ANSWER TO PHOTO QUIZ (PAGE 88)

NEUTROPHIL HYPERSEGMENTATION IRONED OUT

DIAGNOSIS

The manual blood count revealed rouleaux formation, anisochromasia, anisoplania, hypochromasia, polychromasia, but no reticulocytosis. Further, 18% of all neutrophils showed five or more segments, which is designated as neutrophil hypersegmentation; one neutrophil had eight segments (see *figure 1*).

Thalassemia was considered because of patient's descent, but his haemoglobin concentration had been 8.1 mmol/l with an MCV of 92 fL a year before. The iron levels were low, whilst folate and vitamin B12 concentrations were normal. Hence, we established a diagnosis of serious iron-deficiency anemia.

It later became clear that he had been eating poorly for the past six months, mostly drinking tea, and had unintentionally lost weight because of significant psychosocial stress. There had been no accompanying symptoms.

Gastrointestinal evaluation revealed no macroscopic or microscopic abnormalities. PCR for *T. whipplei* was negative.

After erythrocyte transfusions, the patient was discharged with a prescription for ferrofumarate and dietary advice. At follow-up six and 12 months later, he maintained a hemoglobin-level of 10 mmol/l, with complete recovery of iron stores.

Iron deficiency anemia is characterized by a low MCV and decreased serum concentrations of iron, ferritin and decreased transferrin saturation. In this patient, neutrophil hypersegmentation was observed, traditionally a sign of folate or cobalamin deficiency, which were both excluded in this patient. Normal segmentation of neutrophils is mediated by cytoskeletal proteins, and facilitates migration.[1] Neutrophil hypersegmentation is defined as the presence of ≥ 5% five-lobed neutrophils, or any number with six or more lobes. Folates stimulate synthesis of purines and thymidylate, important elements in the formation of DNA and RNA. They also enhance methylation reactions of DNA and RNA through methionine. Therefore, folate-deficiency results in compromised synthesis of nuclear DNA. Cytoplasm and other nuclear components are nevertheless still generated, causing hypersegmentation by accumulation.[2] Heavy chain ferritin, a part of the iron-storing protein ferritin, stimulates an important step in the synthesis of thymidylate and methionine from tetrahydrofolate.[3] Low ferritin levels therefore cause hypersegmentation by impaired methionine generation. Indeed, hypersegmentation was previously observed in iron deficiency anemia by others.[4]

In conclusion, neutrophil hypersegmentation is not only a feature of folate or cobalamin deficiency, but can also be seen in iron deficiency.

DISCLOSURES

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