Alterations of the adaptive immunity in Hereditary Hemorrhagic Telangiectasia are associated with anemia severity

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Objectives
Hereditary hemorrhagic telangiectasia (HHT) is associated with an increased risk of bacterial infections. Experimental evidence on the immune response in these patients is sparse 1-3. Therefore, we aimed to assess the immunological changes in HHT patients and to reveal the factors predisposing to the immunological decline.

Methods
In a prospective study clinical data including the Epistaxis Severity Score (ESS) 4 were documented. The phenotypic characterization of lymphocyte subsets was performed using whole blood and standard immunofluorescence and flow cytometry technology.

Results
Clinical data and parameters of cellular immunity of 72 HHT patients and 40 controls were analyzed. We observed prominent decrease in peripheral T-lymphocyte absolute numbers with relative predominance of other cell populations (percentage of NK, B cells, neutrophils, monocytes) in HHT vs. healthy of comparable age (p < 0.05, fig. 1 A-E). Moreover, PD1+ cell numbers and memory/naïve T cells ratio were increased in this group.

Fig. 1: Hematopoetic and immune cells in patients with HHT
A-E: Comparison of immune cells in patients with HHT (HHT) and controls (Healthy). F-G: Age and ESS influence number of immune cells and cells of hematopoiesis in patients with HHT.

Blood loss and iron-deficient anemia correlated with severity of lymphopenia (ESS: R = -0.39; p < 0.05; Hb: R = -0.42; p < 0.05). Lymphopenia was associated with higher prevalence of abscesses/strokes and chronic inflammatory diseases (CID)/autoimmune diseases (AD) (abscesses/stroke: OR = 3.70, 95% CI: 0.72 - 18.84, p = 0.11; CID / AD: OR = 3.02, 95% CI: 0.84 - 10.86, p = 0.09). In a logistic regression especially the hemoglobin level and the ESS which increases with age were associated with decreased T-cells and a lymphopenia (fig. 1 F-G).

Conclusions
Adaptive immunity is reduced in HHT. Contributing factors seem to be age, epistaxis and resulting anemia. This may contribute to bacterial infections, autoimmune diseases and chronic inflammatory diseases.

Literature