ISSUE
07
November
2020

QSP Monthly

HORIBA Medical

NEWSLETTER OF THE QUALITY SLIDE PROGRAM

This issue

Last Month's Slides

October 2020 Slide Summaries

Slide 1
Normal film

Slide 2
Normal film

Slide 3
A Leukocytosis

Slide 4
Myelofibrosis Patient

Slide 5
Platelet anisocytosis and platelet clumps seen

Slide 6
Myeloproliferative Syndrome, essential thrombocytopenia and platelet clumps seen.

Monthly Digital Case study

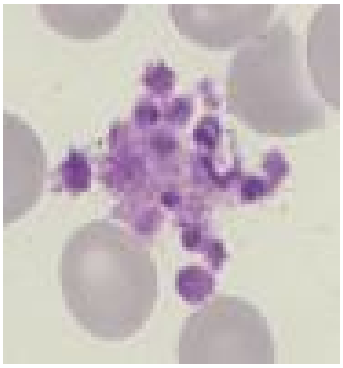
October 2020 Slide 6

Presentation

Female patient, 64 years old. The patient is hospitalised and on a continual care unit.

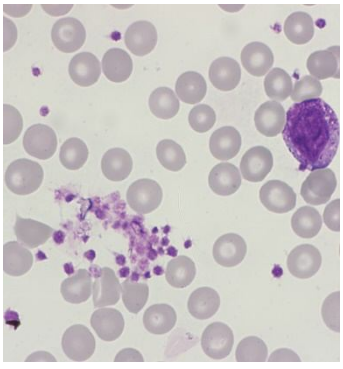
FBC Results

WBC 19.4 (10^3/mm3)		
RBC 2.63* (10^6/mm3)		
HGB 7.8* (g/L)		
HCT 24.4* (%)	**Neutrophils**	**65.9%**
MCV 93 (fL)	**Lymphocytes**	**15.2%**
MCH 29.8 (pg)	**Monocytes**	**6.1%%**
MCHC 32.2 (g/dL)	**Eosinophils**	**4.5%**
PLT 1074* (10^3/mm3)	**Basophils**	**1.5%**



Slide review

Film shows platelet clusters, anisocytosis and hypochromic red cells.



Diagnosis

Further testing for Bcr_alb mutation to confirm if the patient has Chronic Myeloid Leukaemia (CML) or possibly a specific form of acute lymphoblastic leukaemia.

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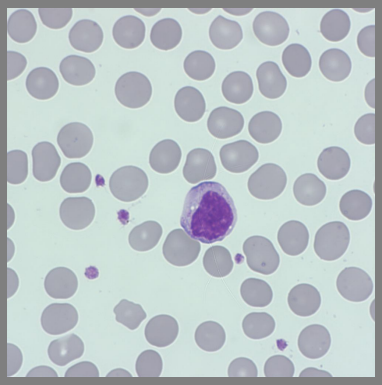
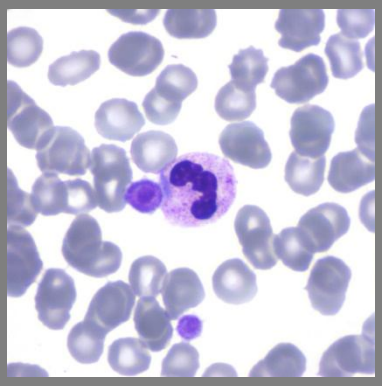
Monthly Morphology Quiz

Look closely at the film below:



What do you notice about this film?

Last month's cells:



The slide shows **May-Hegglin Anomaly (MHA)** from a patient recently diagnosed with MYH9 genetic disorder with a previous history of unexplained bruising.

MHA is a rare, inherited, blood platelet disorder which is autosomal dominant. This disorder is indicated by degrees of thrombocytopenia which may be associated with purpura and bleeding; abnormally large and misshapen platelets containing few granules; and large, well-defined, basophilic, cytoplasmic inclusion bodies in granulocytes that resemble Döhle bodies.

Myeloproliferative Disorders Part 1

Introduction

Chronic myeloproliferative disorders (also known as myeloproliferative neoplasms) are a unique group of hematopoietic stem cell disorders that have common mutations which continuously activate. JAK2 (Janus kinase 2), is an enzyme which usually stimulates the production of red blood cells, white blood cells (granulocytes, monocytes, basophils and eosinophils) and platelets. JAK2 is usually only activated when additional blood cell production is required. Because the blood cells in the myeloproliferative disorders are usually normal in appearance, these disorders mimic clinically benign or reactive blood conditions in which blood production is increased because of stimuli such as hypoxia, inflammation or infection as well as certain malignancies such as chronic myelogenous leukemia and myelodysplasia.

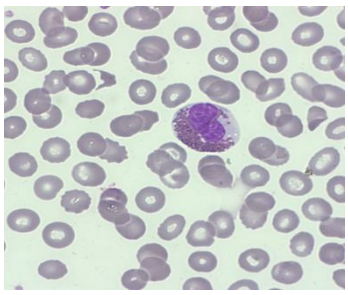
Polycythemia vera

This is the most common myeloproliferative disorder. It is characterised by the excessive production of normal red blood cells and may result in excessive production of white blood cells and platelets over time. Symptoms include itching and classically a burning sensation in hands and feet known as erythromyalgia. This is caused by an increased platelet count, or increased stickiness of the platelets causing tiny clots. Patients with PV are susceptible to thrombosis due to red blood cell-induced hyper viscosity; heart attack, stroke and DVT are often an early indication.

Diagnosis may include splenomegaly or enlarged liver due to migration of the involved hematopoietic stem cells from the marrow (extramedullary hematopoiesis). Laboratory findings would include raised Hb and Hct, possible raised WBC and Platelet count and a raised ESR. A mutation in the JAK2 kinase is strongly associated with PV, and this test would be helpful in the diagnosis and target therapy for the future.

Hypereosinophilic Syndrome

This is a rare disorder due to mutations in proteins which stimulate eosinophil production. Eosinophils, when inappropriately activated, infiltrate tissue and release proteins and inflammatory mediators that damage organs such as the heart, lungs intestines, nervous system and blood vessels as well as causing organ enlargement. Symptoms include skin lesions, pulmonary disease, neuropathy and atopic eczema.



Film from Hypereosinophilic patient

If left untreated, HES is progressive and fatal. In order to correctly diagnose, the most important being the blood test and film, where an eosinophil count >1.5x10^9/L. The blood film can sometimes show normal (although raised) eosinophils but morphological abnormalities, such as less granulation and size can be noted.

Treatment to reduce eosinophil levels consists of Corticosteroids. Occasionally splenectomy and prosthetic heart valves may be indicated.

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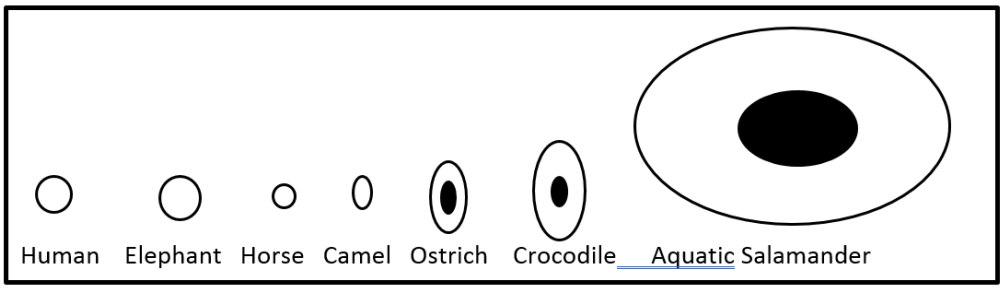
Red Cells characteristics in nature

Normal human red cells are characterised by being biconcave discs with no nucleus and a normal Mean Cell Volume (MCV) of 80 – 100 fl. This is not the same in the natural world with the MCV being totally different and in the case of birds, reptiles and fish contain a nucleus. Amphibian red cells are massive and may be up to 500 fl in volume whereas in goats the mean MCV is approx. 20 fL. The red cell shape is also different e.g. camels having elliptical cells which may protect from the effect of dehydration and some species of Deer display sickle shaped red cells. See tables below for examples of MCV amongst species:

Species	Dog	Cat	Horse	Cow	Sheep	Camel
MCV (fl)	60 - 72	39 - 50	36 - 52	40 - 60	25 - 40	20 - 28
Species	Goat	Pig	Mouse	Rat	Rabbit	Penguin
MCV (fl)	16 -25	50 -56	42 - 56	56 - 62	65 – 76	238

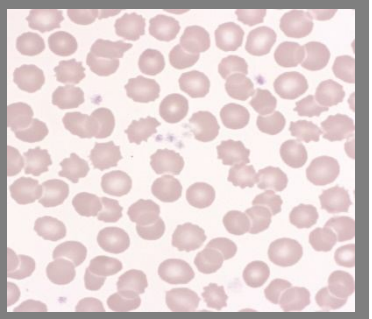
Species	Buzzard	Eagle	Owl
MCV (fL)	151 -171	160 - 184	145 - 216
Species	Parrot	Ostrich	Iguana
MCV (fL)	137 - 155	174	163 - 305

See below for an illustrative guide to red cells volume in various animals



This Month's Top Morphology Tip

Always check the date **on a sample** before making a film. EDTA changes in a sample can be seen as little as <24hrs post venepuncture. Samples collected in EDTA and stored at room temperature can show degenerative changes in leucocyte and erythrocyte morphology. Changes that occur due to a delay in slide making can result in misinterpretation of the blood film, e.g. -segmented neutrophils could be misidentified as young neutrophils, with the differential showing a left shift - Crenated red cells (see right) can resemble acanthocytes.



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