Cytoplasmic fragments of leukaemic cells masquerading as platelets in an automated haematology analyser

The accuracy of platelet counts has been a major achievement of automation in haematology laboratories. However, a large array of interfering substances can erroneously increase automated platelet counts. Thrombocytes, lymphoblasts, and a variety of other particles with a similar size to platelets may be overlooked in the presence of a spurious increase in the platelet count. Therefore, automated parameters require careful interpretation with respect to the clinical profile of the patients, along with blood smear examination.

A 10-year-old boy presented with fever and lethargy of two week’s duration. He was pale, and had cervical and axillary lymphadenopathy, with moderate hepatosplenomegaly. The automated complete blood count carried out on an Advia-60 machine (Bayer, Baroda, India), a three part differential analyser, revealed a haemoglobin of 99 g/litre, a total leukocyte count of \(273 \times 10^9/\text{litre}\), and a platelet count of \(156 \times 10^9/\text{litre}\). The differential count showed 92% blasts with a platelet count. No platelet flags were generated. Samples that are not flagged, but samples with abnormal characteristics that are flagged. Although automated platelet counts are generally precise even at low numbers, inaccuracies can be introduced when analysing blood with unusual characteristics. Extreme microcytosis of red blood cells as seen in HbH disease, microangiopathic haemolytic anaemia, and red cell fragmentation in burns can cause spurious rises in automated platelet counts. Occasionally, increased platelet counts can be caused by other particles with a similar size to platelets.

These include fragments of white blood cell cytoplasm—and this phenomenon has been documented in acute leukaemia, hairy cell leukaemia, and lymphomas—or extraneous particles such as bacteria, fungi, or yeast. Technological advancements in automated haematology analysers have seen the demise of the age old practice of a blood smear examination. The accuracy of the automated haematology analysers has been demonstrated. However, blood smear examination remains a vital tool in haematology reporting. This is especially true for samples with abnormal characteristics that are flagged. Samples that are not flagged, but still show qualitative abnormalities are few and far between, and do not justify a blanket blood smear review.

Awareness of spurious automated results and a review of peripheral blood smears in samples from patients in whom results do not conform to the clinical profile can assist greatly in preventing inappropriate management.

Cytoplasmic blebs being shed off from a blast (insert).

Figure 1 - Non-nucleated basophilic fragments of lymphoblasts. Note that these fragments have a size comparable to that of platelets. Leishman stain; original magnification, \(>1000\). Note the cytoplasmic blebs being shed off from a blast (insert).

Some of them in the process of being shed off, thereby supporting our speculation.

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Sufficient data on spurious results related to automated haematology analysers now exist. There is a need for users of automated data to be aware of the potential sources of error on these otherwise reliable instruments.

References


BOOK REVIEW

Clinical Chemistry. 5th Edition


This well known textbook now appears in its 5th edition with an additional writer. The added colour has helped to produce a very readable book, with well laid out text and useful diagrams. It covers widely the curricula of medical students as well as clinical scientists and other health care professionals. The use of case histories gives the book clinical relevance and the tables provide clear aide mernes for exam candidates. One criticism would be that I would like to have seen more detailed descriptions of how to investigate patients with biochemical problems.

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CALENDAR OF EVENTS

Diagnostic Histopathology of Breast Disease
9-13 May 2005, Hammersmith Hospital and Imperial College, London, UK

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