PATIENT NAME : KANIKA KUMAR **REF. DOCTOR :** DR. SHRUTI CHAVAN

CODE/NAME & ADDRESS : CS00008107 VITAL DIGITAL HEALTH CARE PVT LTD B-103, ROYAL CLASSIC, NEW LINK ROAD, NEXT TO CITI MALL, ANDHERI WEST,ANDHERI (WEST), MUMBAI 400053 9082847268 9619615852	ACCESSION NO : **5048XJ000291** PATIENT ID : KANIF0310915048 CLIENT PATIENT ID: ABHA NO :	AGE/SEX : 33 Years Female DRAWN : RECEIVED : 03/10/2024 13:39:57 REPORTED : 03/10/2024 16:04:59

Test Report Status **Final**	Results	Biological Reference Interval	Units

SPECIALISED CHEMISTRY - ANEMIA

FERRITIN, SERUM

FERRITIN	14.57	13 - 150	ng/mL

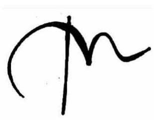
METHOD : ELECTROCHEMILUMINESCENCE

Interpretation(s)
FERRITIN, SERUM-Ferritin is a high-molecular-weight protein that contains approximately 20% iron. It occurs normally in almost all tissues of the body but especially in hepatocytes and reticuloendothelial cells, where it serves as an iron reserve. When needed, the iron molecules are released from the apoferritin shell and bind to transferrin, the circulating plasma protein that transports iron to the erythropoietic cells.

A low serum ferritin value is thought to be the best laboratory indicator of iron depletion. Virtually all patients with low serum iron and low ferritin have iron deficiency. Serum Ferritin concentration, when considered with other factors such as serum iron, iron-binding capacity and tissue iron stores is valuable in the diagnosis of iron deficiency anemia, anemia of chronic infection and conditions such as thalassemia and hemochromatosis that are associated with iron overload. It is particularly useful in distinguishing between iron-deficiency anemia (serum ferritin levels diminished) and "anemia of chronic disease" (serum ferritin levels usually normal or elevated).

Ferritin is an acute phase reactant. It can be found to be elevated in the following conditions and do not reflect actual body iron stores: 1.Inflammation 2.Significant tissue destruction 3.Liver diseases 4.Malignancies such as acute leukemia and Hodgkin''s disease 5.Therapy with iron supplements.

Interferences:
Heterophilic antibodies in human serum can react with reagent immunoglobulins, interfering with in vitro immunoassays. Patients routinely exposed to animals or to animal serum products can be prone to this interference and anomalous values may be observed.



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SPECIALISED CHEMISTRY - HORMONE

PROLACTIN, SERUM

PROLACTIN	12.08	4.79 - 23.3	ng/mL

METHOD : ELECTROCHEMILUMINESCENCE IMMUNO ASSAY

Interpretation(s)

Prolactin is a protein hormone secreted by anterior pituitary gland & placenta (in pregnancy). The secretion is regulated physiologically by inhibitory & releasing factors of hypothalamus. The major physiologic action of prolactin is the initiation & maintenance of lactation in women.Hyperprolactinemia inhibits gonadotrophin secretion & can produce hypogonadism in men & women.

The clinical use of prolactin levels is in the diagnosis & management of male & female hypogonadism. Increased levels seen in : 1.Pituitary tumour. 2.Hypothalamic lesions. 3.Hypothyroidism. 4.Antidepressants. 5.Stress.

NOTE : Various drugs & physiological factors can give rise to falsely elevated levels. Due to its episodic secretion, high prolactin values should be reconfirmed by performing the test on a pooled serum sample from specimens drawn at 6 to 20 minutes interval.
MALE: Hyperprolactinaemia in males may be associated with decreased libido, impotence, infertility, gynaecomastia.
FEMALE: Prolactin secretion from pituitary shows significant diurnal, episodic & cyclical variations. Following is a suggested approach to hyperprolactinaemia in females:

Prolactin Level	Interpretation	Remarks, Often associated with
25 - 50 ng/ml	Mild Prolactin excess	physiological conditions like stress, exercise , pregnancy, lactation etc. This may not be associated with clinical hyperprolactinaemia and needs review after a month.
51 - 75 ng/ml	Moderate Prolactin Excess	clinical hyperprolactinaemia - short luteal phase, oligomennorrhea
Above 100 ng/ml	Marked prolactin excess	clinical hyperpolactinaemia -hypogonadism, amenorrhea, galactorrhea
Above 200 ng/ml	Marked prolactin excess	pituitary adenoma requiring further workup.
References : 1. Diagnosis & Treatment of hyperprolactinaemia.The endocrine society clinical practice guideline, 2011 2. Diagnosis & Management of hyperprolactinemia.Canadian Medical Association CMAJ. Sept.16,2003;169(6)		

THYROID PANEL, SERUM

T3	80.0	Non-Pregnant Women 80.0 - 200.0 Pregnant Women 1st Trimester:105.0 - 230.0 2nd Trimester:129.0 - 262.0 3rd Trimester:135.0 - 262.0	ng/dL

METHOD : ELECTROCHEMILUMINESCENCE IMMUNO ASSAY

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T4	9.00	Non-Pregnant Women 5.10 - 14.10 Pregnant Women 1st Trimester: 7.33 - 14.80 2nd Trimester: 7.93 - 16.10 3rd Trimester: 6.95 - 15.70	µg/dL
METHOD : ELECTROCHEMILUMINESCENCE IMMUNO ASSAY			
TSH (ULTRASENSITIVE)	0.620	Non Pregnant Women 0.27 - 4.20 Pregnant Women (As per American Thyroid Association) 1st Trimester 0.100 - 2.500 2nd Trimester 0.200 - 3.000 3rd Trimester 0.300 - 3.000	µIU/mL
METHOD : ELECTROCHEMILUMINESCENCE IMMUNO ASSAY			

Interpretation(s)

Triiodothyronine T3 , **Thyroxine T4,** and **Thyroid Stimulating Hormone TSH** are thyroid hormones which affect almost every physiological process in the body, including growth, development, metabolism, body temperature, and heart rate.
Production of T3 and its prohormone thyroxine (T4) is activated by thyroid-stimulating hormone (TSH), which is released from the pituitary gland. Elevated concentrations of T3, and T4 in the blood inhibit the production of TSH.
Excessive secretion of thyroxine in the body is hyperthyroidism, and deficient secretion is called hypothyroidism.
In primary hypothyroidism, TSH levels are significantly elevated, while in secondary and tertiary hyperthyroidism, TSH levels are low.
Below mentioned are the guidelines for Pregnancy related reference ranges for Total T4, TSH & Total T3.Measurement of the serum TT3 level is a more sensitive test for the diagnosis of hyperthyroidism, and measurement of TT4 is more useful in the diagnosis of hypothyroidism.Most of the thyroid hormone in blood is bound to transport proteins. Only a very small fraction of the circulating hormone is free and biologically active. It is advisable to detect Free T3, FreeT4 along with TSH, instead of testing for albumin bound Total T3, Total T4**.**

Sr. No.	TSH	Total T4	FT4	Total T3	Possible Conditions
1	High	Low	Low	Low	(1) Primary Hypothyroidism (2) Chronic autoimmune Thyroiditis (3) Post Thyroidectomy (4) Post Radio-Iodine treatment
2	High	Normal	Normal	Normal	(1)Subclinical Hypothyroidism (2) Patient with insufficient thyroid hormone replacement therapy (3) In cases of Autoimmune/Hashimoto thyroiditis (4). Isolated increase in TSH levels can be due to Subclinical inflammation, drugs like amphetamines, Iodine containing drug and dopamine antagonist e.g. domperidone and other physiological reasons.
3	Normal/Low	Low	Low	Low	(1) Secondary and Tertiary Hypothyroidism

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4	Low	High	High	High	(1) Primary Hyperthyroidism (Graves Disease) (2) Multinodular Goitre (3)Toxic Nodular Goitre (4) Thyroiditis (5) Over treatment of thyroid hormone (6) Drug effect e.g. Glucocorticoids, dopamine, T4 replacement therapy (7) First trimester of Pregnancy
5	Low	Normal	Normal	Normal	(1) Subclinical Hyperthyroidism
6	High	High	High	High	(1) TSH secreting pituitary adenoma (2) TRH secreting tumor
7	Low	Low	Low	Low	(1) Central Hypothyroidism (2) Euthyroid sick syndrome (3) Recent treatment for Hyperthyroidism
8	Normal/Low	Normal	Normal	High	(1) T3 thyrotoxicosis (2) Non-Thyroidal illness
9	Low	High	High	Normal	(1) T4 Ingestion (2) Thyroiditis (3) Interfering Anti TPO antibodies

REF: 1. TIETZ Fundamentals of Clinical chemistry 2.Guidlines of the American Thyroid association duriing pregnancy and Postpartum, 2011.

TSH in pregnancy

There's reduction in both the lower and the upper limit of maternal TSH relative to the non-pregnant TSH reference range. This is because of elevated levels of serum hCG that directly stimulates the TSH receptor, thereby increasing thyroid hormone production. The largest decrease in serum TSH is observed during the first trimester. Thereafter, serum TSH and its reference range gradually increases in the second and third trimesters, but nonetheless remains lower than in non-pregnant women.

NOTE: It is advisable to detect Free T3,FreeT4 along with TSH, instead of testing for albumin bound Total T3, Total T4.TSH is not affected by variation in thyroid - binding protein. TSH has a diurnal rhythm, with peaks at 2:00 - 4:00 a.m. And troughs at 5:00 - 6:00 p.m. With ultradian variations.

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SPECIALISED CHEMISTRY - VITAMIN

VITAMIN B12(CYANOCOBALAMINE), SERUM

VITAMIN B12	387	197 - 771	pg/mL

METHOD : ELECTROCHEMILUMINESCENCE IMMUNO ASSAY

25 - HYDROXYVITAMIN D(VITAMIN D TOTAL), SERUM

25 - HYDROXYVITAMIN D	**20.6 Low**	Deficiency: < 20.0 Insufficiency: 20.0 - < 30.0 Sufficiency: 30.0 -100.0 Toxicity > 100.0	ng/mL

METHOD : ELECTROCHEMILUMINESCENCE IMMUNO ASSAY

Comments

Rechecked & Confirmed.

Interpretation(s)
VITAMIN B12(CYANOCOBALAMINE), SERUM-**Test description**
1.Measures the amount of Vitamin B12/ Cyanocobalamin or Methyl cobalamin in blood.2. Done in Anemic conditions like Megaloblastic anemia, pernicious anemia, dietary folate deficiencies,3.Workup of neuropathies especially due to diabetes.4.Nerve health and it is monitored in treatment of nerve damage.5.Important vitamin for women of childbearing age and for older people.
1.Part of water-soluble B complex of vitamins. 2. It is essential in DNA synthesis, hematopoiesis & CNS integrity.3.Source for B12 is dietary foods like milk, yoghurt, eggs, meat, fortified cereals, bread. 4.Absorption depends on the HCl secreted by the stomach and occurs in intestines. 5. It is part of enterohepatic circulation, hence excreted in feces(approx. 0.1% per day)
Test interpretation
Higher than normal levels are in patients on Vitamin supplements or patients with COPD, CRF, Diabetes, Liver cell damage, Obesity, Polycythemia.
Decreased levels seen in
Inflammatory bowel disease, Pernicious anemia - genetic deficiency of intrinsic factor - necessary for Vit B12 absorption, Strict vegetarianslead to sub-clinical B12 deficiency- high among elderly patients, Malabsorption due to gastrectomy, smoking, pregnancy, multiple myeloma & hemodialysis, Alcohol & drugs like amino salicylic acid, anticonvulsants, cholestyramine, cimetidine, Hyperthyroidism (High levels of thyroid), Seen in mothers of children with (NTD) Neural tube defects- hence fortification and supplements are advised in expecting mothers
Recommendations-1.To prevent biotin interference the patient should be atleast 8 hours fasting before submitting the sample. 2. Vit B12 and Folic acid evaluated together in macrocytic anemias to avoid methyl folate trap. Carmel's composite criteria for inadequate Vit B12 status: Serum vitamin B12 < 148 pmol/L, or 148–258 pmol/L and MMA > 0.30µmol/L, or tHcy > 13 nmol/L (females) and >15 nmol/L (males).
Associated Test-Holo-TC: Marker of vitamin B12 status -specificity and sensitivity better than serum vitamin B12, hence recommended in boderline and deficient cases for confirmation.
References-O-Leary F, Samman S. Vitamin B12 in health and disease. Nutrients. 2010 Mar 2(3):299-316.
25 - HYDROXYVITAMIN D(VITAMIN D TOTAL), SERUM-**Test description**
Vitamin D has anti-inflammatory and immune-modulating properties and it works towards the bones, teeth, intestines, immune system, pancreas, muscles and brain. It

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helps to maintain normal calcium and phosphate levels.Vitamin D is a fat-soluble vitamin. Also called as "Sunshine Vitamin".Two main forms as Cholecalciferol (vitamin D3) which is synthesized in skin from 7-dehydrocholesterol in response to sunlight (Type B UV) exposure & Ergocalciferol (vitamin D2) present mainly in dietary sources.
Vit D25(OH)D deficiency is seen due to poor or inadequate sunlight exposure, Nutritional or dietary deficiency or fat malabsorption, Severe Hepatocellular disease, Secondary hyperparathyroidism, Hypocalcemia tetany which can cause involuntary contraction of muscles, leading to cramps and spasms, Rickets in children, Osteomalacia in adults- due to vitamin D deficiency mainly, Older adults- osteoporosis. (Increased risk of bone fractures)due to long-term effect of calcium and/or vitamin D deficiency, Other conditions that are precipitated by Vit D deficiency included increased cardiovascular risk, low immunity & chronic renal failure.
Elevated levels may be seen in patients taking supplements(hence recommended to repeat after 3 months for estimation of accurate levels), Vitamin D intoxication, sarcoidosis and malignancies containing non regulated 1-alpha hydroxylase in the lesion.
Recommendations
1.To prevent biotin interference the patient should be atleast 8 hours fasting before submitting the sample 2.25(OH)D is the analyte of choice for determination of the Vitamin D status as it is the major storage & active form of Vitamin D and has longer half-life. 3. Kidney Disease Outcomes Quality Initiatives (KDOQI) and Kidney Disease Improving Global Outcomes (KDIGO) recommend activated vitamin D testing for CKD patients.
Note-Our Vitamin D assays is standardized to be in alignment with the ID-LC/MS/MS 25(OH)vitamin D Reference Method Procedure (RMP), the reference procedure for the Vitamin D Standardization Program (VDSP). The VDSP, a collaboration of the National Institutes of Health Office of Dietary Supplements, National Institute of Technology and Standards, Centers for Disease Control and Ghent University, is an initiative to standardize 25(OH)vitamin D measurement across methods.
Reference: 1.Wallach Interpretation of diagnostic test, 10th edition.

****End Of Report****
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