

Arterial Spin Labeling Perfusion Imaging: Value in Diagnosis of Hemangioblastoma

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Introduction

Pulsed arterial spin labeling (PASL) is an MR method for perfusion weighted images (PASL-PWI) without any extrinsic tracer administration. PASL has been used to evaluate brain tumors in a few previous reports. However, the clinical value of PASL-PWI in diagnosing brain tumor has not been established. We examined if PASL-PWI could differentiate hemangioblastoma from the other brain tumors.

Materials and Methods

Between 2005 and 2006, 4 patients with hemangioblastoma (HB; 3 men and 1 woman; age range, 20-61 years old) and 13 patients with other brain tumors (5 men and 8 women; age range, 25-70 years old; 2 Glioblastomas (GBM), 2 anaplastic oligodendrogliomas (AOD), 1 diffuse astrocytoma (DA), 1 pleomorphic xanthoastrocytoma (PXA), 1 dsyembryoplastic neuroepithelial tumor (DNT), 3 meningiomas (MEN), 2 atypical meningiomas (MEN), and 1 metastatic brain tumor (MET)) were examined. PASL-PWI was performed using Q2TIPS at a 1.5T MR unit (Magnetom Symphony, Siemens). Q2TIPS parameters were set as follows: TII = 900ms, TI1s = 1300ms and TI2 = 1400ms. Images were acquired at 5 slice levels sequentially in a proximal to distal direction using a single-shot EPI technique (slice width = 5mm, interstice gap = 2.5mm, TR = 2100ms, TE = 26ms). PASL-PWI was acquired from the average of 50 difference images obtained by subtracting the unlabeled image from the labeled image at each slice position. The relative perfusion of the tumor was evaluated by the relative signal intensity rate (%Signal), which was defined as the percentage of the maximum signal intensity of the tumor divided by the averaged signal intensity of the gray matter on PASL-PWI. %Signal was statistically compared between hemangioblastoma and other brain tumors using Mann-Whitney's U test.

Results

Figure 1 shows the result of the perfusion rate measurement by PASL-PWI. The relative perfusion rate of hemangioblastoma (range, 391-524%; average, 430 +/- 63%) was significantly higher than that of other brain tumors (range, 73-314%; average, 182 +/- 59%) (p<0.005). Figure 2 shows PASL-PWI and Gadolinium-enhanced T1 weighted image (Gd-T1WI) of hemangioblastoma.

Discussion

High %Signal of hemangioblastoma is considered to reflect the high blood flow through the abundant capillary network. PASL-PWI may be useful in differentiating hemangioblastoma from the other brain tumors.

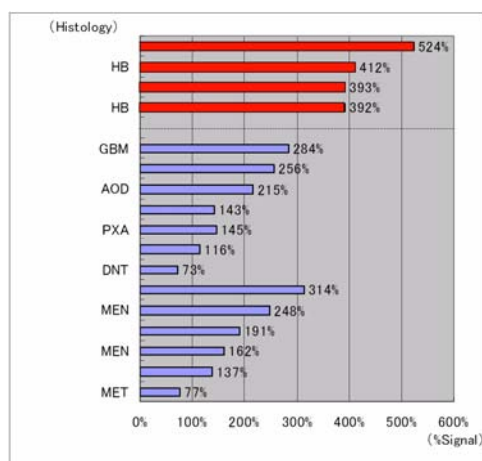


Figure 1: The relative perfusion rates of 17 of a hemangioblastoma.

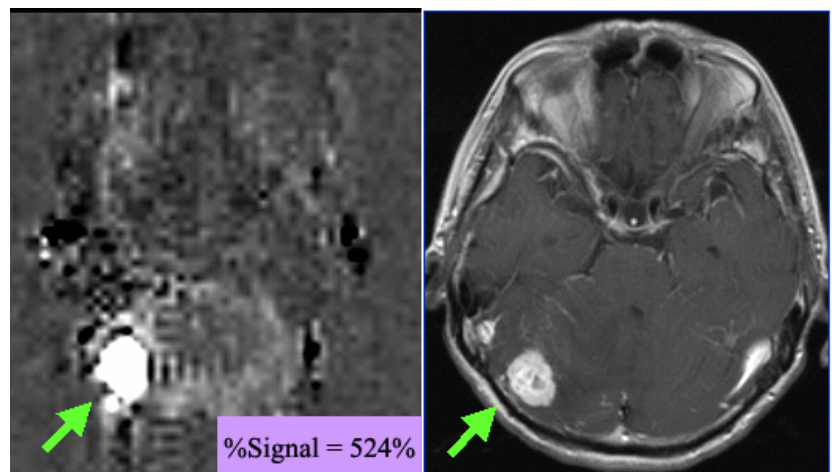


Figure 2: PASL-PWI (left) and Gadolinium- enhanced T1 weighted image brain tumors.

References

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- 2.Luh WM, et al. Magn Reson Med. 1999;41:1246-1254.