LABORATORY REPORT

Redcliffe labs

Patient NAME	**: Mrs Dummy Pl61C**		
DOB/Age/Gender	: 40 Y/Female	Report STATUS	: Final Report
Patient ID / UHID	: 10671134/OF10671134	Barcode NO	: ZF584817
Referred BY	: Self	Sample Type	: Serum
Sample Collected	: Dec 06, 2024, 10:37 AM	Report Date	: Dec 06, 2024, 01:04 PM.

Polycystic Ovary Syndrome (PCOS) Panel- Comprehensive

Lipid Profile

Test Description	Value(s)	Unit(s)	Reference Range
Total Cholesterol *Enzymatic - Cholesterol Oxidase*	145	mg/dL	<200
Triglycerides *Colorimetric - Lip/Glycerol Kinase*	102	mg/dL	<150
HDL Cholesterol *Phosphotungstic acid- Enzymatic*	48	mg/dL	> 40
Non HDL Cholesterol *Calculated*	97	mg/dL	<130
LDL Cholesterol *Calculated*	76.6	mg/dL	<100
V.L.D.L Cholesterol *Calculated*	20.4	mg/dL	< 30
Chol/HDL Ratio *Calculated*	3.02	Ratio	-
HDL/ LDL Ratio *Calculated*	0.63	Ratio	-
LDL/HDL Ratio *Calculated*	1.6	Ratio	-

Interpretation:
Lipid level assessments must be made following 9 to 12 hours of fasting, otherwise assay results might lead to erroneous interpretation. NCEP recommends of 3 different samples to be drawn at intervals of 1 week for harmonizing biological variables that might be encountered in single assays.

National Lipid Association Recommendations (NLA-2014)	Total Cholesterol (mg/dL)	Triglyceride (mg/dL)	LDL Cholesterol (mg/dL)	Non HDL Cholesterol (mg/dL)
Optimal	<200	<150	<100	<130
Above Optimal			100-129	130 - 159
Borderline High	200-239	150-199	130-159	160 - 189
High	>=240	200-499	160-189	190 - 219
Very High	-	>=500	>=190	>=220

HDL Cholesterol	
Low	High
<40	>=60

Risk Stratification for ASCVD (Atherosclerotic Cardiovascular Disease) by Lipid Association of India.

Risk Category	A. CAD with > 1 feature of high risk group
Extreme risk group	B. CAD with >1 feature of very high risk group of recurrent ACS (within 1 year) despite LDL-C <or = 50 mg/dl or poly vascular disease

Booking Centre :- REDCLIFFE - ILC NOIDA
Processing Lab :- Redcliffe Lifetech Pvt. Ltd., H-55, Sector-63, Noida, Uttar Pradesh - 201301

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Very High Risk	1.Established ASCVD 2.Diabetes with 2 major risk factors of evidence of end organ damage 3. Familial Homozygous Hypercholesterolemia
High Risk	1. Three major ASCVD risk factors 2. Diabetes with 1 major risk factor or no evidence of end organ damage 3. CHD stage 3B or 4. 4 LDL >190 mg/dl 5. Extreme of a single risk factor 6. Coronary Artery Calcium - CAC > 300 AU 7. Lipoprotein a >/= 50 mg/dl 8. Non stenotic carotid plaque
Moderate Risk	2 major ASCVD risk factors
Low Risk	0-1 major ASCVD risk factors
Major ASCVD (Atherosclerotic cardiovascular disease) Risk Factors	
1. Age >/=45 years in Males & >/= 55 years in Females	3. Current Cigarette smoking or tobacco use
2. Family history of premature ASCVD	4. High blood pressure
5. Low HDL	

Newer treatment goals and statin initiation thresholds based on the risk categories proposed by Lipid Association of India in 2020.

Risk Group	Treatment Goals		Consider Drug Therapy	
	LDL-C (mg/dl)	Non-HDL (mg/dl)	LDL-C (mg/dl)	Non-HDL (mg/dl)
Extreme Risk Group Category A	<50 (Optional goal <OR = 30)	<80 (Optional goal <OR = 60)	>OR = 50	>OR = 80
Extreme Risk Group Category B	>OR = 30	>OR = 60	> 30	> 60
Very High Risk	<50	<80	>OR = 50	>OR = 80
High Risk	<70	<100	>OR = 70	>OR = 100
Moderate Risk	<100	<130	>OR = 100	>OR = 130
Low Risk	<100	<130	>OR = 130*	>OR = 160

*** After an adequate non-pharmacological intervention for at least 3 months.**

References : Management of Dyslipidaemia for the Prevention of Stroke : Clinical practice Recommendations from the Lipid Association of India. Current Vascular Pharmacology,2022,20,134-155.

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Test Description	Value(s)	Unit(s)	Reference Range

TSH 3rd Generation

Thyroid Stimulating Hormone (Ultrasensitive) *Chemiluminescence Immuno Assay (CLIA)*	2.34	µlU/mL	0.4 - 4.2

Interpretation:

Pregnancy	Reference ranges TSH
1 st Trimester	0.1 - 2.5
2 ed Trimester	0.2 - 3.0
3 rd Trimester	0.3 - 3.0

Note:
TSH levels are subject to circadian variation, reaching peak levels between 2-4 am. and at a minimum between 6-10 pm. The variation is of 50 %, hence time of the day has influence on the measured serum TSH concentrations.

Clinical Use:
- Diagnose Hypothyroidism and Hyperthyroidism
- Monitor T4 replacement or T4 suppressive therapy
- Qunatify TSH levels in the subnormal range

Increased Levels : Primary hypothyroidism, Subclinical hypothyroidis, TSH dependent Hyperthyroidism, Thyroid hormone resistance
Decreased Levels: Grace disease, Autonomous thyroid hormone secretion, TSH deficiency

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Test Description	Value(s)	Unit(s)	Reference Range
Prolactin (PRL)			
Prolactin *ECLIA*	18.2	ng/mL	Men 4.04 - 15.2 Women(Not-pregnant)4.79 - 23.3

Interpretation:
Note:
1. Since prolactin is secreted in a pulsatile manner and is also influenced by a variety of physiologic stimuli, it is recommended to test 3 specimens at 20-30 minute intervals after pooling.
2. Major circulating form of Prolactin is a nonglycosylated monomer, but several forms of Prolactin linked with immunoglobulin occur which can give falsely high Prolactin results.
3. Macroprolactin assay is recommended if prolactin levels are elevated, but signs and symptoms of hyperprolactinemia are absent or pituitary imaging studies are normal

Clinical Use
· Diagnosis & management of pituitary adenomas
· Differential diagnosis of male & female hypogonadism

Increased Levels
· **Physiologic**: Sleep, stress, postprandially, pain, coitus
· **Systemic disorders**: Chest wall or thoracic spinal cord lesions, Primary / Secondary hypothyroidism, Adrenal insufficiency, Chronic renal failure, Cirrhosis
· **Medications**: **Psychiatric medications** like Phenothiazine, Haloperidol, Risperidone, Domperidone, Fluoexetine, Amitriptylene, MAO inhibitors etc.,

Antihypertensives: Alphamethyldopa, Reserpine, Verapamil

Opiates: Heroin, Methadone, Morphine, Apomorphine

Cimetidine / Ranitidine
· Prolactin secreting pituitary tumors: Prolactinoma, Acromegaly
· Miscellaneous: Epileptic seizures, Ectopic secretion of prolactin by non-pituitary tumors, pressure / transaction of pituitary stalk, macroprolactinemia
· Idiopathic

Decreased levels
· Pituitary deficiency: Pituitary necrosis / infarction
· Bromocriptine administration
· Pseudohypoparathyroidism

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Estradiol (E2)

ESTRADIOL(E2), SERUM *CLIA*	72.0	pg/mL	Follicular 19.5 - 144.2 Mid Cycle 63.9 - 356.7 Luteal 55.8 - 214.2 Post Menopausal 32.2

Interpretation:

Population	Bio. Ref. Ranges in pg/mL
Normal Menstruating Females:	
Follicular Phase	21 - 251
Mid-Cycle Phase	38 - 649
Luteal Phase	21 - 312
Postmenopausal Females not on HRT	<10 - 28
Postmenopausal Females on HRT	<10 - 144
Males	11 - 44

HRT = Hormone Replacement Therapy

Note
1.All applications that require measurement of very low level of estradiol (eg men, children, post menopausal women, hypogonadal women etc) recommended test is Estradiol, Ultrasensitive
2. LC- MS/MS is the gold standard for steroid hormone assays due to increased sensitivity & specificity as compared to immunoassays

Clinical Use
1. Determine estrogen status in women
2. Monitor follicular development during induction of ovulation
3. Assess estrogen production in males

Increased Levels
1. Precocious puberty (female)
2. Male gynecomastia
3. Liver disease
4. Ovarian tumors
5. Adrenal feminizing tumors

Decreased Level
1. Oral contraceptives
2. Ovarian failure

Dehydroepiandrosterone Sulfate (DHEAS)

DHEAS (Dehydroepiandrostenedione Sulphate) *CLIA*	215	µg/dL	

Interpretation:

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Test Description	Value(s)	Unit(s)	Reference Range

	Age (years)	Bio. Reference Interval (µg/dL)
Children	<1 week	108-607
	1 - 4 weeks	31.6-431
	1 - 12 months	3.4-124
	1 - 4 years	0.47-19.4
	5 - 9 years	2.8-85.2
Females	10 - 14 years	33.9-280
	15 - 19 years	65.1-368
	20 - 24 years	148-407
	25 - 34 years	98.8-340
	35 - 44 years	60.9-337
	45 - 54 years	35.4-256
	55 - 64 years	18.9-205
	65 - 74 years	9.40-246
	≥ 75	12.0-154
Males	10 - 14 years	24.4-247
	15 - 19 years	70.2-492
	20 - 24 years	211-492
	25 -34 years	160-449
	35 - 44 years	88.9-427
	45 - 54 years	44.3-331
	55 - 64 years	51.7-295
	65 - 74 years	33.6-249
	≥ 75	16.2-123

Clinical Use
1. Marker for Adrenal cortical function and disease
2. Differential diagnosis of virilized patient. In patients with virilizing tumors, DHEAS levels usually exceed 7000 µg/dL.

Increased levels
1. Congenital Adrenal Hyperplasia
2. Adrenal carcinoma
3. Virilizing tumors of the Adrenal gland
4. Cushing's disease, pituitary dependent

Decreased Levels
1. Addison's disease

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Test Description	Value(s)	Unit(s)	Reference Range
2. Adrenal hypoplasia			

Androgen Index

Testosterone Total *CLIA*	28.0	ng/dL	8.4 - 48.1
SEX HORMONE BINDING GLOBULIN (SHBG),SERUM *CLIA*	125.0	nmol/L	16.8 - 135.5
Free Androgen Index (FAI) *Calculated*	0.78		0.4 - 8.4

Interpretation:

Testosterone Total:

1. Testosterone is the major androgenic hormone. It is responsible for the development of the male external genitalia and secondary sexual characteristics. In females, its main role is as an estrogen precursor. In both genders, it also exerts anabolic effects and influences behavior.
2. Testing is useful in males for: Evaluation of symptoms or signs of possible hypogonadism, delayed or precocious puberty, Monitoring testosterone replacement or antiandrogen therapy.
3. Testing is useful in females for: Evaluation of symptoms or signs of hirsutism, virilization, and oligo-amenorrhea, possible testosterone deficiency, diagnosis of androgen-secreting tumors, evaluation of infants with ambiguous genitalia or virilization.

SEX HORMONE BINDING GLOBULIN (SHBG):

1. SHBG is important transport protein for estrogens and androgens in peripheral blood. SHBG concentration is a major factor regulating their distribution between the protein-bound and free states.
2. SHBG concentration in plasma is regulated by androgen/estrogen balance, thyroid hormones, insulin and dietary factors.
3. Plasma SHBG concentrations are affected by many different medical conditions.

A. High values being found in hyperthyroidism, hypogonadism, androgen insensitivity and hepatic cirrhosis in men.

B. Low concentrations are found in myxoedema, hyperprolactinaemia and syndromes of excessive androgen activity.

4. Measurement of SHBG along with Free Androgen index (FAI), which is ratio of testosterone to SHBG helps in identifying excessive androgen activity & useful in the evaluation of mild disorders of androgen metabolism.

Free Androgen Index (FAI)

The testosterone in blood can be found under three forms: tightly bound to SHBG, weakly bound to albumin and only a small percentage (<3% in males and <0.7% in females) unbound. This third form is the free testosterone, the only form capable of binding to tissue receptors to exert its effects, hence why it makes for the best marker of androgen status. FAI was found in statistical analysis to be a poor predictor of bioavailable testosterone. FAI should not be used in isolation and is often accompanied by other measured or estimated parameters such as gonadotropin levels.Because SHBG is present in such large excess in women (10–100:1), free testosterone concentrations are driven primarily by SHBG abundance. In addition, testosterone excess in women lowers SHBG concentrations, which raises the free testosterone concentration and contributes to the strong correlation of 1/SHBG with free testosterone.Typical FAI healthy values range from 30 to 150 in adult men and 7 to 10 in adult women. In men, values below 30 are cause for concern and could contribute to erectile dysfunction whilst in women, higher values are cause for concern and could contribute to polycystic ovary syndrome and hirsutism.

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Testosterone Free

Test Description	Value(s)	Unit(s)	Reference Range
TESTOSTERONE, FREE, SERUM *ELISA*	1.07	pg/ml	0 - 2.85

Interpretation:
Comments:
Testosterone circulates in blood bound to three proteins: sex hormone binding globulin (SHBG, 60-80%), albumin and cortisol binding globulin. About 1 - 2% of the total circulating testosterone remains unbound or free. Measurement of free testosterone permits the estimation of the biologically active hormone. Free testosterone determination is recommended to overcome the influences caused by variations in transport proteins on the total testosterone concentration. High concentration of SHBG (as seen in obesity, advanced age etc) may mask true deficit in testosterone levels. In Polycystic Ovarian Syndrome and related conditions, there is often significant insulin resistance, which is associated with low SHBG levels. Consequently, bioavailable or free testosterone levels may be more significantly elevated.

Clinical Use
As second-level test for suspected increases or decreases in physiologically active testosterone
1. To assess androgen status in cases with suspected or known sex hormone-binding globulin-binding abnormalities
2. To assess functional circulating testosterone in early pubertal boys and older men
3. To assess functional circulating testosterone in women with symptoms or signs of hyperandrogenism but normal total testosterone levels

HOMA-IR.

Test Description	Value(s)	Unit(s)	Reference Range
GLUCOSE FASTING *Plasma, Hexokinase*	88.0	mg/dL	<100
Insulin (Fasting) *CMIA*	8.9	µU/mL	<25.0
HOMA IR Index *Calculated*	1.9		<2.5

Interpretation:
1. The HOMA model is used to yield an estimate of insulin sensitivity and beta cell function from fasting plasma insulin and glucose concentrations.
2. Insulin resistance is a state in which normal concentrations of insulin produce a subnormal biologic response.
3. Levels of Insulin are increased in insulinomas, factitious hypoglycemia, insulin autoimmmune syndrome, acromegaly (after ingestion of glucose), Cushings syndrome, corticosteroid administration and levodopa usage.
4. Levels of Insulin are depressed to absent in diabetes mellitus, pituitary tumors and chronic pancreatic diseases i.e. cystic fibrosis. 5. Insulin/ C-peptide ratio is used for differentiating between factitious hypoglycemia and insulinomas where a ratio< 1.0 indicates insulinoma; but results may vary in renal failure.
6. Antibodies to insulin form in longstanding diabetes mellitus treated with insulin hence in these patients monitoring insulin levels gives better prognosis.

Uses of HOMA Values:
1. To assess the risk of development of diabetes. It allows assessment of inherent beta cell function and insulin sensitivity and characterizes the pathophysiology in those with abnormal glucose tolerance.
2. It can be used to assess response to diet or oral drug therapy.

Remarks:
1. Insulin glucose HOMA model cannot be used in those taking exogenous insulin. Under such circumstances, the C peptide HOMA model which uses C peptide to reflect endogenous insulin secretions could be used.

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LH / FSH Ratio

Test Description	Value(s)	Unit(s)	Reference Range
Luteinising Hormone-LH *CMIA*	7.0	mIU/mL	Follicular Phase 1.80 - 11.78 Mid-Cycle Peak 7.59 - 89.08 Luteal Phase 0.56 - 14.00 Postmenopausal Females Without HRT 5.16 - 61.99
Follicle Stimulating Hormone-FSH *CMIA*	2.4	mIU/mL	Normally Menstruating Females Follicular Phase 3.03 - 8.08 Mid-Cycle Peak 2.55 - 16.69 Luteal Phase 1.38 - 5.47 Postmenopausal Females 26.72 - 133.41
LH / FSH Ratio	2.92		

Interpretation:
1. Ratio of LH to FSH > 2.50 indicates the presence of PCOS.
2.Polycystic Ovary Syndrome (PCOS) is a complex syndrome and each of the clinical phenotype is associated with different patterns of steroid hormones. It is likely that simultaneous measurement of multiple androgens (steroid/androgen profiling with highly specific and sensitive method LC-MS/MS) be more sensitive for detecting PCOS-related androgen excess and for predicting metabolic risk.
3.Women with Non-classical Congenital Adrenal Hyperplasia (NC-CAH) due to 21-hydroxylase deficiency and women with PCOS have similar clinical presentation, with hyperandrogenism, oligomenorrhea, and polycystic ovaries. The screening tool to distinguish NC-CAH from PCOS is the basal 17-OHP levels and the ACTH stimulation test.

Comments:
Polycystic Ovarian Syndrome (PCOS) affects 5-10% of women of reproductive age, making it the most common endocrine disorder of women in this age group. It is characterized by amenorrhea, hirsuitism and infertility. It is caused by a complex interaction of abnormalities in gonadotropins, androgens & estrogens. Insulin resistance and hyperinsulinemia contribute significantly to its pathophysiology. Although PCOS is associated with hyperandrogenism & infertility early in life, it is a harbinger of a lifelong condition that can lead to serious sequelae such as Endometrial or Ovarian cancer, Diabetes mellitus & Coronary artery disease. Thus, it is crucial to diagnose PCOS early in its course not only to recognize but also to delay or arrest its metabolic sequelae

Clinical use :
1. In Diagnosis of gonadal dysfunction and management of infertility
Increased level : Primary hypogonadism
Decreased level :
1. Hypothalamic GnRH deficiency
2. Hypopituitarism

*** End Of Report ***

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