SUMMARY

Meningioma is the most common non-malignant intracranial neoplasm in adults and may significantly affect patient's quality of life. Many of these tumors can invade the dura, cause peritumoral brain edema, and reach large sizes, thus resulting in unfavorable outcome. Although only ten percent of meningiomas exhibit histological malignancy, in many instances neurosurgeon remains helpless facing unexpectedly malignant clinical course of a meningioma. Recent advances in genetics and molecular biology of the cancer have much helped in unvealing some of the biological properties of meningioma, to ultimately improve the success of treatment to an even greater extent than the complete resection itself. For this reason further research on the biology of meningiomas is necessary and expected among neurosurgeons.

The aim of the study was to survey a relatively numerous group of meningiomas in order to study expression of selected molecules known as indicators of hypoxia and those mediating cell adhesion & angiogenesis. Expression of these substances were then cast at histological and clinical features of the meningioma to explore possible liasons between biological activity of these molecules and clinical properties of the tumor.

The study group included 159 patients operated at the Department of Neurosurgery, Medical University of Bialystok, with histopathologically confirmed diagnosis of meningioma. Cardinal features of a tumor, like size, location among intracranial structures, peritumoral oedema, were assessed with MR imaging. Specimens of the removed meningiomas were evaluated by an experienced neuropathologist in terms of histopathological features of the tumor according to the guidelines of the World Health Organization. Expression of adhesion factors: N-cadherin, β-catenin; VEGF and HIF-1 proteins were assessed by immunohistochemical methods using appropriate monoclonal antibodies. Statistical analysis of the collected data was performed.

The obtained results demonstrated a more pronounced expression of both examined mediators of angiogenesis (VEGF and HIF-1) in tumors of higher degree of histological malignancy. For the two examined adhesion molecules such relation was found only for N-cadherin. Expression of β-catenin within the nuclei of meningioma cells was shown to be a strong indicator of a higher histological degree of malignancy. A strong assocciacion was found between the degree of cerebral edema and expression of the adhesion and

angiogenesis factors tested in this study. Moreover, combined expression of adhesion and angiogenesis molecules significantly increased the likelihood of tumor malignancy and development of peritumoral brain edema. However, no differences were found between expression of the examined factors in meningiomas of various sizes or locations.

The results obtained in this study provide an insight into a multi-stage process leading at the same time to malignant transformation of a meningioma, and to cerebral edema. Tangled metabolic processes which finally determine essential biological properties of the tumor apparently seem to require interaction with all of the examined molecules regulating cell adhesion and neoangiogenesis. While components of these reactions have already been found in other types of malignant neoplasms, confirmation of their presence and integrity in human meningiomas was demonstrated for the first time.