Last Month's Slides

September 2020 Slide Summaries

Slide 1
Atypical Lymphocytes and occasional blast cells seen. Some Giant platelets. Crenated red cells

Slide 2
Generally normal film – some platelet aggregates

Slide 3
Neutrophil toxic granulation, eosinophilia

Slide 4
Leuco/erythroblastic picture, polychromasia and anisocytosis. Neutrophilia

Slide 5
Acanthocytes, spherocytes, some basophilic stippling.

Slide 6
Hypersegmented neutrophils

Monthly Digital Case study
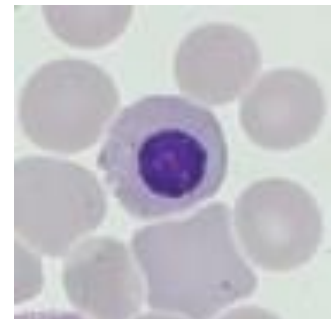## September 2020 Slide 4

Presentation

Male (44 years old)
Slide review requested by the physician, to confirm presence of erythroblasts.
Presence of erythroblasts, Neutrophilia and a Lymphopaenia.

FBC Results

|		
WBC	24 (10^9/L)	Neutrophils 88%
RBC	4.73 (10^{12}/L)	Lymphocytes 3.7%
HGB	141 (g/L)	Monocytes 7.4%
HCT	0.424 (L/L)	Eosinophil 0%
MCV	90 (fL)	Basophils 0%
MCH	29.8 (pg)	
MCHC	333(g/L)	
PLT	90 (10^9/L)	

Slide review
Leuco/erythroblastic picture. Red cells show polychromasia and anisocytosis. Neutrophilia and lymphopaenia. Some large platelets.

Diagnosis
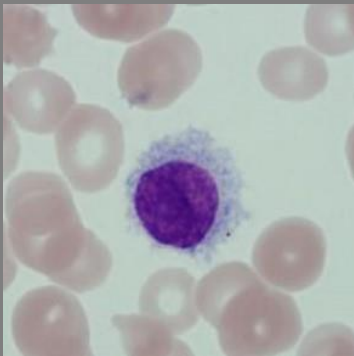No clinical details were provided, however the blood film is suggestive of Sepsis and/or an ICU patient.

QSP Quality Slide Program 2.0

Monthly Morphology Quiz

**What features can you identify this cell/cells?:**
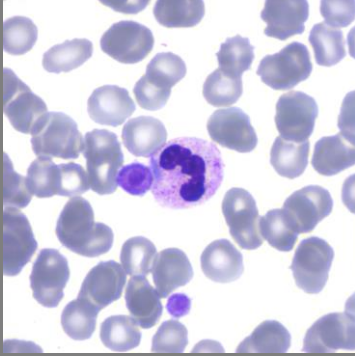
What may this collection of features be known as/seen in?

Last month's cells:

The cell is from a patient with Hairy cell leukemia (HCL). HCL is a relatively rare B-cell lymphoproliferative disease. It is characterised by abnormal large #lymphocytes with villous cytoplasmic projections that give them a distinctive 'hairy appearance.
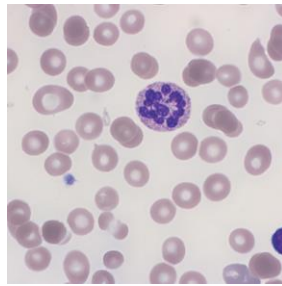
Hypersegmented Neutrophils

**An overview of laboratory findings**

Introduction

Neutrophils, in normal adults, make up for more than half of the body's circulating leucocytes. Their main function is to defend the body against pyogenic bacterial infections. A normal neutrophil will be uniform in size, with a segmented nucleus, showing fine granulation when stained. Generally, neutrophils have 3 nuclear segments or lobes, connected by chromatin strands.

Hypersegmentation

The presence of hypersegmented neutrophils is an important diagnostic feature. Neutrophil hypersegmentation can be defined as the presence of neutrophils with five or more lobes or the presence of more than 3% of neutrophils with at least five lobes.

Hypersegmented neutrophils are also known as "right shifted" neutrophils. The presence of hypersegmented neutrophils is an important diagnostic feature of megaloblastic anaemias. Hypersegmentation can also be seen in other conditions but with relatively less diagnostic significance.
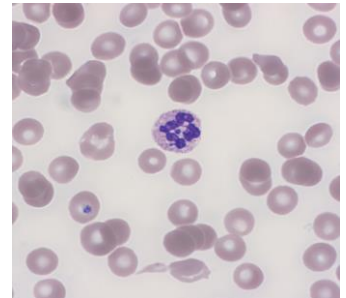
Megaloblastic Anaemia

Neutrophil hypersegmentation is one of the earliest, most sensitive and specific indications of megaloblastic anaemia, due to vitamin B12 & folic acid deficiency. In the severe form of this, one may also see red cell fragments and tear drop poikilocytes in the blood film.

The presence of Megaloblastic anaemia when looking at a blood film may be suspected from the presence of oval macrocytic red cells, poikilocytes and, as already mentioned, hypersegmented neutrophils with >5 nuclear lobes.

Other causes of Megaloblastic anaemia not due to hypovitaminosis may be caused by antimetabolites that poison DNA production directly, such as some chemotherapeutic or antimicrobial agents e.g. azathioprine or trimethoprim.

Other Indications

Hypersegmented Nuetrophils can also be seen in:
- Hereditary neutrophil hypersegmenation- usually >50% of neutrophils in the blood film are hypersegmented. Check family history also.
- Myelokathesis
- MDS- the intermediate state between developing AML (10-20% blasts seen in film
- Myeloproliferative disorders
- Use of chemo/cytotoxic drugs

The presence of hypersegmented neutrophils, with five or more nuclear segments, is an important morphological feature to observe in the blood film. The existence of these cells can be therefore be viewed as an indication of various different conditions mentioned above, and is a valuable morphological feature when investigating a blood film.

QSP Quality Slide Program 2.0

QSP 2.0 News
Focus on the Expert report

Along with many improvements in QSP 2.0, the format of the expert report has been improved to make it easier and quicker to follow the progress of users as they view slides.

The expert report, as the name implies, can only be created by a user with an Expert access level and is the only report from which you can see the performance of multiple assistant users.

The expert can quickly identify those users underperforming and see the reason for the user underperforming e.g. misclassifying blasts, nucleated red cells, myelocytes etc.

The expert report is split into 3 sections, the first section gives an overview of the performance of each user and details the number of incorrectly classified cells :

User Name	Cells	Correct	Incorrect	Accuracy
test	110	108	2	0.98
train1	110	107	3	0.97
train2	110	109	1	0.99

Accuracy is an indication of the number of misclassified cells, thus enabling the expert user to quickly see individual user's overall performance.
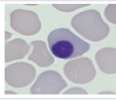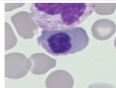
The next section is a more detailed view of how the users performed in classifying individual cell types:

User Name	Sensitivity	Precision	TP	FP	TN	FN	#	# Ref.
Mature leukocytes								
Lymphocytes								
test	1.00	1.00	3	0	107	0	3	3
train1	0.67	1.00	2	0	107	1	2	3

Sensitivity and precision is calculated using the true positive, false positive, true negative, false negative figures where:

- A value of 1 for sensitivity and precision means the user has not misclassified any cells
- A value of less than 1 for sensitivity means that the user has classified one or more cells as a cell type other than the correct one
- A value of less than 1 for precision means that the user has classified one or more cells incorrectly as that cell type.

The final section shows a picture of every misclassified cell along with the name of every user and what cell type the user classified that cell as. It is therefore easy to see if certain users are persistently misclassifying the same cell types, e.g. nucleated red cells as lymphocytes, and if there is a good reason why the cell may have been misclassified. Cells which several users have misclassified could indicate that the cell was incorrectly classified by the expert as in the case of cell 72 below where 3 assistant users classified the cell as a Monocyte and the Expert classified it as a Lymphocyte.

Misclassified cells			
Cell ID	False Class	True Class	Cell
9	Lymphocytes (train6)	Normoblasts, Erythroblasts	
16	Lymphocytes (train6)	Normoblasts, Erythroblasts	

The expert report enables the performance of staff to be quickly evaluated and therefore time can be spent on users who didn't perform as well as expected. The report can then be used as a valuable training tool to explain to users the reasons why the cell is classified as it is.

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