RBC is most and Lymphocyte Least Commonly Effected Hematological Cell in for Acute Aluminium Phosphide Poisoning (AALPP) Patients

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Abstract

Aims & Objectives: Exclude the EDTA induced storage artifacts. Identify and excludes the misinterpretation of peripheral blood smears examination. Identify the EDTA induced RBC & WBC morphological storage artifacts. Identify the EDTA induced platelets related artifacts.

Material & Methods: Blood was collected in a sterile EDTA containing tube and processed following our established laboratory protocol. A complete blood counting including HB%, PCV, Red cell indices, platelet count and total white cell count and differential was done by Automated blood cell counter and peripheral blood smear examination then a sterile EDTA containing blood sample tube stored at room temperature. The all cell count indices including RBC, WBC count with differential along with morphological storage artifacts and platelet count with storages artifacts, was further confirmed by manual oil immersion smear study method. Peripheral smears study was done with field A and B stain and leishman stain.

Conclusion: EDTA cause the various storage artefacts encountered on peripheral blood smear examination when smear prepared from prolong stored sterile EDTA containing blood sample tube at room temperature. EDTA cause RBC, WBC morphological artifacts and platelets related artifacts. These artifacts lead to various misinterpretation of peripheral blood smear examination so exclude them.

Keyword: Creanated RBC, Nuclear lobe, Platelets aggregation.

Material & Methods

Study Area and Design- This present study was conducted at the Advanced institute of medical sciences and research Bhopal and associated referral hospital Bhopal mp. The study was designed as a observational retrograde with prospective hospital based study over a period of time from 2016.

Ethical Consideration- Blood was collected in a sterile EDTA containing tube and processed following our established laboratory protocol then generates the report of each patient. Take informed consent was obtained from all study participant for use of your blood sample for medical research after doing physician request investigating and generate the report.

Patient's Selection Criteria- The study target random selection of routine complete blood count patient. We include both OPD and IPD patients with all age groups, male and female both gender for study. Sample size is 100 patients.
Laboratory investigations Blood was collected in a sterile EDTA containing tube and processed following our established laboratory protocol. A complete blood counting including HB%, PCV, Red cell indices, platelet count and total white cell count and differential was done by Automated blood cell counter and peripheral blood smear examination then a sterile EDTA containing blood sample tube stored at room temperature. The all cell count indices including RBC, WBC count with differential along with morphological storage artifacts and platelet count with storages artifacts, was further confirmed by manual oil immersion smear study method. Peripheral smears study was done with field A and B stain and leishman stain. Smear prepared from prolong stored sterile EDTA containing blood sample tube at room temperature.

Complete Blood Count (CBC) and Peripheral Smear

Materials
1. Purple vacutainer tube or capillary collector (EDTA) ethylenediaminetaacacetate
2. Slides and blue capillary tube
3. Needle or lancet
4. Vacutainer holder
5. Alcohol swab
6. Cotton balls
7. Absorbent materials
8. Slide case

Procedure
Specimen is collected into EDTA (purple) vacutainer. (5 or 7ml volume) Preparation of peripheral blood smear from prolong stored sterile EDTA containing blood sample tube at room temperature.

Step 1. A small drop of venous blood is placed on a glass microscope slide, using a glass capillary pipette.

Step 2. A spreader slide is positioned at 45° angle and slowly drawn toward the drop of blood.

Step 3. The spreader slide is brought in contact with the drop of blood and is being drawn away.

Step 4. The spreader slide is further pulled out, leaving a thin layer of blood behind.

Step 5. The blood smear is nearly complete.

Step 6. End result will be a glass slide with a well-formed blood film. After drying for about 10 minutes, the slide is fixed in methanol & stained with field A and B stain.

A well-made peripheral smear is thick at the frosted end and becomes progressively thinner toward the opposite end. The “zone of morphology” (area of optimal thickness for light microscopic examination) should be at least 2 cm in length. The smear should occupy the central area of the slide and be margin-free at the edges.

Hematological examination- Hematological examination including HB%, PCV, Red cell indices, platelet count and total white cell count with differential count should be done on peripheral smears stained with field A and B stains.

Observation & Discussion
Organ phosphorus toxicity induced RBC changes.

<table>
<thead>
<tr>
<th>RBC changes</th>
<th>Misinterpretation on peripheral blood smears examination</th>
<th>Total Cases (n=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No.</td>
</tr>
<tr>
<td>Acanthocytes</td>
<td>RBC crenations</td>
<td>39</td>
</tr>
<tr>
<td>Spherocytes with central pallor</td>
<td>Heredity Sherocytosis</td>
<td>13</td>
</tr>
<tr>
<td>Polychromatophilic cells</td>
<td>Hemolytic evidence</td>
<td>11</td>
</tr>
<tr>
<td>Dacrocytes / Boat shoped rbc</td>
<td>Hbsc Disease</td>
<td>10</td>
</tr>
<tr>
<td>Shistocytes</td>
<td>Hemolytic Anemia</td>
<td>08</td>
</tr>
<tr>
<td>Target cells</td>
<td>Liver disease</td>
<td>07</td>
</tr>
<tr>
<td>Echinocytes / Burr cell</td>
<td>Ueaemia</td>
<td>05</td>
</tr>
<tr>
<td>Rouleaux formation</td>
<td>High plasma protein concentration</td>
<td>03</td>
</tr>
<tr>
<td>Degenerated erythrocytes</td>
<td>Poor smear / store sample</td>
<td>04</td>
</tr>
</tbody>
</table>
WBC changes

<table>
<thead>
<tr>
<th>WBC cells</th>
<th>WBC Changes</th>
<th>% (n=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutrophils</td>
<td>Degeneration</td>
<td>44.00%</td>
</tr>
<tr>
<td>Monocytes</td>
<td>Nuclear under goes disintegration</td>
<td>24.00%</td>
</tr>
<tr>
<td>Eosinophils</td>
<td>Degeneration</td>
<td>08%</td>
</tr>
<tr>
<td>Lymphocyte</td>
<td>Dismorphism</td>
<td>02%</td>
</tr>
</tbody>
</table>

Platelets

<table>
<thead>
<tr>
<th>platelets aggregation ( Pseudo thrombocytopenia )</th>
<th>% (n=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platelets aggregration</td>
<td>(7.00%)</td>
</tr>
</tbody>
</table>

Extended Mantel-Haenszel test for trend of chi -Squares test. Chi-sq. test X2 Value =0.873 [DF = 1] 2-sided P = 0.350 For trend in a given direction: P = 0.175

Conclusion

EDTA cause the various storage artefacts encountered on peripheral blood smear examination when smear prepared from prolong stored sterile EDTA containing blood sample tube at room temperature. EDTA cause RBC, WBC morphological artifacts and platelets related artifacts. These artifacts lead to various misinterpretation of peripheral blood smear examination so exclude them.

References

