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. Thrombocytopenia, due to either splenic sequestration or bone marrow infiltration, can 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 leucocyte count of 273 x 10⁹/litre, and a platelet count of 156 x 10⁹/litre. The differential count showed 92% blasts with morphology suggestive of T cell type. Cytochemical studies confirmed their lymphoblastic origin. The possibility of T cell acute lymphoblastic leukaemia was suggested in view of the older age of affection, an unusually high white blood cell count, and the characteristic blast morphology. However, the platelet count on the peripheral blood smear was 30 x 10⁹/litre, a discrepancy of 126 x 10⁹/litre compared with the automated platelet count. No platelet flags were generated. In addition, the blood smear showed many rounded and irregular basophilic anucleate structures (fig 1), with an approximate size range similar to that of platelets. These were thought to be cytoplasmic fragments of circulating blasts responsible for the falsely raised platelet count. A few blasts also showed cytoplasmic blebs (fig 1, insert), some of them in the process of being shed off, thereby supporting our speculation.

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 review for most samples. As evidence on spurious data generated by these instruments increases, blood smear examination is regaining its importance as 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.

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 curriculum needs 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

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