IEQAS
Irish External Quality Assessment Scheme

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IEQAS Annual Conference 2021
Notes for Blood Cell Morphology Workshop

BCM131

CLINICAL DETAILS: 87 year old male. WCC = 87 x 10 9/L, Hb = 7.1 g/dL.

DIAGNOSIS: Acute Myeloid Leukaemia with monocytoid differentiation (Acute Myelomonocytic or Acute Monocytic Leukaemia)

ADDITIONAL COMMENT: Given patient's age and co-morbidities, a bone marrow biopsy was not done.
Red cells showed moderate anisocytosis and some tear drop cells.
The main abnormalities are seen in the white cell lineage. Only a very few neutrophils are seen. Although there are a 1 or 2 dysplastic neutrophils, without a bone marrow biopsy it's not possible to comment on MDS changes in this case.
Blasts are mainly monoblasts, with a minor population of myeloblasts. The rest of the cells are promonocytes and some mature monocytes. Promonocytes are counted as blasts.
Blood film features are more in favour of Acute Monocytic Leukaemia. However, AML-M4 cannot be ruled out without a BM biopsy. One laboratory mentioned FLT-3 and NPM1 mutation. Characteristic morphological findings in these situations are not seen at least in the slides I have examined. Myeloid gene panel was not done. It's important to identify this case as Acute Leukaemia.
85% of our participants either diagnosed this as Acute Monocytic/Monoblastic/Myelomonocytic Leukaemia or mentioned these in their differential diagnoses. Just above 60% of the participants have offered a diagnosis of Monocytic/Monoblastic or Myelomonocytic Leukaemia. Only 2 participants didn't offer a diagnosis. 2 other laboratories have diagnosed this case as CMML.
Overall, this was a very good morphological exercise.

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BCM132

CLINICAL DETAILS: 42 year old male. WCC = 4.65 x 10 9/L, Hb 14.3 = g/dL.

DIAGNOSIS: Plasmodium malariae

ADDITIONAL COMMENT: A number of laboratories mentioned about the poor quality of the blood film. The purpose of this BCM morphology exercise is to circulate blood films that will improve morphology knowledge among the laboratory scientists who should suspect certain urgent/life threatening conditions and contact clinicians as appropriate without further delay.
Although the quality was not good, this blood film shows all stages of P malariae. Except for 3 participants, laboratories diagnosed this case as malaria parasites. Just above 60% of the participants either offered a diagnosis of P malariae or mentioned P malariae in the differential diagnosis. Just above 20% of the laboratories didn't give a specific type. One participant diagnosed this case as P ovale.
A few thick densely stained ring forms were seen in red cells which are not enlarged. Both young and old Trophozoites, including Bird's eye and band forms, were present in significant numbers. On careful, detailed examination, a small number of immature and mature schizonts can be seen. A significant number of Gametocytes were seen throughout the blood film. They were small, round or oval and compact with eccentrically placed nuclei and prominent dark-brown pigments.
This film was made before starting on anti-malarial therapy.
We acknowledge that the film quality was not optimal, however IEQAS did ensure that malaria parasites were visible in all films. It is critical that Medical Scientists identify malaria parasites if present, and rule out P. falciparum, which is a life-threatening condition. If malaria parasites were not identified by your laboratory, we suggest a review of the film and staff training if appropriate.

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BCM133

CLINICAL DETAILS: 24 year old. WCC = 11.59 x 10 9/L, Hb = 8.1g/dL.

DIAGNOSIS: Beta Thalassaemia Minor

ADDITIONAL COMMENT: The most obvious feature in the blood film is hypochromic microcytic red cells. The majority of our participants missed this important feature, except for two laboratories. This can very easily happen if the blood film was not screened under low power.
Given this patient was pregnant at the time of this film was made, changes are somewhat different to straight forward Beta thalassaemia minor. Basophilic stippling and tear drop cells are very well described in this condition. There are some target cells, mild polychromasia and a few nucleated red cells.
Although Beta thalassaemia minor is a mild condition, patients can become anaemic at the time haemopoietic stress, such as pregnancy. MCV tends to increase during pregnancy. However this increase is less marked in thalassaemia patients. Slightly prominent neutrophil count, mild left shift and toxic granulation in neutrophils, can be explained with pregnancy.
MCV-68.7, MCH-20.6
Hb Electrophoresis: HbA1-81.7%, HbF 6.2%, HbA2=5.0%
Only 3 participants offered a diagnosis of a Haemoglobinopathy. Out of the 3 laboratories one participant mentioned beta thalassaemia minor. One other laboratory mentioned about thalassaemia major.
The majority of our participants either offered a diagnosis of Myelofibrosis or included Myelofibrosis in their differential diagnosis. Megaloblastic anaemia & lead poisoning were mentioned by a few participants.
Vitamin B12 & iron studies were normal. Folate was >23.
It is very important to remember that tear drop poikilocytosis can be seen in many other conditions other than Myelofibrosis.
The degree of tear drop poikilocytosis in this slide is more marked than in straight forward Beta thalassaemia minor.

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BCM134

CLINICAL DETAILS: 13 year old. WCC = 16.09 x 10 9/L, Hb = 6.5 g/dL.

DIAGNOSIS: Acute Myeloid Leukaemia

ADDITIONAL COMMENT: AML occurs at all ages but becomes increasingly common with advancing age.
This film showed abnormalities in all 3 cell lines.
Red cells show marked anisocytosis with macrocytes, both oval and round forms. Occasional polychromatic cells are seen but are not high enough to call a co-existing haemolysis. Some of the nucleated red cells are late megaloblasts which indicate an element of megaloblastic maturation.
Major abnormalities are seen in the white cell morphology.
There is a significant number of pleomorphic blasts which vary in size, nuclear pattern and nucleocytoplasmic ratio. Distinct nucleoli are seen in a majority of the blasts, with a few blasts showing granules and Auer rods. Cytoplasmic blebs are seen in some of the blasts, and cytoplasmic vacuoles are seen in a few blasts. Chromatin patterns vary from very fine chromatin to slightly more mature pattern. There are some dysplastic neutrophils seen.
Platelets are low.
All the participants have mentioned important morphological features. Only 2 participants did not offer a diagnosis.
All the rest diagnosed this case as at least acute leukaemia. Nearly 50% of the participants diagnosed this case as ALL. Just above 20% of the participants offered a diagnosis of AML. Another 22% of the participants went for acute leukaemia suggesting either AML(50%) or ALL(50%).
Flowcytometry of blood and bone marrow confirmed AML.
This was a very successful morphology exercise.

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BCM135

CLINICAL DETAILS: 57 year old male. WCC = 10.65 x 10 9/L, Hb = 7.1 g/dL.

DIAGNOSIS: Autoimmune Haemolytic Anaemia (AIHA-Warm Type)

ADDITIONAL COMMENT: The main abnormalities are seen in the red cell lineage. Red cell anisocytosis, polychromasia and microspherocytosis are the predominant features which will lead to the diagnosis of Haemolytic Anaemia.
Other red cell abnormalities which were listed by a few participants include red cell agglutination, Howell Jolly bodies, tear drop cells, NRBC and basophilic stippling. Howell Jolly bodies simply indicate hypo-functioning of the spleen. At the time of marked haemolysis, features of hyposplenism are seen as the spleen is not able to handle the workload. Occasional NRBC and mild left shift are seen. Both these features can be explained with a haemolytic process.
There is no evidence of B12 or Folate deficiency or features of MDS.
The broad diagnosis here is Spherocytic Haemolytic Anaemia. Given this patient did not have a previous history of haemolytic process, DCT was done. This was strongly positive for IgG.
Interestingly one of our participants has mentioned about Blister cells. In fact, there are a few of them but the aetiology is not clear. A sample was sent for G-6PD levels.
85% of our participants have diagnosed this case as a form of Haemolytic Anaemia.
Just over 35% of our participants have offered a diagnosis of AIHA.
2 laboratories went for the warm type.
25% of the participants have diagnosed this case as Hereditary Spherocytosis.
Interestingly one of our participants has mentioned about Blister cells. In fact, there are a few of them but the aetiology is not clear. A sample was sent for G-6PD levels.
It is very important to identify all the relevant morphological features.
Overall, this case was discussed very well by our participants.

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BCM136

CLINICAL DETAILS: 65 year old female. WCC = 6.02 x 10 9/L, Hb = 11.4 g/dL.

DIAGNOSIS: Plasmodium Falciparum with parasitaemia <0.1%

ADDITIONAL COMMENT:
25% of our participants have diagnosed this case as Malaria and 2 laboratories have identified the species correctly. However, this slide was discussed by our participants elegantly. Of course, parasitaemia was low and the final diagnosis can be missed easily but all the important features were mentioned by the majority of the laboratories.
Fragmented red cells (Schistocytes) were very obvious, and this led to a diagnosis of Thrombotic Microangiopathy (TMA). Plasmodium Falciparum malaria can be associated with circulating ultra-large von Willebrand Multimers and ADAMTS-13 inhibition. There was increased rouleaux formation. Also, small red cell agglutinins were present. Plasmodium Falciparum trophozoites were seen in the red cells. Howell-Jolly bodies were mentioned by a few participants. A few of them were H-J bodies. Others could have been chromatin dots. Target cells and stomatocytes were seen in significant numbers. White cells showed a mild left shift with a few myelocytes and metamyelocytes. Toxic granulation in neutrophils was very obvious. However, there were a few hypogranular and Pseudo Pelgar Huet forms. This could be as a result of the infection and medication related. A few reactive lymphocytes were also seen. This is not an unusual phenomenon.
Interestingly there were a few platelet abnormalities including clumping, large platelets and giant granular platelets. These features are important to mention in the report and were mentioned by almost all the participants.
This case illustrates abnormal features in all 3 lineages and gives an overall picture of the laboratory reporting which was done very well by all the participants.