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NESTIN EXPRESSION IN THE SUBVENTRICULAR ZONES OF PATIENTS WITH LIVER CIRRHOSIS

Ammonia neurotoxicity during liver cirrhosis (LC) associates with decline of astrocytic function, structural remodeling and cellular lost leading to brain homeostatic disruption and dysfunction named hepatic encephalopathy (HE) [1, 2]. Loss of a significant quantity of astrocytes expects restoring at least part of the lost cells. The mechanisms of adult astrocitogenesis are still elusive, but it is believed that it might be caused by limited proliferation of mature reactive astrocytes or differentiation from neural stem cells (NSCs) especially generated by neurogenic niches (NN) [3]. The main canonical NN in humans is subventricular zone (SVZ) of the lateral ventricles of the brain [4, 5]. The present study was aimed to evaluate Nestin expression, the main marker of NSCs, in the SVZs of patients suffered from LC of different severity according Child-Pugh score. The study was performed on the postmortem brain of 90 patients with non-alcoholic LC of classes A (n = 30), B (n = 30) and C (n = 30), among which 65.55 % patients had HE of I-IV grades. Control group included postmortem brains of 30 patients died from acute cardiovascular insufficiency. Nestin exression was evaluated in paraffin sections of the subventricular zones (SVZ) of the anterior and lower horns of the brain lateral ventricles in standardized fields of view of the microscope Scope A1 «Carl Zeiss» (Germany) using Videotest-Morphology 5.2.0.158 software. In SVZs, cytoplasmic Nestin immunolabeled the vascular endothelium of all vessels, which is consistent with other studies [6]. Extravascular Nestin expression was found in the astrocyte-like stem cells which in controls were mainly localized in the subventricular glial nodules (SGN) [7] and to a lesser extent in astrocytic ribbon of SVZ. Compensated and subcompensated LC were characterized by elevated Nestin immunoreactivity compared to control (by 61.36% and 208.74%, respectively) due to increased quantities of Nestin-positive astrocyte-like stem cells in astrocytic ribbons of SVZ. In these patients, areas of periventricular reparative astrogliosis in small foci of encephalolysis in the head of caudate nucleus contained clusters of astrocyte-like Nestin+. Decompensated cirrhosis was associated with substantive drop in Nestin-expression in astrocyte-like stem cells of SVZs and subventricular foci of preparative gliosis. In conclusion, NN of the lateral ventricles of patients with compensated and subcompensated LC reflect signs of activation of neural stem cells with maximally increased Nestin in subcompensated cohort. These clusters of astrocyte-like Nestin+ cells in periventricular repair foci potentially could migrate from activated adjacent subventricular niche. Considering astrocytic nature of NSCs and their astrocytic microenvironment in astrocytic ribbons [8], decompensated LC which characterized by pronounce astroastenia [9] and severe HE Grade 3-4 is associated with substantial decrease in the activity of subventricular niche cells and expected astrocytogenesis in periventricular regions.

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