Differential diagnosis of intracranial ectopic germinomas at early stage and lacunar infarction by Susceptibility-Weighted Imaging

X. Lou[1], L. Ma[1], C. Tian[2], A. Zhang[1], Y. Wang[1], and Z. Chen[1]

[1]Radiology Department, Beijing, Beijing, China, People's Republic of, [2]Neurology Department, Beijing, Beijing, China, People's Republic of

Introduction

Intracranial ectopic germinomas (IEGs) refer to germinomas arise in sites besides pineal and suprasellar regions [1]. Sometimes it is difficult to differentiate IEGs from lacunar infarction by conventional MR. Susceptibility-weighted imaging (SWI) has proved to be sensitive in detecting early basal ganglia germinoma due to exquisite sensitivity to the haemorrhage and iron deposition in the tumor [2]. The goal of the study was to evaluate the values of SWI in differentiating early IEGs (largest diameter < 10 mm) from lacunar infarction.

Materials and Methods

From 2006 to 2009, conventional MRI and SWI were performed in five early IEGs proved by pathology and six lacunar infarction in basal ganglia proved by clinic at our institution. All MR images were acquired on a 3.0-T scanner (Twinspeed 3.0 T, GE Healthcare) with 8 channel head coil. The protocols and parameters of conventional MR examination were as follows: axial and coronal T2WI (TR/TE=5000 ms/113.7 ms), axial and sagittal T1WI (TR/TE/TI=2000 ms/6.9 ms/860 ms), Post-contrast T1WI .SWI was performed before contrast agent administration (TR/TE = 32 ms/19 ms, FA = 20°, slice thickness = 2 mm, FOV = 24×24cm, matrix = 448×384, NEX = 0.75). We post-processed SWI by Functool 2 on the workstation (Sun, ADW4.3). Region-of-interest measurements were made in the lesions and in the tissues adjacent to the lesions, and then the contrast-to-noise ratio (CNR) was calculated on T1WI, T2WI, and SWI. The CNR was defined as the algebraic difference of the normalized signal intensity between the lesion and adjacent tissue divided by the standard deviation of background noise.

Results

Five early IEGs and six infarction lesions were invisible or showed slight hyperintensity or hypointensity on T1WI, patchy slight hyperintensity on T2WI, without mass effect, and with variable enhancement. On SWI, the IEGs appeared as obvious hypointensity in the globus pallidus and putamen and the size was larger than that on conventional MR (Fig 1, 2). Infarction lesions appeared as slight hypointensity to isointensity on SWI and the size was smaller than that on conventional MR (Fig3, 4). CNRs of IEGs were higher than infarction lesions on SWI (Table).

Conclusions

SWI is a useful tool for differentiating early IEGs from lacunar infarction lesions.

Table: Comparison of CNR between IEGs and lacunar infarction

Sequences	IEGs	Lacunar infarction	*P*
T1W	26.6±15.2	17.8±3.3	0.196
T2W	38.3±19.2	36.4±8.4	0.831
SWI	-55.7 ±40.1	1.6±4.9	0.007

References

1. Ozelame RV, et al**.** Pediatr Radiol, 2006;36:325–330.
2. Lou X, et al. AJNR Am J Neuroradiol,2009 ;30 :1694-1699.

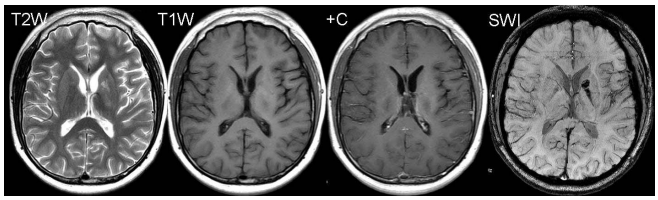

Fig 1. T2WI shows patchy hyperintensity at the left basal ganglia. The tumor is invisible on T1WI and without enhancement. SWI shows obvious hypointensity at the left basal ganglia, the size is larger than that on T2WI.

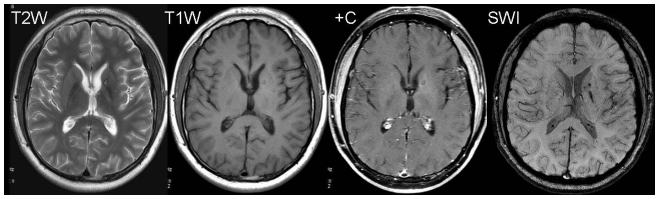

Fig 2. 27 days after radiotherapy, tumor markedly decreases on follow-up T2WI, T1WI, and SWI, but shows slight ring-like enhancement.

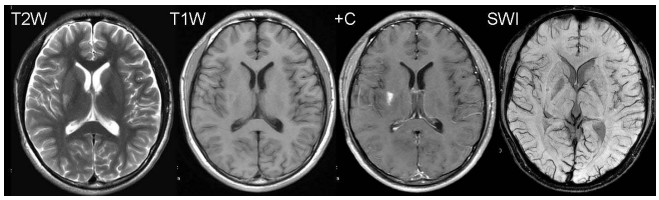

Fig 3. T2WI shows slight patchy hyperintensity at the right basal ganglia. The tumor is invisible on T1WI and with obvious enhancement. The lesion shows round slight hypointensity on SWI, the size is smaller than that on T2WI.

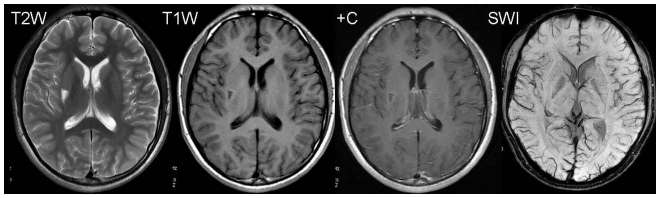

Fig 4. 7 days after medical therapy, the lesion shows hyperintensity on T2WI and hypointensity on T1WI, and without enhancement. The lesion is invisible on SWI.