ISSUE
20
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QSP Monthly

HORIBA Medical

NEWSLETTER OF THE QUALITY SLIDE PROGRAM

This issue

Last Month's Slides

Slide 1
Monomorphic hyperlymphocytosis composed of large lymphocytes, often nucleolated nuclei and with abundant cytoplasm (sometimes vacuolated). Phenotyping result of circulating lymphocytes: Matutes scoring at 1/5. Expert comment : Cytology suggestive of lymphoma of the marginal zone.

Slide 2
Anisocytosis (+).Echinocytes (+++).Hyposegmentation of neutrophils / band cells (++).Discrete myelemia. Expert comment: Döhle body?

Slide 3
Erythroblasts (2 to 3%). Hyposegmented PMN (+). Expert comment: Morphology "Elliptocytes" of red blood cells not taken into account, because there is an underlying iron deficiency.

Slide 4
Anisocytosis (++).Echinocytes (++).2 to 3% of Erythroblasts. Vacuolated (+) and hypergranulated (+) PMNs. Discrete myelemia.

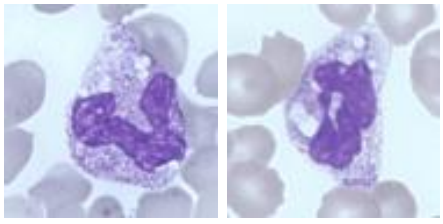
Slide 5
10 to 12% eosinophils. Expert comment: A cell classified in the "Plasma Cells" column.

Slide 6
See Slide Review

Monthly Digital Case study
November 2021 Slide 6

Presentation
Male 49 years

FBC Results
WBC 3.83 (10^3/mm3)
RBC 3.27 * (10^6/mm3)
HGB 10.5(g/dL)
HCT 31.5 (%)
MCV 96 (fL)
MCH 32.3 (pg)
MCHC 33.4 (g/dL)
PLT 19* (10^3/mm3)
Neutrophils 97.2 %
Lymphocytes 0.0 %
Monocytes 0.9 %
Eosinophils 0.0 %
Basophils 0.0%
Metamyelocytes 1.9%



Neutrophils showing left shift (decrease in the number of lobes), Toxic Granulation (increase in granulation) and nuclear vacuolation

Analyser Alarms – WBC abn Matrix, Plt Abn histogram

Slide review
Anisocytosis (++).
Echinocytes (+).
Lymphopenia (0.1x10 ^ 9 / L).
Thrombocytopenia.
Expert comment:
Very vacuolated and hypergranulated atypical PMNs: Septic shock?

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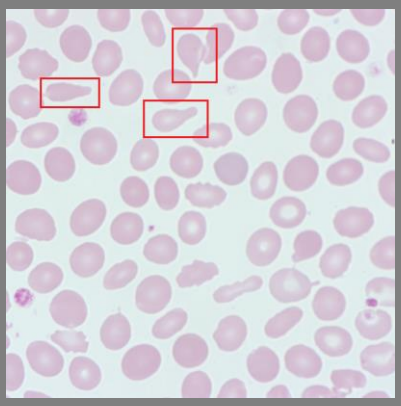
Cell Quiz:

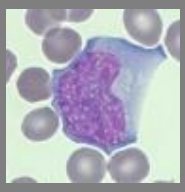
What is the name of the cells highlighted in red box:

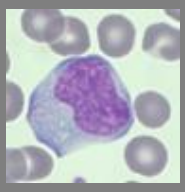


A) Acanthocyte
B) Dacrocyte
C) Schistocyte
D) Drepanocyte

Last Month's Cell Quiz:

What test would you perform if you saw a number of these cells in a young adult presenting with swollen lymph nodes, tiredness, sore throat:





A) Ham's test
B) Infectious Mononucleosis test (Monospot)
C) Malarial parasites
D) COVID-19 Lateral Flow test

Answer:
B) Infectious Mononucleosis test. The cells displayed are classical Atypical Lymphocytes which are a feature of Infectious Mononucleosis (most commonly caused by Epstein-Barr Virus) . Atypical Lymphocytes are large with abundant basophillic cytoplasm the nucleus can be round, oval, reniform or occasionally clover leaf sometimes with a prominent nucleoli.

Slide 6 Review continued

Neutro Toxic Granulation (NTG) - increase in azurophilic granules with the granules being more visible than normal due to their increase in size and being more basophilic. Although being characteristic of infection, NTG is not only seen in infection as it can be seen in normal pregnancy and in patients receiving cytokine treatment (GM-CSF, G-CSF).
Neutrophil Left Shift – increase in less mature Neutrophils i.e. fewer number of segmented lobes. The term Left Shift is derived from the fact that on old fashioned manual cell counting machines the more immature Neutrophils were on the left most side of the counter. Left shift is indicative of the marrow's response to infection by releasing the more immature forms. Left Shift may also be seen in GM-CSF, G-CSF treatment.

Follow up tests:
Due to the low platelet count, a full coagulation screen, including D-Dimer, is highly recommended in order to check for the presence of Disseminated Intravascular Coagulation (DIC). Sepsis is the most common underlying cause of DIC and the presence of DIC in sepsis has a poor prognostic outcome.

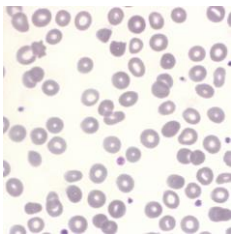
Red Cell Morphology Terminology part 1

Normal red cells are biconcave cells with an average diameter of approx. 7.5um, when a blood film is stained and then examined microscopically the red cells appear as circular discs with a central area of parlour and with little variation on size and colour in normal patients. The normal red cell is approximately the same diameter as that of the nucleus of a Lymphocyte.
Numerous terms are used to describe the variation in size, shape and colour of the red cell and is traditionally scored in severity as either +, ++, +++ and even ++++.

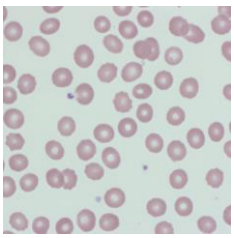
Variation in size

Anisocytosis - describes an increase in the variation in size. Anisocytosis in itself is non specific. An increase Red Cell Distribution Width as measured by automated analyser is indicative of the presence of anisocytosis in the blood film.
Anisocytosis may be accompanied with the majority of the red cells being either smaller or larger in size than normal red cell. Microcytosis describes the presence of cell smaller than normal red cells, while Macrocytosis describes the presence of cell larger than normal red cells.

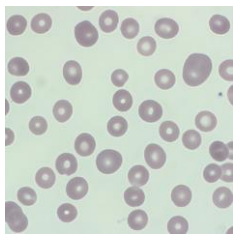
Microcytic (MCV 62fL)



Normal (MCV 90fL)



Macrocytic (MCV 114fL)



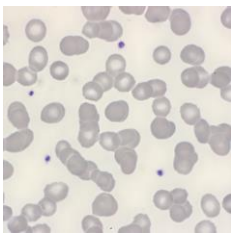
If there are only a small number of Microcytic or Macrocytic red cells present the Mean Cell Volume (MCV) may still be within the reference range.

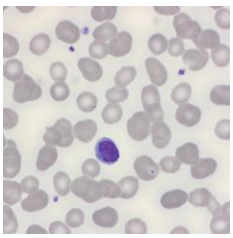
Some causes of Microcytosis and Macrocytosis:

Microcytosis	Macrocytosis
Iron Deficiency	Vitamin B12 deficiency
Anaemia of chronic disease	Folic acid deficiency
Beta Thalassaemia	Liver disease (including increased alcohol uptake)
Hb Constant Spring, Hb H disease, Hb Lepore	Drug interaction e.g Hydroxycarbamide, doxorubicin, azathioprine

The importance of the blood film in patients with raised MCV is seen in patients who present with cold agglutinin disease (agglutinating autoantibodies which operate at a temperature below 37°C) which causes the red cells to agglutinate (clump together) in low temperatures and the measured MCV may be inappropriately raised. As the agglutinated cells are counted in the analyser, they cause the red cell count to be less than it should be and the MCV greater with agglutinated multiple cells being counted as a single cell. Warming the sample to 37°C and then re-analysing often, clears the red cell agglutination. Fig below showing RBC autoagglutination (red box):

RBC auto agglutination needs to be differentiated from Rouleaux formation which is where the red cells are in stacks resembling a pile of coins (see below):



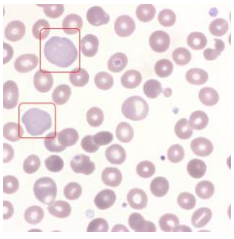


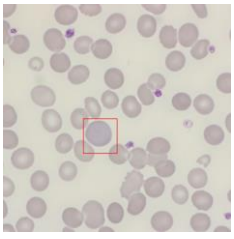
Rouleaux formation does not affect the measured MCV. Rouleaux formation is caused by increased concentration of plasma proteins e.g. Immunoglobulins and Fibrinogen. The Erythrocyte Sedimentation Rate (ESR) will also be elevated. Rouleaux formation is seen in infections, myeloma (as in the case above) and Waldenström's macroglobulinemia. The case above also displays a bluish background staining as a result of the excessive concentration of the paraprotein present.

Variation in Colour

Polychromasia

As immature red cells are released from the bone marrow, they are larger than mature red cells and also contain an amount of RNA which is lost as the cell matures in the circulation. The RNA causes the red cell to appear more of a bluish colour than a red colour and this leads to the term Polychromasia. In normal adults, only about 0.1 % of red cells are polychromatic since only the most immature red cells are polychromatic. Examples of polychromatic red cells (red box):





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