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NAME	**: Mr. RAJINDER JAIN**		
AGE/ GENDER	: 70 YRS/MALE	**PATIENT ID**	: 1642031
COLLECTED BY	:	**REG. NO./LAB NO.**	**: 012410130014**
REFERRED BY	:	**REGISTRATION DATE**	: 13/Oct/2024 10:27 AM
BARCODE NO.	: 01518789	**COLLECTION DATE**	: 13/Oct/2024 03:08PM
CLIENT CODE.	: KOS DIAGNOSTIC LAB	**REPORTING DATE**	: 13/Oct/2024 04:16PM
CLIENT ADDRESS	: 6349/1, NICHOLSON ROAD, AMBALA CANTT		

Test Name	Value	Unit	Biological Reference interval

HAEMATOLOGY

GLYCOSYLATED HAEMOGLOBIN (HBA1C)

GLYCOSYLATED HAEMOGLOBIN (HbA1c): WHOLE BLOOD *by HPLC (HIGH PERFORMANCE LIQUID CHROMATOGRAPHY)*	6.3	%	4.0 - 6.4
ESTIMATED AVERAGE PLASMA GLUCOSE *by HPLC (HIGH PERFORMANCE LIQUID CHROMATOGRAPHY)*	134.11	mg/dL	60.00 - 140.00

INTERPRETATION:

AS PER AMERICAN DIABETES ASSOCIATION (ADA):		
REFERENCE GROUP	**GLYCOSYLATED HEMOGLOGIB (HBAIC) in %**	
Non diabetic Adults >= 18 years	<5.7	
At Risk (Prediabetes)	5.7 – 6.4	
Diagnosing Diabetes	>= 6.5	
Therapeutic goals for glycemic control	**Age > 19 Years**	
	Goals of Therapy:	< 7.0
	Actions Suggested:	>8.0
	Age < 19 Years	
	Goal of therapy:	<7.5

COMMENTS:

1.Glycosylated hemoglobin (HbA1c) test is three monthly monitoring done to assess compliace with therapeutic regimen in diabetic patients.

2.Since Hb1c reflects long term fluctuations in blood glucose concentration, a diabetic patient who has recently under good control may still have high concentration of HbAIc. Converse is true for a diabetic previously under good control but now poorly controlled.

3.Target goals of < 7.0 % may be beneficial in patients with short duration of diabetes, long life expectancy and no significant cardiovascular disease. In patients with significant complications of diabetes, limited life expectancy or extensive co-morbid conditions, targetting a goal of < 7.0% may not be appropiate.

4.High HbA1c (>9.0 -9.5 %) is strongly associated with risk of development and rapid progression of microvascular and nerve complications

5.Any condition that shorten RBC life span like acute blood loss, hemolytic anemia falsely lower HbA1c results.

6.HbA1c results from patients with HbSS,HbSC and HbD must be interpreted with caution , given the pathological processes including anemia,increased red cell turnover, and transfusion requirement that adversely impact HbA1c as a marker of long-term gycemic control.

7.Specimens from patients with polycythemia or post-splenctomy may exhibit increse in HbA1c values due to a somewhat longer life span of the red cells.

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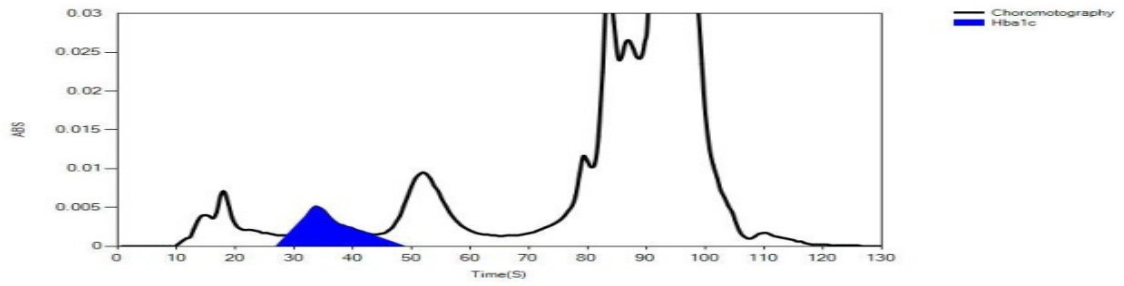
Test Name	Value	Unit	Biological Reference interval

LIFOTRONIC Graph Report

Name :	Case :	Patient Type :		Test Date : 13/10/2024 16:00:48
Age :	Department :	Sample Type : Whole Blood EDTA		Sample Id : 01518789
Gender :				Total Area : 15422

Peak Name	Retention Time(s)	Absorbance	Area	Result (Area %)
HbA0	68	4904	13849	85.4
HbA1c	38	95	815	6.3
La1c	25	51	356	2.2
HbF	20	14	76	0.5
Hba1b	13	72	203	1.2
Hba1a	11	40	123	0.8



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Test Name	Value	Unit	Biological Reference interval

CLINICAL CHEMISTRY/BIOCHEMISTRY

GLUCOSE FASTING (F)

GLUCOSE FASTING (F): PLASMA *by GLUCOSE OXIDASE - PEROXIDASE (GOD-POD)*	**128.5^{H}**	**mg/dL**	**NORMAL: < 100.0** **PREDIABETIC: 100.0 - 125.0** **DIABETIC: > 0R = 126.0**

INTERPRETATION

IN ACCORDANCE WITH AMERICAN DIABETES ASSOCIATION GUIDELINES:

1. A fasting plasma glucose level below 100 mg/dl is considered normal.
2. A fasting plasma glucose level between 100 - 125 mg/dl is considered as glucose intolerant or prediabetic. A fasting and post-prandial blood test (after consumption of 75 gms of glucose) is recommended for all such patients.
3. A fasting plasma glucose level of above 125 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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Test Name	Value	Unit	Biological Reference interval
	LIPID PROFILE : BASIC		
CHOLESTEROL TOTAL: SERUM *by CHOLESTEROL OXIDASE PAP*	**222.37^{H}**	**mg/dL**	**OPTIMAL: < 200.0** **BORDERLINE HIGH: 200.0 - 239.0** **HIGH CHOLESTEROL: > OR = 240.0**
TRIGLYCERIDES: SERUM *by GLYCEROL PHOSPHATE OXIDASE (ENZYMATIC)*	**176^{H}**	**mg/dL**	**OPTIMAL: < 150.0** **BORDERLINE HIGH: 150.0 - 199.0** **HIGH: 200.0 - 499.0** **VERY HIGH: > OR = 500.0**
HDL CHOLESTEROL (DIRECT): SERUM *by SELECTIVE INHIBITION*	50.94	mg/dL	LOW HDL: < 30.0 BORDERLINE HIGH HDL: 30.0 - 60.0 HIGH HDL: > OR = 60.0
LDL CHOLESTEROL: SERUM *by CALCULATED, SPECTROPHOTOMETRY*	**136.23^{H}**	**mg/dL**	**OPTIMAL: < 100.0** **ABOVE OPTIMAL: 100.0 - 129.0** **BORDERLINE HIGH: 130.0 - 159.0** **HIGH: 160.0 - 189.0** **VERY HIGH: > OR = 190.0**
NON HDL CHOLESTEROL: SERUM *by CALCULATED, SPECTROPHOTOMETRY*	**171.43^{H}**	**mg/dL**	**OPTIMAL: < 130.0** **ABOVE OPTIMAL: 130.0 - 159.0** **BORDERLINE HIGH: 160.0 - 189.0** **HIGH: 190.0 - 219.0** **VERY HIGH: > OR = 220.0**
VLDL CHOLESTEROL: SERUM *by CALCULATED, SPECTROPHOTOMETRY*	35.2	mg/dL	0.00 - 45.00
TOTAL LIPIDS: SERUM *by CALCULATED, SPECTROPHOTOMETRY*	620.74	mg/dL	350.00 - 700.00
CHOLESTEROL/HDL RATIO: SERUM *by CALCULATED, SPECTROPHOTOMETRY*	4.37	RATIO	LOW RISK: 3.30 - 4.40 AVERAGE RISK: 4.50 - 7.0 MODERATE RISK: 7.10 - 11.0 HIGH RISK: > 11.0
LDL/HDL RATIO: SERUM *by CALCULATED, SPECTROPHOTOMETRY*	2.67	RATIO	LOW RISK: 0.50 - 3.0 MODERATE RISK: 3.10 - 6.0 HIGH RISK: > 6.0

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Test Name	Value	Unit	Biological Reference interval
TRIGLYCERIDES/HDL RATIO: SERUM *by CALCULATED, SPECTROPHOTOMETRY*	3.46	RATIO	3.00 - 5.00

INTERPRETATION:

1.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.
2. As per NLA-2014 guidelines, all adults above the age of 20 years should be screened for lipid status. Selective screening of children above the age of 2 years with a family history of premature cardiovascular disease or those with at least one parent with high total cholesterol is recommended.
3. Low HDL levels are associated with increased risk for Atherosclerotic Cardiovascular disease (ASCVD) due to insufficient HDL being available to participate in reverse cholesterol transport, the process by which cholesterol is eliminated from peripheral tissues.
4. NLA-2014 identifies Non HDL Cholesterol (an indicator of all atherogeniclipoproteins such as LDL , VLDL, IDL, Lpa, Chylomicron remnants) along with LDL-cholesterol as co- primary target for cholesterol lowering therapy. Note that major risk factors can modify treatment goals for LDL &Non HDL.
5. Additional testing for Apolipoprotein B, hsCRP,Lp(a) & LP-PLA2 should be considered among patients with moderate risk for ASCVD for risk refinement

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Test Name	Value	Unit	Biological Reference interval
CREATININE			
CREATININE: SERUM *by ENZYMATIC, SPECTROPHOTOMETRY*	0.69	mg/dL	0.40 - 1.40

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Test Name	Value	Unit	Biological Reference interval

GLOMERULAR FILTERATION RATE (GFR) - ESTIMATED

ESTIMATED GLOMERULAR FILTERATION RATE (eGFR): SERUM	113.4	mL/min/1.73m2	KIDNEY FAILURE: < 15.0

by SPECTROPHOTOMETRY-ENZYMATIC, MDRD CALCULATION

INTERPRETATION:

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	

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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ENDOCRINOLOGY

HOMA - IR: INSULIN RESISTANCE (IR) INDEX

HOMA - INSULIN RESISTANCE INDEX (IR)

Test Name	Value	Unit	Biological Reference interval
GLUCOSE FASTING (F): PLASMA *by GLUCOSE OXIDASE - PEROXIDASE (GOD-POD)*	**128.5^{H}**	**mg/dL**	**NORMAL: < 100.0** **PREDIABETIC: 100.0 - 125.0** **DIABETIC: > 0R = 126.0**
INSULIN FASTING (F) *by CLIA (CHEMILUMINESCENCE IMMUNOASSAY)*	**36.1^{H}**	**µIU/ml**	**2.0 - 25.0**
BETA CELL FUNCTION (% B) *by CALCULATED*	143.5		
INSULIN SENSTIVITY (% S) *by CALCULATED*	20.7	%	
HOMA - IR INDEX WITH INSULIN *by CALCULATED*	**5^{H}**	**INDEX**	**< 2.50**

INTERPRETATION:

NOTE

1. As insulin secretion is pulsatile, it is recommended to take mean of three samples at 5 minute intervals to compute HOMA accurately.
2. This assay cannot be used to assess beta cell function in those taking exogenous insulin. In such patients HOMA-IR, C-peptide Model is recommended.
3. The HOMA IR calculator version 2.2 accepts values only in following validated ranges, Insulin (2.9- 57.6uU/mL) and Glucose (54.1-450.5 mg/dL).

COMMENT:

1. Homeostatic model assessment (HOMA) is a method for assessing beta cell function (%B)and insulin sensitivity (%S) from fasting glucose and insulin concentrations.
2. HOMA can be used to track changes in insulin sensitivity and beta cell function to examine natural history of diabetes.
3. Insulin sensitivity is reduced in normal subjects having first degree relative with type 2 diabetes compared with control subjects.
4. Changes in beta cell sensitivity in subjects on insulin secretogogues may be useful in determining beta cell function over a period.

USES:

1. To assess risk of developing diabetes
2. To assess response to treatment

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Test Name	Value	Unit	Biological Reference interval

INSULIN FASTING (F)

INSULIN FASTING (F)	**36.1^{H}**	**µIU/ml**	**2.0 - 25.0**

by CLIA (CHEMILUMINESCENCE IMMUNOASSAY)

INTERPRETATION:-

1.Insulin is a hormone produced by the beta cells of the pancreas. It regulates the uptake and utilization of glucose and is also involved in protein synthesis and triglyceride storage.
2.Type 1 diabets (insulin-dependent diabetes) is caused by insulin deficiency due to destruction of insulin producing pancreatic islets (beta) cells.
3.Type 2 diabetes (noninsulin dependent diabetes) is characterized by resistance to the action of insulin (insulin resistance).
4.The test is useful for management of diabetes mellitus and for diagnoses of insulinomas, when used in conjunction with proinsulin and C-peptide measurements.

NOTE:

1.No standard referance range has yet been established for INSULIN POST-PRANDIAL (PP) in indian population, therefore same could not be provided along with test. However various studies done on several populations mention that the range of INSULIN PP can vary somewhere from 5-79 mIU/L which can be used for clinical purpose.

2.This assay has 100% cross-reactivity with recombinant human insulin (Novolin R and Novolin N). It does not recognize other commonly used analogues of injectable insulin (ie, insulin lispro, insulin aspart, and insulin glargine).

INTERPRETATIVE GUIDE:

1.During prolonged fasting, when the patient's glucose level is reduced to <40 mg/dL, elevated insulin level plus elevated levels of proinsulin and C-peptide suggest insulinomaS.
2.Insulin levels generally decline in patients with type 1 diabetes mellitus.
3.In the early stage of type 2 diabetes, insulin levels are either normal or elevated. In the late stage of type 2 diabetes, insulin levels decline.
4.In normal individuals, insulin levels parallel blood glucose levels.
5.Patients on insulin therapy may develop anti-insulin antibodies. These antibodies may interfere in the assay system, causing inaccurate results. In such individuals, measurement of free insulin FINS / Insulin, Free, Serum should be performed.

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Test Name	Value	Unit	Biological Reference interval

C-PEPTIDE

C-PEPTIDE: SERUM *by CLIA (CHEMILUMINESCENCE IMMUNOASSAY)*	3.37	ng/mL	0.30 - 3.80

INTERPRETATION:-

C-peptde is useful in distinguishing insulinomas from exogenous insulin administration. When insulin secretion is diminished, as in insulin dependent diabetes, low c-peptide levels are to be expected. Elevated c-peptide levels may result from increased beta cell activity associated with insulinomas. C-Peptide is also useful in monitoring patients who have received islet cell or pancreatic transplants.

C-peptide orginates in pancreatic beta cells as an inert byproduct in the synthesis of insulin from proinsulin. Insulin and c-peptide are released from proinsulin in equimolar concentration into the circulation. C-peptide levels can therefore serve as an index of insulin secretion. Anti-insulin antibodies are commonly found in patients who have underfore insulin therepy. These antibodies may interfere with insulin assay. C-peptide measurments are therefore used as an alternative measurment index in this context.

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Test Name	Value	Unit	Biological Reference interval

CLINICAL PATHOLOGY

MICROALBUMIN/CREATININE RATIO - RANDOM URINE

MICROALBUMIN: RANDOM URINE *by SPECTROPHOTOMETRY*	8.12	mg/L	0 - 25
CREATININE: RANDOM URINE *by SPECTROPHOTOMETRY*	69.16	mg/dL	20 - 320
MICROALBUMIN/CREATININE RATIO - RANDOM URINE *by SPECTROPHOTOMETRY*	11.74	mg/g	0 - 30

***INTERPRETATION*:-**

PHYSIOLOGICALLY NORMAL:	mg/L	0 - 30
MICROALBUMINURIA:	mg/L	30 - 300
GROSS PROTEINURIA:	mg/L	> 300

Long standing un-treated Diabetes and Hypertension can lead to renal dysfunction.
2. Diabetic nephropathy or kidney disease is the most common cause of end stage renal disease(ERSD) or kidney failure.
3. Presence of Microalbuminuria is an early indicator of onset of compromised renal function in these patients.
4.Microalbuminuria is the condition when urinary albumin excre tion is between 30-300 mg & above this it is called as macroalbuminuria, the presence of which indicates serious kidney disease.
5.Microalbuminuria is not only associated with kidney disease but of cardiovascular disease in patients with dibetes & hypertension.
6.Microalbuminuria reflects vascular damage & appear to be a marker of of early arterial disease & endothelial dysfunction.
NOTE:- *IF A PATIENT HAS = 1+ PROTEINURIA (30 mg/dl OR 300 mg/L) BY URINE DIPSTICK (URINEANALYSIS), OVERT PROTEINURIA IS PRESENT AND TESTING FOR MICROALBUMIN IS INAPPROPIATE. IN SUCH A CASE, URINE PROTEIN:CREATININE RATIO OR 24 HOURS TOTAL URINE MICROPROTEIN IS APPROPIATE.*

*** End Of Report ***

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