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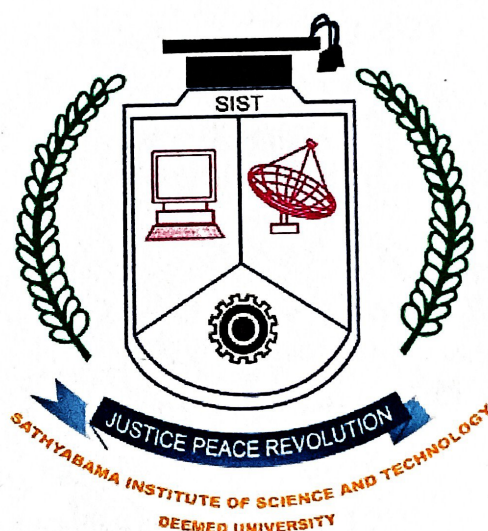
In partial Fulfillment for the Award of The Degree Of
BACHELOR OF SCIENCE

In

MEDICAL LABORATORY TECHNOLOGY

By

GOPITHA. M (Reg. No: 41737005)



DEPARTMENT OF MEDICAL LABORATORY TECHNOLOGY

SCHOOL OF ALLIED HEALTH SCIENCES

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with Grade "A++" by NAAC

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APRIL 2024



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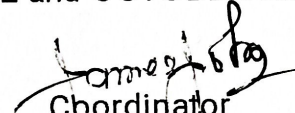
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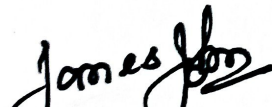
BONAFIDE CERTIFICATE

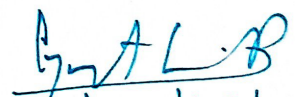
This is to certify that this internship report is the bonafide work of Gopitha M who have done the project work as a team and carried out the training program at GERI CARE HOSPITAL - T. NAGAR AND LIONS BLOOD BANK - AMBATTUR under our supervision from OCTOBER 2022 and OCTOBER 2023.


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12/ APR/2024
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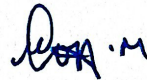
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DECLARATION

I, GOPITHA. M (41737005), hereby declare that the internship trainings done by me at "GERI CARE HOSPITAL – T. NAGAR" under the guidance of Dr. JAMES JOHN and "LIONS BLOOD BANK AND RESEARCH FOUNDATION - AMBATTUR under the guidance of Ms. D. JASMINE PRIYA at Sathyabama Institute of Science and Technology is submitted in partial fulfilment of the requirements for the award of Bachelor of science degree in MEDICAL LABORATORY TECHNOLOGY.

Date: 12.04.2024

Place: CHENNAI



(GOPITHA. M)

ACKNOWLEDGEMENT

We are pleased to acknowledge our sincere thanks to **the Board of Management** of **SATHYABAMA Institute of Science and Technology** for their kind encouragement in doing this internship program and for completing it successfully. We are grateful to them.

We would like to express our sincere and deep sense of gratitude to our Head of the Department **Dr. J. Premkumar** and Course Coordinator **Dr. James John** and **Ms. D. Jasmine Priya** for their valuable guidance, suggestions and constant encouragement paved way for the successful completion of our internship report.

We wish to express our thanks to all Teaching and Non-teaching staff members of the Department of Biomedical Engineering who were helpful in many ways for the completion of the internship.

We would like to express our thanks to our parents for their unwavering support to us during these years.

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Introduction:

I completed a one-month internship at Geri Care Hospital, where I gained valuable experience in various departments such as phlebotomy, microbiology, immunology, biochemistry, hematology and While at the Lions Blood Bank in Ambattur, I acquired knowledge about blood donation procedures and the correct methods for storing both blood and its components.

Phlebotomy

Blood collection:

- ✓ The site is cleaned with 70 % alcohol spirit (antiseptic).
- ✓ An elastic band is put around the upper arm to apply pressure to the area. This makes the vein below it swell with blood.
- ✓ A needle is inserted into the vein.
- ✓ The blood collects into an airtight vial or tube attached to the needle.
- ✓ The elastic band is removed from your arm.
- ✓ The needle is taken out and the spot is covered with a bandage to stop bleeding.

Order of draw:

- ✓ Blood Culture Tubes or Vials
- ✓ Coagulation Tubes (Blue-Top Tubes)
- ✓ Serum Tubes without Clot Activator or Gel (Red-Top tubes)
- ✓ Serum Tubes with Clot Activator or Gel (Gold or Tiger Top Tubes)
- ✓ Heparin Tubes (Green-Top Tubes)
- ✓ EDTA Tubes (Lavender-Top Tubes)
- ✓ Oxalate/Fluoride Tubes (Gray-Top Tubes)

The typical order of draw is as follows:

Blood culture bottles: These are sterile bottles used to collect blood samples for microbial culture testing to detect infections. Collecting blood cultures first helps prevent contamination from skin bacteria introduced during subsequent venipuncture.

Coagulation tubes: These tubes contain anticoagulants such as sodium citrate and are used for coagulation studies, including tests to evaluate clotting factors and monitor anticoagulant therapy.

Serum tubes without additives: These tubes are used to collect blood samples for chemistry tests that require serum, such as glucose, electrolytes, and liver function tests.

Tubes with additives (such as EDTA, heparin, or fluoride): These tubes contain anticoagulants or additives specific to certain tests, such as EDTA for hematology tests, heparin for some chemistry tests, and fluoride for glucose tests.

Nasal and throat swab collection:

Collecting a nasal and throat swab involves gently inserting a swab into the nostril and then into the throat to collect samples for testing. The person collecting the sample should wash, and put on gloves and a mask for protection. The person being tested should also be informed about the procedure. To collect the sample, the swab is inserted in the nostril and gently moved forward into the nasopharynx, a region of the pharynx that covers the roof of the mouth. The swab is then rotated for a specified period to collect secretions, then the swab is removed and placed into a sterile viral transport media, which preserves the sample for subsequent analysis.

Microbiology

Gram staining:

Reagents:

- ✓ Crystal violet (primary stain)
- ✓ Iodine solution/Gram's Iodine (mordant that fixes crystal violet to cell wall)
- ✓ Decolorizer (e.g. ethanol)
- ✓ Safranin (secondary stain)
- ✓ Water

Make a slide of sample to be stained. Heat fixes the sample to the slide by carefully passing the slide with a drop or small piece of sample on it through a Bunsen burner three times.

Add the primary stain crystal violet to the slide and incubate for 1 minute. Rinse slide with a gentle stream of water for a maximum of 5 seconds to remove unbound crystal violet.

Add Gram's iodine for 1 minute. This is a mordant, or an agent that fixes crystal violet to the bacterial cell wall.

Rinse slide with acetone or alcohol for 3 seconds and rinse with a gentle stream of water. The alcohol will decolorize the sample if it is Gram negative, removing the crystal violet. However, if the alcohol remains on the sample for too long, it may also decolorize Gram positive cells.

Add the secondary stain, safranin, to the slide and incubate for 1 minute. Wash with a gentle stream of water for a maximum of 5 seconds. If the bacteria are Gram positive, will retain the primary stain crystal violet and not take the secondary stain safranin, causing it to look violet/purple under a microscope. If the bacteria are Gram negative, it will lose the primary stain and take the secondary stain, causing it to appear red when viewed under a microscope.

Smear making:

Collect the sample using a swab or another appropriate tool from the area of interest.

Place a drop of water or saline solution on a clean glass slide.

Gently roll the swab or sample onto the drop of water on the slide to spread the sample thinly and evenly.

Allow the smear to air dry or fix it by passing the slide through a flame or using a fixative if necessary.

Apply the appropriate stain, such as Gram stain or methylene blue, to enhance the visibility of the microorganisms or cells.

Once the smear is dry, place a cover slip over the smear to protect it and make it easier to observe under the microscope.

Examine the smear under a microscope to observe the microorganisms or cells present.

Media preparation:

Reagents: The reagents may include peptone, agar, beef extract, specific additives, and distilled water. Ensure that all components are of high quality and properly labeled.

Weigh and Measure: Accurately measure and weigh the required quantities of each reagent according to the formulation specified in the protocol or recipe. Use a balance or weighing scale to ensure precise measurements.

Dissolve and Mix: In a clean and sterilized container, dissolve the measured reagents in distilled water. Use a magnetic stirrer or vortex mixer to ensure thorough mixing and dissolution of the components. Follow the recommended temperature and pH conditions for dissolution.

Adjust pH and Volume: Check the pH of the medium using a pH meter or pH indicator paper. Adjust the pH by adding small amounts of acid or base as per the instructions provided in the protocol. Once the pH is within the desired range, adjust the volume of the medium by adding more distilled water.

Sterilization: Sterilize the prepared medium using the appropriate method. For heat-sensitive components, such as antibiotics or growth factors, sterilization by filtration is preferred. For other media, autoclaving at high pressure and temperature is the most common method.



Figure 1: media preparation

Microscopic Examination:

The stained slide is examined under a microscope. Gram-positive bacteria appear purple, while Gram-negative bacteria appear pink or red.

Urine culture:

Urine culture is used to detect and identify microorganisms, typically bacteria, present in a urine sample.

Sample Collection: A clean-catch midstream urine sample is collected in a sterile container.

A small amount of the urine sample is spread onto agar plates containing culture media that support bacterial growth. It may be blood agar, MacConkey agar or another specialized agar. The agar plates are then placed in an incubator at a specific temperature of 37°C to promote the growth of any bacteria present in the urine sample. The plates are incubated for a period of 24 to 48 hours. After the incubation period, microbiologists examine the agar plates for the presence of bacterial colonies. The colonies are observed for characteristics such as size, shape, color, and texture. Then viewed under the microscope.

Stool culture:

A stool culture is used to detect and identify bacteria or other pathogens in a person's stool sample. It's often used to diagnose gastrointestinal infections, such as those caused by bacteria like Salmonella, Shigella, or Campylobacter.

Collection: The patient is provided with a sterile container to collect a stool sample.

Processing: In the lab, the stool sample is processed, usually by mixing it with a special medium that encourages the growth of bacteria.

Incubation: The sample is incubated at a specific temperature for a certain period to allow any bacteria present to grow.

Examination: After incubation, the sample is examined under a microscope to identify any bacterial colonies that have grown.

Identification: If bacterial colonies are present, they are identified using various biochemical tests or molecular techniques to determine the specific type of bacteria.

Stool occult blood: Stool occult blood testing is a diagnostic test used to detect small amounts of blood in the stool that are not visible to the naked eye. This type of blood loss can occur due to various gastrointestinal conditions, such as ulcers, polyps, colorectal cancer, or inflammatory bowel disease.

Collection: The patient collects a small sample of stool using a special collection kit provided by their healthcare provider.

Testing: The stool sample is then tested for the presence of blood using various methods, such as chemical reagents that react with blood components to produce a color change.

Interpretation: A positive result indicates the presence of occult blood in the stool, which may warrant further investigation to determine the underlying cause. A negative result suggests that no blood was detected in the stool sample.

Biochemicals:

Biochemical tests in microbiology are used to identify microorganisms based on their metabolic activities, helping differentiate between different species. Examples include catalase, oxidase, coagulase, TSI agar, and citrate utilization tests.

Identification of bacterial sensitivity:

Identification of bacterial sensitivity, also known as antimicrobial susceptibility testing, is a laboratory procedure used to determine which antibiotics are effective against a particular bacterial strain.

- ✓ Isolating the bacteria from a patient sample, such as blood or urine.
- ✓ Culturing the bacteria on agar plates or in broth to grow colonies.
- ✓ Applying antibiotic discs or strips containing different antibiotics to the bacterial culture.
- ✓ Incubating the plates or broth to allow the bacteria to grow in the presence of the antibiotics.
- ✓ Observing the growth patterns around each antibiotic disc or strip to determine the sensitivity or resistance of the bacteria to the antibiotics.
- ✓ Interpreting the results according to established guidelines to identify which antibiotics are effective against the bacteria.

Cultural characteristic:

Colony morphology: This involves the size, shape, color, texture, and elevation of bacterial colonies grown on agar plates. For example, colonies may be round, irregular, smooth, rough, shiny, or dull.

Growth pattern: Microorganisms may exhibit different growth patterns in liquid or solid media. They can grow as dispersed cells, clusters, chains, or biofilms.

Pigmentation: Some bacteria produce pigments that give their colonies distinctive colors. For instance, some species of bacteria produce yellow, red, orange, or green pigments.

Hemolysis: Hemolysis refers to the destruction of red blood cells. Bacterial colonies on blood agar plates may exhibit different types of hemolysis, such as alpha (partial), beta (complete), or gamma (no) hemolysis.

Odor: Certain bacteria produce characteristic Odors when grown in culture. These Odors can be helpful in identifying specific species.

Texture: Bacterial colonies may vary in texture, ranging from smooth and shiny to rough and dry.

C reactive protein:

C-reactive protein (CRP) is a substance produced by the liver in response to inflammation in the body. Its levels rise in response to inflammation, infection, tissue injury, or certain diseases. CRP is a marker of inflammation and is often measured through a blood test.

High levels of CRP in the blood can indicate acute or chronic inflammation, such as that seen in infections, autoimmune disorders, cardiovascular diseases, and certain cancers. CRP levels can help healthcare providers diagnose and monitor the progression of these conditions, as well as assess the response to treatment.

- ✓ Sample collection: blood is drawn from the patient's hand using syringe or vacuum.
- ✓ Sample processing: After collecting the sample the blood is then centrifuged to separate plasma from the blood cells.
- ✓ CRP measurement: The level of CRP in the serum or plasma is measured using a quantitative assay, such as an enzyme-linked immunosorbent assay (ELISA) or a high-sensitivity CRP (HS-CRP) assay. These tests detect and quantify CRP levels

accurately.

- ✓ Interpretation: Once the CRP level is determined, Elevated CRP levels may indicate inflammation or infection, while normal or low levels may suggest that inflammation is absent or well-controlled.

Dengue profile:

A dengue profile typically refers to a series of tests used to diagnose and monitor dengue fever, a mosquito-borne viral infection caused by the dengue virus. The profile usually includes:

Dengue NS1 antigen test: This test detects the presence of the dengue virus antigen in the blood during the early stages of infection, typically within the first week of symptoms.

Dengue IgM antibody test: This test detects immunoglobulin M (IgM) antibodies produced by the body in response to the dengue virus. IgM antibodies are usually detectable within 3-5 days after the onset of symptoms and can persist for several weeks.

Dengue IgG antibody test: This test detects immunoglobulin G (IgG) antibodies produced by the body as part of the immune response to dengue virus infection. IgG antibodies typically appear later in the course of infection and can remain detectable for months to years after recovery.

Biochemistry:

It encompasses the study of molecules such as proteins, carbohydrates, lipids, and nucleic acids, and their interactions within biological systems.

Liver Function Test (LFT) is a series of blood tests that measure various enzymes, proteins, and substances produced or processed by the liver. These tests help evaluate liver health and function, including assessing liver enzymes, bilirubin levels, albumin, and total protein levels.



Figure 2: Mindray machine to identify RFT & LFT

Abnormal LFT results can indicate liver damage, inflammation, or disease.

Renal Function Test (RFT) evaluates the function of the kidneys by measuring various markers in the blood and urine. Common tests included in RFTs are serum creatinine, blood urea nitrogen (BUN), and estimated glomerular filtration rate (eGFR). These tests help assess kidney function and detect conditions such as kidney disease, kidney damage, or impaired kidney function.

Urine routine:

Physical Examination:

Color: Describes the color of the urine, which can range from pale yellow to dark amber, and may indicate hydration status or the presence of certain substances.

Appearance: Refers to the clarity of the urine, which can be clear, cloudy, or turbid, and may indicate the presence of cells, proteins, or other substances.

Chemical Examination:

pH: Measures the acidity or alkalinity of the urine, with normal values typically ranging from 4.6 to 8.0.

Specific Gravity: Reflects the concentration of solutes in the urine and provides information about the kidney's ability to concentrate urine.

Biochemical Parameters:

Protein: Detects the presence of proteins in the urine, which can indicate kidney disease or other conditions.

Glucose: Measures the level of glucose in the urine, which can be elevated in diabetes or other conditions.

Ketones: Detects the presence of ketones in the urine, which may occur in uncontrolled diabetes or other metabolic disorders.

Bilirubin: Indicates the presence of bilirubin in the urine, which may be a sign of liver disease or other conditions.

Urobilinogen: Measures the level of urobilinogen in the urine, which can provide information about liver function and the breakdown of red blood cells.



Figure 3: urine routine machine

Nitrites: Detects the presence of nitrites in the urine, which may indicate signs of infection or inflammation.

Microscopic Examination:

Cells: Includes the presence of red blood cells, white blood cells, and epithelial cells, which can provide information about kidney disease, urinary tract infections, or other conditions.

Casts: Detects the presence of casts, which are cylindrical structures formed in the kidney tubules and can indicate kidney disease.

Crystals: Identifies the presence of crystals in the urine, which may be associated with certain diseases or conditions.

Interpreting these parameters in the context of an individual's medical history and symptoms is crucial for accurate diagnosis and management. If you have specific results from a urine routine biochemistry report that you would like to discuss, please feel free to share them with me for further interpretation.

Troponin Test:

The troponin test is a fundamental component of biochemistry used in the diagnosis of heart-related conditions, particularly myocardial infarction (heart attack). It measures the levels of troponin T and troponin I, which are cardiac muscle proteins released into the bloodstream when the heart muscle is damaged.

Biochemical Basis:

Troponin T and troponin I are regulatory proteins that are integral to muscle contraction, specifically in cardiac muscle. When cardiac injury occurs, these proteins are released into the bloodstream due to the damage to heart muscle cells, making them valuable biomarkers for myocardial injury.

Clinical Significance:

Elevated levels of troponin in the blood indicate myocardial injury, and this is highly indicative of a heart attack. The troponin test is crucial in confirming the diagnosis of acute myocardial infarction and plays a pivotal role in the early assessment and management of patients presenting with symptoms of a heart attack.

D-dimer

Introduction to D-dimer

D-dimer is a small protein fragment that is produced when a blood clot dissolves in the body. It is a fibrin degradation product resulting from the breakdown of cross-linked fibrin, which is a key component of blood clots.

Diagnosis of Blood Clotting Disorders

D-dimer testing is widely used in the diagnosis of conditions related to blood clotting, such as deep vein thrombosis (DVT), pulmonary embolism (PE), and disseminated intravascular coagulation (DIC). Elevated levels of D-dimer in the blood can indicate the presence of an active blood clot or the breakdown of a clot in the body.

Procedure

A blood sample from a vein in your arm, using a small needle. After the needle is inserted, a small amount of blood will be collected into a test tube or vial. You may feel a little sting when the needle goes in or out. This usually takes less than five minutes.

Interpretation

Elevated D-dimer levels are indicative of potential clot formation or breakdown, but it's important to note that they can also be caused by conditions unrelated to blood clotting, such as inflammation, infection, or certain types of cancer. Therefore, D-dimer testing is often used in conjunction with other diagnostic tools to make an accurate assessment.

Conclusion

In conclusion, D-dimer testing is an important component of the field of biochemistry, providing valuable insights into the presence of blood clots and aiding in the diagnosis and management of clotting disorders. Its clinical significance extends to a wide range of medical conditions, making it an essential tool in modern healthcare.

NT-pro BNP: A Biochemical Marker in Cardiovascular Disease

Introduction

NT-pro BNP, or N-terminal pro-B-type natriuretic peptide, is a peptide that serves as a biomarker for cardiac stress and heart failure. It is produced when the heart is under increased pressure or stress, and its levels in the blood can provide valuable information about cardiac function.

Structure and Function

NT-pro BNP is derived from pro-BNP, a precursor molecule that is synthesized and released primarily by the ventricles of the heart in response to increased wall tension. When pro-BNP is cleaved, it forms the biologically active BNP hormone and the inactive N-terminal fragment, NT-pro BNP. While BNP is rapidly cleared from circulation, NT-pro BNP has a longer half-life, making it a more stable and reliable marker for cardiac dysfunction.

Differential Diagnosis

In addition to heart failure, NT-pro BNP levels may be elevated in other conditions such as pulmonary embolism, chronic kidney disease, and sepsis. Its measurement can aid in the differential diagnosis of dyspnoea and help distinguish cardiac from non-cardiac causes.

NT-pro BNP levels are typically measured using immunoassays, with results reported in picograms per milliliter (pg/mL). Various commercial assays are available for quantifying NT-pro BNP, and standardization of measurements is essential for accurate interpretation of results.

Conclusion

In summary, NT-pro BNP is a valuable biomarker in the field of biochemistry, particularly in the assessment of cardiac function and heart failure. Its clinical utility extends to diagnosis,

prognosis, and monitoring of patients with cardiovascular disease, making it an indispensable tool in modern medicine.

Biomeriux Biochemical Analyzer

Introduction

The Biomeriux Biochemical Analyzer is a state-of-the-art instrument designed for the precise analysis of biochemical components in various biological samples. This report provides a detailed description of the analyzer, including its key features, functionality, and applications.

The Biomeriux Biochemical Analyzer is equipped with a range of advanced features that facilitate accurate and efficient biochemical analysis. These features include:

Automated Sample Handling: The analyzer can handle many samples simultaneously, streamlining the analysis process and increasing throughput.

Multiple Assay Capabilities: It offers the flexibility to perform a wide variety of biochemical assays, including enzymatic, immunochemical, and chemical methods, catering to diverse research and clinical needs.

Precision and Accuracy: The analyzer is renowned for its high precision and accuracy, ensuring reliable results for critical biochemical measurements.

Research and Development: It plays a crucial role in research endeavors, enabling scientists to investigate biochemical pathways, study disease mechanisms, and evaluate the efficacy of pharmaceutical compounds.

Quality Control: The analyzer is employed in quality control processes within industries such as pharmaceuticals, food and beverage, and environmental monitoring, ensuring the integrity and safety of products.

Conclusion: The Biomeriux Biochemical Analyzer stands as a cutting-edge instrument in the field of biochemistry, offering unparalleled precision, versatility, and efficiency in biochemical analysis. Its impact spans across clinical, research, and industrial domains, contributing to advancements in healthcare, scientific knowledge, and product quality assurance.

Electrolyte analyzer

Introduction

The electrolyte analyzer is an essential instrument used in biochemistry to measure the concentration of various electrolytes present in biological samples. These electrolytes include sodium (Na^+), potassium (K^+), chloride (Cl^-), and bicarbonate (HCO_3^-), which play crucial roles in various physiological processes within the human body.

Principle of Operation

The analyzer operates based on different techniques such as ion-selective electrodes and conductivity measurement. Ion-selective electrodes selectively measure the concentration of specific ions in the sample, while conductivity measurement assesses the ability of the sample to conduct an electric current, providing information about the overall electrolyte concentration.

Components of an Electrolyte Analyzer

Key components include electrodes for ion measurement, a sample handling system for processing biological samples, a calibration system to ensure accuracy, a measurement unit for analyzing the samples, and a data display and analysis module for presenting and interpreting results. These components work together to provide accurate and reliable measurements of electrolyte concentrations.

Electrolytes Measured

The electrolyte analyzer can measure a range of electrolytes, including sodium (Na^+), potassium (K^+), chloride (Cl^-), and bicarbonate (HCO_3^-). These electrolytes play essential roles in various physiological processes within the human body.

Sample Analysis Process

The process begins with sample collection, followed by sample preparation and the actual analysis procedure. Quality control measures are crucial to ensure the accuracy and reliability of the results, and routine maintenance and troubleshooting are necessary to address any issues that may arise during operation.

Quality Assurance and Maintenance

Regular calibration, quality control procedures, and routine maintenance are necessary to

uphold the accuracy and precision of the analyzer's measurements. This includes troubleshooting to address any issues that may arise during operation.

Hematology

Peripheral smear

Introduction

A peripheral smear, also known as a blood smear, is a crucial component of hematological analysis. It involves the manual preparation of a thin layer of blood on a glass slide, followed by staining and microscopic examination. This technique allows for the visual inspection of blood cell morphology and the identification of various abnormalities.

Preparation of Peripheral Smear

The process begins with the collection of a blood sample, typically from a finger prick or venipuncture. A small drop of blood is placed on a glass slide, and using another slide, the drop is spread thinly to create a monolayer of cells. The smear is then left to air dry before staining.

Staining

After drying, the smear is stained using dyes such as Wright's stain or Giemsa stain. These stains help to differentiate the various blood cell types and allow for better visualization under the microscope.

Microscopic Examination

The stained peripheral smear is examined under a microscope at various magnifications. The morphology of red blood cells, white blood cells, and platelets is carefully assessed for any abnormalities such as shape, size, color, and presence of inclusions.

Identification of Abnormalities

The peripheral smear allows for the identification of various abnormalities, including:

Red Blood Cells: Anisocytosis, poikilocytosis, hypochromia, and polychromasia.

White Blood Cells: Abnormalities in cell count, morphology, and presence of immature cells.

Platelets: Assessment of platelet count and identification of abnormal forms.

Conclusion

In conclusion, the peripheral smear is an indispensable tool in hematological analysis, providing valuable insights into blood cell morphology and aiding in the diagnosis and monitoring of various hematological disorders.

Leishman staining Introduction

Leishman staining is a vital staining technique used in hematology for the visualization and identification of blood cells, particularly for the examination of blood smears under a microscope. It is named after the British pathologist William Boog Leishman.

Purpose of Leishman Staining

The primary purpose of Leishman staining is to differentiate and visualize various types of blood cells, including red blood cells, white blood cells, and platelets, in order to aid in the diagnosis of blood-related disorders and diseases.

Staining Process

Leishman staining involves a multistep process, including fixation of the blood smear with methanol, followed by staining with Leishman's stain, which contains a mixture of methylene blue and eosin. This staining process imparts differential coloration to different cellular components, allowing for their identification and examination.

Microscopic Examination

Following staining, the blood smear is examined under a microscope at various magnifications to assess the morphology, distribution, and relative proportions of different blood cell types. This microscopic examination is crucial for the diagnosis of various hematological conditions.

Differential count

Introduction

The differential count, also known as the white blood cell (WBC) differential, is a critical component of a complete blood count (CBC). It involves the microscopic examination of a stained blood smear to determine the relative proportions of different types of white blood cells present in the sample.

Sample Collection and Preparation

Blood samples for the WBC differential are typically collected via venipuncture and anticoagulated using ethylenediaminetetraacetic acid (EDTA). After collection, a blood smear is prepared by spreading a drop of blood thinly and evenly on a glass slide, followed by staining with a Wright-Giemsa stain to allow for optimal visualization of cellular morphology.

Microscopic Examination

The stained blood smear is examined under a microscope using oil immersion to visualize the individual white blood cells. A trained technologist or hematologist carefully reviews the slide, identifying and counting the different types of white blood cells based on their distinct morphological characteristics.

Types of White Blood Cells

Neutrophils: Phagocytic cells involved in the body's defense against bacterial infections.

Lymphocytes: Play a key role in the immune response, including antibody production and immune regulation.

Monocytes: Precursors to tissue macrophages, involved in phagocytosis and immune regulation.

Eosinophils: Implicated in allergic reactions and defense against parasitic infections.

Basophils: Release histamine and other mediators during allergic reactions and inflammation.

Reporting and Interpretation

The differential count results are reported as percentages of each cell type and absolute counts, which represent the actual number of each cell type per unit volume of blood. These values are used to assess and monitor various medical conditions, such as bacterial infections (neutrophilia), viral infections (lymphocytosis), and allergic reactions (eosinophilia).

Clinical Significance

Abnormalities in the differential count can provide valuable diagnostic and prognostic information. For example, an increased percentage of eosinophils may suggest an allergic condition or parasitic infection, while a high percentage of lymphocytes may indicate a viral infection.

CBC analyzer and ESR Introduction

The Hematology - CBC analyzer and ESR are essential instruments used in the field of hematology to assess various parameters related to blood composition and erythrocyte sedimentation rate, providing valuable insights into a patient's health status.

CBC Analyzer (Complete Blood Count)

The CBC analyzer is a fundamental tool in hematology, providing a comprehensive analysis of blood composition, including red blood cell (RBC) count, white blood cell (WBC) count, platelet count, hemoglobin concentration, hematocrit, and various red blood cell indices such as mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and mean corpuscular hemoglobin concentration (MCHC).

Components of a CBC Analyzer

Key components include a sample handling system for processing blood samples, automated cell counting and sizing mechanisms, hemoglobin measurement systems, and data analysis and reporting modules for presenting and interpreting results.

Sample Analysis Process

The process involves sample aspiration, cell counting and sizing, hemoglobin measurement, and the calculation of various blood cell indices. Quality control measures are critical to ensure the accuracy and reliability of the results.

ESR (Erythrocyte Sedimentation Rate)

The ESR is a simple, non-specific laboratory test that measures the rate at which red blood cells settle in a vertical column of blood, providing indirect information about the presence of inflammation in the body.

Sample Analysis Process

The ESR test involves the collection of blood into an ESR tube, where the rate of sedimentation is measured over a specific period. The result is reported as the distance in millimeters that the red blood cells have descended in one hour.

Conclusion

The Hematology - CBC analyzer and ESR play integral roles in hematology, providing valuable information about blood composition and inflammatory processes. Their accurate and

timely measurements contribute significantly to clinical diagnostics and patient care, making them indispensable instruments in the realm of hematology and healthcare.



Figure 4: CBC and ESR

Hematology - HbA1c

Introduction

Hemoglobin A1c (HbA1c) is a crucial test used in hematology to measure the average blood glucose levels over a period of two to three months. This test is primarily used in the management and diagnosis of diabetes mellitus.

Clinical Significance

HbA1c is a valuable tool in the management of diabetes, as it provides an indication of long-term glycemic control. It is used to monitor the effectiveness of diabetes treatment plans and to assess the risk of diabetes-related complications.

Sample Collection and Analysis

Blood samples are collected and analyzed using high-performance liquid chromatography (HPLC) or immunoassay methods to measure the percentage of glycated hemoglobin in the sample.

Interpretation of Results

The results of the HbA1c test are reported as a percentage, with higher percentages indicating poorer glycemic control. Healthcare professionals use these results to adjust treatment plans and assess the risk of diabetes-related complications.

Quality Assurance and Standardization

Quality control measures are essential to ensure the accuracy and reliability of HbA1c test results. Standardization of testing methods and regular calibration of equipment are crucial in maintaining the consistency of results across different laboratories.

Immunology

Vitros Analyzer

Introduction

The Vitros Analyzer is a critical instrument used in the field of immunology for analyzing various parameters related to immune system function and specific disease markers.

Components of the Vitros Analyzer

Key components of the analyzer include the sample handling system, reagent storage and dispensing system, reaction chambers, detection system, and data analysis and reporting modules. These components work together to automate the process of immune system parameter measurement with high precision and accuracy.

Parameters Analyzed

The Vitros Analyzer can measure a wide range of immunological parameters, including but not limited to cytokines, hormones, tumor markers, infectious disease markers, autoimmune disease markers, and allergy-related markers.

Conclusion

During my internship at Geri Care Hospital, I gained valuable experience in various departments such as phlebotomy, microbiology, immunology, biochemistry, and hematology. This hands-on experience has provided me with a deep understanding of medical laboratory practices and procedures. It has been an enriching opportunity that has equipped me with practical skills and knowledge essential for a career in the healthcare field.

S.no	Figure	Name
1	Figure 1	Media preparation
2	Figure 2	Mindray machine
3	Figure 3	Urine routine machine
4	Figure 4	CBC & ESR

S.NO	TOPIC	Pg. No
1.	INTRODUCTION	23
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INTRODUCTION:

Blood banking is the process that takes place in the lab to make sure that donated blood, or blood products, are safe before they are used in blood transfusions and other medical procedures. Blood banking includes typing the blood for transfusion and testing for infectious diseases.

- ✓ About 36,000 units of blood are needed every day.
- ✓ The number of blood units donated is about 13.6 million a year.
- ✓ About 6.8 million volunteers are blood donors each year.
- ✓ Each unit of blood is broken down into components, such as red blood cells, plasma, cryo precipitated AHF, and platelets. One unit of whole blood, once It's separated, may be transfused to several patients, each with different needs.
- ✓ Annually, more than 21 million blood components are transfused.
- ✓ Must be at least 16 years of age, or in accordance with state law.
- ✓ Must be in good health.
- ✓ Must weigh at least 110 pounds.
- ✓ Must pass the physical and health history exam given before donation.

Some states permit people younger than 16 or 17 years to donate blood, with parental consent.

Blood donation is a vital part of worldwide healthcare. It allows for blood transfusion as a life-sustaining and life-saving procedure. Over one hundred million units of blood are donated each year throughout the world. This activity reviews donor eligibility and selection, adverse effects of donation, and pathogen reduction and inactivation for donated blood. This activity highlights the role of the interprofessional team in ensuring appropriate protocol is followed.

DONOR SELECTION CRITERIA:

Who is Eligible to Donate Blood?

Any healthy adult, both male and female, can donate every three months.

Good health of the donor must be fully ensured.

The universally accepted criteria for donor selection are:

- ✓ Age between 18 and 60 years
- ✓ Hemoglobin - not less than 12.5 g/Dl
- ✓ Pulse - between 50 and 100/minute with no irregularities Blood Pressure -Systolic 100-180 mm Hg and Diastolic 50 - 100 mm Hg.
- ✓ Temperature - Normal (oral temperature not exceeding 37.50C)
- ✓ Body weight - not less than 45 Kg
- ✓ Health conditions: The donor should be in a healthy state of mind and body.
- ✓ They should fulfil the following criteria:
 - ✓ Past one year - not been treated for Rabies or received Hepatitis B immune globulin.
 - ✓ Past six months - not had a tattoo, ear or skin piercing or acupuncture, not received blood or blood products, no serious illness or major surgery, no contact with a person with hepatitis or yellow jaundice.
 - ✓ Past three months - not donated blood or been treated for Malaria.
 - ✓ Past one month - had any immunizations.
 - ✓ Past 48 hours - taken any antibiotics or any other medications (Allopathic or Ayurveda or Sidha or Homeo)
 - ✓ Past 24 hours taken alcoholic beverages.
 - ✓ Past 72 hours - had dental work or taken Aspirin.
 - ✓ Present - not suffering from cough, influenza or sore throat, common cold.
 - ✓ Women should not be pregnant or breast feeding her child.
 - ✓ Women donor should not donate during her menstrual cycles.
 - ✓ Free from Diabetes, not suffering from chest pain, heart disease or high BP, cancer, blood clotting problem or blood disease, unexplained fever, weight loss, fatigue, night sweats, enlarged lymph nodes in armpits, neck or groin, white patches in the mouth etc.
 - ✓ Ever had TB, bronchial asthma or allergic disorder, liver disease, kidney disease, fits

or fainting, blue or purple spots on the skin or mucous membranes, received human pituitary - growth hormones etc.

REJECTION CRITERIA

- ✓ Affected with HIV viruses or AIDS.
- ✓ If the patient had undergone any open-heart surgery
- ✓ Pregnant lady
- ✓ Cancer patient
- ✓ Kidney disorder or Diabetes patient
- ✓ TB patients are not eligible.
- ✓ Have asthma with active symptoms, and severe asthma patients.
- ✓ High blood pressure
- ✓ Organ transplantation
- ✓ Unexpected weight loss of more the 5 kg over 6 months
- ✓ Put the tattoo.
- ✓ Cannot donate the blood in alcoholic person.
- ✓ Should not donate blood to smoker.
- ✓ Affected with jaundice patient.

BLOOD DONOR REQUEST FORM

- ✓ First when the donor arrives, we should give the donor request form.
- ✓ That request form only decides whether can donate blood or not.
- ✓ The donor should fill in the details like age, weight, hemoglobin level, name, phone number, health condition.
- ✓ If he is the first donor, he has any diseases or genetic problem, last time donated date address, whether he donated blood before or not.
- ✓ If he is the first donor, he has any disease or genetic problem, last time donated date.
- ✓ If he is alcoholic or drug addict or if he uses tobacco etc.....

- ✓ The donor should fill this kind of question and put his signature.
- ✓ The doctor will see if he is eligible by the form then only the donor is allowed to donate blood.

BLOOD BAG

- ✓ Blood bags are used for the reliable collection, separation, storage and transport of blood. Rounded blood bag design prevents blood coagulation and ensures the blood and anti-coagulants are properly mixed during separation and transfusion.
- ✓ Blood bags contain some liquid like chemical called sagam which is help as anticoagulant.
- ✓ Sagam A as 45 days lifetime and sagam as 35 days lifetime.
- ✓ Citrate Phosphate Dextrose Adenine (CPDA-1) anticoagulant is present in blood bag.
- ✓ It is used as transportation and transfusion of human blood and blood components.
- ✓ Blood bag stores about 350 to 450 ml of blood for that it has different types of bags.
- ✓ Blood bags are one of the types is double bags which is help full in collecting blood and transferring plasma.
- ✓ Blood bags have three types.
- ✓ Single bag
- ✓ Double bag
- ✓ Triple bag



Figure 1: blood bag

BLOOD DONATION

REGISTRATION

- ✓ We'll sign you in and go over basic eligibility.
- ✓ You'll be asked to show ID, such as your driver's license.
- ✓ You'll read some information about donating blood.
- ✓ We'll ask you for your complete address.
- ✓ Your address needs to be complete (including PO Box, street/apartment number) and the place where you will receive your mail 8 weeks from donation.

HEALTH HISTORY

- ✓ You'll answer a few questions about your health history and places you've travelled, during a private and confidential interview.
- ✓ You'll tell us about any prescription and/or over-the-counter medications that may be in your system.
- ✓ We'll check your temperature, pulse, blood pressure and hemoglobin level.

PROCEDURE

- ✓ If you're donating whole blood, we'll cleanse an area on your arm and insert a brand-new sterile needle for the blood drawer. (This feels like a quick pinch and is over in seconds)
- ✓ Other types of donations, such as platelets, are made using an apheresis machine which will be connected to both arms.
- ✓ A whole blood donation takes about 8-10 minutes, during which you'll be seated comfortably or lying down.
- ✓ When approximately a pint of whole blood has been collected, the donation is complete and a staff person will place a bandage on your arm.

- ✓ For platelets, the apheresis machine will collect a small amount of blood, remove the platelets, and return the rest of the blood through your other arm; this cycle will be repeated several times over about 2 hours.

REFRESHMENT AND RECOVERY

- ✓ You'll answer a few questions about your health history and places you've traveled, during a private and confidential interview.



Figure 2: blood collecting chair.

DONOR CONSULTING:

The conditions and situations where blood donor consulting is particularly important are,

- ✓ First-time and young donors: to explain the blood donation process and to allay their anxiety and apprehension.
- ✓ Individuals who do not meet donor selection criteria based on the assessment of medical history and risk for TTI resulting in temporary or permanent deferral: to explain the reason for deferral.

EX: history of cancer, multiple sexual partners and provide information on further management, as appropriate

- ✓ Individuals whose basic health check reveals a condition indicating temporary or permanent deferral: to explain the reason for deferral.

EX: low hemoglobin level and provide information on further management, as appropriate

- ✓ Individuals who may be donating blood to seek testing for infections such as HIV: to understand their motivation for blood donation and provide information on voluntary counselling and testing services.
- ✓ Donors who had experienced adverse reactions during or after donation in the past: to allay their anxiety and apprehension.
- ✓ Donors who, after a previous donation, had asked for confidential unit exclusion (CUE) or informed the BTS that their blood should not be transfused: to be aware of the reason for CUE and refer for further management.
- ✓ Donors who give post-donation information that warrants temporary or permanent deferral.
- ✓ EX: significant health problem developed shortly after donation): to explain the reason for deferral and provide information on further management, as appropriate
- ✓ Donors with unusual red cell serology, rare blood groups or abnormal TTI test results: to explain the importance of these results for the donor and provide information on further management.

BLOOD GROUPING:

TYPES OF BLOOD GROUPS ANTIGENS & ANTIBODIES:

A blood type (also known as a blood group) is a classification of blood, based on the presence and absence of antibodies and inherited antigenic substances on the surface of red blood cells (RBCs). These antigens may be proteins, carbohydrates, glycoproteins, or glycolipids, depending on the blood group system. Some of these antigens are also present on the surface of other types of cells of various tissues. Several of these red blood cell surface antigens can stem from one allele (or an alternative version of a gene) and collectively form a blood group system.

- ✓ Antigen A with antibody B
- ✓ Antigen B with antibody A
- ✓ Antigen AB with neither antibody A nor B
- ✓ Antigen null (group O) with both antibody A and B (see fig:2)

RH BLOOD GROUP SYSTEM

The Rh system (Rh meaning Rhesus) is the second most significant blood-group system in human-blood transfusion with currently 50 antigens. The most significant Rh antigen is the D antigen because it is the most likely to provoke an immune system response of the five main Rh antigens. It is common for D-negative individuals not to have any anti-D IgG or IgM antibodies, because anti-D antibodies are not usually produced by sensitization against environmental substances. However, D-negative individuals can produce IgG anti-D antibodies following a sensitizing event: possibly a fetomaternal transfusion of blood from a fetus in pregnancy or occasionally a blood transfusion with D positive RBCs. Rh disease can develop in these cases. Rh negative blood types are much less common in Asian populations (0.3%) than they are in European populations (15%).

- ✓ A POSITIVE
- ✓ B POSITIVE
- ✓ AB POSITIVE
- ✓ POSITIVE
- ✓ A NEGATIVE
- ✓ B NEGATIVE
- ✓ NEGATIVE
- ✓ AB NEGATIVE, ARE THE TYPES OF THE BLOOD

ABO BLOOD GROUP SYSTEM:

The ABO blood group system involves two antigens and two antibodies found in human blood. The two antigens are antigen A and antigen B. The two antibodies are antibody A and antibody.

B. Antigens are present on the red blood cells and the antibodies in the serum. Regarding the antigen property of the blood all human beings can be classified into four groups, those with antigen A (group A), those with antigen B (group B), those with both antigen A and B (group AB) and those with neither antigen (group O). The antibodies present together with the antigens are found as follows.

DONOR SCREENING:

Blood screening test

Donor blood will be screened for,

- ✓ HIV
- ✓ Hepatitis B and C
- ✓ Syphilis malaria
- ✓ Malaria
- ✓ HIV
- ✓ HIV testing, also called HIV screening, is the only way to know if you have the virus.
- ✓ Several types of tests check your blood or other body fluids to see whether you're infected. Most can't Importance of HIV Testing
- ✓ If you have the virus, finding out quickly means you can start treatment right away so you can feel better and live a long, full life. You can also take steps, so you don't pass on HIV to other people.
- ✓ Importance of HIV testing
- ✓ Pregnant women should get tested because early treatment means you probably won't pass it to your baby spot HIV right away because it takes time for your body to make antibodies or for enough of the virus to grow inside you.

Laboratory tests:

- ✓ For these tests, a technician takes a sample of your blood and tests it. You'll get the results within a few days.

Rapid tests:

- ✓ These tests provide results in about 20-30 minutes. You can get them done in a community clinic or take them home.

HIV Testing Types:

- ✓ Standard HIV blood test
- ✓ Rapid blood test
- ✓ Rapid oral test
- ✓ Urine test
- ✓ Nucleic acid tests (NAT)

Standard HIV blood test:

- ✓ This test uses blood that a technician takes from your vein and sends to a lab. I can find antibodies (proteins your immune system makes when you've been exposed to the virus) 23-90 days after infection.

Rapid blood test:

- ✓ This test looks for antibodies using a drop of blood from a prick of your fingertip. It's about as accurate as the original antibody test, but its window period could be longer - between 18 and 90 days. Your health care provider can do this test, or you can buy a kit that lets you mail your sample in for testing.

Antibody/antigen test:

- ✓ These tests look for both antibodies and an antigen, a substance the virus makes before your immune system can start making antibodies. An antibody/antigen test that uses blood taken from a vein can find HIV 18-45 days after you're exposed to the virus.
- ✓ Newer antigen/antibody combination tests (you might hear them called "fourth generation" tests) can find HIV in 99% of people who are tested within 13-42 days of exposure. This test has become the standard HIV blood test in most labs.
- ✓ A rapid antibody/antigen can also be done using blood from a prick of your fingertip. A health care provider can do this test. Or you can use a mail-in kit. The window period for this test is 18 to 90 days.

Rabbit oral test:

- ✓ You can do this quick, easy test at home. Just rub a swab in the area between your gums and teeth to collect a sample of oral fluid (it isn't the same as saliva) for antibodies against HIV. If you've had the virus for a while, the rapid oral test is highly accurate. But if you have a new infection, even if you got it in the past few months, the test won't be as reliable. The window period is 23 to 90 days.

Urine test:

- ✓ These also look for HIV antibodies, but they aren't as accurate as other tests that check either your blood or oral fluid. Because it's an antibody test, its window period is similar to that of a standard HIV test.

Hepatitis B:

- ✓ Our doctors may also recommend hepatitis B screening for people with certain medical conditions that require treatment with immunosuppressive medication. These therapies can cause a dormant hepatitis B virus to reactivate, even if the infection hasn't been diagnosed or caused symptoms. People with rheumatoid arthritis, inflammatory bowel disease, or cancer, for instance, may be tested for hepatitis B before starting treatment with immunosuppressive medication.
- ✓ To test for hepatitis B, your doctor draws a small amount of blood from a vein in the arm and sends it to a laboratory for analysis. Results are usually available within days.

Hepatitis C:

- ✓ Screening for hepatitis C involves a simple, two-step blood test. The first step involves testing the blood for the presence of hepatitis C antibodies, which are proteins the body creates if exposed to the virus. If antibodies are detected, the second step involves testing the same blood sample for the presence of the virus itself. A positive result indicates current infection.
- ✓ Your doctor administers this test in minutes in the office by drawing a small amount of blood from a vein in the arm and sending it to a laboratory. The results are usually available the next day.

- ✓ The Food and Drug Administration has approved some at-home screening tests for hepatitis C. They are available for purchase online. To complete an at-home test, prick the tip of a finger with a small needle and place a blood sample on a piece of paper both needle and paper are included in the test kit—and mail it to a laboratory for testing. Test results are available in two weeks.

Malaria:

- ✓ Malaria parasites can be identified by examining under the microscope a drop of the patient's blood, spread out as a “blood smear” on a microscope slide. Prior to examination, the specimen is stained (most often with the Giemsa stain) to give the parasites a distinctive appearance.

VDRL:

- ✓ Screening for syphilis is typically performed with blood testing to detect antibodies indicating possible infection with syphilis. If the first test is positive, a second blood test is performed to confirm the diagnosis.
- ✓ Rapid point-of-care testing for antibodies against syphilis, which gives results in 5 to 30 minutes, are generally less accurate and less widely used.

BLOOD COMPONENTS AND SEPARATION

INTRODUCTION TO BLOOD COMPONENTS

PLASMA: Plasma accounts for around 55% of blood fluid in humans. Plasma is 92% water, and the contents of the remaining 8% include: glucose, hormones, proteins, fats, vitamins.



Figure 3: plasma

ERYTHROCYTES: Red blood cells have a slightly indented, flattened disk shape. They transport oxygen to and from the lungs. Hemoglobin is a protein that contains iron and carries oxygen to its destination. The life span of a red blood cell is 4 months, and the body replaces them regularly. The human body produces around 2 million blood cells every second.

LEUKOCYTES: it make up less than 1% of blood content, forming vital defenses against disease and infection. The number of white blood cells in a microliter of blood usually ranges from 3,700–10,500. Higher or lower levels of white blood cells can indicate disease.

THROMBOCYTES: Platelets interact with clotting proteins to prevent or stop bleeding. There should be between 150,000 and 400,000 platelets per microliter of blood.

PLSMA SEPARATION

- ✓ At first, we took a blood bag (double bag) and we calculated the blood bag weight.
- ✓ Then we folded the double bag (see fig10) properly and we placed in the centrifuge machine (see fig 11)
- ✓ At the rpm 2800 for 20 mins
- ✓ After 20 mins we can observe the settlement of RBC in the bottom of the blood bag and plasma is clearly visible
- ✓ With the help of plasma expresser (see fig 13) we can transfer the plasma to another empty bag which is connected to blood bag.
- ✓ So that the plasma is separated and we should check the weight
- ✓ If the weight is lower than the normal range, we can add sagam to that bag with the help of connected tubes.
- ✓ After that we can store the plasma in refrigerator, screened means we can keep in - 40°c, non-screened means -80°c (see fig 12)



Figure 4: plasma storage refrigerator



figure 5: plasma bag



Figure 6: Blood bag centrifuge



Figure 7: plasma bag seal machine

BLOOD ISSUING

What is blood issuing?

- ✓ Blood components and blood products should be issued to one recipient at a time.
- ✓ Issue only one unit of red cells at a time from the transcription medicine laboratory.
- ✓ Multiple units are issued to a single patient in an emergency or in a transfusion area that has a monitored storage area.

Cross matching:

- ✓ Cross matching is based on the principle of serological detection of any clinically significant irregular/unexpected antibodies in either donor or recipient's blood. There are two types of cross matches.

Two types of cross matches:

Major Cross Match:

- ✓ It involves testing the donor's red cells with recipient's serum to determine the presence of any antibody which may cause hemolysis or agglutination of donor red cells. This is more important than a minor cross match.

Minor Cross Match:

- ✓ It involves testing of donor's plasma with recipient's red cells to determine the presence of any antibody which may cause hemolysis or agglutination of recipient's red cells.



Figure 8: antigens for blood grouping



Figure 9: blood grouping

CROSS MATCHING:

Principle of Cross Matching

- ✓ Cross matching is based on the principle of serological detection of any clinically significant irregular/unexpected antibodies in either donor or recipient's blood.

There are two types of cross matches:

Major Cross Match:

- ✓ It involves testing the donor's red cells with recipient's serum to determine the presence of any antibody which may cause hemolysis or agglutination of donor red cells. This is more important than a minor cross match.

Minor Cross Match:

- ✓ It involves testing of donor's plasma with recipient's red cells to determine the presence of any antibody which may cause hemolysis or agglutination of recipient's red cell.

Major Cross Match

- ✓ Prepare donor and recipient's blood sample: Donor's red cells and recipient's serum/plasma.
- ✓ Prepare 3-5% saline cell suspension of red cells.
- ✓ Label a test tube.
- ✓ Add two drops of recipient's serum and one drop of donor cell suspension.
- ✓ Mix and incubate the tubes at 37 degrees Celsius for about 60 minutes.
- ✓ Decant the serum completely and wash the cells three times in saline.
- ✓ Add two drops of Anti-human Globulin (AHG) and mix. Allow you to stand at room temperature for 5 minutes.
- ✓ Centrifuge at 1500 rpm for 1 minute.
- ✓ Observe macroscopically and microscopically for agglutination.
- ✓ If macroscopic agglutination is not observed, transfer a small amount onto a glass slide.

and examine for microscopic agglutination. Rolex is not an indication of incompatibility.

Minor Cross Match

Prepare donor and recipient's blood sample: Recipient's red cells and donor's serum/plasma.

- ✓ Label a test tube.
- ✓ Add two drops of donor's serum and one drop of recipient's cell suspension.
- ✓ Mix and incubate the tubes at 37 degrees Celsius for about 60 minutes.
- ✓ Decant the serum completely and wash the cells three times in saline.
- ✓ Add two drops of Anti-human Globulin (AHG) and mix. Allow you to stand at room temperature for 5 minutes.
- ✓ Centrifuge at 1500 rpm for 1 minute.
- ✓ Observe macroscopically and microscopically for agglutination.
- ✓ If macroscopic agglutination is not observed, transfer a small amount onto a glass slide and examine for microscopic agglutination. Rolex is not an indication of incompatibility.



Figure 10: centrifuge

BLOOD BANKING RECORDS:

RECORDS MANAGEMENT:

All transmission records in the recipient's medical chart shall be retained in accordance with care facility policy.

- ✓ A complete record pertaining to the identification of the blood component including Transfusion Medicine Laboratory testing results and worksheets and the collecting facility shall be retained indefinitely.
- ✓ The recipient transfusion data file in the Transfusion Medicine Laboratory shall be retained indefinitely.
- ✓ For each blood component issued, a recant system shall be in place which documents.
- ✓ Recipient's name and identification number
- ✓ Recipient's ABO group
- ✓ ABO group of the blood component
- ✓ Rh group of the blood component for red cells, platelets and granulocytes
- ✓ Compatibility verification for red cells and granulocyte Vital inspection
- ✓ Companions venation for red cents and granulocytes Visual inspection
- ✓ Records of inspection of blood components and blood products prior to sue shall be retained for five years.
- ✓ Records for all facilities shall ensure that it is possible for blood components and blood products to be traced from its source to foal disposition.
- ✓ The record system must provide a means to locate and access all records related to a given blood component or blood product. These records must be kept indefinitely, The Transfusion Medicine Laboratory stall develop and maintain records that demonstrate that the quality system is operating is an effective manner.
- ✓ Healthcare employee signatures initials and computer identification shall be retained for ten years.
- ✓ Date and time of issue.
- ✓ identity of the person issuing the blood component Identity of the person transporting the blood component to the
- ✓ recipient's location

- ✓ For catch blood product issued, a record system shall be in place which document.
- ✓ Recipient's name and identification number
- ✓ Blood product name and manufacturer

CONCLUSION:

- ✓ We have gone to an internship at lion's blood bank, Ambattur. I have got knowledge about blood banks, blood groups and handling blood and blood compounds.
- ✓ I have observed the machines which are placed in the blood bank and I also know how to handle them.
- ✓ In conclusion, this internship has been a very useful experience for me, and I can also safely handle a patient.

S.no	Figures	Name
1	Figure 1	Blood bag
2	Figure 2	Blood collecting chair
3	Figure 3	Plasma
4	Figure 4	Plasma storage refrigerator
5	Figure 5	Plasma bag
6	Figure 6	Blood bag centrifuge
7	Figure 7	Plasma bag
8	Figure 8	Antigens for blood grouping
9	Figure 9	Blood grouping
10	Figure 10	Centrifuge

Geri Care Hospital-Certificate:

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INTERNSHIP COMPLETION LETTER

This is to certify that Ms. Gopitha M a bonafide BSc. Medical Laboratory Technology student of the Sathyabama institute of science and technology Chennai - 600119, has successfully completed Internship with the Laboratory Services Department of our hospital.

Duration : 1st October 2023 to 31st October 2023

**SEMINAR PRESENTED: 1. Common Organism in Urine
2. Pheripheral Smear and preparation**

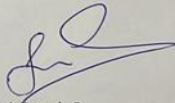
She has learnt to do routine work under supervision and has been aware of basic lab procedures.

She is well behaved and has maintained a cordial professional rapport with lab staff.

We wish her all the best in all her future endeavours.

Best Regards,

For Geri Home Care Services Private Limited,


Siddharth B
Head - HR

Dr. Archana Ashwin
Consultant & Laboratory Head
Geri Care hospitals
Chennai

GERI HOME CARE SERVICES PRIVATE LIMITED
U85300TN2018PTC123571 GST: 33AAHCG3888J1Z7 PAN: AAHCG3888J
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Lions Blood Bank-Certificate:

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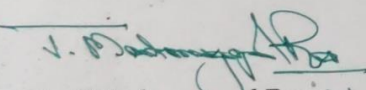
Date: 12th Dec 2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Ms. Gopitha. M, BSc in MLT, 2nd year of Sathyabama Institute of Science and Technology, Chennai - 119, undergone Internship training in Madras Egmore Lions Blood Bank & Research Foundation(Ambattur Unit), Chennai - 58. She has been observed blood bank procedures including Bleeding the Donors, Bloodgrouping, Cross-matching, Component separation, TTI screening and attend Blood donation camp for the period from 21st Nov 2022 to 26th Nov 2022

During her internship, performance was good and she was able to complete the project on time.

We wish him all the best for her upcoming career.


Ln.J.Madanagopal Rao
Chairman

  This project made possible through the co-operation of Lions Club International Foundation, Clubs in the District 324 - A1, A5 & A6 and well wishers - sponsored by Lions Club of Madras Egmore

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Tel : 28414949 / 4959 / 5959
Web : www.lionsbloodbank.net
AMBATTUR : C-15, A.T.C. Road, Ambattur Industrial Estate, Chennai - 600 058. Tel : 48504959
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