

case 1		case 2
Blood picture + bioch	Normal values	Blood picture + bioch
Leu: 2,56]	[4,00..10,00]	Leu: 4,02
Ery: 1,85	[4,00..5,80]	Ery: 2,83
HB: 78	[135..175]	HB: 91
HTC: 0,226	[0,400..0,500]	HTC: 0,281
MCV: 122,2	[82,0..98,0]	MCV: 99,3
MCH: 42,2	[28,0..34,0]	MCH: 32,2
MCHC: 345	[320..360]	MCHC: 324
RDW: 15,9	[10,0..15,2]	RDW: 17,0
Plt: 107	[150..400]	Plt: 112
Differential count relative		Differential count relative
Ne: 59,8	[45,0..70,0]	Ne: 44,6
Ly: 32,0	[20,0..45,0]	Ly: 47,5
Mo: 4,3	[2,0..12,0]	Mo: 7,5
Eo: 3,5	[0,0..5,0]	Eo: 0,2
Ba: 0,4	[0,0..2,0]	Ba: 0,2
Differential count absol.		Differential count absol.
Ne abs.: 1,53	[2,00..7,00]	Ne abs.: 1,79
Ly abs.: 0,82	[0,80..4,00]	Ly abs.: 1,91
Mo abs.: 0,11	[0,80..4,00]	Mo abs.: 0,30
Eo abs.: 0,09	[0,00..0,50]	Eo abs.: 0,01
Ba abs.: 0,01	[0,00..0,20]	Ba abs.: 0,01
Dif. count manual (microscope):		Coagulation
Anisocytosis: +++		Quick test -INR: 2,27
Makrocytes: +++		APTT: 54,6
Poikilocytes: +		Fibrinogen: 5,82
Rtc abs. 0,022	[0,025..0,100]	Antithrombin III: 81
Biochemistry		Nitrogen catabolites
Fe: 19,7	[7,2..29,0]	Urea: 10,5
Transferrin: 1,88	[2,00..3,60]	Creatinine.: 281
Satur. trf: 46,1	[19,0..49,0]	Uric acid: 328
Ferritin: 99,3	[22,0..322,0]	Minerals + Osmolality:
Vitamin B12: 45	[145..569]	Na: 125
Folic acid 8,5	[3,9..26,8]	K: 4,7
Haptoglobin: 0,30	[0,30..2,00]	Cl: 90
		Ca: 2,26
LD: 5,2	[2,2..3,8]	P: 1,61
Direct coombs test: negat		

case 1	case 2
Hypoproliferative anaemia: severe avitaminosis B 12 – makrocytic anaemia, leuko and thrombocytopenia	Pancytopenia; coagulopathy; renal insufficiency

case 3		case 4
Blood picture	Normal values	Blood picture
Leu: 205,79	[4,00..10,00]	Leu: 7,81
Ery: 4,16	[4,00..5,80]	Ery: 2,34
HB: 107	[135..175]	HB: 74
HTC: 0,376	[0,400..0,500]	HTC: 0,226
MCV: 90,4	[82,0..98,0]	MCV: 96,6
MCH: 25,7	[28,0..34,0]	MCH: 31,6
MCHC: 285	[320..360]	MCHC: 327
RDW: 20,4	[10,0..15,2]	RDW: 17,6
Plt: 112	[150..400]	Plt: 86
MPV: 10,5		MPV: 12,5
PCT: 0,120		PCT: 0,110
PDW: 12,5		PDW: 20,5
Differential count relative		Differential count relative
Ne: 2,3	[45,0..70,0]	Ne: 64,2
Ly: 95,5	[20,0..45,0]	Ly: 28,0
Mo: 1,8	[2,0..12,0]	Mo: 7,4
Eo: 0,1	[0,0..5,0]	Eo: 0,1
Ba: 0,3	[0,0..2,0]	Ba: 0,3
Differential count absol.		Differential count absol.
Ne abs.: 4,61	[2,00..7,00]	Ne abs.: 5,01
Ly abs.: 196,55	[0,80..4,00]	Ly abs.: 2,19
Mo abs.: 3,77	[0,80..4,00]	Mo abs.: 0,58
Eo abs.: 0,27	[0,00..0,50]	Eo abs.: 0,01
Ba abs.: 0,59	[0,00..0,20]	Ba abs.: 0,02
Gumprecht's shadows: 31		
or: smudge cells		

case 3	case 4
CLL, slight anaemia, and slight thrombocytopenia	severe ACD (= normocytic , normochromic anemia), slight anisocytosis, thrombocytopenia

case 5		case 6
Blood picture	Normal values	Blood picture
Leu: 3,11	[4,00..10,00]	Leu: 88,03
Ery: 4,63	[4,00..5,80]	Ery: 5,13
HB: 109	[135..175]	HB: 146
HTC: 0,348	[0,400..0,500]	HTC: 0,44
MCV: 75,2	[82,0..98,0]	MCV: 85,8
MCH: 23,5	[28,0..34,0]	MCH: 28,5
MCHC: 312	[320..360]	MCHC: 332
RDW: 27,2	[10,0..15,2]	RDW: 15
Plt: 548	[150..400]	Plt: 98
MPV: 7,4		MPV: 10
PCT: 0,403		PCT: 0,1
PDW: 16,7		PDW: 11,3
Differential count relative		Differential count relative
Ne: 30,0	[45,0..70,0]	Ne: 3,2
Ly: 36,7	[20,0..45,0]	Ly: 86,8
Mo: 25,9	[2,0..12,0]	Mo: 9,7
Eo: 6,5	[0,0..5,0]	Eo: 0,1
Ba: 1,0	[0,0..2,0]	Ba: 0,2
Differential count absol.		Differential count absol.
Ne abs.: 0,93	[2,00..7,00]	Ne abs.: 2,72
Ly abs.: 1,14	[0,80..4,00]	Ly abs.: 76,44
Mo abs.: 0,81	[0,80..4,00]	Mo abs.: 8,56
Eo abs.: 0,20	[0,00..0,50]	Eo abs.: 0,11
Ba abs.: 0,03	[0,00..0,20]	Gumprecht's shadows: 31
		or: smudge cells

case 5	case 6
Slight microcytic hypochromic anaemia, anisocytosis, absol. neutropenia, reactive thrombocytaemia	CLL Rai, clinical stage IV (thrombocytopenia)

case 7		case 8
Blood picture	Normal values	Blood picture
Leu: 0,95	[4,00..10,00]	Leu: 163,08
Ery: 4,16	[4,00..5,80]	Ery: 4,24
HB: 115	[135..175]	HB: 111
HTC: 0,345	[0,400..0,500]	HTC: 0,354
MCV: 83,1	[82,0..98,0]	MCV: 83,5
MCH: 27,7	[28,0..34,0]	MCH: 26,3
MCHC: 333	[320..360]	MCHC: 315
RDW: 18,7	[10,0..15,2]	RDW: 15,7
Plt: 54	[150..400]	Plt: 51
MPV: 8,1		MPV: 7,7
PCT: 0,043		PCT: 0,039
PDW: 18,8		PDW: 19,9
Differential count relative		Differential count relative
Ne: 21,8	[45,0..70,0]	Ne: 7,3
Ly: 60,3	[20,0..45,0]	Ly: 8,8
Mo: 17,0	[2,0..12,0]	Mo: 83,1
Eo: 0,2	[0,0..5,0]	Eo: 0,8
Ba: 0,7	[0,0..2,0]	Ba: 0,0
Differential count absol.		Differential count absol.
Ne abs.: 0,21	[2,00..7,00]	Ne abs.: 11,90
Ly abs.: 0,57	[0,80..4,00]	Ly abs.: 14,30
Mo abs.: 0,16	[0,80..4,00]	Mo abs.: 135,6
Eo abs.: 0,00	[0,00..0,50]	Eo abs.: 1,30
Ba abs.: 0,01	[0,00..0,20]	Ba abs.: 0,00

case 7	case 8
Severe neutropenia, thrombocytopenia, slight anaemia = pancytopenia after chemotherapy	Monocytic leukaemia (absolute monocytosis, severe thrombocytopenia, slight anaemia (ACD))

case 9		case 10
Blood picture	Normal values	Blood picture + bioch
Leu: 205,79	[4,00..10,00]	Leu: 6,10
Ery: 4,16	[3,80..5,20]	Ery: 4,25
HB: 107	[120..160]	HB: 113
HTC: 0,376	[0,350..0,470]	HTC: 0,345
MCV: 90,4	[82,0..98,0]	MCV: 81,2
MCH: 25,7	[28,0..34,0]	MCH: 26,6
MCHC: 285	[320..360]	MCHC: 328
RDW: 20,4	[10,0..15,2]	RDW: 16,7
Plt: 112	[150..400]	Plt: 236
Differential count relative		Differential count relative
Ne: 2,3	[45,0..70,0]	Ne: 46,0
Ly: 95,5	[20,0..45,0]	Ly: 42,0
Mo: 1,8	[2,0..12,0]	Mo: 7,9
Eo: 0,1	[0,0..5,0]	Eo: 3,8
Ba: 0,3	[0,0..2,0]	Ba: 0,3
		Minerals
	[40,8..76,6]	TIBC: 80,1
		Fe-saturation 0,12
Differential count absol.		Proteins:
Ne abs.: 4,61		Transferrin: 3,98 [2,00..3,60]
Ly abs.: 196,55		Trf saturation: 10,5 [19,0..49,0]
Mo abs.: 3,77		Ferritin: 6,9 [10,0..291,0]
Eo abs.: 0,27		
Ba abs.: 0,59		
Gumprecht's shadows: 31		
or: smudge cells		

case 9	case 10
CLL - thrombocytopenia, anaemia, anisocytosis	Iron deficiency anaemia (microcytic, hypochromic, sideropenic)

case 11		case 12
Blood picture (CBC)	Normal values	Blood picture + bioch:
Leu: 0,95	[4,00..10,00]	Leu: 6,45
Ery: 4,16	[4,00..5,80]	Ery: 3,29
HB: 115	[135..175]	HB: 105
HTC: 0,345	[0,400..0,500]	HTC: 0,301
MCV: 83,1	[82,0..98,0]	MCV: 91,5
MCH: 27,7	[28,0..34,0]	MCH: 31,9
MCHC: 333	[320..360]	MCHC: 349
RDW: 18,7	[10,0..15,2]	RDW: 15,8
Plt: 54	[150..400]	Plt: 172
Differential count relative		Differential count relative
Ne: 21,8	[45,0..70,0]	Ne: 68,0
Ly: 60,3	[20,0..45,0]	Ly: 21,2
Mo: 17,0	[2,0..12,0]	Mo: 7,6
Eo: 0,2	[0,0..5,0]	Eo: 2,9
Ba: 0,7	[0,0..2,0]	Ba: 0,3
Differential count absol.		Differential count absol.
Ne abs.: 0,21	[2,00..7,00]	Ne abs.: 4,38
Ly abs.: 0,57	[0,80..4,00]	Ly abs.: 1,37
Mo abs.: 0,16	[0,80..4,00]	Mo abs.: 0,49
Eo abs.: 0,00	[0,00..0,50]	Eo abs.: 0,19
Ba abs.: 0,01	[0,00..0,20]	Ba abs.: 0,02
		Other
	[1,0-15,0 ‰]	Rtc (thousandth): 48 ‰
	[0,025..0,100]	Rtc abs.: 0,157
		Liver tests
	[2,0..17,0]	Bilirubin: 54,7
	[0,0..5,1]	Bili dir.: 16,5
		ALT: 0,47
		AST: 0,50
		GGT: 0,43
		ALP: 1,82
		Enzymes:
	[2,2..3,8]	LD: 5,9
		Proteins:
	[0,30..2,00]	Haptoglobin: <0,06

case 11	case 12
Pancytopenia – after chemotherapy	Haemolytic anaemia (Hb, rtc, bili, hopto, LD)

case 13		case 14
Blood picture + bioch	Normal values	Blood picture
Leu: 2,77	[4,00..10,00]	Leu: 9,49
Ery: 2,27	[4,00..5,80]	Ery: 2,94
HB: 73	[135..175]	HB: 82
HTC: 0,219	[0,400..0,500]	HTC: 0,248
MCV: 96,5	[82,0..98,0]	MCV: 84,5
MCH: 32,2	[28,0..34,0]	MCH: 27,8
MCHC: 333	[320..360]	MCHC: 329
RDW: 16,1	[10,0..15,2]	RDW: 13,9
Plt: 42	[150..400]	Plt: 185
Differential count relative		MPV: 7,2
Ne: 70,4		PCT: 0,132
Ly: 19,9		PDW: 16,9
Mo: 9,7		Differential count relative
Eo: 0,0	[45,0..70,0]	Ne: 33,9
Ba: 0,0	[20,0..45,0]	Ly: 60,2
Differential count absol.	[2,0..12,0]	Mo: 3,5
Ne abs.: 1,95	[0,0..5,0]	Eo: 1,8
Ly abs.: 0,55	[0,0..2,0]	Ba: 0,6
Mo abs.: 0,27		Differential count absol.
Eo abs.: 0,00	[2,00..7,00]	Ne abs.: 3,22
Ba abs.: 0,00	[0,80..4,00]	Ly abs.: 5,71
Coagulation		Mo abs.: 0,33
Quick test -INR: 2,28	[0,80 – 1,20]	Eo abs.: 0,17
APTT: 51,4	[25,9 – 40 s]	Ba abs.: 0,06
Fibrinogen: 5,31		
Nitrogen catabolites:		
Urea: 9,9	[2,8 – 8,0]	
Creatinine.: 229	[44-110]	
Uric acid.: 274	[220 – 420]	
Proteins:		
TP: 126,6	[65,0...85,0]	
FKAP: 1,43	[3,30..19,40]	
FLAM: 26592,00	[5,71..26,30]	
index FKAP/FLAM: 0,00	[0,26..1,65]	

case 13	case 14
Multiple myeloma, FLAM, B; anaemia, thrombocytopenia; renal insufficiency hyperproteinaemia, coagulopathy	ACD (= normocytic, normochromic anemia), abs. lymphocytosis – susp. CLL ? reactive ?

Case 15

ESR FW/1hod: >120	Normal values	Proteins:
Blood picture (CBC):		Albumin: 37,9
Leu: 8,86	[4,00..10,00]	Total Protein : 106,8 [65,0...85,0]
Ery: 4,26	[4,00..5,80]	IgG: 5,1
HB: 133	[135..175]	IgA: 58,90
HTC: 0,402	[0,400..0,500]	FKAP: 87,19 [3,30..19,40]
MCV: 94,4	[82,0..98,0]	FLAM: 6,39 [5,71..26,30]
MCH: 31,2	[28,0..34,0]	index FKAP/FLAM: 13,64 [0,26..1,65]
MCHC: 331	[320..360]	IELFO(IEP): paraprotein IgA kappa.
RDW: 16,1	[10,0..15,2]	ELFO (EP - Protein electrophoresis):
Plt: 394	[150..400]	M-G%: 45,8
Differential count relative		Alb.%: 34,30
Ne: 47,3		A1G%: 2,20
Ly: 46,2		A2G%: 8,50
Mo: 5,5		B1G%: 3,40
Eo: 0,7	[45,0..70,0]	B2G%: 4,80
Ba: 0,3	[20,0..45,0]	GG%: 46,80
Differential count absol.:	[2,0..12,0]	M-G: 48,91 g/l [0,0 – 0,1]
Ne abs.: 4,19	[0,0..5,0]	Alb.: 36,6 [35,2 – 50,4]
Ly abs.: 4,09	[0,0..2,0]	A1G: 2,35 [1,3..3,9]
Mo abs.: 0,49		A2G: 9,1
Eo abs.: 0,06	[2,00..7,00]	A2G%: 8,50
Ba abs.: 0,03	[0,80..4,00]	B1G: 3,63
Diff. count - microscope:		B2G: 5,1
SEG: 51,5		GG: 49,98 [5,80..15,20]
Ly: 42,0		A/G: 0,522
Mo: 5,5		Blood - tumour markers:
Ba: 1,0		Beta-2-mikro: 7,25 [1,0 – 2,40]
Rouleaux ery: +++		Liver tests
Minerals + Osmolality:		Bilirubin: 8,6
Na: 135	[137...146]	ALT: 0,25 [0,10..0,78]
K: 4,9	[3,8...5,0]	AST: 0,95 [0,10..0,72]
Cl: 96	[97..108]	GGT: 1,88 [0,14..0,68]
Ca: 2,78	[2,0..2,75]	ALP: 3,06 [0,58..1,,73]
P: 1,17	[065..1,61]	
Nitrogen catabolites:		Enzymes:
Urea: 4,8	[2,0..6,7]	LD: 2,5 [2,20..3,80]
Creatinine.: 95	[44..104]	
Uric acid.: 449	[140..340]	

case 15

Multiple myeloma IgA kappa, B; anaemia, thrombocytopenia; renal insufficiency
hyperproteinaemia, coagulopathy

UHKT

Case 16		
Blood picture (CBC):	Result	Normal values
Leuko	97.97 10 ⁹ /l	4.00-10.00
Ery	2.88 10 ¹² /l	3.80-5.20
Hgb	88 g/l	120-160
HTC	0.259 1	0.350-0.470
MCV	89.9 fl	82.0-98.0
MCH (Stř. obsah Hgb v erythrocytu)	30.6 pg	28.0-34.0
MCHC (Stř. koncentrace Hgb v ery)	340 g/l	320-360
RDW (Distr. šíře dle objemu ery)	17.00 %	10.00-15.20
RTC absol	0.010 10 ¹² /l	0.025-0.100
RTC relat	0.34 %	0.50-2.50
MCH RTC (Stř. obsah Hgb v rtc)	36.7 pg	28.0-35.0
Thrombocytes	53 10 ⁹ /l	150-400
Differential relative		
Neutrophils	44.0 %	45.0-70.0
Lymphocytes	17.8 %	20.0-45.0
Monocytes	38.2 %	2.0-12.0
Eo	0.0 %	0.0-5.0
Baso	0.0 %	0.0-2.0
Differential absol.		
Neutrophils	43.12 10 ⁹ /l	2.00-7.00
Lymphocytes	17.42 10 ⁹ /l	0.80-4.00
Monocytes	37.39 10 ⁹ /l	0.08-1.20
Eo	0.00 10 ⁹ /l	0.00-0.50
Baso	0.04 10 ⁹ /l	0.00-0.20
Differential count – microscope		
Segment neutro	1.0 %	47.0-70.0
Band - neutro	0 %	0.0-4.0
Lymphocyte	9.0 %	20.0-45.0
Prolymphocyte	0 %	0.0-0.0
Large granular lymphocytes	0 %	0.0-10.0
Monocytes	55.5 %	2.0-10.0
Eosino	0 %	0.0-5.0
Baso	0 %	0.0-1.0
Neutrophile metamyelocyte	0 %	0.0-0.0
Neutrophile myelocyte	0 %	0.0-0.0
Promyelocyte	0 %	0.0-0.0
Blast	32.0 %	0.0-0.0

Leukocytosis, anaemia, thrombocytopenia

Diff: monocytosis, blasts 32% - (AML)

Hiatus leucaemicus (leukemic gap): extensive lack of **mean** stages of maturation of myelopoiesis in the differential blood count or in the bone marrow

Case 17 – UHKT

Blood picture (CBC):	Results	Normal values
Leu	631.79 10 ⁹ /l	4.00-10.00
Ery	2.40 10 ¹² /l	3.80-5.20
Hgb	83.00 g/l	120-160
Hct	0.230 l	0.350-0.470
MCV	95.80 fl	82.0-98.0
MCH (Stř. obsah Hb v ery)	34.60 pg	28.0-34.0
MCHC (Stř. koncentrace Hb v ery)	361.00 g/l	320-360
RDW (Distr. šíře dle objemu ery)	19.70 %	10.00-15.20
RTC absol	0.072 10 ¹² /l	0.025-0.100
RTC relat	3.01 %	0.50-2.50
Thrombocytes	220.00 10 ⁹ /l	150-400
Differential absol.		
Neutrophils	512.63 10 ⁹ /l	2.00-7.00
Lymphocytes	27.53 10 ⁹ /l	0.80-4.00
Monocytes	11.86 10 ⁹ /l	0.08-1.20
Eo	5.44 10 ⁹ /l	0.00-0.50
Baso	74.33 10 ⁹ /l	0.00-0.20
Differential relative	Differential relative	
Neutrophils	81.00 %	45.0-70.0
Lymphocytes	4.40 %	20.0-45.0
Monocytes	1.90 %	2.0-12.0
Eo	0.90 %	0.0-5.0
Baso	11.80 %	0.0-2.0
Immature granulo	318.64 10 ⁹ /l	
Immature granulo	50.40 %	
Erythroblasts	3.75 10 ⁹ /l	
Erythroblasts	0.60 /100WBC	
Differential count – microscope:		
Segment neutro	29.00 %	
Band - neutro	27.00 %	
Lymphocyte	0 %	
Prolymphocyte	0 %	
Large granular lymphocytes	0 %	
Monocytes	1.00 %	
Eosino	2.00 %	
Baso	3.00 %	
Neutrophile metamyelocyte	11.00 %	
Neutrophile myelocyte	21.00 %	
Promyelocyte	3.00 %	
Blast	3.00 %	
BCR-ABL - . . . positive – inf the region major BCR-ABL		
Cytogenetics . . .Mitoses:: 22 : 46,XY, t(9;22)(q34;q11)		

Case 17

Chronic myeloid leukemia

Hyperleukocytosis, anaemia,

Positivity of fusion gen **bcr/abl**, presence of **Philadelphia chromosome**

NCI Common Terminology Criteria for Adverse Events grading of hematologic toxicity

Blood element (units)	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Neutrophils	<LLN to 1500/mm ³	1000 to 1500/mm ³	500 to 1000/mm ³	<500/mm ³	
Platelets	<LLN to 75,000/mm ³	50,000 to 75,000/mm ³	25,000 to 50,000/mm ³	<25,000/mm ³	
Haemoglobin	<LLN to 10 g/dL	8.0 to 10.0 g/dL	<8.0 g/dL	Life-threatening consequences: urgent intervention indicated	Death
CD4 count	<LLN to 500/mm ³	200 to 500/mm ³	50 to 200/mm ³	<50/mm ³	
Lymphocytopenia	<LLN to 800/mm ³	500 to 800/mm ³	200 to 500/mm ³	<200/mm ³	
Febrile neutropenia			ANC <1000/microL with a single temperature >38.3°C (100.4°F) or a sustained temperature ≥38°C (100°F) for more than one hour	Life-threatening consequences: urgent intervention indicated	Death

LLN: lower limit of normal.

With permission from: *Common Terminology Criteria for Adverse Events, version 4.0, June 2010, National Institutes of Health, National Cancer Institute, file://evs.nci.nih.gov/ftp1/CTCAE/CTCAE_4.03_2010-06-14_QuickReference_5x7.pdf.*