Patient Name	: Ms. SARA		**Sample UID No.**	:	4003368
Age / Gender	: 14 Y / Female		**Sample Collected On**	:	02-04-2024 17:45
Patient ID	: QLD003366		**Registered On**	:	03-04-2024 14:38
Referred By	: PMC ARJAN		**Reported on**	:	03-04-2024 19:28
Referral Client	: PESHAWAR MEDICAL CENTER		**External Patient ID**	:	41751
Emirates ID / Passport No	:		**Print Version**	:	V.1

Department of BIOCHEMISTRY

Investigation	Results	Flag	Units	Biological Reference Interval	Method
IRON	69		µg/dl	33-193	Colorimetric assay

Sample: Serum

Comments :

CLINICAL IMPLICATIONS:

1.The combined results of iron, transferrin, and TIBC are helpful in the differential diagnosis of anemia ,in assessment of iron deficiency anemia and in the evaluation of thalassemia, sideroblastic anemia and haemochromatosis.

2.Transferin saturation is a better index of iron saturation. Percent saturation is a better index of iron stores than serum alone. Saturation <15% percent denotes iron deficiency.

INTERFERING FACTORS:

1.Hemolysis of the blood sample may interfere with testing. Drugs like aspirin, antibiotics, testosterone may cause decreased levels and drugs like ethanol, estrogen may cause an increased iron levels.

2.Diurnal variation in iron. Normal values in the morning, low in midafternoon, very low in the evening.

3.Serum iron and TIBC may be normal in iron deficiency anemia if Hb is >than 9.0g/dl or >90g/L.

RECOMMENDATION:

In patients receiving folate or Vitamin B12 recommended to repeat iron studies after 1 to 3 months of completion of treatment.

REFERENCE:

1) Manual of Laboratory and Diagnostics -Frances Fischbach Marshall B. Dunning III [9th Edition]

2) Tietz clinical guide to Laboratory tests(Fourth edition) ALAN H.B.WU

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DHA No. 57146854-002

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Patient Name	: Ms. SARA	**Sample UID No.**	: 4003368
Age / Gender	: 14 Y / Female	**Sample Collected On**	: 02-04-2024 17:45
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Department of BIOCHEMISTRY
LIPID PROFILE TEST

Investigation	Results	Flag	Units	Biological Reference Interval	Method
CHOLESTEROL (TOTAL)	184		mg/dl	Desirable: < 200 Borderline High: 200-239 High: > 240	Enzymatic colorimteric assay
TRIGLYCERIDES	62		mg/dl	Normal Up to 150 Borderline-High 150-199 High 200-499 Very High > 500	Enzymatic colorimetric test
HDL CHOLESTEROL	66	H	mg/dl	High risk up to 40 Low risk > 60	Homogeneous Enzymatic Colorimetric
LDL CHOLESTEROL DIRECT	110		mg/dl	Optimal up to < 100 Near Optimal: 100-129 Borderline : 130-159 High: 160-189 Very High: > 190	Enzymatic, colorimetric method
VLDL CHOLESTEROL	12		mg/dl	10-35	Calculation
NON-HDL CHOLESTEROL	118		mg/dl	Desirable < 130 Borderline 130 – 159 High >159	Calculation
TOTAL CHOLESTEROL / HDL RATIO	2.8		--	< 4.5	Calculation
LDL / HDL RATIO	1.7	L	--	Low Risk < 3.0 Borderline 3.1-6.0 High Risk >6.0	Calculation

Interpretation Notes :

CLINICAL IMPLICATIONS:

1. Cholesterol testing evaluates the risk for atherosclerosis, myocardial occlusion, and coronary artery occlusion. Elevated cholesterol levels are a major component in the hereditary hyper lipoproteinemia. It is also used to monitor effectiveness of diet, medications, lifestyle, and stress management.
2.The cholesterol to HDL ratio provides more information than does either value alone. When a slightly increased cholesterol is due to high HDL, therapy is not indicated.
3. LDL cholesterol has a longer shelf life and determines the CHD risk.

INTERFERING FACTORS:

1. Seasonal and positional variations may alter cholesterol levels. Estrogens, ascorbic acid, bilirubin decrease the cholesterol levels .Pregnancy, bile salt, high saturated fat, and high cholesterol diet may increase the cholesterol values. Prolonged fasting with ketosis may increase the value.
2.Increased levels of HDL may be associated with estrogen therapy, drugs like steroids, alcohol and insulin therapy. Decreased levels are associated with stress, recent illness, starvation, obesity, smoking, hyper triglyceridemia, lack of exercise.
3.Increased LDL may be associated with pregnancy, drugs like steroids. Decreased LDL are found in women under estrogen therapy. No fasting may cause false elevation.

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Department of BIOCHEMISTRY
LIPID PROFILE TEST

Investigation	Results	Flag	Units	Biological Reference Interval	Method

4.A transient increase in triglycerides occurs following heavy meal, alcohol ingestion, pregnancy, acute illness like cold ,flu, obesity, physical inactivity ,smoking. Transient decrease occurs after strenuous exercise, weight loss.

RECOMMENDATION:

1. Cholesterol levels >200 mg/dl should be retested and the results averaged and if the results differ by >than 10%,,a third test need to be done for confirmation. Perform a comprehensive lipoprotein analysis if cholesterol levels are not lowered within 6 months after start of therapy. If the values are altered in a normal condition, recommended to follow a stable diet for 1 week and overnight fasting (9 to 12 hours)before repeating the test.
2. Cholesterol and HDL should not be measured immediately after MI.A 3 month wait is suggested.
3. If triglyceride levels are more than 400mg/dl or >10.36mmol/L recommended to fast overnight(9 to 12 hours) and retest .Because of biological and analytical variation, at least 2 serial sample may be necessary for clinical decision making. VLDL cannot be calculated if triglycerides are more than 400mg/dl

REFERENCE: 1) Manual of Laboratory and Diagnostics -Frances Fischbach Marshall B. Dunning III [9th Edition]
2) Tietz clinical guide to Laboratory tests(Fourth edition) ALAN H.B.WU

Sample: Serum

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Age / Gender	: 14 Y / Female		**Sample Collected On**	:	02-04-2024 17:45
Patient ID	: QLD003366		**Registered On**	:	03-04-2024 14:38
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Department of BIOCHEMISTRY
Renal Function Test

Investigation	Results	Flag	Units	Biological Reference Interval	Method
UREA (SERUM)	23.4		mg/dl	16.6-48.5	Kinetic test,Urease
CREATININE (SERUM)	0.53		mg/dl	0.5-1.0	Jaffe Method
URIC ACID (SERUM)	2.4		mg/dl	2.4-5.7	Enzymatic colorimetric test
BLOOD UREA NITROGEN (SERUM)	10.9		mg/dl	6-20	Calculation
BUN/CREATININE RATIO	20.57		NULL	10-30	Calculation

Interpretation Notes :

CLINICAL IMPLICATIONS:

1.A markedly increased BUN is conclusive of severe impaired glomerular function and in chronic renal disease BUN level correlates better with the symptoms of uremia than does the serum creatinine.

2.Uric acid levels is used most commonly in the evaluation of renal failure ,gout, and leukemia. In gout the amount of increase is not directly related to the severity of the disease. Acute levels may occur following administration of cytotoxic drugs.

3.In chronic renal disease ,BUN/creatinine ratio is a better indicator to evaluate the renal problem than evaluating either alone. For each 50% reduction in GFR serum creatinine doubles. In chronic renal disease the plasma levels of creatinine may be more sensitive to changes in glomerular function than creatinine clearance ,which may be factitiously higher than the true value.

INTERFERING FACTORS:

1.A combination of low protein high carbohydrate diet ,late pregnancy (PHYSIOLOGIC HYDREMIA),IV feedings may cause a low levels of BUN.BUN is normally lower in children and women than adult. Elderly person can have an increased BUN levels. Many drugs like steroids ,tetracyclines, thyroxine, Stress, strenuous exercise may alter the values of BUN levels.

2.Stress,strenuous exercise, purine rich diet(liver, kidney, sweet breads)increases uric acid levels. High levels of aspirin, low purine intake, coffee, tea intake may cause a decreased levels of uric acid. Drugs like steroids, diuretics, acetaminophen may alter the uric acid levels.

3.High levels of ascorbic acid, cephalosporin, diet high in meat, ketoacidosis may increase serum creatinine substantially. Creatinine is falsely decreased by bilirubin, glucose, histidine, quinidine compounds. Drugs like cephalosporins may alter the values. Lipemic and hemolyzed samples may cause a false elevations.

REFERENCE:

1) Manual of Laboratory and Diagnostics -Frances Fischbach Marshall B. Dunning III [9th Edition]
2) Tietz clinical guide to Laboratory tests(Fourth edition) ALAN H.B.WU

Sample: Serum

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Patient Name	: Ms. SARA		**Sample UID No.**	:	G4003368F
Age / Gender	: 14 Y / Female		**Sample Collected On**	:	02-04-2024 17:45
Patient ID	: QLD003366		**Registered On**	:	03-04-2024 14:38
Referred By	: PMC ARJAN		**Reported on**	:	03-04-2024 22:31
Referral Client	: PESHAWAR MEDICAL CENTER		**External Patient ID**	:	41751
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Department of BIOCHEMISTRY

Investigation	Results	Flag	Units	Biological Reference Interval	Method
GLUCOSE (FASTING)	66	L	mg/dL	74 - 109	Hexokinase

Sample: Fluoride Plasma

Comments :

CLINICAL IMPLICATIONS:

ADA criteria for definitive test for diabetes:

1) Fasting blood glucose > 126 mg/dl (> 6.99 mmol/l) on at least two occasions.

2) Symptoms of diabetes plus random blood glucose > 200 mg/dl (> 11.1 mmol/l)

3) OGTT with 2 hrs. post load (75 gm glucose load) > 200 mg/dl (> 11.1 mmol/l) 4)HbA1c > 6.5%

INTERFERING FACTORS:

1) Steroids, diuretics, pregnancy, surgical procedures, anesthesia, obesity, smoking may cause elevated glucose levels.

2) Hematocrit > 55%, intense exercise, drug intake may cause lowered glucose level.

3)Dawn Phenomenon-Increase in blood glucose typically between 4.00am and 8.00 am due to counter-regulatory hormones.

RECOMMENDATION: As mild borderline cases may present with normal fasting glucose levels, recommended repeat testing different day.

REFERENCE: 1) Manual of Laboratory and Diagnostics -Frances Fischbach Marshall B. Dunning III [9th Edition]

2) Tietz clinical guide to Laboratory tests(Fourth edition) ALAN H.B.WU

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Department of BIOCHEMISTRY

GLYCATED HEMOGLOBIN (Hba1c)

Investigation	Results	Flag	Units	Biological Reference Interval	Method
Sample: EDTA					
GLYCATED HEMOGLOBIN (HbA1C) ^	**5.1**	L	%	<5.7 non-diabetic 5.7-6.4 Pre-Diabetic >6.4 Diabetic	Turbidimetric Immunoassay
Average Blood Glucose	99.7		mg/dl	90-120 Good Control 121-150 Fair Control 151-180 Unsatisfactory Control >180 Poor Control	Calculated

Comments :

False elevated levels may be due to hypertriglyceridemia, iron deficiency anemia,B12 deficiency, vit C supplement usage, uremia, hemoglobinopathies. In such cases recommended to evaluate the value using alternative index like fructosamine, glycated albumin or continuous glucose monitoring

CLINICAL IMPLICATIONS:

1) Glycated hemoglobin reflects average blood sugar level for 2 to 3 month period and useful for evaluating diabetic medications and to track the control of blood glucose in milder cases.
2) Increase in Glycated hemoglobin occurs in non diabetic conditions like Iron deficiency anemia, splenectomy, alcohol toxicity. Decrease in Glycated Hemoglobin in hemolytic anemia, chronic blood loss, pregnancy and chronic renal failure.
3) Improvement in the glucose control occurring in the 4 week before drawing of the sample is not well reflected in the result since the formation of glycated hemoglobin is irreversible.

INTERFERING FACTORS:

1) Presence of HbF and HbH cause falsely elevated values.
2) Presence of Hb S, C, E, D, G and Lepore cause falsely decrease results.
3)If test results are not consistent with clinical finding check the patient for HbF which elevates HbA1c results.
4) Hemolytic blood samples may cause falsely low results because of increased erythrocyte turnover.

REFERENCE:

1) Manual of Laboratory and Diagnostics -Frances Fischbach Marshall B. Dunning III [9th Edition]
2) Tietz clinical guide to Laboratory tests(Fourth edition) ALAN H.B.WU

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Patient Name	: Ms. SARA	**Sample UID No.**	: 4003368
Age / Gender	: 14 Y / Female	**Sample Collected On**	: 02-04-2024 17:45
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Department of BIOCHEMISTRY
LIVER FUNCTION TEST

Investigation	Results	Flag	Units	Biological Reference Interval	Method
ALT / SGPT	<5		U/L	10-35	IFCC with P5P
AST / SGOT	13		U/L	10-35	IFCC with P5P
ALP (ALKALINE PHOSPHATASE)	66		U/L	57-254	Colorimetric assay
GGT (GAMMA GLUTAMYL TRANSFERASE)	7		U/L	5-36	Enzymatic colorimetric assay
BILIRUBIN (TOTAL)	0.6		mg/dl	0.1-1.2	Colorimetric diazo
BILIRUBIN (DIRECT)	0.25		mg/dl	0-0.3	Diazo
INDIRECT BILIRUBIN	0.35		mg/dl	0.00-1.1	Calculated Parameter
TOTAL PROTEIN	6.9		g/dl	6.6-8.7	Colorimetric assay
ALBUMIN (SERUM)	4.5		g/dl	3.97-4.94	Colorimetric assay
GLOBULIN	2.4	L	g/dl	2.5-3.5	Calculated Parameter
A/G RATIO	1.9			1.1-2.5	Calculated Parameter

Interpretation Notes :

CLINICAL IMPLICATIONS:

1) Total Bilirubin elevation accompanied by jaundice is due to hepatic, obstructive, hemolytic and blood group compatibility.

2) Increase albumin is associated with dehydration and decrease is due to acute and chronic inflammation, burns and heart failure.

3) Although AST levels always increase in acute MI, ALT level doesn't always increase unless there also liver damage.

4) ALT is usually increased more than AST in acute extra hepatic biliary obstruction.

5) ALT is more specific than AST for liver disease but AST is more sensitive to liver disease.

6) Alkaline phosphatase normal values are higher in pediatric patient and in pregnancy. Values may increase up to 3 times in puberty.

7) GGT is used to confirm biliary abnormality and is elevated in hepatobiliary disease but not in uncomplicated bone disease.

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Department of BIOCHEMISTRY
LIVER FUNCTION TEST

Investigation	Results	Flag	Units	Biological Reference Interval	Method

8) GGT values are higher in new born, first 3 to 6 month . Adult male have 25% higher values than female.

INTERFERING FACTORS:

1) Certain foods like carrots, yam, drugs, anorexia, prolonged fasting may falsely increase bilirubin level.

2) Albumin levels may reduce in pregnancy, over hydration, edema, drugs, obesity.

3) Young children, pregnant women, post-menopausal women have physiological high level of ALT. Alkaline phosphatase increase after fatty meal.

4) Slight reduce level of AST can be seen during pregnancy and false reduced level in severe liver disease.

REFERENCE: 1) Manual of Laboratory and Diagnostics -Frances Fischbach Marshall B. Dunning III [9th Edition]
2) Tietz clinical guide to Laboratory tests(Fourth edition) ALAN H.B.WU

Sample: Serum

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Department of HEMATOLOGY
ADVANCE COMPLETE BLOOD COUNT

Investigation	Results	Flag	Units	Biological Reference Interval	Method
HEMOGLOBIN	11.5	L	g/dl	12-15	photometric
WBC COUNT	5.6		10^3/uL	4-11	Electrical Impedance
RBC COUNT	5.34	H	10^6/uL	3.8-4.8	Electrical Impedance
HEMATOCRIT	37.5		%	35-47	Calculation
MCV	70.3	L	fL	78-95	Calculation
MCH	21.6	L	pg	26-32	Calculation
MCHC	30.7	L	g/dl	31-37	Calculation
RDW	15.1		%	9.3-16	Calculation
RDW-SD	37.2	L	fL	38.9-49	Calculation
MPV	11.2		fL	8.8-12.5	Calculation
PLATELET COUNT	168		10^3/uL	150-400	Electrical Impedance
Neutrophil	55.7		%	44-70	VCS-Method
Lymphocyte	37.6		%	25-48	VCS-Method
Monocyte	5.8		%	0-9	VCS-Method
Eosinophil	0.4		%	0-7	VCS-Method
Basophil	0.5		%	0-2	VCS-Method
ABSOLUTE NEUTROPHIL COUNT	3.1		10^3/uL	1.5-7	Calculation
ABSOLUTE LYMPHOCYTE COUNT	2.1		10^3/uL	1.5-4	Calculation
ABSOLUTE MONOCYTE COUNT	0.3		10^3/uL	0-0.8	Calculation
ABSOLUTE EOSINOPHIL COUNT	0		10^3/uL	0-0.6	Calculation
ABSOLUTE BASOPHIL COUNT	0		10^3/uL	0-0.2	Calculation

Interpretation Notes :

Comments:

Interfering factors: Factors such as age, gender, pregnancy, drug intake, excessive fluid intake, dehydration, hyperlipidemia, stress, exercise, post-operative state, new born, clotted specimen may interfere with test results. Hence recommended fresh EDTA blood sample for confirmation.

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DHA No. 57146854-002

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DHA No. 00231751-004

Patient Name	:	Ms. SARA	**Sample UID No.**	:	EB4003368
Age / Gender	:	14 Y / Female	**Sample Collected On**	:	02-04-2024 17:45
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Department of HEMATOLOGY
ADVANCE COMPLETE BLOOD COUNT

Investigation	Results	Flag	Units	Biological Reference Interval	Method

Reference :-Manual of Laboratory and Diagnostics -Frances Fischbach Marshall B. Dunning III [9th Edition

Sample: EDTA Whole Blood

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Department of IMMUNOLOGY

Investigation	Results	Flag	Units	Biological Reference Interval	Method
VITAMIN D, 25-OH (TOTAL)	17	L	ng/mL	Deficient : ≤ 20 insufficient: 21-29 Sufficient: ≥ 30 Toxicity : >80	ECLIA

Sample: Serum

Comments :

CLINICAL IMPLICATIONS:

1. Increased Vitamin D levels are seen in gastrointestinal symptoms like anorexia, nausea,vomiting, constipation, hypercalcemia, renal colic, supplements, normal growing children ,pregnant and lactating females,tuberculosis,idiopathic hypercalciuria,sarcoidosis. Levels can increase to 200 -300pg/ml during treatment of osteomalacia with physiological doses of vitamin D.
2. Decreased levels are seen in Inadequate diet,Inadequate exposure to sunlight,liver disease,Malabsorption syndrome,osteomalacia, Anticonvulsants, rickets, chronic renal failure, pseudohypoparathyroidism, post-menopausal osteoporosis and adults with insulin requiring diabetes mellitus. 3.25(OH) levels do not indicate clinical vitamin D status in patients with chronic renal failure or type 1 vitamin D dependent rickets or when calcitriol is used as a supplement.

INTERFERING FACTORS:

Age,season of the year,diarrhea or vomiting,certain drugs,diseases,and long term hyperalimentation are the factors that may interfere with the vitamin levels.

RECOMMENDATION:

Recommended to evaluate alternate cause of impaired mineralization ,if the levels are not consistent with the suspected diagnosis.

REFERENCE:

1) Manual of Laboratory and Diagnostics -Frances Fischbach Marshall B. Dunning III [9th Edition]

2) Tietz clinical guide to Laboratory tests(Fourth edition) ALAN H.B.WU

3)Clinical microbiology procedures 4th edition AMY L LEBER

Verified By

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Patient Name	: Ms. SARA		**Sample UID No.**	:	4003368
Age / Gender	: 14 Y / Female		**Sample Collected On**	:	02-04-2024 17:45
Patient ID	: QLD003366		**Registered On**	:	03-04-2024 14:38
Referred By	: PMC ARJAN		**Reported on**	:	03-04-2024 19:28
Referral Client	: PESHAWAR MEDICAL CENTER		**External Patient ID**	:	41751
Emirates ID / Passport No	:		**Print Version**	:	V.1

Department of IMMUNOLOGY
THYROID FUNCTION TEST (T3,T4,TSH)

Investigation	Results	Flag	Units	Biological Reference Interval	Method
TRIIODOTHYRONINE, TOTAL (T3)	1.13		ng/mL	0.8-2	ECLIA
THYROXINE, TOTAL (T4)	7.2		ug/dL	5.1-14.1	ECLIA
THYROID STIMULATING HORMONE (TSH)	1.89		uIU/mL	0.27-4.2	ECLIA

Interpretation Notes :

Total T3 Clinical implication:

Total T3 level is a quantitative determination of the total T3 concentration in the blood and is the test of choice in the diagnosis of T3 thyrotoxicosis.

Total T4 Clinical Implications:

Total T4 is a good index of thyroid function when TB G (Thyroid Binding Globulin) is normal. The increase in TBG levels normally seen in pregnancy and with estrogen therapy increases total T4 levels.The decrease of TBG levels in person receiving anabolic steroids ,in chronic liver disease and in nephrosis decrease the total T4 value..

TSH CLINICAL IMPLICATIONS:

TSH has diurnal rhythm, peaks at 2:00-4:00am and has low levels at 5:00-6:00pm with ultradian rhythm (shorter than circadian).
Moderately high TSH is often found in euthyroid patients during treatment for hyperthyroidism. In treated hyperthyroid patient, TSH may remain low for 4-6 week after euthyroid state is achieved. TSH surges with birth,peaking at 30min at 25-160mU/L,declining to cord blood levels by 3 days,and reaching adult values in the first week of life.

REFERENCE:

Manual of Laboratory and Diagnostics -Frances Fischbach Marshall B. Dunning III [9th Edition].
Tietz clinical guide to Laboratory tests(Fourth edition) ALAN H.B.WU

Sample: Serum

- END OF REPORT -

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