



## LABORATORY INVESTIGATION REPORT

<b>Patient Name</b> : Mr. VISWANATHAN CHANDRASEKHARAN <b>UHID</b> : SHHM.92037 <b>Episode</b> : OP <b>Ref. Doctor</b> : Self	<b>Age/Sex</b> : 37 Year(s) / Male <b>Order Date</b> : 13/04/2024 09:12 <b>Mobile No</b> : 8328524933 <b>DOB</b> : 09/06/1986 <b>Facility</b> : SEVENHILLS HOSPITAL, MUMBAI
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### HAEMATOLOGY

Test Name	Result	Unit	Biological Reference Interval
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Sample No : O0325791A	Collection Date : 13/04/24 09:29	Ack Date : 13/04/2024 11:32	Report Date : 13/04/24 11:51
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#### COMPLETE BLOOD COUNT (CBC) - EDTA WHOLE BLOOD

Test Name	Result	Unit	Biological Reference Interval
Total WBC Count	7.29	x10 <sup>3</sup> /ul	4.00 - 10.00
Neutrophils	58.2	%	40.00 - 80.00
Lymphocytes	33.1	%	20.00 - 40.00
Eosinophils	3.2	%	1.00 - 6.00
Monocytes	5.5	%	2.00 - 10.00
Basophils	<b>0.0 ▼ (L)</b>	%	1.00 - 2.00
Absolute Neutrophil Count	4.24	x10 <sup>3</sup> /ul	2.00 - 7.00
Absolute Lymphocyte Count	2.41	x10 <sup>3</sup> /ul	0.80 - 4.00
Absolute Eosinophil Count	0.24	x10 <sup>3</sup> /ul	0.02 - 0.50
Absolute Monocyte Count	0.40	x10 <sup>3</sup> /ul	0.12 - 1.20
Absolute Basophil Count	0.00	x10 <sup>3</sup> /ul	0.00 - 0.10
RBCs	5.03	x10 <sup>6</sup> /ul	4.50 - 5.50
Hemoglobin	15.5	gm/dl	13.00 - 17.00
Hematocrit	46.2	%	40.00 - 50.00
MCV	91.9	fl	83.00 - 101.00
MCH	30.8	pg	27.00 - 32.00



MC-5288

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MCHC	33.5	gm/dl	31.50 - 34.50
RED CELL DISTRIBUTION WIDTH-CV (RDW-CV)	12.7	%	11.00 - 16.00
RED CELL DISTRIBUTION WIDTH-SD (RDW-SD)	44.7	fl	35.00 - 56.00
Platelet	233	x10 <sup>3</sup> /ul	150.00 - 410.00
Mean Platelet Volume (MPV)	9.5	fl	6.78 - 13.46
PLATELET DISTRIBUTION WIDTH (PDW)	16.1	%	9.00 - 17.00
PLATELETCRIT (PCT)	0.221	%	0.11 - 0.28

**Method:-**

HB Colorimetric Method.

RBC/PLT Electrical Impedance Method.

WBC data Flow Cytometry by Laser Method.

MCV, MCH, MCHC, RDW and rest parameters - Calculated.

All Abnormal Haemograms are reviewed confirmed microscopically.

NOTE: Wallach's Interpretation of Diagnostic Tests. 11th Ed, Editors: Rao LV. 2021

**NOTE :-**

The International Council for Standardization in Haematology (ICSH) recommends reporting of absolute counts of various WBC subsets for clinical decision making. This test has been performed on a fully automated 5 part differential cell counter which counts over 10,000 WBCs to derive differential counts. A complete blood count is a blood panel that gives information about the cells in a patient's blood, such as the cell count for each cell type and the concentrations of Hemoglobin and platelets. The cells that circulate in the bloodstream are generally divided into three types: white blood cells (leukocytes), red blood cells (erythrocytes), and platelets (thrombocytes). Abnormally high or low counts may be physiological or may indicate disease conditions, and hence need to be interpreted clinically.

End of Report



**Dr. Ritesh Kharche**  
MD, PGD



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Consultant Pathologist and Director of  
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### HAEMATOLOGY

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#### **ERYTHROCYTE SEDIMENTATION RATE (ESR)**

ESR	10	mm/hr	0 - 20
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*Method: Westergren Method*

#### **INTERPRETATION :-**

*ESR is a non-specific phenomenon, its measurement is clinically useful in disorders associated with an increased production of acute-phase proteins. It provides an index of progress of the disease in rheumatoid arthritis or tuberculosis, and it is of considerable value in diagnosis of temporal arteritis and polymyalgia rheumatica. It is often used if multiple myeloma is suspected, but when the myeloma is non-secretory or light chain, a normal ESR does not exclude this diagnosis.*

*An elevated ESR may occur as an early feature in myocardial infarction. Although a normal ESR cannot be taken to exclude the presence of organic disease, the vast majority of acute or chronic infections and most neoplastic and degenerative diseases are associated with changes in the plasma proteins that increased ESR values.*

*The ESR is influenced by age, stage of the menstrual cycle and medications taken (corticosteroids, contraceptive pills). It is especially low (0-1 mm) in polycythaemia, hypofibrinogenaemia and congestive cardiac failure and when there are abnormalities of the red cells such as poikilocytosis, spherocytosis, or sickle cells. In cases of performance enhancing drug intake by athletes the ESR values are generally lower than the usual value for the individual and as a result of the increase in haemoglobin (i.e. the effect of secondary polycythaemia).*

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### Biochemistry

Test Name	Result	Unit	Biological Reference Interval
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<b>GLYCOSYLATED HAEMOGLOBIN (HBA1C)</b>			
<b>HbA1c</b> <i>Method - Immunoturbidimetry</i>	5.8	%	4 to 6% Non-diabetic 6.0--7.0% Excellent control 7.0--8.0% Fair to good control 8.0--10% Unsatisfactory control ABOVE 10% Poor control
<b>Estimated Average Glucose (eAG)</b> <i>Method - Calculated</i>	119.76	mg/dl	90 - 126

**NOTES :-**

1. HbA1c is used for monitoring diabetic control. It reflects the mean plasma glucose over three months
2. HbA1c may be falsely low in diabetics with hemolytic disease. In these individuals a plasma fructosamine level may be used which evaluates diabetes over 15 days.
3. Inappropriately low HbA1c values may be reported due to hemolysis, recent blood transfusion, acute blood loss, hypertriglyceridemia, chronic liver disease. Drugs like dapsone, ribavirin, antiretroviral drugs, trimethoprim, may also cause interference with estimation of HbA1c, causing falsely low values.
4. HbA1c may be increased in patients with polycythemia or post-splenectomy.
5. Inappropriately higher values of HbA1c may be caused due to iron deficiency, vitamin B12 deficiency, alcohol intake, uremia, hyperbilirubinemia and large doses of aspirin.
6. Trends in HbA1c are a better indicator of diabetic control than a solitary test.
7. Any sample with >15% HbA1c should be suspected of having a hemoglobin variant, especially in a non-diabetic patient. Similarly, below 4% should prompt additional studies to determine the possible presence of variant hemoglobin.
8. HbA1c target in pregnancy is to attain level <6 % .
9. HbA1c target in paediatric age group is to attain level < 7.5 %.



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*Method : turbidimetric inhibition immunoassay (TINIA) for hemolyzed whole blood*  
*Reference : American Diabetes Associations. Standards of Medical Care in Diabetes 2015*

<b><u>GLUCOSE-PLASMA-FASTING</u></b>			
Glucose,Fasting	97.58	mg/dl	70 - 110

*American Diabetes Association Reference Range :*

*Normal : < 100 mg/dl*  
*Impaired fasting glucose(Prediabetes) : 100 - 126 mg/dl*  
*Diabetes : >= 126 mg/dl*

*References:*

- 1) Pack Insert of Bio system
- 2) Tietz Textbook Of Clinical Chemistry And Molecular Diagnostics , 6th Ed, Editors: Rifai et al. 2018

*Interpretation :-*

*Conditions that can result in an elevated blood glucose level include: Acromegaly, Acute stress (response to trauma, heart attack, and stroke for instance), Chronic kidney disease, Cushing syndrome, Excessive consumption of food, Hyperthyroidism, Pancreatitis.*

*A low level of glucose may indicate hypoglycemia, a condition characterized by a drop in blood glucose to a level where first it causes nervous system symptoms (sweating, palpitations, hunger, trembling, and anxiety), then begins to affect the brain (causing confusion, hallucinations, blurred vision, and sometimes even coma and death). A low blood glucose level (hypoglycemia) may be seen with: Adrenal insufficiency, Drinking excessive alcohol, Severe liver disease, Hypopituitarism, Hypothyroidism, Severe infections, Severe heart failure, Chronic kidney (renal) failure, Insulin overdose, Tumors that produce insulin (insulinomas), Starvation.*

<b><u>Lipid Profile</u></b>			



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Total Cholesterol	178.49	mg/dl	CHILD Desirable - Less than : 170 CHILD Borderline High : 170-199 CHILD High - More than : 200 ADULT Desirable - Less than : 200 ADULT Borderline High : 200-239 ADULT High - More than : 240
Triglycerides <i>Method - glycerol Phosphate Oxidase/Peroxide</i>	245.56	mg/dl	NORMAL : <150 Borderline High : 150-199 High : 200-499 Very High : > 500
HDL Cholesterol <i>Method - Enzymatic immuno inhibition</i>	27.42	mg/dl	Desirable - Above 60 Borderline Risk : 40-59 Undesirable - Below :40
VLDL Cholesterol <i>Method - Calculated</i>	49.11	mg/dl	5 - 51
Total Cholesterol / HDL Cholesterol Ratio - Calculated <i>Method - Calculated</i>	<b>6.51 ▲ (H)</b>	RATIO	0 - 5

**Note:**

- 1) Biological Reference Interval is as per National Cholesterol Education Program (NCEP) Guidelines.
- 2) tests done on Fully Automated Biosystem BA-400 Biochemistry Analyser.

**Interpretation**

1. Triglycerides: When triglycerides are very high greater than 1000 mg/dL, there is a risk of developing pancreatitis in children and adults. Triglycerides change dramatically in response to meals, increasing as much as 5 to 10 times





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higher than fasting levels just a few hours after eating. Even fasting levels vary considerably day to day. Therefore, modest changes in fasting triglycerides measured on different days are not considered to be abnormal.

2. HDL-Cholesterol: HDL- C is considered to be beneficial, the so-called "good" cholesterol, because it removes excess cholesterol from tissues and carries it to the liver for disposal. If HDL-C is less than 40 mg/dL for men and less than 50 mg/dL for women, there is an increased risk of heart disease that is independent of other risk factors, including the LDL-C level. The NCEP guidelines suggest that an HDL cholesterol value greater than 60 mg/dL is protective and should be treated as a negative risk factor.

3. LDL-Cholesterol: Desired goals for LDL-C levels change based on individual risk factors. For young adults, less than 120 mg/dL is acceptable. Values between 120-159 mg/dL are considered Borderline high. Values greater than 160 mg/dL are considered high. Low levels of LDL cholesterol may be seen in people with an inherited lipoprotein deficiency and in people with hyperthyroidism, infection, inflammation, or cirrhosis.

### Uric Acid (Serum)

Method - Uricase

Uric Acid

Method - Uricase

**7.47 ▲ (H)**

mg/dl

3.5 - 7.2

### References:

1)Pack Insert of Bio system

2) TIETZ Textbook of Clinical chemistry and Molecular Diagnostics Edited by: Carl A.burtis,Edward R. Ashwood,David e. Bruns

### Interpretation:-

Uric acid is produced by the breakdown of purines. Purines are nitrogen-containing compounds found in the cells of the body,

including our DNA. Increased concentrations of uric acid can cause crystals to form in the joints, which can lead to the joint

inflammation and pain characteristic of gout. Low values can be associated with some kinds of liver or kidney diseases, Fanconi

syndrome, exposure to toxic compounds, and rarely as the result of an inherited metabolic defect ( Wilson disease).

### Liver Function Test ( LFT )

SGOT (Aspartate Transaminase) - SERUM

Method - IFCC

28.16

IU/L

0 - 35

SGPT (Alanine Transaminase) - SERUM

Method - IFCC

41.9

IU/L

0 - 45

Total Bilirubin - SERUM

Method - Diazo

0.86

mg/dl

0 - 2



MC-5288

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Direct Bilirubin - - SERUM <i>Method - Diazotization</i>	<b>0.45 ▲ (H)</b>	mg/dl	0 - 0.4
Indirect Bilirubin - Calculated <i>Method - Calculated</i>	0.41	mg/dl	0.1 - 0.8
Alkaline Phosphatase - SERUM <i>Method - IFCC AMP Buffer</i>	84.6	IU/L	43 - 115
Total Protein - SERUM <i>Method - Biuret</i>	7.2	gm/dl	6 - 7.8
Albumin - SERUM <i>Method - Bromo Cresol Green(BCG)</i>	4.67	gm/dl	3.5 - 5.2
Globulin - Calculated <i>Method - Calculated</i>	2.53	gm/dl	2 - 4
A:G Ratio <i>Method - Calculated</i>	1.85	:1	1 - 3

**References:**

- 1) Pack Insert of Bio system
- 2) Tietz Textbook Of Clinical Chemistry And Molecular Diagnostics, 6th Ed, Editors: Rifai et al. 2018

**Interperatation :-**

Bilirubin is a yellowish pigment found in bile and is a breakdown product of normal heme catabolism. Elevated levels results from increased bilirubin production (eg hemolysis and ineffective erythropoiesis); decreased bilirubin excretion (eg; obstruction and hepatitis); and abnormal bilirubin metabolism (eg; hereditary and neonatal jaundice). conjugated (direct) bilirubin is also elevated more than unconjugated (indirect) bilirubin when there is some kind of blockage of the bile ducts like in Gallstones getting into the bile ducts tumors & Scarring of the bile ducts. Increased unconjugated (indirect) bilirubin may be a result of hemolytic or pernicious anemia, transfusion reaction & a common metabolic condition termed Gilbert syndrome.

AST levels increase in viral hepatitis, blockage of the bile duct ,cirrhosis of the liver, liver cancer, kidney failure, hemolytic anemia, pancreatitis, hemochromatosis. Ast levels may also increase after a heart attck or strenuous activity. ALT is commonly measured as a part of a diagnostic evaluation of hepatocellular injury , to determine liver health. Elevated ALP levels are seen in Biliary Obstruction, Osteoblastic Bone Tumors, Osteomalacia, Hepatitis, Hyperparathyroidism, Leukemia, Lymphoma, paget's disease, Rickets, Sarcoidosis etc.

Elevated serum GGT activity can be found in diseases of the liver, Biliary system and pancreas. Conditions that increase serum GGT are obstructive liver disease, high alcohol consumption and use of enzyme-including drugs etc. Serum total protein, also known as total protein, is a biochemical test for measuring the total amount of protein in serum..Protein in the plasma is made up of albumin and globulin. Higher-than-normal levels may be due to: Chronic inflammation or infection, including HIV and hepatitis B or C, Multiple myeloma, Waldenstrom's disease.



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*Lower-than-normal levels may be due to: Agammaglobulinemia, Bleeding (hemorrhage), Burns, Glomerulonephritis, Liver disease, Malabsorption, Malnutrition, Nephrotic - Human serum albumin is the most abundant protein in human blood plasma. It is produced in the liver. Albumin constitutes about half of the blood serum protein. Low blood albumin levels (hypoalbuminemia) can be caused by: Liver disease like cirrhosis of the liver, nephrotic syndrome, protein-losing enteropathy, Burns, hemodilution, increased vascular permeability or decreased lymphatic clearance, malnutrition and wasting etc.*

### Renal Function Test ( RFT )

Parameter	Result	Unit	Reference Range
Urea - SERUM <i>Method - Urease</i>	32.4	mg/dl	15 - 39
BUN - SERUM <i>Method - Urease-GLDH</i>	15.14	mg/dl	4 - 18
Creatinine - SERUM <i>Method - Jaffes Kinetic</i>	1.13	mg/dl	0.5 - 1.3

#### References:

- 1) Pack Insert of Bio system
- 2) Tietz Textbook Of Clinical Chemistry And Molecular Diagnostics, 6th Ed, Editors: Rifai et al. 2018

#### Interpretation:-

*The blood urea nitrogen or BUN test is primarily used, along with the creatinine test, to evaluate kidney function in a wide range of circumstances, to help diagnose kidney disease, and to monitor people with acute or chronic kidney dysfunction or failure. It also may be used to evaluate a person's general health status.*

### GLUCOSE-PLASMA POST PRANDIAL

Parameter	Result	Unit	Reference Range
Glucose, Post Prandial	65.97 ▼ (L)	mg/dl	70 - 140

American Diabetes Association Reference Range :

#### Post-Prandial Blood Glucose:

- Non- Diabetic: Up to 140mg/dL
- Pre-Diabetic: 140-199 mg/dL
- Diabetic :>200 mg/dL

#### References:

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### Interpretation :-

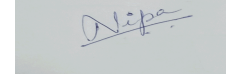
Conditions that can result in an elevated blood glucose level include: Acromegaly, Acute stress (response to trauma, heart attack, and stroke for instance), Chronic kidney disease, Cushing syndrome, Excessive consumption of food, Hyperthyroidism, Pancreatitis.

A low level of glucose may indicate hypoglycemia, a condition characterized by a drop in blood glucose to a level where first it causes nervous system symptoms (sweating, palpitations, hunger, trembling, and anxiety), then begins to affect the brain (causing confusion, hallucinations, blurred vision, and sometimes even coma and death). A low blood glucose level (hypoglycemia) may be seen with: Adrenal insufficiency, Drinking excessive alcohol, Severe liver disease, Hypopituitarism, Hypothyroidism, Severe infections, Severe heart failure, Chronic kidney (renal) failure, Insulin overdose, Tumors that produce insulin (insulinomas), Starvation.

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**Dr. Nipa Dhorda**  
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Pathologist



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<b>HbA1c</b> <i>Method - Immunoturbidimetry</i>	5.8	%	4 to 6% Non-diabetic 6.0--7.0% Excellent control 7.0--8.0% Fair to good control 8.0--10% Unsatisfactory control ABOVE 10% Poor control
<b>Estimated Average Glucose (eAG)</b> <i>Method - Calculated</i>	119.76	mg/dl	90 - 126

**NOTES :-**

1. HbA1c is used for monitoring diabetic control. It reflects the mean plasma glucose over three months
2. HbA1c may be falsely low in diabetics with hemolytic disease. In these individuals a plasma fructosamine level may be used which evaluates diabetes over 15 days.
3. Inappropriately low HbA1c values may be reported due to hemolysis, recent blood transfusion, acute blood loss, hypertriglyceridemia, chronic liver disease. Drugs like dapsone, ribavirin, antiretroviral drugs, trimethoprim, may also cause interference with estimation of HbA1c, causing falsely low values.
4. HbA1c may be increased in patients with polycythemia or post-splenectomy.
5. Inappropriately higher values of HbA1c may be caused due to iron deficiency, vitamin B12 deficiency, alcohol intake, uremia, hyperbilirubinemia and large doses of aspirin.
6. Trends in HbA1c are a better indicator of diabetic control than a solitary test.
7. Any sample with >15% HbA1c should be suspected of having a hemoglobin variant, especially in a non-diabetic patient. Similarly, below 4% should prompt additional studies to determine the possible presence of variant hemoglobin.
8. HbA1c target in pregnancy is to attain level <6 % .
9. HbA1c target in paediatric age group is to attain level < 7.5 %.



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<b><u>Lipid Profile</u></b>			



## LABORATORY INVESTIGATION REPORT

<b>Patient Name</b> : Mr. VISWANATHAN CHANDRASEKHARAN	<b>Age/Sex</b> : 37 Year(s) / Male
<b>UHID</b> : SHHM.92037	<b>Order Date</b> : 13/04/2024 09:12
<b>Episode</b> : OP	<b>Mobile No</b> : 8328524933
<b>Ref. Doctor</b> : Self	<b>DOB</b> : 09/06/1986
	<b>Facility</b> : SEVENHILLS HOSPITAL, MUMBAI

Total Cholesterol	178.49	mg/dl	CHILD Desirable - Less than : 170 CHILD Borderline High : 170-199 CHILD High - More than : 200 ADULT Desirable - Less than : 200 ADULT Borderline High : 200-239 ADULT High - More than : 240
Triglycerides <i>Method - glycerol Phosphate Oxidase/Peroxide</i>	245.56	mg/dl	NORMAL : <150 Borderline High : 150-199 High : 200-499 Very High : > 500
HDL Cholesterol <i>Method - Enzymatic immuno inhibition</i>	27.42	mg/dl	Desirable - Above 60 Borderline Risk : 40-59 Undesirable - Below :40
VLDL Cholesterol <i>Method - Calculated</i>	49.11	mg/dl	5 - 51
Total Cholesterol / HDL Cholesterol Ratio - Calculated <i>Method - Calculated</i>	<b>6.51 ▲ (H)</b>	RATIO	0 - 5

**Note:**

- 1) Biological Reference Interval is as per National Cholesterol Education Program (NCEP) Guidelines.
- 2) tests done on Fully Automated Biosystem BA-400 Biochemistry Analyser.

**Interpretation**

1. Triglycerides: When triglycerides are very high greater than 1000 mg/dL, there is a risk of developing pancreatitis in children and adults. Triglycerides change dramatically in response to meals, increasing as much as 5 to 10 times



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higher than fasting levels just a few hours after eating. Even fasting levels vary considerably day to day. Therefore, modest changes in fasting triglycerides measured on different days are not considered to be abnormal.

2. HDL-Cholesterol: HDL- C is considered to be beneficial, the so-called "good" cholesterol, because it removes excess cholesterol from tissues and carries it to the liver for disposal. If HDL-C is less than 40 mg/dL for men and less than 50 mg/dL for women, there is an increased risk of heart disease that is independent of other risk factors, including the LDL-C level. The NCEP guidelines suggest that an HDL cholesterol value greater than 60 mg/dL is protective and should be treated as a negative risk factor.

3. LDL-Cholesterol: Desired goals for LDL-C levels change based on individual risk factors. For young adults, less than 120 mg/dL is acceptable. Values between 120-159 mg/dL are considered Borderline high. Values greater than 160 mg/dL are considered high. Low levels of LDL cholesterol may be seen in people with an inherited lipoprotein deficiency and in people with hyperthyroidism, infection, inflammation, or cirrhosis.

### Uric Acid (Serum)

Method - Uricase

Uric Acid

Method - Uricase

**7.47 ▲ (H)**

mg/dl

3.5 - 7.2

### References:

1)Pack Insert of Bio system

2) TIETZ Textbook of Clinical chemistry and Molecular Diagnostics Edited by: Carl A.burtis,Edward R. Ashwood,David e. Bruns

### Interpretation:-

Uric acid is produced by the breakdown of purines. Purines are nitrogen-containing compounds found in the cells of the body,

including our DNA. Increased concentrations of uric acid can cause crystals to form in the joints, which can lead to the joint

inflammation and pain characteristic of gout. Low values can be associated with some kinds of liver or kidney diseases, Fanconi

syndrome, exposure to toxic compounds, and rarely as the result of an inherited metabolic defect ( Wilson disease).

### Liver Function Test ( LFT )

SGOT (Aspartate Transaminase) - SERUM

Method - IFCC

28.16

IU/L

0 - 35

SGPT (Alanine Transaminase) - SERUM

Method - IFCC

41.9

IU/L

0 - 45

Total Bilirubin - SERUM

Method - Diazo

0.86

mg/dl

0 - 2





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Direct Bilirubin - - SERUM <i>Method - Diazotization</i>	<b>0.45 ▲ (H)</b>	mg/dl	0 - 0.4
Indirect Bilirubin - Calculated <i>Method - Calculated</i>	0.41	mg/dl	0.1 - 0.8
Alkaline Phosphatase - SERUM <i>Method - IFCC AMP Buffer</i>	84.6	IU/L	43 - 115
Total Protein - SERUM <i>Method - Biuret</i>	7.2	gm/dl	6 - 7.8
Albumin - SERUM <i>Method - Bromo Cresol Green(BCG)</i>	4.67	gm/dl	3.5 - 5.2
Globulin - Calculated <i>Method - Calculated</i>	2.53	gm/dl	2 - 4
A:G Ratio <i>Method - Calculated</i>	1.85	:1	1 - 3

**References:**

- 1) Pack Insert of Bio system
- 2) Tietz Textbook Of Clinical Chemistry And Molecular Diagnostics, 6th Ed, Editors: Rifai et al. 2018

**Interperatation :-**

Bilirubin is a yellowish pigment found in bile and is a breakdown product of normal heme catabolism. Elevated levels results from increased bilirubin production (eg hemolysis and ineffective erythropoiesis); decreased bilirubin excretion (eg; obstruction and hepatitis); and abnormal bilirubin metabolism (eg; hereditary and neonatal jaundice). conjugated (direct) bilirubin is also elevated more than unconjugated (indirect) bilirubin when there is some kind of blockage of the bile ducts like in Gallstones getting into the bile ducts tumors & Scarring of the bile ducts. Increased unconjugated (indirect) bilirubin may be a result of hemolytic or pernicious anemia, transfusion reaction & a common metabolic condition termed Gilbert syndrome.

AST levels increase in viral hepatitis, blockage of the bile duct ,cirrhosis of the liver, liver cancer, kidney failure, hemolytic anemia, pancreatitis, hemochromatosis. Ast levels may also increase after a heart attck or strenuous activity. ALT is commonly measured as a part of a diagnostic evaluation of hepatocellular injury , to determine liver health. Elevated ALP levels are seen in Biliary Obstruction, Osteoblastic Bone Tumors, Osteomalacia, Hepatitis, Hyperparathyroidism, Leukemia, Lymphoma, paget's disease, Rickets, Sarcoidosis etc.

Elevated serum GGT activity can be found in diseases of the liver, Biliary system and pancreas. Conditions that increase serum GGT are obstructive liver disease, high alcohol consumption and use of enzyme-including drugs etc. Serum total protein, also known as total protein, is a biochemical test for measuring the total amount of protein in serum..Protein in the plasma is made up of albumin and globulin. Higher-than-normal levels may be due to: Chronic inflammation or infection, including HIV and hepatitis B or C, Multiple myeloma, Waldenstrom's disease.



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*Lower-than-normal levels may be due to: Agammaglobulinemia, Bleeding (hemorrhage), Burns, Glomerulonephritis, Liver disease, Malabsorption, Malnutrition, Nephrotic - Human serum albumin is the most abundant protein in human blood plasma. It is produced in the liver. Albumin constitutes about half of the blood serum protein. Low blood albumin levels (hypoalbuminemia) can be caused by: Liver disease like cirrhosis of the liver, nephrotic syndrome, protein-losing enteropathy, Burns, hemodilution, increased vascular permeability or decreased lymphatic clearance, malnutrition and wasting etc.*

### Renal Function Test ( RFT )

Parameter	Value	Unit	Reference Range
Urea - SERUM <i>Method - Urease</i>	32.4	mg/dl	15 - 39
BUN - SERUM <i>Method - Urease-GLDH</i>	15.14	mg/dl	4 - 18
Creatinine - SERUM <i>Method - Jaffes Kinetic</i>	1.13	mg/dl	0.5 - 1.3

#### References:

- 1) Pack Insert of Bio system
- 2) Tietz Textbook Of Clinical Chemistry And Molecular Diagnostics, 6th Ed, Editors: Rifai et al. 2018

#### Interpretation:-

*The blood urea nitrogen or BUN test is primarily used, along with the creatinine test, to evaluate kidney function in a wide range of circumstances, to help diagnose kidney disease, and to monitor people with acute or chronic kidney dysfunction or failure. It also may be used to evaluate a person's general health status.*

### GLUCOSE-PLASMA POST PRANDIAL

Parameter	Value	Unit	Reference Range
Glucose, Post Prandial	<b>65.97 ▼ (L)</b>	mg/dl	70 - 140

American Diabetes Association Reference Range :

#### Post-Prandial Blood Glucose:

- Non- Diabetic: Up to 140mg/dL
- Pre-Diabetic: 140-199 mg/dL
- Diabetic :>200 mg/dL

#### References:

- 1) Pack Insert of Bio system
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### Interpretation :-

Conditions that can result in an elevated blood glucose level include: Acromegaly, Acute stress (response to trauma, heart attack, and stroke for instance), Chronic kidney disease, Cushing syndrome, Excessive consumption of food, Hyperthyroidism, Pancreatitis.

A low level of glucose may indicate hypoglycemia, a condition characterized by a drop in blood glucose to a level where first it causes nervous system symptoms (sweating, palpitations, hunger, trembling, and anxiety), then begins to affect the brain (causing confusion, hallucinations, blurred vision, and sometimes even coma and death). A low blood glucose level (hypoglycemia) may be

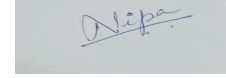
seen with: Adrenal insufficiency, Drinking excessive alcohol, Severe liver disease, Hypopituitarism, Hypothyroidism, Severe infections, Severe heart failure, Chronic kidney (renal) failure, Insulin overdose, Tumors that produce insulin (insulinomas), Starvation.

End of Report



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**MD, PGD**

Consultant Pathologist and Director of  
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RegNo: 2006/03/1680



**Dr. Nipa Dhorda**  
**MD**

Pathologist



MC-5288

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### IMMUNOLOGY

Test Name	Result	Unit	Biological Reference Interval
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Sample No : O0325791C	Collection Date : 13/04/24 09:29	Ack Date : 13/04/2024 09:42	Report Date : 13/04/24 12:28
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T3 - SERUM <i>Method - CLIA</i>	104.2	ng/dl	70.00 - 204.00
<b><u>TFT- Thyroid Function Tests</u></b>			
T4 - SERUM <i>Method - CLIA</i>	6.55	ug/dL	4.60 - 10.50
TSH - SERUM <i>Method - CLIA</i>	2.62	uIU/ml	0.40 - 4.50

**Reference Ranges (T3) Pregnancy:**

First Trimester 81 - 190

Second Trimester & Third Trimester 100 - 260

**Reference Ranges (TSH) Pregnancy:**

1st Trimester : 0.1 – 2.5

2nd Trimester : 0.2 – 3.0

3rd Trimester : 0.3 – 3.0

**Reference:**

1. Clinical Chemistry and Molecular Diagnostics, Tietz Fundamentals, 7th Edition & Endocrinology Guideliens

**Interpretation :-**

It is recommended that the following potential sources of variation should be considered while interpreting thyroid hormone results:

1. Thyroid hormones undergo rhythmic variation within the body this is called circadian variation in TSH secretion: Peak levels are seen between 2-4 am. Minimum levels seen between 6-10 am. This variation may be as much as 50% thus, influence of sampling time needs to be considered for clinical interpretation.
2. Circulating forms of T3 and T4 are mostly reversibly bound with Thyroxine binding globulins (TBG), and to a lesser extent with albumin and Thyroid binding PreAlbumin. Thus the conditions in which TBG and protein levels alter such as chronic liver disorders, pregnancy, excess of estrogens, androgens, anabolic steroids and glucocorticoids may cause misleading total T3, total T4 and TSH interpretations.
3. Total T3 and T4 levels are seen to have physiological rise during pregnancy and in patients on steroid treatment.
4. T4 may be normal the presence of hyperthyroidism under the following conditions : T3 thyrotoxicosis,



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*Hypoproteinemia related reduced binding, during intake of certain drugs (eg Phenytoin, Salicylates etc)*

5. Neonates and infants have higher levels of T4 due to increased concentration of TBG

6. TSH levels may be normal in central hypothyroidism, recent rapid correction of hypothyroidism or hyperthyroidism, pregnancy, phenytoin therapy etc.

7. TSH values of <0.03 uIU/mL must be clinically correlated to evaluate the presence of a rare TSH variant in certain individuals which is undetectable by conventional methods.

8. Presence of Autoimmune disorders may lead to spurious results of thyroid hormones

9. Various drugs can lead to interference in test results.

10. It is recommended that evaluation of unbound fractions, that is free T3 (fT3) and free T4 (fT4) for clinic-pathologic correlation, as these are the metabolically active forms.

End of Report

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<b>UHID</b>	: SHHM.92037	<b>Order Date</b>	: 13/04/2024 13:01
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## IMMUNOLOGY

Test Name	Result	Unit	Biological Reference Interval
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Sample No :	O0325863A	Collection Date :	13/04/24 13:31	Ack Date :	13/04/2024 13:35	Report Date :	13/04/24 15:33
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Vitamin D3 - SERUM <i>Method - CLIA</i>	15.8	ng/ml	DEFICIENCY :- < 10 MODERATE INSUFFICIENCY :- 11 - 20 MILD INSUFFICIENCY :- 21 - 25 SUFFICIENCY :- 26 - 70 TOXICITY :- > 70
<b><u>VITAMIN D -TOTAL(25 HYDROXY)</u></b>			

### Interpretation :-

Vitamin D is a lipid-soluble steroid hormone that is produced in the skin through the action of sunlight or is obtained from dietary sources. The role of vitamin D in maintaining homeostasis of calcium and phosphorus is well established.

The assay measures both D2 (Ergocalciferol) and D3 (Cholecalciferol) metabolites of vitamin D. 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 Dihydroxy vitamin D ( 5-8 hrs)

The reference ranges discussed in the preceding are related to total 25-OHD; as long as the combined total is 30 ng/mL or more, the patient has sufficient vitamin D. Levels needed to prevent rickets and osteomalacia (15 ng/mL) are lower than those that dramatically suppress parathyroid hormone levels (20–30 ng/mL). In turn, those levels are lower than levels needed to optimize intestinal calcium absorption (34 ng/mL). Neuromuscular peak performance is associated with levels approximately 38 ng/mL.

End of Report



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