**ANALIZE MEDICALE EXPLICATE PENTRU PACIENT – GHID DE INTERPRETARE A ANALIZELOR UZUALE**

1. **Analize hematologice – hemograma , coagulare**

HEMOLEUCOGRAMA – valori normale:

Eritrocite

* Barbati: 4,2 – 5,6 x 106/ ml
* Femei: 3,7 – 4,9 x 106/ ml
* Nou - nascuti : 4,5 – 4,8 x 106/ copiii

Hematocrit

* Barbati: 40 – 48%
* Femei : 36 – 42%
* Copiii : 36 – 39%

Hemoglobina

* Barbati: 13 – 16 g/dl
* Femei : 11 – 15 g/dl
* Copiii: 11 – 13 g/dl

Leucocite, dintre care granulocite si agranulocite

Barbati si femei: 4.000 – 10.000/mm3 ( 4 – 10x 103/ul)

Copiii: 4.000 – 12.000/mm3(4 – 12x103/ul)

* Neutrofile: 50-70 % 2 – 7x103/ul
* Eozinofile : 0.5-5 % 0,02 – 0,5x103/ ul
* Bazofile: 0-1.0 % 0 – 0,1x103/ ul
* Limfocite: 20-40 % COPII 20-60 % 0,8 – 4x103/ ul
* Monocite: 3-12 % 0,12 – 1,2x 103/ ul
* Trombocite: 150 – 450x103/ul

ERITROCITE

* Valori scazute: hemoragie, hemoliza, anemie, hemoglobinopatie, talasemie, sferocitoza, siclemie, splenomeglie secundara, leucemie, mielom multiplu, chimioterapie.
* Valori crescute: policitemia vera, boala cardiaca congenitala, BPOC severa, cord pulmonar, fibroza pulmonara, altitudine inalta, stress.

HEMATOCRIT

* Valori scazute: sarcina, anemie, hemoragie, hemoliza, deficit de fier, hemoglobinopatie, insuficienta medulara, leucemie.
* Valori crescute: policitemia vera, eritrocitoza, deshidratare severa, diaree severa, arsuri, boli cardiace congenital, BPOC.

HEMOGLOBINA

* Valori scazute: anemie, hemoragie, hemoglobinopatii, splenomegalie, afectiuni renale, neoplasme, malnutritie.
* Valori crescute: policitemia vera, hemoconcentratie, arsuri severe, deshidratare, altitudini inalte, boli cardiace congenitale, BPOC.

LEUCOCITE

* Valori scazute: febra tifoida, febra paratifoida, gripa, rujeola, rubeola, hepatita acuta, boli la nivelul organelor hematopoetice, septicemia, boala de iradiere.
* Valori crescute: stress, sarcina, menstruatie, efort fizic intens, infectii ( cu exceptia febrei tifoide si febrei paratifoide), necroza tisulara, tumori , interventii chirurgicale, hemoragii mari, hemoliza, uremie crescuta, coma diabetica, guta, leucemie, medicamente( acid acetilsalicilic, adrenalina, corticosteroizi, heparina, triamteren).

NEUTROFILIE

* Valori scazute: infectii bacteriene/virale severe, anemie aplasitica, LES, mononucleoza, medicamente mielotoxice, radioterapie.
* Valori crescute: sters, efort fizic intens, afectiuni inflamatorii, infectii, neoplasme, hemoragie/hemoliza, eclampsie, infarct miocardic acut.

LIMFOCITE

* Valori scazute: administrare de glucocorticoizi sau antineoplazice, sepsis, arsuri, boala Hodgkin, boala Gaucher, purpura trombocitopenica idiopatica, hipersplenism, reactie transfuzionala.
* Valori crescute: infectii virale sau bacteriene, leucemie limfocitara, limfoame maligne, mielom multiplu, iradiere.

FIBRINOGEN

* Valori normale: 250 – 400 mg/dl
* Valori scazute: malnutritie, afectiuni hepatice, deficit congenital de fibrinogen.
* Valori crescute: sarcina, inflamatii/infectii acute, neoplasme, necroza tisulara.

VSH (viteza de sedimentare a hematiilor)

* Valori normale: >Barbati: 1- 10 mm/1h, 7-15mm/2h

 >Femei: 2- 10mm/1h

* Valori scazute: siclemie, sferocitoza, hipofibrinogenemie, policitemia vera.
* Valori crescute: menstruatie, sarcina, infectii bacteriene, boli inflamatorii, hiperfibrinogenemie, septicemia, neoplasm, insuficienta renala cronica, anemie severa, boli de colagen, trombembolism pulmonar, intoxicatii cu metale grele.

TIMPUL DE COAGULARE (TC)

* Valori normale: 4 -8 min.(pulpa degetului)
* Valori crescute: deficit de factori ai coagularii ( cu exceptia factorului XII), insuficienta hepatica, coagulopatie de consum, medicamente anticoagulante ( de tip heparinic, cumarinic sau warfarinic) si fibrinolitice (urokinaza, streptokinaza).

TIMPUL HOWELL

* Valori normale: 105- 150 sec.
* Valori crescute: vezi Timp de coagulare (TC)
* Observatii: Reprezinta principalul test pentru monitorizarea tratamentului cu heparina.

TIMPUL QUICK ( PT – timp de protrombina)

* Valori normale: 13 – 17 sec.
* Valori crescute: deficit congenital de factori ai coagularii, deficit de vitamina K, hepatita, ciroza, administrare de cumarinice, intoxicatie cu salicilati, coagulare intravasculara diseminata.

TIMPUL DE SANGERARE (TS )

* Valori normale: >2 – 3 min.( pulpa degetului)

* Valori crescute: trombocitopenie, hipersplenism, boala von Willebrand, trombastenie Glanzmann, deficit de factori ai coagularii, fragilitate capilara, coagulare intravasculara diseminata.

 **2. Analize biochimie**

ACIDUL URIC

* Valori normale: >Barbati: 3,4 – 6,7 mg/dl

 >Femei: -2,5 – 5,7 mg/dl

* Valori scazute: medicamente( alopurinol, chimioterapice, corticosteroizi, probenecid, salicilati, warfarina),secretie inadecvata de hormoni antidiuretici, hemocromatoza, boli hepatice, boala Wilson, sindrom Fanconi.
* Valori crescute: guta deshidratare, insuficienta renala cronica, diuretice tiazidice, diabet zaharat, alcoolism, leucemie, limfom, mielom multiplu, boli mieloproliferative, radioterapie, anemie hemolitica, dieta bogata in nucleoproteine, malnutritie, policitemia vera, diabet insipid, intoxicatie cu plumb.

ALBUMINA

* Valori normale: 3,5 – 5,0 g/dl
* Valori scazute: hiperhidratare, malnutritie, hepatita, ciroza, insuficienta hepatica, sindrom nefrotic, glomerulonefrita cronica, enteropatii cu pierdere de proteine ( boala Crohn, colita ulcerative, boala Whipple), sarcina, arsuri severe, malabsobtie, desproteinemie idiopatica familial.

AMILAZA SERICA

* Valori normale: 30 -100 U/L
* Valori scazute: pancreatita cronica, insuficienta hepatica, hepatita.
* Valori crescute: pancreatita acuta, colecistita acuta, obstructie canal cistic, cancer pancreatic, ocluzie intestinala, infarct intestinal, peritonita, apendicita acuta, sarcina extrauterina, ruptura de chist ovarian, oreion, traumatism de glande salivare sau de pancreas, infarct pulmonar, arsuri, cetoacidoza diabetica, insuficienta renala, alcoolism acut, macroamilazemie, medicamente ( acid acetilsalicilic, contraceptive orale, corticosteroizi, diuretice tiazidice, morfina), ciroza.

ALT, TGP, GPT ( glutamic-piruvat transferaza serica, alanil aminotransferaza )

* Valori normale: 5 – 45 U/L
* Valori crescute: hepatita, ciroza hepatica, insuficienta hepatica, necroza hepatica, staza hepatica, colestaza, cancer hepatic, obstructie biliara, pancreatita acuta, medicamente (acid acetilsalicilic, aldomet, alopurinol, antibiotic, contraceptive orale, fenitoina, heparina, izoniazida), insuficienta cardiac congestive, afectarea musculaturii scheletice, mononucleoza infectioasa, soc, infarct miocardic acut, miocardita.

AST, TGO, GOT (glutamic-oxaloacetic transaminaza serica, aspartat aminotransferaza)

* Valori normale: 5 – 45 U/L
* Valori crescute: infarct miocardic acut, hepatita, staza hepatica, necroza hepatica, colestaza, ciroza, obstructive biliara, miocardita, insuficienta cardiac congestive, embolism pulmonar, infarct pulmonar, pancreatita acuta, afectarea musculaturii scheletice, arsuri, anemie hemolitica, medicamente (acetaminofen, antihypertensive, contraceptive orale , digitala, izoniazida, opiacee, verapamil), mononucleoza infectioasa.

BILIRUBINA TOTALA

* Valori normale: <1,2 mg/dl
* Valori crescute: hepatita, obstructie biliara, colestaza, cancer hepatic primar, metastaze hepatice, pancreatita, ciroza, ficat de staza, sepsis, medicamente(alopurinol, antibiotic, cloramfenicol, clorpromazin, contraceptive orale, halotan, indometacin, izoniazida, metildopa, steroizi, sulfonamide, tolbutamida), mononucleoza infectioasa, insuficienta hepatica, ictere ereditare.

BILIRUBINA DIRECTA (conjugate)

* Valori normale: < 0,53mg/dl
* Valori crescute: obstructie biliara, metastaze hepatice, hepatom, cancer pancreatic, ampulom, colangiocarcinom, pancreatita, hepatita, sepsis, ciroza, sindrom Dublin Johnson, sindrom Rotor, boala Wilson.

BILIRUBINA INDIRECTA (necomjugata)

* Valori normale : <1,10 mg/dl
* Valori crescute: hemoliza, transfuzii, anemie hemolitica, anemie pernicioasa, siclemie, hematom in resorbtie, hepatita, ciroza, sepsis, insuficienta hepatica, sindromul Gilbert, sindromul Crigler-Najjar.

CALCIU

* Valori normale: 8,6 – 10,3 mg/dl
* Valori scazute: hipovitaminoza D, hipoparatiroidism, tetanii, insuficienta renala, rahitism, asteomalacie.
* Valori crescute: hipervitaminoza D, hiperparatiroidism, nefropatii cornice.

CLOR

* Valori normale: 98 – 107 mmol/L
* Valori scazute: hidratare in exces, hiperaldosteronism, sindrom de secretie inadecvata de hormone antidiuretic, varasaturi, arsuri, alcaloza metabolic, hiperkaliemie, medicament

( corticosteroizi, diuretice de ansa si tiazidice, triamteren).

* Valori crescute: deshidratare, acitoza tubular renala, hiperpnee, alcaloza metabolic, aport salin crescut, medicamente(acetazolamida, antiinflamatoare nesteroidiene, estrogeni, metildopa).

COLESTEROL TOTAL

* Valori normale ale colesterolului total: 110 – 200 mg/dl
* preferabil sa aiba valori mai mici de 200mg/dl
* risc moderat la valori cuprinse intre 200 si 240 mg/dl
* risc crescut cand colesterolul depaseste 240mg/dl
* Valori scazute: malnutritie, hipertiroidism, boli hepatice, insuficienta hepatica, mielom multiplu, malabsorbtie, anemie hemolitica, medicamente(alopu rinol, cholestiramina, colchicina, izoniazida, niacina).
* Valori crescute: hipercolesterolemie, diabet zaharat, hipotiroidism, infarct miocardic acut, trimestrul al treilea de sarcina , afectiuni biliare, colesteaza, obstructie biliara, sindrom nefrotic, dieta bogata in cholesterol, sedentarism, obezitate, hipercolesterolemie familial, hiperlipoproteinemii, medicamente(contraceptive orale, fenitoina, fenotiazide, steroiozi).

Observatii: Factorii de risc pentru boala coronariana sunt reprezentati de varsta (barbatii>44, femei>54), fumatul, hipertensiune arteriala, diabet, antecedente familiale, HDL<35 mg/dl, raportul Colesterol /HDL >4.5.

HDL COLESTEROLUL

* Valori normale: femei 35 – 88 mg/dl

 Barbati 42 – 88 mg/dl

In functie de valorile HDL –C, pacientul este incadrat ca risc cardiac scazut la valori ale HDL colesterolului peste 45 mg/dl si risc cardiac crescut cand HDL colesterolul este sub 35 mg/dl.

* Valori scazute: fumat, sedentarism, obezitate, insuficienta renala, beta blocante.
* Valori crescute: sport regulat, aport moderat de alcool, niacina.

LDL COLESTEROLUL

* preferabil sa aiba valori mai mici 130mg/dl
* risc moderat cand valorile sunt cuprinse intre 130 si 160 mg/dl
* risc crescut la valori de peste 160mg/dl

Observatii: Valorile LDL se afla folosind formula : LDL = colesterol total –TG/5 – HD

CPK, CK (creatinfosfokinaza )

* Valori normale: femei 24 – 170 U/L

 barbati 24 – 195 U/L

* Valori crescute:

Cresterea creatinfosfokinazei totale: infarct miocardic acut, chirurgie cardiaca, dupa injectii intramusculare, traumatisme, sindrom de strivire, politraumatisme, defibrilare, electrocutare, miozita, rabdomioliza, accident vascular cerebral, eforturi intense, soc.

* Valori crescute ale CPK – MB: infarct miocardic acut, angina instabila, chirurgie cardiaca, ischemie cardiaca, miocardita acuta, pericardita, cardiopatie, defibrilare, rabdomioliza, distrofii muscular.

FIER

* Valori normale ale sideremiei: femei 49,2 – 150,9 ug/dl

 barbati 50,3 – 167,7 ug/dl

* Valori scazute: anemii feriprive, hemoragii, tratamente cu vitamina B12, stari infectioase cornice, poliartrita reumatoida, procese neoplazice.
* Valori crescute: hemosideroza, hemocromatoza, transfuzii sangvine recente, anemie megaloblastica/hemolitica, talasemie, hepatite, ciroza.

FOSFATAZA ALCALINA

* Valori normale: copii 200 – 1000U/L

 adulti 100 – 300 U/L

* Valori scazute: hipofosfatemie, hipotiroidism, malnutritie.
* Valori crescute: obstructie biliara, colecistita acuta, metastaze hepatice, hepatita, mononucleoza infectioasa, ciroza, metastaze osoase, cancer primitive osos Paget, hiperparatiroidism, fractura osoasa in curs de vindecare, osteomalacie, poliartrita reumatoida, pancreatita cauta, insuficienta cardiaca congestive, sarcina, mielom multiplu, leucemie, medicamente( medicamente colestatice, antibiotic, contraceptive orale, estrogeni, fenotiazide, indometacin, izoniazida, methotrexat), hipertiroidism, infarct intestinal, sarcoidoza, sepsis.

FOSFOR

* Valori normale: 2,7 – 4,5 mg/dl
* Valori scazute: rahitism, hipovitaminoza D, hiperparatiroidism, ingestia cronica de antiacide.
* Valori crescute: hipoparatiroidism, hipervitaminoza D, insuficienta renala, diabet zaharat.

 GGT (gamma glutamil -transferaza)

* Valori normale: femei 7 -32 U/L

 barbati 11 – 50 U/L

* Valori crescute: boli hepatice, colestaza, metastaze hepatice, hepatom, cancer pancreatic, hepatita, icter obstructive, pancreatita acuta, medicamente (antibiotice, antidepresive, barbiturice, fenobarbital, fenotiazine), insuficienta cardiac congestive, sepsis, sindrom nefrotic, mononucleoza infectioasa.
* Observatii: Specifica pentru patologia hepatica, GGT se coreleaza cu valorile fosfatazei alcaline.

LDH (lactat de dehidrogenaza)

* Valori normale: 135 – 225 U/L
* Valori crescute: infarct miocardic acut, miocardita, insuficienta cardiaca congestive, anemie hemolitica, hemoliza, infarct (pulmonar, renal, intestinal), boli hepatice ( hepatita, necroza), cancer, leucemie acuta, limfom, afectari ale musculaturii scheletice, accident vascular cerebral, necroza tisulara, transfuzii, momonucleoza infectioasa

MAGNEZIU

* Valori normale: 1,6 – 2,6 mg/dl
* Valori crescute: hipervitaminoza D, hiperparatiroidism, nefropatii cornice.

POTASIU

* Valori normale: 3,5 – 5,1 mmol/l
* Valori scazute: pierderi digestive prin diaree sau varsaturi, stenoza pilorica, fistule digestive, pierderi urinare.
* Valori crescute: insuficienta corticosuprarenala, insuficienta renala.

PROTEINE TOTALE

* Valori normale: 6 – 8 g/dl
* Valori scazute: hiperhidratare, malnutritie, hepatita, ciroza, insuficienta hepatica, sindrom nefrotic, glomerulonefrita cronica, boala Crohn, colita ulcerative, boala Whipple, sarcina, arsuri severe, malabsorbite, disproteinemie idiopatica familial.
* Valori crescute: deshidratare, mielom multiplu, sarcoidoza, inflamatii cornice, colagenoze, macroglobulinemie.

SODIU

* Valori normale: 134 – 148 mmol/l
* Valori scazute: aport salin insuficient, deshidratari globale, ingestie scazuta de lichide, poliurie, insuficienta renala cronica, insuficienta corticosuprarenaliana.
* Valori crescute: transpiratii excessive, diaree, varsaturi, diabet insipid, insuficienta renala, insuficienta cardiaca, hiperaldosteronism.

TRIGLICERIDE

* Valori normale: femei 40 – 140 mg/dl

 barbati 50 – 165 mg/dl

* Valori scazute: malnutritie, malabsorbtie, hipertiroidism.
* Valori crescute: hiperlipoproteinemii primare, diabet zaharat, hipotiroidism, infarct miocardic acut, pancreatita acuta, alcoolism, sindrom nefrotic, boli hepatice, dieta bogata in carbohidrati, guta, sarcina, medicamente(acid acetilsalicilic, contraceptive orale, estrogen, prazosin, propranolol, steroizi, tamoxifen), sindrom Werner.

UREE SERICA

* Valori normale: 15 – 45 mg/dl

GLICEMIE

* Valori normale: 70 – 105 mg/dl

CREATININA

* Valori normale: femei 0,5 – 1,10 mg/dl

 barbati 0,6 – 1,20 mg/dl

LIPIDE SERICE

* Valori normale: 450 – 800 mg/dl.