Cytohematology Proficiency Testing Glass Slide Critique ~ August 2005

Results from this proficiency test event are available on
our website at: http://www.wadsworth.org/chemheme/heme/glass/0508.htm

Slide 058

Diagnosis: Myelodysplastic syndrome (MDS) /Acute Myelogenous Leukemia (AML)
Available data: 82 year-old female

Laboratory Data:

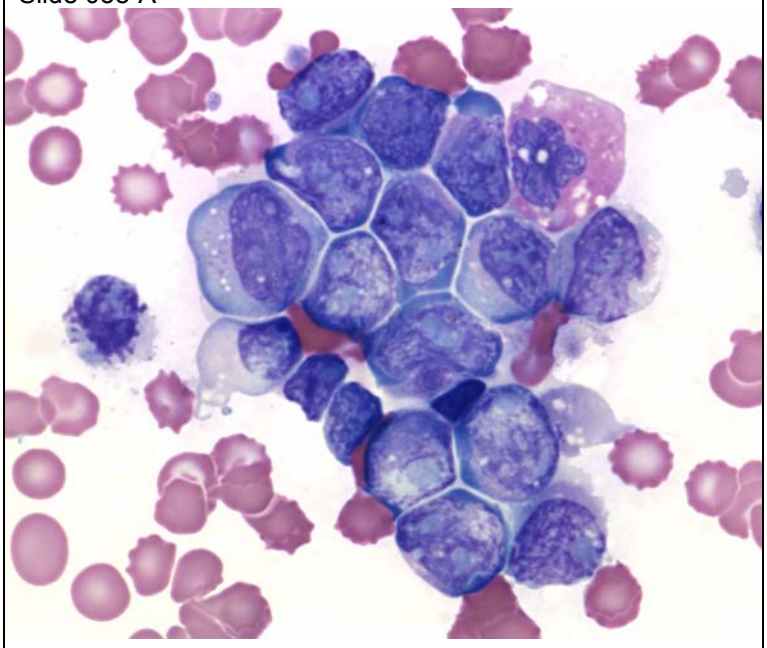
WBC	251.0 x 10^9 /L
RBC	2.50 x 10^{12} /L
Hemoglobin	8.6 g/dL
Hematocrit	21.6 %
MCV	86.2 fL
Platelet count	50 x 10^9 /L

"The myelodysplastic syndromes (MDS) are a morphologically heterogeneous group of conditions which are a consequent on proliferation of a clone of neoplastic haemopoietic cells showing abnormalities of proliferation and maturation." Bain, B.J. Blood Cells: A Practical Guide, 3rd Ed. Oxford: Blackwell Scientific, 2002, p. 357-58. This hematologic disorder runs over the course of years and about 25% of the patients develop acute myelogenous leukemia (AML). As a result these cases are sometimes referred to as "pre-leukemias." Experts differ on what constitutes pre-leukemia in part because of the complication surrounding the difference between dysplasia and neoplasia. "All the myeloproliferative disorders (like CML and AML) are neoplasias. The involved cells are malignant and derived from a single neoplastic stem cell. Myelodysplastic syndromes, such as refractory anemia, are pre-neoplastic. Stem cells are abnormal but to a lesser degree." Glass, E.T. Color Atlas of Hematology, CAP Northfield, 1998, p.56. The difficulty arises in determining where dysplasia ends and neoplasia begins. The dysplasias often show more changes in the red cells, granulocytes, monocytes and platelets than the neoplasias. On the basis of morphology, the French-American-British (FAB) classification defined five different myelodysplastic syndromes:
Refractory anemia (RA)
Refractory anemia (RA) with ringed sideroblasts
Refractory anemia (RA) with excess blasts (RAEB)
Refractory anemia (RA) with excess blasts (RAEB) "in transformation"
Chronic myelomonocytic leukemia (CMML)

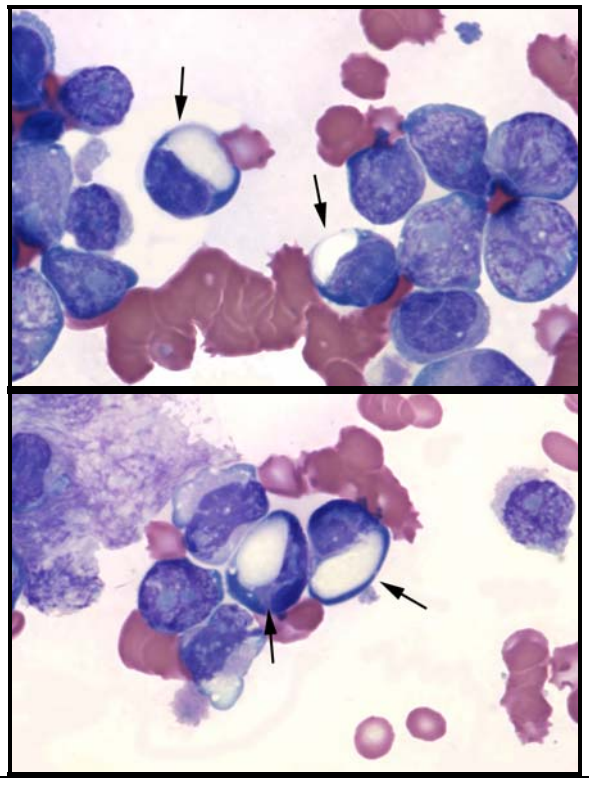
Few comments were received questioning the integrity of the sample used for slide 058 and also on the quality of the stain. In this particular case, slide preparation commenced within an hour of collection. A sample with such a high cell count as in this case challenges the ability of all the cells to uniformly take on the stain. Variation in the "color" of the cells can be expected. The high white count in this case also compromised the ability to accurately assess red blood cell morphology and no error points were assigned to any of those findings.

Few laboratories commented on the presence of blasts with cytoplasmic vacuolation, as shown in figure 058-B below.

Slide 058-A



Slide 058-B



Slide: 058

Cell Classification or Finding	Expected Range	Participant Median	Participant Range
Blast cell not classified	58 -100	92	0 - 99
Myeloblast/Promyelocyte	58 -100	0	0 - 13
Lymphoblast/Prolymphocyte	0 - 0	0	0 - 0
Monoblast/Promonocyte	0 - 0	0	0 - 0
Erythroblast	0 - 0	0	0 - 0
Lymphoma cell	0 - 0	0	0 - 0
*[Blasts, all types + Lymphoma Cells]	58 -100	93	54 - 99
Hairy cell	0 - 0	0	0 - 0
Myelocyte	0 - 11	0	0 - 11
Metamyelocyte	0 - 4	0	0 - 4
Band neutrophil	0 - 2	0	0 - 2
Segmented neutrophil	0 - 4	1	0 - 4
*[Total neutrophils]	0 - 5	1	0 - 5
Eosinophil	0 - 1	0	0 - 1
Basophil	0 - 0	0	0 - 0
Lymphocyte	0 - 10	2	0 - 10
Atypical lymphocyte	0 - 1	0	0 - 3
*[Lymphocytes+Atypical lymphocytes]	0 - 10	2	0 - 12
Monocyte	0 - 11	0	0 - 11
Plasma cell	0 - 0	0	0 - 0
NRBC / 100 WBC	0 - 5	2	0 - 5

Erythrocyte Morphology	Expected Result	Participant Results			
Anisocytosis	Moderate	None (15%)	Slight (40%)	Moderate (40%)	MarKed (5%)
Poikilocytosis	Moderate	None (25%)	Slight (32%)	Moderate (38%)	MarKed (6%)
Macrocytosis	None	None (58%)	Slight (28%)	Moderate (13%)	MarKed (1%)
Microcytosis	None	None (77%)	Slight (18%)	Moderate (5%)	MarKed (0%)
Polychromasia	None	None (91%)	Slight (7%)	Moderate (2%)	MarKed (0%)

Cell Classification or Finding	Expected Result	Participant Results	
Reduced number of platelets	Present	Absent(28%)	Present(72%)
Increased number of platelets	Absent	Absent(97%)	Present(3%)
Phagocytosis of platelet(s)	Absent	Absent(96%)	Present(4%)
Bizarre or irregular platelets	Absent	Absent(59%)	Present(41%)
Clumped platelets	Absent	Absent(98%)	Present(2%)
Giant platelets	Present	Absent(49%)	Present(51%)
Platelet satellitosis	Absent	Absent(100%)	Present(0%)
Auer rods	Absent	Absent(99%)	Present(1%)
Dohle bodies	Absent	Absent(100%)	Present(0%)
Hypersegmentation	Absent	Absent(100%)	Present(0%)
Pelger Huet anomaly	Absent	Absent(100%)	Present(0%)
Smudge / Basket cells	Absent	Absent(73%)	Present(27%)
Toxic granulation	Absent	Absent(100%)	Present(0%)
Acanthocytes	Absent	Absent(82%)	Present(18%)
Basophilic stippling	Absent	Absent(99%)	Present(1%)
Blister cells (pre keratocytes)	Absent	Absent(100%)	Present(0%)
Cabot rings	Absent	Absent(100%)	Present(0%)
Echinocytes (crenated/burr cells)	Present	Absent(16%)	Present(84%)
Elliptocytes	Absent	Absent(95%)	Present(5%)
Howell-Jolly bodies	Absent	Absent(90%)	Present(10%)
Pappenheimer bodies	Absent	Absent(98%)	Present(2%)
Red cell agglutinates	Absent	Absent(92%)	Present(8%)
Rouleaux	Absent	Absent(71%)	Present(29%)
Schistocytes	Absent	Absent(72%)	Present(28%)
Schuffner's granules	Absent	Absent(100%)	Present(0%)
Sickle cells (drepanocytes)	Absent	Absent(100%)	Present(0%)
Spherocytes	Absent	Absent(84%)	Present(16%)
Stomatocytes	Absent	Absent(100%)	Present(0%)
Target cells (codocytes)	Absent	Absent(97%)	Present(3%)
Tear drop cells (dacrocytes)	Absent	Absent(94%)	Present(6%)
Bacteria	Absent	Absent(99%)	Present(1%)
Fungi/yeast	Absent	Absent(100%)	Present(0%)
Malaria/Babesiosis	Absent	Absent(100%)	Present(0%)
Stain precipitate	Absent	Absent(100%)	Present(0%)
Phagocytosis of red cell(s)	Absent	Absent(97%)	Present(3%)