Summary

Introduction. Aims

Angiogenesis is a process of formation of new vessels from the preexisting ones. It is involved in many physiological processes, at the same time, however, it is involved also in the progress of tumoral growth. Although a lot is known about angiogenesis in solid tumors where it plays a role in tumoral invasion and its metastatic potential, in hematological malignancies it has been appreciated only recently. However, the results of studies on abnormal angiogenesis in hematological malignancies are inconsistent. The tumoral angiogenesis can be studied at different levels; histologically, it is studied in the infiltrated tissues (lymph nodes, bone marrow) and quantified as microvessel density (MVD).

The aims of our study were to introduce the method of MVD quantification in the bone marrow using immunohistochemical proof of endothelial markers and then evaluate MVD in bone marrow samples in a group of patients with multiple myeloma (MM) and with chronic lymphocytic leukaemia (CLL) and compare the results with a control group of patients (CON).

Methods

Fifteen patients with MM and twenty-two patients with B-CLL were entered in the study. Bone marrow trephine biopsy was performed on all patients as a routine diagnostic procedure. Samples were fixed in Löwy fixative and embedded in paraffin. Three-micrometer-thick sections were stained with May-Grünwald-Giemsa method (MGG), hematoxylin-eosin, PAS, chloracetatesterase and Gömöri silver impregnation, and the samples were evaluated with light microscope.

The degree of angiogenesis was quantified by measuring the microvessel numbers visualised by endothelial marker fVIII. Microvessels (M) are identified as small, thin walled vessels without smooth muscle in the wall. They are usually smaller then 10μm in diammeter. In the bone marrow samples of patients with CLL we found not only the typical microvessels but also larger but still thin walled vessels. They were so prominent that we decided to involve them into the counting, calling them sinuses (S). Therefore, in the specimens of patients with CLL we counted separately microvessels and sinuses.

Angiogenesis was assesed in "hot spots", zones with the highest microvessel density and expressed by number and area of vessels per $1mm^2$ using an image analysis software LUCIA M/Comet 3.52 (LIM, Czech Republic).

Discussion

At first, we have evaluated the MVD in a group of patients with MM. So far, MM is the only hematologic malignancy, where the increased angiogenesis was confirmed and the MVD is considered as an independent prognostic factor of this disease. In our study, the number and the area of microvessels in patients with MM were increased and our results agree with those of other authors.

CLL is a typical malignancy of the hematopoietic tissue but the course and the prognosis of patients with this disease vary considerably. For this reason there is "hunting" for prognostic markers. Angiogenesis is one of the possible markers which may add more informations about the course of this disease. But so far there are only few studies published about angiogenesis measured as MVD in CLL patients and the results are inconsistent. In our study, the number and area of microvessels were increased in bone marrow of patients with CLL, but the number and area of sinuses were not. It can be concluded that there are signs of abnormal angiogenesis in bone marrow of patients with CLL but a more long-term study is needed to give informations about prognostic value of this findings.