Clinical significance of vasculogenic mimicry in human gliomas.

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Abstract

Vasculogenic mimicry (VM) is known as non-endothelial tumor cell-lined microvascular channels in aggressive tumors. We have previously found the presence of VM in high-grade gliomas. In this study, we aimed to identify VM patterns in gliomas and to explore their clinical significance. Tumor samples as well as their detailed clinical/prognostic data were collected from 101 patients. Vasculogenic mimicry in the glioma samples was determined by dual staining for endothelial marker CD34 and periodic acid-Schiff (PAS). Tumor samples were also immunohistochemically stained for Ki-67, VEGF, COX-2 and MMP-9. The association between VM and the clinical characteristics of the patients were analyzed. A Kaplan-Meier survival analysis and log-rank tests were performed to compare survival times of the patients. Vasculogenic mimicry was present in 13 out of 101 samples. The higher grade gliomas had a higher incidence of VM than that of lower grade gliomas (P = 0.006). Vasculogenic mimicry channels were associated with the expression of COX-2 and MMP-9 (P < 0.05). While there was no association between the existence of VM and the sex, age and preoperative epilepsy of the patients, or expression of Ki-67 and VEGF. However, patients with VM-positive gliomas survived a shorter period of time than those with VM negative gliomas (P = 0.027). Interestingly, in high-grade gliomas, the level of microvascular density was lower in VM positive tumors than those VM negative tumors (P = 0.039). Our results suggest that VM channels in gliomas correlate with increasing malignancy and higher aggressiveness, and may provide a complementation to the tumor's blood supply, especially in less vascularized regions, which may aid in the identification of glioma patients with a poorer prognosis.

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