

Sir,

Choroid plexus papilloma is a rare intraventricular tumor and there have been few reports of the findings on Proton Magnetic Resonance Spectroscopy (H-MRS) and  $^{201}\text{Tl}$  (Tl),  $^{99\text{m}}\text{Tc}$  Methoxyisobutylisonitrile (MIBI) Single Photon Emission Computed Tomography (SPECT). We would like to draw your reader's attention to their potential in the diagnosis of this pathology.

An eighteen month old girl was admitted to our hospital with normal physical and neurological examination. A CT scan showed mild ventriculomegaly and an isodense tumor in the left trigone which on MRI showed low intensity on T1 weighted images and high intensity on T2 weighted images (**Figure 1**). The tumor was homogeneously enhanced after intravenous injection of Gadolinium-diethyltriaminepentaacetic acid (Gd-DTPA) (**Figure 1**).

We performed SPECT 15 min and 3 hr after intravenous injection of  $^{201}\text{Tl}$  Chloride 74 Megabecquerel (MBq) or  $^{99\text{m}}\text{Tc}$  MIBI 740 MBq and calculated Tl or MIBI indexes for tumor and normal tissue. Both Tl and MIBI SPECT showed a homogenous hot tumor uptake on both early and delayed images (**Figure 2**). The delayed Tl index was 4.95 and it was lower than the early Tl index. The delayed MIBI index was 14.5 and it was higher than the early MIBI index. The retention index was calculated by the formula;  $(\text{radioactivity of ROI on the tumor in the delayed image} - \text{radioactivity of ROI on the tumor in the early image}) / \text{radioactivity of ROI on the tumor in the early image}$ . The Tl retention index was -0.15 and the MIBI retention index was -0.64, these indexes showed moderate wash out of the tracer from the tumor.

H-MRS was performed at 1.5 Tesla with proton regional imaging of metabolites (PRIME) and point resolved spectroscopy (PRESS) sequences. These demonstrated an increase of Cho and a decrease of NAA and Cre (**Figure 1**). The quantified tumor NAA was 2.51 mM/kg and this is remarkably decreased in comparison to the normal brain NAA (10.8 mM/kg)(4). The quantified tumor Cre was 2.56 mM/kg which is slightly higher than in the normal brain Cre (2.1 mM/kg). High peaks at 3.4 and 3.6 ppm were found on the spectroscopy images, and these peaks were prominent in the image with a 64 msec echo time. These peaks were thought to represent taurine and inositol.

The tumor was surgically resected and histological examination confirmed the imaging diagnosis of choroids plexus papilloma. The patient made an uneventful recovery. Post-operative MRI confirmed that there was no residual tumor and no recurrence has been observed on follow up.

There are a few reports of <sup>99m</sup>Techetium hexamethylpropyleneamine oxime (HMPAO) SPECT of choroid plexus papilloma (1, 2). No studies documenting the use of Tl and MIBI SPECT in a choroid plexus papilloma were found in a MEDLINE search in 2008.

Tl and MIBI SPECT in this case showed high tumor uptake and good wash out. These findings are compatible with a high blood flow in a benign tumor. MIBI shows early accumulation into the normal choroid plexus and good wash out from it. In this case, the choroid plexus papilloma showed slower tracer wash out than the normal choroid plexus, so the delayed MIBI index was higher than the early MIBI index. The delayed Tl index was also lower than the early Tl index. This decrease of the Tl index was dependent on wash out of the Tl tracer from tumor, because Tl does not accumulate into the

normal choroid plexus and normal brain tissue.

Choroid plexus carcinoma is known to show higher Cho and lactate than those of a choroid plexus papilloma and no inositol and taurine (3, 5). The current case showed high Cho, inositol, taurine and low NAA, Cre and no lactate. Because inositol and taurine were recognized based on the findings of only short echo time spectroscopy, taking MRS with short echo time is thus considered to be important to diagnose a choroid plexus papilloma.

We therefore suggest that H-MRS and SPECT are valuable techniques to differentiate it from other intraventricular tumor types with increased inositol on H-MRS and the early accumulation of Tl and MIBI tracer in tumor and good wash out as diagnostic findings of choroid plexus papilloma.

#### Legends of figures

Fig 1: Preoperative MRI showed a heterogeneous tumor in the left trigone as low intensity on T1 weighted images (upper left) and high intensity on T2 weighted images (lower left). The tumor was homogeneously enhanced (upper right). H-MRS demonstrated an increase of Cho, taurine, inositol and a decrease of NAA and Cre (lower right).

Fig 2: Tl (upper) and MIBI (lower) SPECT showed homogenous hot tumor uptake on both of the early (left) and delayed (right) images.

## References

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