

Report on :-Estimation of Creatinine Test in given blood sample and general tests performed in Pathology Laboratory

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Table of contents

Sr. No	Topic	Page No.
1	Acknowledge section	3
2	Introduction	4
3	Work responsibilities and the tasks performed during the internship	5
4	The skills learned and the experiences had	31
5	Conclusion and future aspects	32
6	References	33

Acknowledgement section

I am thankful to Dr. Chandni Patel to let me work at SK pathology laboratory. As a learner I got the chance to perform the tests there. Working atmosphere was peaceful and moreover the knowledge I gained with her guidance was very important and helpful.

Every person working there is dedicated and is keen to make me understand about the work knowledge in depth. Every time I had a doubt they were eager to solve it.

I was working with MD pathologist's guidance and had her team of staff too. And every time mam used to give a detailed information of any tests performed.

Working with the detailed instructions of the lab assistants and mam it was possible for me to work with ease. Every time it's the matter of precision so we need the expertise. And I was blessed to have that expertise.

There are less laboratories where the doctor's are available to explain and guide. Every test performed had to be done with safety.

And I was fortunate to learn and perform different tests but it requires a lot of experience to have that urge to learn new things and practically implement it. My mentor has been quite patient when she used to perform tests and let us perform them.

Every tests were performed and then after learning them I was allowed to perform them on her guidance. Dr. Chaandni Patel has used to even bring books and make us understand things better through diagrams too.

Introduction

Sk Laboratory is located near Sadhu Vasvani road. We have 24/7 service and home collection is available. The staff is inclined to give the methodology and pre procedure of the test to the patient.

Before collection of the sample from patients we actually first of all take the profiling of the patients and ask them their details about them including their age, name, contact number, address , tests to be done and gender.

Every patient's sample is labelled and stacked on the bases of their number. And bases of their time they are given priorities. Patients are to be given a specialised bar code tag on their sample for their identification. Our lab has three departments Haematology, Biochemistry and Immunology.

We have a team of assistants which deal with the patients. Our expertise is for more than 7 years. We have the profiling and updates of each patient. We provide a microbiological analysis of the sample further. We have our head Dr. Chaandni Patel and her guidance and expertise leads us to excellence.

Our lab is cleaned and managed properly. We operate by wearing masks if needed. We give reports in envelope and cover every detail in the report. Every tests are performed by wearing gloves and maintaining cleanliness.

We have collected all kinds of samples. If the instrument is not available regarding few tests we will take sample and send the sample to other laboratories. But we will ensure that the diagnosis is proper.

Work responsibilities and task performed during the internship

Bio chemistry Department:

Clinical Biochemistry help to diagnose and disease through the analysis of blood, urine and other blood fluids. The infections in organs can be determined. The various tests in bio chemistry department are:

1. Creatinine Test:

In this test, we are estimating creatinine content in a blood sample. The creatinine test is a measure of how well your kidneys are performing their job of filtering waste from your blood. Creatinine is a waste product formed in muscle from the high energy storage compound, creatine phosphate.

The amount of creatinine produced is fairly constant and is primarily a function of muscle mass. Creatinine is removed from plasma by glomerular filtration and then excreted in urine without any appreciable resorption by the tubules.

Normal range in men: 0.74 to 1.35 mg/dL.

Normal range in women: 0.59 to 1.04 mg/dL.

Creatinine exceeding from this range or decreasing may cause problems. Creatinine may increase, decrease or normal depending on the individual. Increasing creatinine level is due to poor kidney function. And decrease in creatinine leads to liver disease.

Machines used in creatinine test and method to perform:



Blood sample is collected in red test tube to let the blood clot.

Kept in centrifuge to let the blood and plasma separate.



Centrifuge machine

Biochemistry machine



Add 250 μ l of R1 and 250 μ l of R2 with 50 μ l. Plasma kept in with R1 and R2 in biochemistry machine for the analysis of creatinine.

2) CRP Test:

A c-reactive protein test measures the level of c-reactive protein in a sample of your blood. CRP is a protein that your liver makes. CRP test is done for the level of infection in our body.

A CRP test may be used to help find or monitor inflammation in acute or chronic conditions, including: Infections from bacteria, viruses, heart diseases, asthma, lupus and many more.

Normal level of CRP: 0.3 to 1mg/dL

Increasing or decreasing level can cause damage. Normally, we have low levels of c-reactive protein in our blood. Our liver releases more CRP into your bloodstream if you have inflammation in your body. High levels of CRP mean you have a serious health condition that causes inflammation.

Machines used in CRP Test and method to perform:

Blood sample is collected in red test tube to let the blood clot.



Centrifuge machine

Kept in centrifuge to let the blood and plasma separate.

Add 400 μ l of R1 and 100 μ l of R2 with 5 μ l. Plasma kept in with R1 and R2 reagent in biochemistry machine for the analysis of CRP.



Biochemistry Machine

3) SGOT/AST test:

Aspartate aminotransferase (AST) is an enzyme mostly found in the liver. AST is also present in other parts of the body, including the:

- kidneys
- heart
- muscles

Another name for the AST enzyme is serum glutamic-oxaloacetic transaminase (SGOT).

Normal Range of AST in Adults

8 to 33 U/L

If higher than the above range then can cause chronic hepatitis, liver cancer, cholestasis, kidney damage, heart damage and many more.

If lower than the above range than shows deficiency of vitamin B6, kidney disease, liver disease, cancer and cirrhosis.

Machines used in AST test and method to perform:

Blood sample is collected in red test tube to let the blood clot.



Centrifuge machine

Kept in centrifuge to let the blood and plasma separate.

Add 400 μ l of R1 and 100 μ l of R2 with 50 μ l..Plasma kept in with R1 and R2 reagent in biochemistry machine for the analysis of AST.



Biochemistry machine

4) Bilirubin Test:

A bilirubin blood test measures the levels of bilirubin in your blood. Bilirubin is a yellowish substance made during your body's normal process of breaking down old red blood cells. Bilirubin is found in bile, a fluid your liver makes that helps you digest food. If your liver is healthy, it will remove most of the bilirubin from your body. If your liver is damaged, bilirubin can leak out of your liver and into your blood.

When too much bilirubin gets into the bloodstream, it can cause jaundice, the condition that causes your skin and eyes to turn yellow. Signs of jaundice, along with a bilirubin blood test, can help your health care provider find out if you have liver disease. Low range than normal range can cause coronary artery disease (CAD).

Normal Range: 0.1 to 1.2 mg/dL

Machines used in Bilirubin test and method to perform:

Blood sample is collected in red test tube to let the blood clot.



Kept in centrifuge to let the blood and plasma separate.



Centrifuge machine

Add 1000 μ l of T1 and 20 μ l of T2 with 50 μ l. Plasma kept in with T1 and T2 reagent in biochemistry machine for the analysis of Bilirubin.



Biochemistry machine

5) HDL- Cholesterol

A high-density lipoprotein (HDL) test measures the level of good cholesterol in your blood. Cholesterol is a waxy substance that's found in all of the cells in your body. It has several different functions, including helping to build your body's cells. Cholesterol is carried through the bloodstream attached to proteins called lipoproteins.

Two types of cholesterol in your body are HDL, which is the good cholesterol, and low-density lipoprotein (LDL), or bad cholesterol. HDL is known as the good cholesterol because it carries LDL, triglycerides, and harmful fats and returns them to your liver for processing. When HDL reaches your liver, the liver breaks down the LDL, turns it into bile, and removes it from your body.

Normal range: 35 to 65 mg/dL for men, 35 to 80 mg/dL for women

High HDL can cause stroke. Low HDL cause metabolic syndrome, heart failure, and diabetes.

Machines used in HDL test and method to perform

Blood sample is collected in red test tube to let the blood clot.



Kept in centrifuge to let the blood and plasma separate.



Centrifuge machine

Add plasma in the machine in small tube and then put R1 and R2 reagent with their bottles in the machine

Start the program in the machine by pressing start in the-



computer.

6)LDL- Cholesterol

Low-density lipoprotein (LDL) cholesterol. This is called the "bad" cholesterol. Too much of it in your blood causes the buildup of fatty deposits in your arteries, which reduces blood flow. LDL is basically lipid profiling.

Normal range:-100-129 mg/dL

Lower than the above range of LDL can cause increased risk of: Cancer and Hemorrhagic stroke. Higher than the above range of LDL can cause heart disease and stroke.

Machines used in LDL test and method to perform:

Blood sample is collected in red test tube to let the blood clot.



Kept in centrifuge to let the blood and plasma separate.



Centrifuge machine

Add plasma in the machine in small tube and then put R1 and R2 reagent with their bottles in the machine

Start the program in the machine by pressing start in the computer.



Biochemistry machine

7) Uric Acid

This test measures the amount of uric acid in a sample of your blood or urine. Uric acid is a normal waste product that your body makes when it breaks down chemicals called purines. Purines come from your cells when they die. Purines are also found in many foods and beverages.

Normal Range: 3.5 to 7.2mg/dL

Higher than above range can cause gout, kidney stones, leukemia, multiple myeloma, or cancer that has spread in your body and obesity. And lower range than the above can cause kidney disease, lead poisoning or alcohol use disorder.

Machines used in Uric acid test and method to perform:

Blood sample is collected in red test tube to let the blood clot.



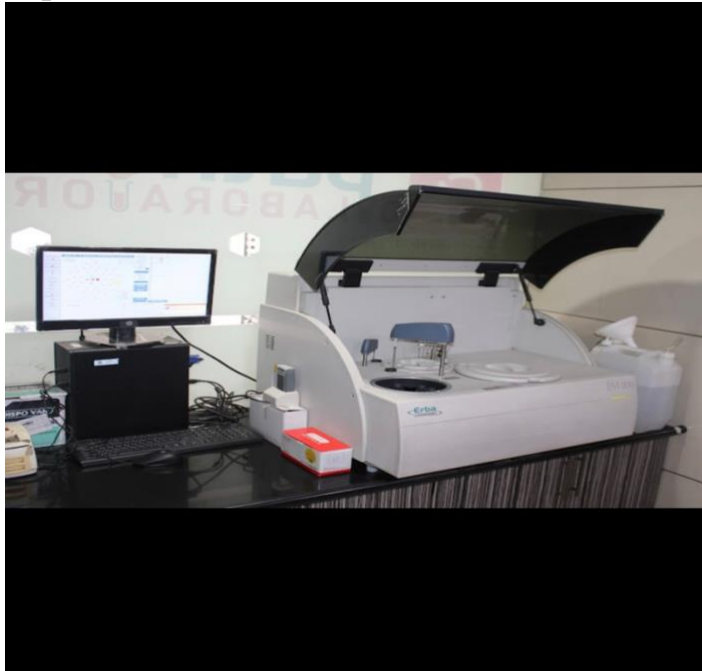
Kept in centrifuge to let the blood and plasma separate.

Centrifuge machine



Add plasma in the machine in small tube and then put R1 and R2 reagent with their bottles in the machine

Start the program in the machine by pressing start in the computer.



Biochemistry machine

Haematology Department

The Clinical Haematology Laboratory performs a wide variety of basic and advanced haematology testing on whole blood, serum, urine, cerebrospinal fluids and other body fluids.

CBC

A complete blood count, or CBC, is a blood test that measures many different parts and features of your blood, including:

Red blood cells which carry oxygen from your lungs to the rest of your body. And the types of RBC are included in this

Normal range: Males 4.7 to 6.1 million cells per micro litre and in females 4.2 to 5.4 million cells per micro litre

Higher than the above range can cause dehydration, pulmonary disease, Kidney cancer and many more diseases.

Lower than the above range can cause: Anaemia
leukaemia, malnutrition , multiple myeloma or kidney failure

White Blood cells which fight infections and other diseases. There are five major types of white blood cells. A CBC test measures the total number of white cells in your blood.

Normal range: The normal number of WBCs in the blood is 4,500-11,000 white blood cells per microliter (mcL).

Higher range than the above range of WBC cause A bacterial or viral infection, an inflammatory disease such as rheumatoid arthritis,an allergy, Leukemia or Hodgkin disease, tissue damage from a burn injury or surgery.Lower range than the above range of WBC can cause Bone marrow damage, cancers that affect the bone marrow, an autoimmune disorder, such as lupus.

Platelets,which stop bleeding by helping your blood to clot.

Normal range: 1,50,000 to 4,00,000 per micro litre.

Higher level of platelet can cause Anaemia, breast cancer, lung cancer, Inflammatory bowel disease, Rheumatoid arthritis, a viral or bacterial infection and many more.Lower level of platelet can cause Leukemia,Hepatitis,Cirrhosis,Infection or damage in bone marrow , vitamin B 12 deficiency.

Haemoglobin is a protein in red blood cells that carries oxygen from your lungs to the rest of your body. A haemoglobin test measures the levels of haemoglobin in your blood.

Normal range: 13.0-18.0 g/dL in males and 11.5-16.5 g/dL in females

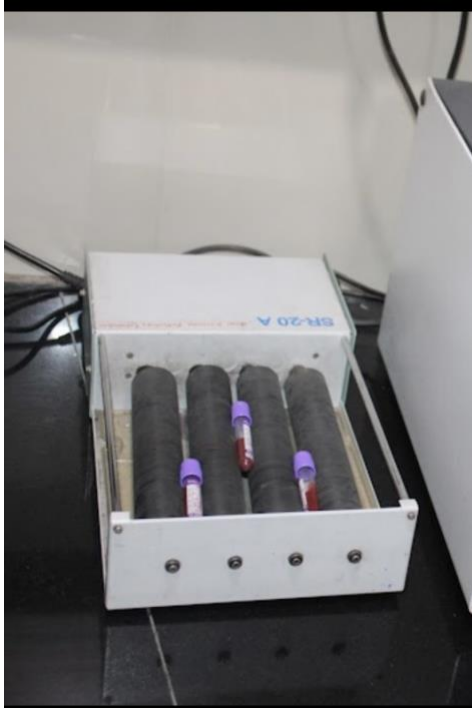
Higher range than the above range can cause: Lung disease, heart disease and can cause many more diseases. Lower than the above range can cause different types of Anaemia, Thalassemia , lung disease, iron deficiency and many more.

Machines used in CBC test and method to perform:



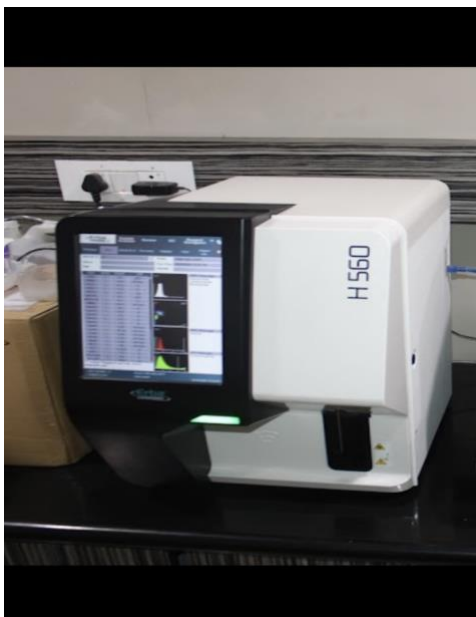
Blood sample is collected in the above purple test tube.

Kept in roller for mixing.



Roller machine

Sample is touched to the tip of the machine needle than immediately after pressing the button behind it, we have to take the sample. And on the screen we will get the report.



CBC Machine

Immunology Department

The Immunology Laboratory is the clinical component of the Immunology Division. The laboratory performs and offers expert interpretation on a broad array of laboratory tests and comprehensive consultation in clinical and diagnostic immunology. In addition, the laboratory is involved in research and the development of diagnostic tests for a wide range of immune-based disorders.

1)FSH:

This test measures the level of follicle-stimulating hormone(FSH) in your blood. FSH is made by your pituitary gland, a small gland located underneath the brain. FSH plays an important role in sexual development and functioning.

In women, FSH helps control the menstrual cycle and stimulates the growth of eggs in the ovaries. FSH levels in women change throughout the menstrual cycle, with the highest levels happening just before an egg is released by the ovary. This is known as ovulation. In men, FSH helps control the production of sperm. Normally, FSH levels in men do not change very much. In children, FSH levels are usually low until puberty, when levels begin to rise. In girls, it helps signal the ovaries to make estrogen

. In boys, it helps signal the testes to make testosterone.
Normal Range:

In males:

Age	FSH range
Before puberty	0—5 IU/L
During puberty	0.3—10 IU/L
Adulthood	1.5—12.4 IU/L

Higher value than this in men than this can cause: Testicles have been damaged due to chemotherapy, radiation, infection, or alcohol abuse. Klinefelter syndrome, a genetic disorder affects sexual development in males. It often causes infertility. Lower value than this in man can cause: disorder of the pituitary gland or hypothalamus.

In females:

	Normal FSH levels
Before puberty	0—4 IU/L
During puberty	0.3—10 IU/L
While still menstruating	4.7—21.5 IU/L
After menopause	25.8—134.8 IU/L

Higher value than the above value can cause: Primary ovarian insufficiency (POI), also known as premature ovarian failure. POI is the loss of ovarian function before the age of 40 or Polycystic ovary syndrome (PCOS), a common hormonal disorder affecting childbearing women, it is one of the leading causes of female infertility, an ovarian Tumor, Turner

syndrome, a genetic disorder that affects sexual development in females or causes infertility. Lower value than the above can cause: pituitary gland is not working or hypothalamus is not working.

In children, high FSH levels, along with high levels of luteinizing hormone, may mean puberty is about to start or has already started. If this is happening before age 9 in a girl or before age 10 in a boy, it may be a sign of: A disorder of the central nervous system or brain injury.

Low FSH and luteinizing hormone levels in children may be a sign of delayed puberty. Delayed puberty may be caused by: A disorder of the ovaries or testicles, Turner syndrome in girls, Klinefelter syndrome in boys, an infection, a hormone deficiency, eating disorder

Machines used in FSH test and method to perform:

Blood sample is collected in red test tube to let the blood clot.



Kept in centrifuge to let the blood and plasma separate.



Centrifuge machine

Take plasma and take FSH kit. We have strip in it which has one hole where in we load plasma. And put the strip in the machine to detect FSH.

FSH kit



Immunology machine



Immunology Machine

2) LH

This test measures the level of luteinizing hormone (LH) in your blood. LH is made by your pituitary gland, a small gland located underneath the brain. LH plays an important role in sexual development and functioning.

In women, LH helps control the menstrual cycle. It also triggers the release of an egg from the ovary. This is known as ovulation. LH levels quickly rise just before ovulation.

In men, LH causes the testicles to make testosterone, which is important for producing sperm. Normally, LH levels in men do not change very much.

In children, LH levels are usually low in early childhood, and begin to rise a couple of years before the start of puberty. In girls, LH helps signal the ovaries to make estrogen. In boys, it helps signal the testes to make testosterone.

Normal range:

Men: 1.24 to 7.8 IU/mL

Women, follicular phase of menstrual cycle: 1.68 to 15 IU/mL

Women, midcycle peak: 21.9 to 56.6 IU/mL

Women, luteal phase: 0.61 to 16.3 IU/mL
Women, postmenopausal: 14.2 to 52.3 IU/mL

Higher range than the above in men can cause: dysfunctionality of testicles, Klinefelter's Syndrome and many

more. And lower range than the above can cause disorder of the pituitary gland or the hypothalamus.

Higher range than the above in women can cause: PCOS, Turner's Syndrome and many more. Lower range than the above in women can cause eating disorder or have malnutrition.

Machines used in LH test and method to perform:

Blood sample is collected in red test tube to let the blood clot.



Kept in centrifuge to let the blood and plasma separate.



Centrifuge machine

Take plasma and take LH kit. We have strip in it which has one hole where in we load plasma. And put the strip in the machine to detect LH.

Immunology Machine



3) Vitamin D3:

Vitamin D test measures the level of vitamin D in your blood to make sure you have enough for your body to work well. Vitamin D is essential for healthy bones and teeth. It also helps keep your muscles, nerves, and immune system working normally.

Supplements of vitamin D:
Sunlight, egg yolks, fishy foods and many more.

Optimal range: 50-70 ng/mol

High level of vitamin D can cause kidney disease, liver disease, tuberculosis and many more. Low level of vitamin D can cause rickets, osteoporosis, fractures.

Machines used in Vitamin D test and method to perform:

Blood sample is collected in red test tube to let the blood clot.



Kept in centrifuge to let the blood and plasma separate.



Centrifuge machine

Take plasma and take vitamin D kit. We have strip in it which has one hole where in we load plasma. And put the strip in the machine to detect Vitamin D.

Immunology Machine



The Skills learned and experience I had:

I had a great experience working in the laboratory. I learned to spread blood with the help of other slide and then gram stain it and watch it on microscope apart from the tests. I saw different blood cells under microscope. In the spreading process the hardest thing is to actually make a tongue shape in the slide which I did. It happens only after too much of practice. Beyond that I even learned the software used in the laboratories to give reports to the patients.

Every skill needs time and I even did urine analysis in the microscope. Where I gained the knowledge of different blood cells if present I could count and identify.

I get interest in the slight of things. Dealing with patients is again the work in laboratory which we have to have with patience, and guide them with utmost knowledge. Make sure to self assure them. And always give them a particular time of them getting the report.

Machines are to be cleaned properly either with a tissue after all the tests are done. Machines are costly hence we have to handle them with care. Whenever a patient has a query, solve it immediately. And taking appropriate about of the samples and reagent is a must thing.

The quantities of costly reagent are to be taken with precision and every time the blood related wastes need to handled properly and kept separately. Every test in laboratory needs precision and might lead to patient's health problem so we need to be careful while testing any sample.

Conclusion and Future Aspects:

Every test performed its vital and requires precision. Thus, every tests performed starting from the collection to the final report needs equal attention.

I was always eager to learn and was curious about the procedure of blood tests which I learned in my internship. For the future in case I have knowledge regarding this then I can go and apply in different labs if I want to continue in this field.

References:

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Textbook Of Medical Laboratory Technology Clinical Laboratory Science And Molecular Diagnosis by Praful Godkar and Darshan Godkar