

## **MORPHOLOGICAL DIAGNOSTICS OF INTRAVASCULAR COAGULATION**

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The lack of correlation between clinical and morphological data of intravascular coagulation (IC) is still an unsolved problem. There is no general agreement about criteria for morphological diagnosis of IC, that is why hyper- and hypodiagnosics of its different forms is quite frequent.

The aim of this paper is to propose some criteria and methods for morphological diagnostics of IC elaborated after the postmortem examination of 798 cases with morphologically confirmed IC. Fibrin was proved by staining with PTAH - quick method and immunohistochemical identification of fibrin with antifibrin immunofluorescent serum.

The analysis of the autopsy material shows that in routine pathomorphological examination IC is established only in 54,73% of the cases. In 35,67% microthrombi are observed in the visceral organs but they are not interpreted as a morphological evidence of IC. In these cases they are accepted just as a local morphological finding. In the rest 9,60% microthrombi are missed in the morphological examination or have undergone full lysis.

Our observations allow us to suggest morphological criteria and methods for optimization of pathomorphological diagnostics of IC. The first step in the diagnostic process is the search for and the finding of microthrombi in the microcirculatory bed (vessels with diameter less than 200  $\mu\text{m}$ ) of visceral organs. The lack of microthrombi in H&E-stained preparations cannot exclude fully IC. In such cases methods for selective staining of fibrin must be used. What is more microthrombi must be looked for at high magnification (10x20 or 10x40) mainly in capillaries and venules, where they are usually missed. The use of these methods is sufficient for the confirming of IC in more than 90% of the cases. In clinically manifested IC, if microthrombi are not revealed even with special staining methods (PTAH) it is necessary to attempt the immunofluorescent prove of fibrin.

The presence of microthrombi in two or more separate organs is a sufficient reason to accept the disseminated IC (DIC) - diagnosis. If microthrombi are found in just one organ, a differential diagnosis between DIC with expressed thrombolysis and local IC is necessary.

The presence of scattered micronecroses in more than one organ, haemorrhages and lung megakaryocyaemia are a proof of DIC. If they are not available local IC must be accepted which is limited in just one organ. Most difficult is the morphological diagnosis of DIC in which full lysis of microthrombi is observed. In such cases it is necessary to look for other reliable morphological signs approving of DIC.

On the basis of the morphological changes observed in different forms of IC we propose a method for morphological diagnostics of DIC with expressed thrombolysis (without microthrombi). It is based on constellation of unknown up to now or unfamiliar morphological signs in visceral organs most often affected by DIC which are available also after the lysis of microthrombi: 1) Positive staining for fibrin with PTAH of the plasma in some microvessels, mainly in the lungs and kidneys because of the presence in the plasma of soluble fibrin and ultrastructural fibrin particles formed during thrombolysis; 2) Positive staining for fibrin with PTAH of cylinders and needle-like fibres in the distal renal tubuli obtained as a result of spontaneous polymerization of fibrin monomers which have passed through the damaged glomerular capillaries; 3) Megakaryocyaemia in the microcirculatory bed of visceral organs - result of consumption of thrombocytes and stimulation of megakaryopoiesis with an increase of the number of circulating megakaryocytes in the peripheral blood. Most often an increased number of megakaryocytes is to be found in pulmonary capillaries (above 10 megakaryocytes /  $1\text{cm}^2$  tissue section) and seldom in the liver and kidneys.

The evidence of these three signs is necessary in order to accept the diagnosis DIC with expressed thrombolysis in the absence of laboratory findings for consumptive coagulopathy. In the presence of characteristic changes in the coagulation tests in order to prove the diagnosis, it is enough to find one of the two first signs in combination with megakaryocyaemia. A significant advantage of the suggested three indirect morphological signs of DIC is, that they are lasting and can be observed in the late stages of the process when the microthrombi have undergone full lysis. Morphological diagnostics of IC in routine practice may be considerably improved if there is sequence in the application of morphological methods for the prove of fibrin and recognition of indirect morphological signs of DIC.