PRELIMINARY EXPERIENCE WITH VISUALIZATION OF SUSCEPTIBILITY SIGNAL PATTERNS TO DIFFERENTIATE INTRACRANIAL HEMANGIOPERICYTOMAS AND MENINGIOMAS BY T2* WEIGHTED ANGIOGRAPHY IMAGING

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Introduction: Intracranial hemangiopericytomas represent a rare type of brain tumor that are typically difficult to distinguish from meningiomas based on clinical presentation and contrast enhancement findings but require different treatment. Susceptibility weighted imaging allows for noninvasive visualization of small veins in the human brain at submillimeter resolution and, therefore, is used to depict venous architecture in normal, as well as pathologic, tissue. The aim of this study was to assess the potential of T2 star weighted angiography (SWAN) in discriminating among intracranial hemangiopericytomas, hemangioblastomas and meningiomas based on the intralesional susceptibility effects and peritumoral vein distention.

Materials and Methods: 19 patients with histologically verified intracranial tumor, including 7 cases of hemangiopericytomas, 2 cases of cerebellar hemangioblastoma and 10 cases of meningiomas(2 cases of angiomatous meningiomas, 3 cases of fibrous meningioma and 3 cases of transitional megingiomas, 2 cases of atypical meningiomas)were recuited for this study with a mean age of 42 years ranging from 38-65 years. All patients were selected and acquired to preoperatively undergo SWAN scanning in addition to CT and conventional MR imaging sequences. SWAN parameters were: flip angle=20°,TR=55.9ms, TE=5.2/11.7/18.2/24.6/31.1/37.5/44.0/50.5ms, FOV=18×18cm, matrix=320×256,slice thickness=1.4mm. We evaluated different signals patterns of hemangiopericytomas, meningiomas and hemangioblastoma with the flowing sequences: contrast enhanced T1weighted images, SWAN images correlated with pathologic HE staining and immunohistochemical index-CD34 among three kinds of tumor. Also CT scan was performed to determine calcification.

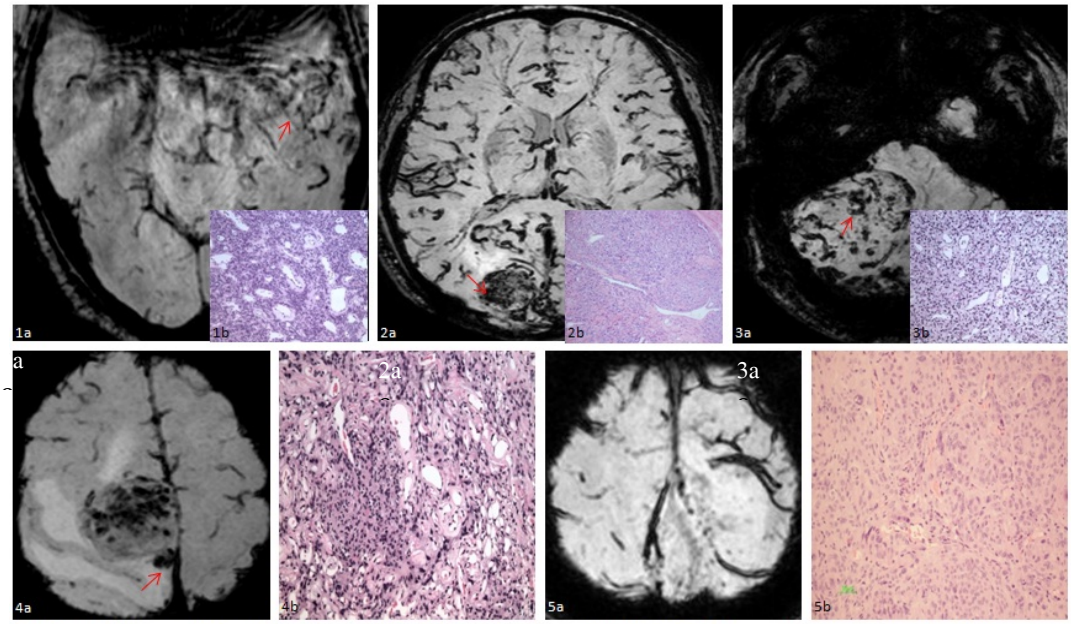

Fig. Graphs illustrates the intralesional susceptibility effects and peritumoral vein distention of hemangiopericytomas(case 1 and 2), hemangioblastoma(case 3) in Axial SWAN images(a) and Photomicrographs of histopathology(b) respectively. The following images shows the different susceptibility effects of angiomatous meningiomas(case 4) and atypical meningiomas(case 5). Fig a MinIP images show distinct rich venous vasculature in tumor inside(arrows) and peritumoral vein distention(1-4) whereas other type of meningiomas have no susceptibility effects inside tumor and peritumoral vein extruded(5a). Fig b Hematoxylin stained section is corresponding to an increased tumor microvascularity and most meningiomas has no susceptibility effects inside tumor.

Results: three kinds of tumor had the same prominent substantive significant enhancement (19/19). According to the SWAN images , seven cases of hemangiopericytomas showed complex and variable venous patterns in vascular distributions of tumor parenchyma and peritumoral vein distention. 2 cases of hemangioblastoma had similar performance with hemangiopericytomas in SWAN images. Whereas 8 cases of meningiomas did not show increased microvascularity except two cases of hemangiomatous meningioma. 11 cases of intralesional susceptibility effects were correlated with intralesional vascular proliferations determined by histopathology.

Discussion: Hemangiopericytomas could be clearly distinguished from most meningiomas by SWAN based on the intratumoral susceptibility effects, SWAN may be a promising tool for the noninvasive differentiation origin of entity hypervascular tumor of vascular or meningeal specifically.

Reference:

Pinker K, Noebauer-Huhmann IM, Stavrou I, et al. High-resolution contrast-enhanced, susceptibility-weighted MR imaging at 3T in patients with brain tumors: correlation with positron-emission tomography and histopathologic findings. AJNR 2007;28(7):1280-1286