SUMMARY STATISTICS

EQA round: NKDF1/21 - Bone Marrow Aspirate Film

Deadline (EQA round closed): 28.05.2021

Professional supervision: Czech Haematological Society

Key: >>> ... marks correct (expected) result
> ... marks conditionally correct (acceptable) result

Patient A

Photo 1

Object no. 1	Nuclear cells - type of cells		1	Granulopoiesis: Myeloblast	1,8 %
		>>>	49	Granulopoiesis: Promyelocyte	88 %
			6	Granulopoiesis: Neutrophil myelocyte	11 %
	Nuclear cells - morphology	>>>	44	Granulopoiesis: Normal finding	79 %
			1	Granulopoiesis: Hypo-/agranularity	1,8 %
		>	5	Granulopoiesis: Neutrophil disgranularity	8,9 %
		>	3	Granulopoiesis: Nucleocytoplasmatic asynchrony	5,4 %
			1	Granulopoiesis: Abnormal chromatin clumping	1,8 %
			2	Granulopoiesis: Döhle bodies	3,6 %
			3	Granulopoiesis: Abnormal/leukemic promyelocyte	5,4 %
Object no. 2	Nuclear cells - type of cells	>>>	50	Granulopoiesis: Myeloblast	89 %
			3	Granulopoiesis: Promyelocyte	5,4 %
			2	Granulopoiesis: Neutrophil myelocyte	3,6 %
			1	Other cells: Blast, unclassifiable	1,8 %
	Nuclear cells - morphology	>	31	Granulopoiesis: Normal finding	55 %
			1	Granulopoiesis: Hypo-/agranularity	1,8 %
			1	Granulopoiesis: Neutrophil disgranularity	1,8 %
		>	13	Granulopoiesis: Cytoplasmatic vacuolisation	23 %
			2	Granulopoiesis: Nucleocytoplasmatic asynchrony	3,6 %
			2	Granulopoiesis: Abnormal chromatin clumping	3,6 %
			1	Granulopoiesis: Döhle bodies	1,8 %
			4	Granulopoiesis: Pseudo Chediak-Higashi granules	7,1 %
Object no. 3	Nuclear cells - type of cells	>	34	Granulopoiesis: Promyelocyte	61 %
		>>>	21	Granulopoiesis: Neutrophil myelocyte	38 %
			1	Granulopoiesis: Neutrophil metamyelocyte	1,8 %
	Nuclear cells - morphology		9	Granulopoiesis: Normal finding	16 %
		>	7	Granulopoiesis: Hypo-/agranularity	13 %
			1	Granulopoiesis: Hypergranularity/toxic granulation	1,8 %
		>>>	35	Granulopoiesis: Neutrophil disgranularity	63 %
		>	13	Granulopoiesis: Nucleocytoplasmatic asynchrony	23 %
			2	Granulopoiesis: Abnormal chromatin clumping	3,6 %
			2	Granulopoiesis: Döhle bodies	3,6 %
			3	Granulopoiesis: Abnormal/leukemic promyelocyte	5,4 %
Object no. 4	Nuclear cells - type of cells		1	Erythropoiesis: Polychromatophil erythroblast	1,8 %
		>>>	54	Erythropoiesis: Orthochromatic erythroblast	96 %
			1	Lymphocyte pop.: LGL (large granular lymphocyte)	1,8 %
	Nuclear cells - morphology	>>>	27	Erythropoiesis: Nucleus karyorrhexis / lobulisation / fragmentation	48 %
			2	Erythropoiesis: Abnormal chromatin clumping	3,6 %
		>	14	Erythropoiesis: Pycnosis of nucleus	25 %
		>>>	38	Erythropoiesis: Disturbance of cytoplasmatic haemoglobinisation	68 %
			2	Erythropoiesis: Cytoplasmatic vacuolisation	3,6 %
			1	Erythropoiesis: Howell-Jolly bodies	1,8 %
		>>>	52	Erythropoiesis: Basophilic stippling	93 %
			2	Erythropoiesis: Nucleocytoplasmatic asynchrony	3,6 %
			1	Erythropoiesis: Pappenheimer bodies	1,8 %
Object no. 5	Nuclear cells - type of cells		1	Granulopoiesis: Neutrophil myelocyte	1,8 %
		>>>	35	Granulopoiesis: Neutrophil metamyelocyte	63 %

Patient A

Photo 1

Object no. 5	Nuclear cells - type of cells		1	Monocyte pop: Promonocyte	1,8 %
			19	Monocyte pop: Monocyte	34 %
	Nuclear cells - morphology		3	Granulopoiesis: Normal finding	5,4 %
		>>>	32	Granulopoiesis: Hypo-/agranularity	57 %
			2	Granulopoiesis: Cytoplasmatic vacuolisation	3,6 %
			11	Granulopoiesis: Nucleocytoplasmatic asynchrony	20 %
		>	10	Granulopoiesis: Megalostabs and megalometamyelocytes	18 %
			1	Granulopoiesis: Macropolycyte	1,8 %
			1	Granulopoiesis: Abnormal chromatin clumping	1,8 %
			16	Monocyte pop: Normal finding	29 %
			3	Monocyte pop: Atypical/reactive monocyte	5,4 %

Photo 2

Object no. 1	Nuclear cells - type of cells	>	4	Erythropoiesis: Basophilc erythroblast	7,1 %
		>>>	52	Erythropoiesis: Polychromatophil erythroblast	93 %
	Nuclear cells - morphology		1	Granulopoiesis: Normal finding	1,8 %
			1	Granulopoiesis: Nucleocytoplasmatic asynchrony	1,8 %
			1	Erythropoiesis: Normal finding	1,8 %
			2	Erythropoiesis: Abnormal chromatin clumping	3,6 %
			1	Erythropoiesis: Pycnosis of nucleus	1,8 %
		>>>	51	Erythropoiesis: Disturbance of cytoplasmatic haemoglobinisation	91 %
			3	Erythropoiesis: Cytoplasmatic vacuolisation	5,4 %
			7	Erythropoiesis: Nucleocytoplasmatic asynchrony	13 %
Object no. 2	Nuclear cells - type of cells		2	Granulopoiesis: Neutrophil metamyelocyte	3,6 %
		>>>	53	Granulopoiesis: Neutrophil bar	95 %
			1	Granulopoiesis: Neutrophil segment	1,8 %
	Nuclear cells - morphology		19	Granulopoiesis: Normal finding	34 %
		>>>	26	Granulopoiesis: Hypo-/agranularity	46 %
			3	Granulopoiesis: Nucleocytoplasmatic asynchrony	5,4 %
			2	Granulopoiesis: Megalostabs and megalometamyelocytes	3,6 %
			1	Granulopoiesis: Neutrophil and eosinophil hyposegmentation and acquired Pelger-Huët anomaly	1,8 %
		>>>	15	Granulopoiesis: Abnormal chromatin clumping	27 %
Object no. 3	Nuclear cells - type of cells		2	Erythropoiesis: Basophilc erythroblast	3,6 %
		>	15	Erythropoiesis: Polychromatophil erythroblast	27 %
		>>>	39	Erythropoiesis: Orthochromatic erythroblast	70 %
	Nuclear cells - morphology		2	Granulopoiesis: Nucleocytoplasmatic asynchrony	3,6 %
			1	Erythropoiesis: Normal finding	1,8 %
			1	Erythropoiesis: Abnormal chromatin clumping	1,8 %
			2	Erythropoiesis: Pycnosis of nucleus	3,6 %
		>>>	51	Erythropoiesis: Disturbance of cytoplasmatic haemoglobinisation	91 %
		>>>	40	Erythropoiesis: Cytoplasmatic vacuolisation	71 %
			1	Erythropoiesis: Basophilic stippling	1,8 %
		>	11	Erythropoiesis: Nucleocytoplasmatic asynchrony	20 %
Object no. 4	Nuclear cells - type of cells		4	Granulopoiesis: Promyelocyte	7,1 %
		>>>	52	Granulopoiesis: Neutrophil myelocyte	93 %
	Nuclear cells - morphology	>>>	40	Granulopoiesis: Normal finding	71 %
			2	Granulopoiesis: Hypo-/agranularity	3,6 %
			3	Granulopoiesis: Hypergranularity/toxic granulation	5,4 %
		>	7	Granulopoiesis: Neutrophil disgranularity	13 %
		>	4	Granulopoiesis: Nucleocytoplasmatic asynchrony	7,1 %
			2	Granulopoiesis: Abnormal chromatin clumping	3,6 %
			1	Granulopoiesis: Döhle bodies	1,8 %
			1	Granulopoiesis: Abnormal/leukemic promyelocyte	1,8 %
Object no. 5	Nuclear cells - type of cells		9	Granulopoiesis: Promyelocyte	16 %
		>>>	38	Granulopoiesis: Neutrophil myelocyte	68 %
			1	Granulopoiesis: Neutrophil metamyelocyte	1,8 %
			1	Granulopoiesis: Eosinophil myelocyte	1,8 %
			7	Granulopoiesis: Basophil myelocyte	13 %
	Nuclear cells - morphology		8	Granulopoiesis: Normal finding	14 %
			1	Granulopoiesis: Hypo-/agranularity	1,8 %
		>>>	43	Granulopoiesis: Hypergranularity/toxic granulation	77 %

Patient A

Photo 2

Object no. 5	Nuclear cells - morphology		2	Granulopoiesis: Neutrophil disgranularity	3,6 %
			5	Granulopoiesis: Nucleocytoplasmatic asynchrony	8,9 %
			2	Granulopoiesis: Abnormal chromatin clumping	3,6 %
			2	Granulopoiesis: Döhle bodies	3,6 %
			1	Granulopoiesis: Abnormal/leukemic promyelocyte	1,8 %

General view and diagnosis

Cellularity		3	Normocellular	5,4 %
	>>>	52	Hypercellular	93 %
Granulopoiesis - count	>>>	24	Within physiological limits	43 %
		15	Increased	27 %
	>>>	16	Decreased	29 %
Granulopoiesis - morphology		8	No significant changes	14 %
	>>>	42	Dyspalstic granulopoiesis	75 %
		2	Atypical/toxic granulopoiesis	3,6 %
		3	Pathological (clonal) granulopoiesis	5,4 %
Erythropoiesis - count	>	15	Within physiological limits	27 %
	>>>	36	Increased	64 %
		4	Decreased	7,1 %
Erythropoiesis - morphology		1	No significant changes	1,8 %
	>>>	51	Dysplastic erythropoiesis	91 %
		3	Atypical erythropoiesis	5,4 %
Lymphopoiesis - count	>>>	44	Within physiological limits	79 %
		11	Decreased	20 %
Lymphopoiesis - morphology	>>>	52	No significant changes	93 %
		3	Reactive changes/iritations	5,4 %
Monocytopoiesis - count	>>>	48	Within physiological limits	86 %
		7	Increased	13 %
Monocytopoiesis - morphology	>>>	54	No significant changes / reactive changes	96 %
		1	Pathological monocytopoiesis	1,8 %
Megakaryopoiesis - count		7	Within physiological limits	13 %
	>>>	48	Increased	86 %
Megakaryopoiesis - morphology		3	No significant changes	5,4 %
	>>>	28	Dysplastic megakaryopoiesis	50 %
		3	Atypical megakaryopoiesis	5,4 %
	>>>	21	Pathological (clonal) megakaryopoiesis	38 %
Estimation of diagnosis	>>>	43	MDS/MPN-RS-T (MDS/MPN with ring sideroblasts and thrombocytosis)	77 %
		1	Polycythemia vera	1,8 %
		3	Primary myelofibrosis	5,4 %
		4	Essential thrombocythemia	7,1 %
		1	Myeloproliferative disorder (unclassifiable)	1,8 %
		3	MDS-RS (MDS with ring sideroblasts)	5,4 %
		1	APL (acute promyelocytic leukaemia)	1,8 %

Patient B

Photo 1

Object no. 1	Nuclear cells - type of cells		1	Granulopoiesis: Neutrophil metamyelocyte	1,8 %
			9	Granulopoiesis: Neutrophil bar	16 %
			4	Granulopoiesis: Neutrophil segment	7,1 %
			1	Granulopoiesis: Basophil segment	1,8 %
		>>>	40	Monocyte pop: Monocyte	71 %
	Nuclear cells - morphology		2	Granulopoiesis: Normal finding	3,6 %
			12	Granulopoiesis: Hypo-/agranularity	21 %
			1	Granulopoiesis: Neutrophil disgranularity	1,8 %
			1	Granulopoiesis: Cytoplasmatic vacuolisation	1,8 %
			6	Granulopoiesis: Nucleocytoplasmatic asynchrony	11 %
			2	Granulopoiesis: Neutrophil and eosinophil hyposegmentation and acquired Pelger-Huët anomaly	3,6 %
			3	Granulopoiesis: Abnormal chromatin clumping	5,4 %
		>>>	32	Monocyte pop: Normal finding	57 %
			5	Monocyte pop: Atypical/reactive monocyte	8,9 %
Object no. 2	Nuclear cells - type of cells	>>>	56	Granulopoiesis: Eosinophil segment	100 %
	Nuclear cells - morphology	>	22	Granulopoiesis: Normal finding	39 %

Patient B

Photo 1

Object no. 2	Nuclear cells - morphology		2	Granulopoiesis: Neutrophil disgranularity	3,6 %
		>>>	33	Granulopoiesis: Cytoplasmatic vacuolisation	59 %
			2	Granulopoiesis: Neutrophil and eosinophil hyposegmentation and acquired Pelger-Huët anomaly	3,6 %
			3	Granulopoiesis: Abnormal chromatin clumping	5,4 %
			1	Granulopoiesis: Döhle bodies	1,8 %
Object no. 3	Nuclear cells - type of cells	>>>	56	Granulopoiesis: Neutrophil segment	100 %
	Nuclear cells - morphology	>	10	Granulopoiesis: Normal finding	18 %
			13	Granulopoiesis: Hypo-/agranularity	23 %
			1	Granulopoiesis: Neutrophil disgranularity	1,8 %
		>>>	43	Granulopoiesis: Cytoplasmatic vacuolisation	77 %
			3	Granulopoiesis: Abnormal chromatin clumping	5,4 %
Object no. 4	Nuclear cells - type of cells	>>>	41	Erythropoiesis: Basophilc erythroblast	73 %
			15	Erythropoiesis: Polychromatophil erythroblast	27 %
	Nuclear cells - morphology		1	Granulopoiesis: Nucleocytoplasmatic asynchrony	1,8 %
		>>>	26	Erythropoiesis: Normal finding	46 %
			4	Erythropoiesis: Abnormal chromatin clumping	7,1 %
			12	Erythropoiesis: Disturbance of cytoplasmatic haemoglobinisation	21 %
			1	Erythropoiesis: Cytoplasmatic vacuolisation	1,8 %
			15	Erythropoiesis: Nucleocytoplasmatic asynchrony	27 %
			3	Erythropoiesis: Macroerythroblast	5,4 %
			1	Erythropoiesis: Intercytoplasmatic bridges	1,8 %
Object no. 5	Nuclear cells - type of cells		1	Granulopoiesis: Myeloblast	1,8 %
			2	Erythropoiesis: Polychromatophil erythroblast	3,6 %
		>>>	53	Lymphocyte pop.: Lymphocyte	95 %
	Nuclear cells - morphology		1	Granulopoiesis: Normal finding	1,8 %
			2	Erythropoiesis: Normal finding	3,6 %
		>>>	47	Lymphocyte pop.: Normal lymphocyte/plasmocyte	84 %
			3	Lymphocyte pop.: Reactive lymphocyte	5,4 %
			1	Lymphocyte pop.: Patological lymphocyte	1,8 %

Photo 2

Object no. 1	Nuclear cells - type of cells		1	Other cells: Blast, unclassifiable	1,8 %
		>>>	37	Other cells: Macrophage	66 %
			4	Other cells: Osteoblast	7,1 %
			14	Other cells: Bare nuclei / smudge cell	25 %
Object no. 2	Nuclear cells - type of cells		3	Erythropoiesis: Polychromatophil erythroblast	5,4 %
		>>>	53	Erythropoiesis: Orthochromatic erythroblast	95 %
	Nuclear cells - morphology		1	Granulopoiesis: Normal finding	1,8 %
		>>>	31	Erythropoiesis: Normal finding	55 %
			1	Erythropoiesis: Abnormal chromatin clumping	1,8 %
			1	Erythropoiesis: Pycnosis of nucleus	1,8 %
			2	Erythropoiesis: Disturbance of cytoplasmatic haemoglobinisation	3,6 %
			9	Erythropoiesis: Nucleocytoplasmatic asynchrony	16 %
			1	Erythropoiesis: Megaloerythroblast	1,8 %
			8	Erythropoiesis: Macroerythroblast	14 %
Object no. 3	Nuclear cells - type of cells		1	Erythropoiesis: Polychromatophil erythroblast	1,8 %
			1	Megakaryopoiesis: Megakaryocyte	1,8 %
			1	Lymphocyte pop.: Lymphoblast	1,8 %
		>>>	53	Lymphocyte pop.: Lymphocyte	95 %
	Nuclear cells - morphology		1	Erythropoiesis: Microerythroblast	1,8 %
			1	Megakaryopoiesis: Micro (mega) karyocyte	1,8 %
		>>>	47	Lymphocyte pop.: Normal lymphocyte/plasmocyte	84 %
			1	Lymphocyte pop.: Cytoplasmatic vacuolisation	1,8 %
			2	Lymphocyte pop.: Reactive lymphocyte	3,6 %
			2	Lymphocyte pop.: Patological lymphocyte	3,6 %
			1	Lymphocyte pop.: Patological plasmocyte/plasmablast	1,8 %
Object no. 4	Nuclear cells - type of cells	>	20	Granulopoiesis: Neutrophil bar	36 %
		>>>	36	Granulopoiesis: Neutrophil segment	64 %
	Nuclear cells - morphology	>>>	39	Granulopoiesis: Normal finding	70 %
		>	9	Granulopoiesis: Hypergranularity/toxic granulation	16 %
		>	4	Granulopoiesis: Cytoplasmatic vacuolisation	7,1 %

Patient B

Photo 2

Object no. 4	Nuclear cells - morphology		1	Granulopoiesis: Nucleocytoplasmatic asynchrony	1,8 %
			3	Granulopoiesis: Neutrophil and eosinophil hyposegmentation and acquired Pelger-Huët anomaly	5,4 %
			2	Granulopoiesis: Abnormal chromatin clumping	3,6 %
Object no. 5	Nuclear cells - type of cells		2	Granulopoiesis: Neutrophil myelocyte	3,6 %
		>>>	51	Granulopoiesis: Eosinophil myelocyte	91 %
			3	Granulopoiesis: Eosinophil metamyelocyte	5,4 %
	Nuclear cells - morphology	>>>	45	Granulopoiesis: Normal finding	80 %
			4	Granulopoiesis: Hypergranularity/toxic granulation	7,1 %
			5	Granulopoiesis: Neutrophil disgranularity	8,9 %
			4	Granulopoiesis: Cytoplasmatic vacuolisation	7,1 %
			1	Granulopoiesis: Nucleocytoplasmatic asynchrony	1,8 %
			3	Granulopoiesis: Abnormal chromatin clumping	5,4 %

General view and diagnosis

Cellularity	>	26	Normocellular	46 %
	>	29	Hypocellular	52 %
Granulopoiesis - count	>>>	49	Within physiological limits	88 %
		1	Increased	1,8 %
		5	Decreased	8,9 %
Granulopoiesis - morphology		12	No significant changes	21 %
	>>>	42	Dyspalstic granulopoiesis	75 %
		1	Atypical/toxic granulopoiesis	1,8 %
Erythropoiesis - count	>>>	44	Within physiological limits	79 %
		6	Increased	11 %
		5	Decreased	8,9 %
Erythropoiesis - morphology		4	No significant changes	7,1 %
	>>>	47	Dysplastic erythropoiesis	84 %
		4	Macroerythroblastic erythropoiesis	7,1 %
Lymphopoiesis - count	>>>	50	Within physiological limits	89 %
		5	Decreased	8,9 %
Lymphopoiesis - morphology	>>>	51	No significant changes	91 %
		3	Reactive changes/iritations	5,4 %
		1	Pathological lymphopoiesis	1,8 %
Monocytopoiesis - count	>>>	55	Within physiological limits	98 %
Monocytopoiesis - morphology	>>>	52	No significant changes / reactive changes	93 %
		3	Pathological monocytopoiesis	5,4 %
Megakaryopoiesis - count		7	Within physiological limits	13 %
	>>>	48	Increased	86 %
Megakaryopoiesis - morphology		2	No significant changes	3,6 %
	>>>	47	Dysplastic megakaryopoiesis	84 %
		6	Pathological (clonal) megakaryopoiesis	11 %
Estimation of diagnosis	>	1	MDS-MLD (MDS with multilineage dysplasia)	1,8 %
	>>>	52	MDS with isolated del(5q)	93 %
		2	Bone marrow failure / aplastic anaemia	3,6 %

Evaluation of the results - scoring system **NKDF1/21**

Patient A	Photo A1	Photo A2	General view
Maximal achievable score:	**64**	**68**	**26**
Successful participants (success 60 % and more):	30 (it is 54 %)	41 (it is 73 %)	43 (it is 77 %)
Minimal success in this round:	-21,9 %	-14,7 %	-7,7 %
Maximal success in this round:	100,0 %	100,0 %	100,0 %

Patient B	Photo B1	Photo B2	General view
Maximal achievable score:	**60**	**56**	**24**
Successful participants (success 60 % and more):	41 (it is 73 %)	41 (it is 73 %)	50 (it is 89 %)
Minimal success in this round:	6,7 %	-7,1 %	0,0 %
Maximal success in this round:	100,0 %	100,0 %	100,0 %

	Number of participants:	**56**
Number of the participants that succeeded:	in all 6 tests:	17 (it is 30 %)
	in 5 tests:	16 (it is 29 %)
	in 4 tests:	9 (it is 16 %)
	in 3 tests:	7 (it is 13 %)
	in 2 tests:	3 (it is 5 %)
	in 1 test:	1 (it is 2 %)
	in no test:	3 (it is 5 %)