The Scratch Test

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A 47-year-old anicteric patient with plasma cell myeloma was noted to have 9660 mg/dL of monoclonal immunoglobulin G in her serum. More than 90% of her bone marrow cellularity was composed of sheets of atypical, nucleated, and multinucleate plasma cells. Her peripheral blood smear showed red blood cell rouleaux formation (Figure), which prohibited the accurate automated measurement of her red blood cell indices and interfered with her blood group determination and cross-matching in polyethylene glycol before blood transfusion. The high concentration of paraprotein also resulted in a noticeably homogeneous basophilic stained background of her peripheral blood smear, readily demonstrated after making a scratch on the slide and comparing the abnormally stained proteinaceous material to the clean colorless background of the slide. The increased blue coloration of the blood film was also observed on gross examination of the stained glass slide. This phenomenon is not pathognomonic of plasma cell myeloma but indicates a hypergammaglobulinemia that may be due to either a paraprotein or reactive increase in immunoglobulins. In some cases, this appearance can interfere with an assessment of morphologic detail. To prepare films free of this artifact, it may be necessary to dilute the blood sample in isotonic saline. The M-protein in this case also resulted in pseudohyponatremia and an artefactually elevated total bilirubin level (18.6 mg/dL [318 µmol/L]). Although paraproteins may commonly interfere with automated blood cell counts and electrolyte measurements, their interference with total bilirubin is the result of an unusual idiosyncratic reaction between the M-protein and the specific analytic method used. As occurred in this case, spurious hyperbilirubinemia from paraprotein interference may cause clinical confusion.

References