ISSUE
44
February
2024

QSP Monthly

NEWSLETTER OF THE QUALITY SLIDE PROGRAM

HORIBA

This issue

February Slides

Slide 1
Nothing to report.

Slide 2
Intensive care unit.
Anaemia.
Neutrophilia + myelemia.
Thrombocytopenia.
cells (+++).
Anaemia.
Echinocytes/Burr
Neutrophilia + myelemia.
Thrombocytopenia.
Expert's comment: Echinocytes/Burr cells (+++) => probable metabolic cause.

Slide 3
See case study opposite.

Slide 4
Presence of a few activated lymphocytes (large lymphocytes with +/- irregular form and basophilic cytoplasm)?
Expert's comment:
See liver assessment (transaminase assay).

Slide 5
Pneumology unit.
Multiple analyser flag on leukocyte differential.
- Leukocytosis. Neutrophilia.
- Hyposegmented neutrophils (band cells)/granular immature cells.
- Monocytosis, Eosinophilia.
- No blastosis associated with myelemia.
Presence of rare erythroblasts and some macro-platelets/giant platelets.
Expert's comment:
Paraneoplastic syndrome (PNS) to look for first.

Slide 6
Intensive care unit.
Analyser flag on leukocyte differential.
- Macrocytic anisocytosis (+).
- Leukocytosis.
- Neutrophilia.
- Discreet myelemia.

Monthly Digital Case Study Presentation
February 2024, Slide 3

FBC Results

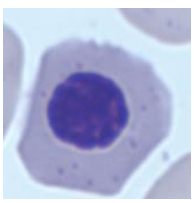
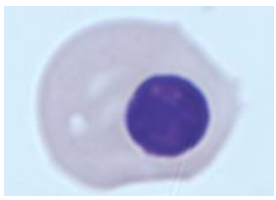
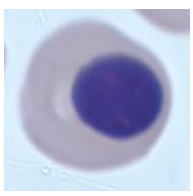
WBC 2.85* (10^3/mm3)	Neutrophils 60.9%
RBC 2.37* (10^6/mm3)	Lymphocytes 28.1%
HGB 8.2* (g/dL)	Monocytes 9.4%
HCT 24.4* (%)	Basophils 1.6%
MCV 103 (fL)	Normoblasts, Erythroblasts 58
MCH 34.6 (pg)	Large Platelets 6
MCHC 34.6 (g/dL)	
PLT 127 (10^3/mm3)	

Clinical Details
Haemodialysis unit.

Slide Information
Leukopenia. Anaemia. Anisocytosis (+++). Hypochromic RBCs (+/-). Punctated RBCs/Howell-Jolly bodies (+). Erythroblastosis (acidophilic erythroblasts). Presence of macroplatelets.

Expert's comments: Punctated RBCs/Howell-Jolly bodies (+): Patient with splenectomy. Hypersegmented neutrophils: Patient on hydroxyurea? Pathology of red blood cells: Abnormal Hb?

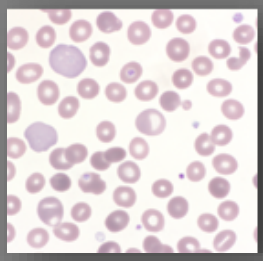
Nucleated Red Blood Cell (NRBC) Erythroblasts

QSP Quality Slide Program 2.0

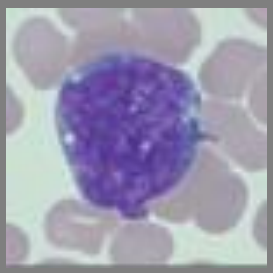
Cell Quiz

Can you name a condition where this red cell picture would be seen?



Last Month's Quiz

Can you name the cell below?



Right answer:
Blast cell

Bibliography

Erythropoiesis: insights into pathophysiology and treatments in 2017

Diagnostic Value and Prognostic Significance of Nucleated Red Blood Cells (NRBCs) in Selected Medical Conditions

Frequency of Nucleated Red Blood Cells in the Peripheral Blood of ICU-Admitted Patients

Editorial Team

Kelly Duffy
Andrew Fisher

About us

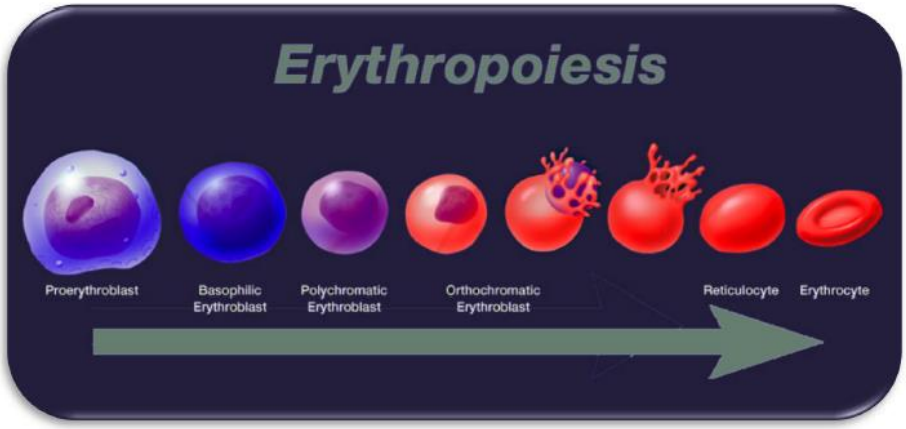
HORIBA UK Limited
Kyoto Close, Moulton Park
Northampton, UK, NN3 6FL

HORIBA Medical
Parc Euromédecine, Rue du Caducée, BP 7290, 34184
Montpellier Cedex 4, France

www.horiba.com/medical

NRBC Quick Overview

Nucleated red blood cells are early precursors of red cells and in normal healthy adults are rarely seen outside of the bone marrow. In a process known as Erythropoiesis various cytokines and growth factors cause progenitor cells such as the Pluripotent haemopoietic stem cells to form committed erythroid progenitor cells – burst forming unit – erythroid (BFU-E). BFU-E gives rise to a more mature progenitor cell the colony forming unit erythrocyte (CFU-E). The CFU-E is extremely responsive to erythropoietin and causes the CFU-S to produce the erythroid precursor known as the Proerythroblast. The proerythroblast is a large cell, with a large round nucleus, finely stippled cytoplasm, deeply basophilic cytoplasm and one or more nucleoli. As the cell matures it decreases in size along with changes to the size of the nucleus and alongside changes to the cytoplasm (see below). After the cell reaches the late (orthochromatic) erythroblast stage, the nucleus is extruded from the cell producing a reticulocyte, the reticulocyte is then released into the blood stream where it matures to a red cell within 24 - 48 hours. It is remarkable to think that every second the human body generates 2 million red cells.



Manual counting of NRBC

The traditional way of enumerating Nucleated Red Blood cells and therefore providing a Corrected White Cell Count (most automated cell counters produce a Total Nucleated Cell Count (TNC) that may include NRBC as well as WBC) is when performing the differential and the total number of NRBC seen per 100 WBC is counted. The Corrected WBC may then be calculated with the following formula:

Corrected WBC = TNC x [100 / (NRBC +100)]

Automated analysers like the HORIBA Yumizen series of analysers are able to enumerate NRBC on every sample with a high degree of accuracy.

In adults the presence of NRBC is rare and if found in numbers has been shown to indicate the presence of numerous diseases e.g. solid tumours, haematological malignancies, haemolysis, hypoxia, nutritional anaemia, blood loss, septicaemia, myocardial infarct, chronic lung disease, and myelodysplasia. In studies it has been shown that the presence of NRBC in the peripheral blood of adults is a marker for poor prognosis.

NRBC are found in healthy neonates and disappear after approx. one month of life.