The prevalence of pincer and fish-shaped red blood cells in various hematologic disorders.

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Background: In peripheral blood smears the morphology of red blood cells (RBC) provides key information for differential diagnosis of anemia but also other diseases. Distinct poikilocytes such as fish- and mushroom-shaped RBC, also known as pincer cells, are rarely observed. Methods: The smears of 255 blood specimens, grouped into various types of anemia (iron deficiency anemia (IDA), ?-thalassemia minor (BTM), sickle cell disease (SCD), microangiopathic hemolytic anemia (MAHA), autoimmune hemolytic anemia (AIHA), hereditary spherocytosis (HS), hereditary elliptocytosis (HE), vitamin B12/folate deficiency (VBFD)and other diseases myelodysplastic syndromes (MDS), primary myelofibrosis (PMF), malaria, liver disease (LD)) as well as a control group, were systematically reviewed. Abnormal RBCs were counted as cells per 20 high-power fields at 1000-fold magnification. The prevalence in different diseases as compared to controls was assessed by the Mann-Whitney-U Test and potential correlations were determined by using the Spearman correlation. Results: While fish cells were found with statistically increased numbers in blood smears of patients with IDA, BTM, MDS, HE, PMF and VBFD, numbers of pincer cells were significantly elevated in IDA, BTM, MDS, HS, HE, PMF and VBFD. Accordingly, numbers of fish and pincer cells displayed a strong correlation in IDA, BTM, MDS, PMF and VBFD (p<0.01). A negative correlation of hemoglobin levels independent from the underlying disorders was shown for numbers of fish (p < 0.0001) as well as pincer cells (p < 0.0001). Conclusion: These results demonstrate that fish- and pincer cells represent an abnormal RBC morphology indicative of pathologic conditions in distinct hematological disorders. Their numbers are associated with the severity of anemia. Additionally, numbers of pincer- and fish cells strongly correlate, assuming they are either the same kind of RBC abnormality or at least share the same etiopathogenesis.