COMMENTS:
Results may differ between laboratories due to variation in population and test method. Vitamin B12 is implicated in the formation of myelin, and along with Folate is required for DNA synthesis. The most prominent source of B12 for humans is meat while untreated fresh water can also be a source.
Megaloblastic anaemia has been found to be due to B12 deficiency, a major cause being Pernicious anemia due to poor B12 uptake resulting in below normal serum levels. Other conditions related to low B12 levels include iron deficiency anemia, pregnancy, vegetarianism, partial gastrectomy, ileal damage, oral contraceptives, parasitic infestations, pancreatic deficiency, treated epilepsy and advancing age. The correlation of serum B12 levels and Megaloblastic anemia however is not always clear - some patients with high MCV may have normal B12 levels, while some individuals with B12 deficiency may not have megaloblastic anemia. Disorders renal failure, liver diseases and myeloproliferative diseases may have elevated vitamin B12 levels.

LIMITATIONS:
For diagnostic purposes, the B12 results should be used in conjunction with other data; e.g.; symptoms results of other testing, clinical impressions, etc.
If the B12 level is inconsistent with clinical evidence, additional testing is suggested to confirm the result.

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DEPARTMENT OF IMMUNOASSAY

FOLATE SERUM (FOLIC ACID)

Folate Serum (Folic Acid)	5.9	ng/ml	0.35-3.37:Deficient 3.38-5.37:Indeterminate >5.38:Normal	Chemiluminescence

Interpretation :

Folic acid is a type of B vitamin.This test is done to check for folic acid deficiency. Folic acid helps form red blood cells and produce DNA that stores genetic codes. Taking the right amount of folic acid before and during pregnancy helps prevent neural tube defects, such as spina bifida. Women who are pregnant or planning to become pregnant should take at least 600 micrograms (mcg) of folic acid every day. Some women may need to take more if they have a history of neural tube defects in earlier pregnancies. Lower-than-normal folic acid levels may indicate: Poor diet Malabsorption syndrome (for example, celiac sprue) Malnutrition.

***** End Of Report *****

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