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Quantification of red blood cell fragmentation by automated haematology analyser XE-2100

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The extent of red blood cell fragmentation in peripheral blood is useful for diagnosis and follow-up in many diseases, e.g. haemolytic uremic syndrome, transplantation-associated thrombotic microangiopathy (BMT-TMA). However, this quantification still relies on manual counting of fragmented red cells on blood smears. We have developed a quantification system by gating a fixed area of fragmented red blood cells (Gate 1) on an automated haematology analyser (XE-2100, Sysmex Co., Kobe, Japan). The fragmented red cell percentage (FRC%) calculated with this system, from 100 samples, was highly correlated with the manual count ($r=0.902$, $P < 0.0001$). Because microcytic anaemia specimens usually occupy a lower position on the XE-2100 scattergram, with microcytic cells overlapping Gate 1 and causing a spuriously high FRC% calculation, a supplementary gate (Gate 2) was added. Using the particle number in this gate as well as in Gate 1, a revised method for such samples was developed and its validity confirmed (revised FRC% correlated with a manual count for 10 subjects ($P < 0.001$). Because this gating system can be programmed on any XE-2100, it is likely to prove useful for accurate quantification of red blood cell fragmentation and for the monitoring of the development of BMT-TMA.