Virginia Western Community College
MDL 225
Clinical Hematology II

Prerequisites
MDL 125 or equivalent

Course Description
Continuation of MDL 125, Clinical Hematology I. Concentrates on the pathogenic aspects of hematology, including polycythemia, leukemias, lymphomas, and myelodysplastic syndrome. Also covers principles of hemostasis and disorders of hemostasis. Review of hematology instrumentation and laboratory quality control procedures.

Semester Credits: 4 Lecture Hours: 2 Lab 3 /Clinical/Internship Hours:

Required Materials

Textbook:
1.Clinical Hematology and Fundamentals of Hemostasis 5th Edition by D. HarmeningISBN-13: 978-08036173222. 2. Delmar's Clinical Laboratory Manual Series: Hematology 1st Editionby Allan RussellISBN: 978-0827363731

Other Required Materials:
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Course Outcomes

At the completion of this course, the student should be able to:

- Identify morphological abnormalities of mature granulocytes such as toxic granulation, Dohle bodies, and Pelger-Huet Anomaly
- Distinguish between plasma cell development and lymphocyte development; describe major lymphocyte categories and functions and the role of antibody production in immunity
- Distinguish leukemias, lymphomas and myelomas
- Classify the leukemias according to the FAB and WHO classifications
- Distinguish between the types of acute leukemias
- Describe the lymphoid and plasma cell neoplasms
- Describe the myeloproliferative neoplasms, such as chronic myelogenous leukemia. Primary myelofibrosis, essential thrombocytosis, and polycythemia vera
- Describe the myelodysplastic syndromes and myeloproliferative neoplasms
- Know the principles and disorders of hemostasis and thrombosis

- Describe the principles of automated hematology instruments, including histograms, laser technology and flow cytometry
- Recognize how pre-analytical, analytical, and post analytical errors can adversely affect results

Topical Description

I. Disorders of Neutrophils, Infectious Mononucleosis, and Reactive Lymphocytosis

A. Neutrophil Function
B. Disorders of Neutrophils
C. Eosinophils, Basophils and Monocytes
D. Absolute Monocytosis: Reactive vs. Malignant
E. Lymphocyte Morphology
F. Causes of Reactive Lymphocytosis
G. Lymphocytopenia

II. Introduction to Leukemia and the Acute Leukemias

A. Comparison of Acute and Chronic Leukemia
B. Classifications
C. Introduction to Acute Leukemia
D. Laboratory Evaluation of acute Leukemia
E. Acute Myeloid Leukemia; FAB Classification of AML
F. WHO Classification of AML
G. Acute Lymphoblastic Leukemia
H. FAB Classification of ALL; WHO Classification of ALL
I. Burkitt's Leukemia/Lymphoma
J. Childhood vs. Adult ALL
K. Treatment of Acute Leukemia

III. Chronic Myeloproliferative Disorders I: Chronic Myelogenous Leukemia

A. Chronic Myelogenous Leukemia; Pathogenesis, Clinical Features, Laboratory Findings

IV. Chronic Myeloproliferative Disorders II: Polycythemia vera, Essential Thrombocythemia, and Idiopathic Myelofibrosis

A. Polycythemia vera
B. Essential thrombocythemia
C. Idiopathic Myelofibrosis

V. Myelodysplastic Syndromes

A. Epidemiology
B. Morphological Characteristics of Blood and Bone Marrow
C. FAB Classification
D. WHO Classification
E. Laboratory Features
F. Secondary Myelodysplastic Syndromes
G. Myelodysplastic Syndromes in Children
H. Clinical Features
I. Evolution and Prognosis
J. Diagnostic Problems in MDS

VI. Chronic Lymphocytic Leukemia and Related Lymphoproliferative Disorders

A. Chronic Lymphocytic Leukemia/Small Lymphocytic Lymphoma

VII. The Lymphomas

A. Hodgkin Lymphoma
B. Non-Hodgkin Lymphoma

VIII. Introduction to Hemostasis

A. Platelets and Hemostatic Mechanisms
B. Primary Hemostasis
C. Platelet Function
D. Secondary Hemostasis: Fibrin Forming (Coagulation) System
E. Thrombin-Mediated Reactions in Hemostasis
F. A Cell-Based Model of Hemostasis
G. Fibrinolytic System
H. Kinin System
I. Protease Inhibitors
J. Complement System
K. Laboratory Evaluation of Hemostasis

IX. Disorders of Primary Hemostasis: Quantitative and Qualitative Platelet Disorders and Vascular Disorders

A. Laboratory Evaluation of Disorders of Primary Hemostasis
B. Thrombocytopenia
C. Thrombocytosis
D. vonWillebrand Disease
E. Acquired Qualitative Platelet Disorders
F. Vascular disorders

X. Disorders of Plasma Clotting Factors

A. The Plasma Clotting Factors and Associated Disorders
B. Circulating Anticoagulants/Acquired Inhibitors

XI. Interaction of Fibrinolytic, Coagulation, and Kinin Systems: DIC and Related Pathology

A. Molecular Components
B. Congenital Abnormalities
C. Disseminated Intravascular Coagulation
D. Related Disorders

XII. Introduction to Thrombosis and Anticoagulant Therapy

A. Regulation of Coagulation and Fibrinolysis
B. Inherited Thrombophilia
C. Acquired Thrombotic Disorders
D. Other Acquired Conditions Associated with Thrombosis
E. Issues in Laboratory Testing in Patients with Thrombosis
F. Anticoagulant Therapy

XIII. Quality Management, Quality Assurance and Quality Control

A. Quality Management
B. Quality Assurance and Quality Control
C. Hematology Laboratory Applications

XIV. Principles of Automated Differential Analysis

A. Evaluation of Blood Specimens by Accucount® Cell Volume and VCS Technology
B. Evaluation of Blood Specimens by Light Scattering and Cytochemical Analysis
C. Evaluation of Blood Specimens by Fluorescent Flow Cytometry
D. Evaluation of Blood Specimens by MAPSS Technology
E. Selected Case Studies

XV. Application of Flow Cytometry to Hematopathology

A. Basic Concepts of Flow Cytometry
B. Applications of Flow Cytometry

Laboratory Topics

Week	
1	Lab 1, 2: Review of WBC Differentials; Identification of Immature WBCs
2	Lab 3, 4: Bone Marrow Exam; Identification of Leukemias
3	Lab 5, 6: Sudan Black Stains; Acid Phosphatase in Leukocytes Stain; α-napthyl-Esterase in Leukocytes Stain
4	Lab 7, 8: Heinz Body Staining; Periodic Acid Schiff (PAS) in Leukocyte
5	Lab 9, 10: Monospot Test & I.M. Blood Smears; Malaria Smears
6	Lab 11: Kleihaur-Betke Hgb F Acid Elution
7	Lab 12, 13: Identification of Hodgkin's disease and Multiple Myeloma
8	Lab 14: α-Napthyl Esterase with Fluoride Inhibition
9	Lab 15, 16: PT Test (Fibrinometer) & Clot Retraction; APTT Test
10	Lab 17, 18: Antithrombin III; Circulating Anticoagulants
11	Lab 19, 20: Fibrin Split Products; Fibrinogen Assay
12	Lab 21: Euglobulin Lysis Time

Notes to Instructors

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