

MEDICAL UNIVERSITY – PLOVDIV
FACULTY OF MEDICINE
DEPARTMENT OF CLINICAL LABORATORY

CONSPECTUS IN CLINICAL LABORATORY
SPECIALTY MEDICINE

1. Reference ranges – population-based (definition, reference group, reference individuals, choice of statistical method, disadvantages) and individual (establishment, advantages).
2. Diagnostic reliability of clinical laboratory parameters – criteria. Requirements to the criteria of diagnostic reliability of clinical laboratory tests in different group of diseases.
3. Permanent, long-term, and short-term acting factors on the biological variation of the results – examples.
4. Influence of medical procedures and medicines on the clinical laboratory results (chemical and pharmacological interference). Instructions for control of drug effects on the clinical laboratory tests.
5. Specimen collection for clinical laboratory investigation – basic rules and requirements. Venous and capillary blood for analysis? Closed system for biological samples collection – advantages for the clinic, advantages for the laboratory.
6. Venous blood collection for clinical laboratory investigation – basic procedures and sources of errors.
7. Storage and transport of biological samples for analysis to the laboratory – requirements and sources of errors. Criteria for rejection of the specimen for laboratory analysis.
8. Urine for clinical laboratory investigation – basic rules and requirements for urine collection, storage, and transport to the laboratory. Sources of errors. Cerebrospinal fluid, body fluids and stool - basic rules and requirements for collection, storage, and transport to the laboratory. Sources of errors.
9. Body water and its distribution in the human body. Osmolality and osmolarity - methods for determination – reference range, informative significance.
10. Water-electrolyte imbalance – types. Clinical laboratory parameters for assessment of water-electrolyte imbalance.
11. Sodium and chloride – common data for the parameters, indications for investigation, principles of the analytical methods, reference range, interpretation of results.
12. Potassium - common data for the parameter, indications for investigation, principles of the analytical methods, reference ranges, interpretation of results.
13. Total and ionized calcium, total and ionized magnesium - common data for the parameters, indications for investigation, principles of the analytical methods, reference ranges, interpretation of results.

14. Inorganic phosphate - common data for the parameter, indications for investigation, principles of the analytical methods, reference ranges, interpretation of results.
15. Serum iron and iron binding capacity - common data for the parameters, indications for investigation, principles of the analytical methods, reference ranges, interpretation of results.
16. Glucose in the blood - common data for the parameter, indications for investigation, principles of the analytical methods, reference ranges, interpretation of results.
17. Glucose in the blood - tests with overload: two-hour postprandial test and glucose tolerance test (GTT) - indications for investigation and contraindications, source of errors, reference ranges, interpretation of results.
18. Evaluation of glycemia for preceded period of time: glyated proteins – glyated hemoglobin HbA1, HbA1c and fructosamine. Common data for the parameters, indications for investigation, patient preparation, specimen, reference ranges and interpretation of results.
19. Choice of clinical laboratory tests in diabetes mellitus - basic, extended and specialized laboratory tests (glyated proteins, microalbuminuria) and their discussion.
20. Total protein - common data for the parameter, principles of the analytical methods, interference, indications for investigation, patient preparation, reference ranges, interpretation of results. Major protein fractions – electrophoreses; indications for investigation, interpretation of results.
21. Individual protein, proteins of the acute phase, immunoglobulins – types, analytical methods for investigation, indications for investigation, patient preparation, reference ranges, interpretation of results.
22. Urea - common data for the parameter, principles of the analytical methods, source of errors, indications for investigation, patient preparation, reference ranges, interpretation of results.
23. Creatinine - common data for the parameter, principles of the analytical methods, interference, indications for investigation, patient preparation, specimen, reference ranges, interpretation of results.
24. Uric acid and ammonia - common data for the parameters, principles of the analytical methods, interference, indications for investigation, patient preparation, specimen, reference ranges, interpretation of results.
25. Transaminases, alkaline phosphatase, gamma glutamyltransferase in serum – common data for the parameters, principles of analytical methods, sources of errors, indications for analysis, biological material, reference ranges, interpretation of results.
26. Lactate dehydrogenase and creatine phosphokinase in serum – common data for the parameters, principles of analytical methods, sources of errors, indications for analysis, biological material, reference ranges, interpretation of results.
27. Amylase, lipase and cholinesterase – common data for the parameters, principles of analytical methods, sources of errors, indications for analysis, biological material, reference ranges, interpretation of results.
28. Cholesterol, lipoproteins and triglycerides in serum - common data for the parameters, analytical methods, interference, risk limits, interpretation of results.
29. Serum bilirubin and fractions – metabolism, methods, interference, reference ranges, interpretation of results.

30. Hemostasis as a complex functional system – phases and factors.
31. Blood coagulation and fibrinolysis – factors and inhibitors.
32. Clinical laboratory parameters for evaluation of hemostasis.
33. Choice and discussion of laboratory parameters in hemorrhagic diathesis.
34. Choice and discussion of laboratory parameters in thrombophilia.
35. Choice and discussion of laboratory parameters in DIC syndrome.
36. Evaluation of changes in the values of pH, osmolality of urine and 24-hour diuresis in the course of diagnosis of renal diseases. Evaluation and procedures for clarifying of hematuria.
37. Choice of clinical laboratory parameters in renal diseases – assessment of proteinuria, mainly glomerular and mainly tubular proteinuria. Mechanism of appearance, diagnostic significance.
38. Basic hematologic parameters – CBC, DBC, ESR, reference ranges, indications for investigation, interpretation of results.
39. Choice and assessment of clinical laboratory parameters in iron deficiency anemias and posthemorrhagic anemia.
40. Choice and assessment of clinical laboratory parameters in megaloblastic anemias.
41. Choice and assessment of clinical laboratory parameters in hemolytic anemias.
42. Choice and assessment of clinical laboratory parameters in white blood cell line disorders. Cytochemical and immunophenotype characteristics of leukocytes in acute leukemia.
43. Choice and assessment of clinical laboratory parameters in white blood cell line disorders. Cytochemical and immunophenotype characteristics of leukocytes in chronic leukemias (lymphocytic and granulocytic).
44. Choice and assessment of clinical laboratory parameters in cardio-vascular diseases and myocardial infarction.
45. Choice and assessment of clinical laboratory parameters in hepatic and bile diseases.
46. Hormones in biological fluids - basic groups, biological material and patient preparation. Indications for investigation, interpretation of results.
47. Hormones of thyroid gland. Clinical laboratory parameters and their interpretation in thyroid diseases.
48. Tumor markers. Markers of the first and second choice.

BIBLIOGRAPHY

Recommended books

1. Clinical laboratory interpretation of results. ed. by T. Deneva, Plovdiv, 2021
2. Marshall, William J. et al. Clinical chemistry / William J. Marshall, Andrew Day, Marta Lapsley. - 8th ed.- Edinburgh : Elsevier, 2017.
3. Clinical chemistry: Principles, techniques, and correlations / Ed. Michael L. Bishop, Edward P. Fody, Larry E. Schoeff. - 7th ed.- Philadelphia: Wolters Kluwer / Lippincott Williams & Wilkins, 2013
4. M. Pincus. Henry's Clinical diagnosis and Management by laboratory methods, 21st ed.
5. S. K. Strasinger, M. Sch. Di Lorenzo. Urinalysis and Body Fluids. 5th ed. E. A. Davis Company- Philadelphia, 2008

Websites

1. Lichtman's Atlas of Hematology 2016 , Lichtman MA, Shafer MS, Felgar RE, Wang N
<https://accessmedicine.mhmedical.com/Book.aspx?bookid=1630>
2. Longo, Dan L. "Atlas of Hematology." Harrison's Principles of Internal Medicine, 21e Eds. Joseph Loscalzo, et al. McGraw-Hill Education, 2022,
<https://accessmedicine.mhmedical.com/book.aspx?bookid=3095&isMissingChapter=true>
3. Laposata's Laboratory Medicine: Diagnosis of Disease in the Clinical Laboratory, 3e
<https://accessmedicine.mhmedical.com/book.aspx?bookid=2503>

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