

# Identification of the anterior choroidal arteries in patients with sella and parasella tumors using time-of-flight magnetic resonance angiography with 7 Tesla MR imager

Tsukasa Wada<sup>1</sup>, Toshiyuki Murakami<sup>1</sup>, Takamasa Nanba<sup>1</sup>, Kohsuke Kudo<sup>2</sup>, Makoto Sasaki<sup>2</sup>, and Kuniaki Ogasawara<sup>1</sup>

<sup>1</sup>Department of Neurosurgery, Iwate Medical University, Morioka, Iwate, Japan, <sup>2</sup>Division of Ultrahigh Field MRI, Institute for Biomedical Sciences, Iwate Medical University, Morioka, Iwate, Japan

## INTRODUCTION:

Preoperative identification of the anatomical description of the anterior choroidal artery (AchA) is important for surgery for intracranial tumors adjacent the internal carotid artery. However, modalities except digital subtraction angiography via arterial catheterization do not correctly display the AchA. Recently, magnetic resonance imaging (MRI) with a field strength of 7 Tesla has been available for clinical research. The aim of this study was to investigate whether time-of-flight (TOF) magnetic resonance (MR) angiography with 7 Tesla MR imager can display the anterior choroidal artery (AchA) in patients with sella and parasella tumors.

## METHODS:

Seven patients with intracranial tumor (3 meningiomas, 2 pituitary adenomas, 1 craniopharyngioma, and 1 chordoma) located at the sellar or parasellar region underwent 7T-MRA with 3D-TOF sequence before and after injection of gadolinium-based contrast agents. 3D-TOF was performed using a 7T MRI scanner (Discovery MR950, GE Healthcare) with the following parameters: TR/TE, 13/3.6 ms; FA, 15°; FOV, 120mm; Slice Thickness, 0.6mm; Matrix size, 512X384. We determined as “presence of AchA” when the cisternal portion of the AchA arised from the internal carotid artery and entered choroidal fissure on MRA source images of 7T-MRA (Fig. 1). In patients who underwent microsurgery through craniotomy, intraoperative findings were compared with findings on preoperative 7T-MRA.

## RESULTS:

The cisternal portion of at least one AchA was clearly demonstrated on 7T-MRA without contrast agent in all patients. One AchA on each side was displayed in 6 patients. In the one side of the remaining patient, two AchAs were depicted (Table 1). In two of 3 patients who underwent microsurgery through craniotomy, although two AchAs were intraoperatively identified, 7T-MRA displayed only one AchA (Fig. 2).

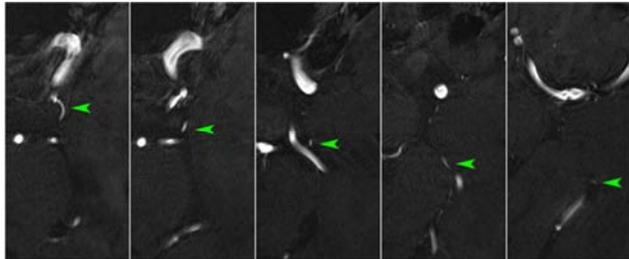


Fig.1. The cisternal portion of the AchA (arrow heads) is identified on 7T-MRA.

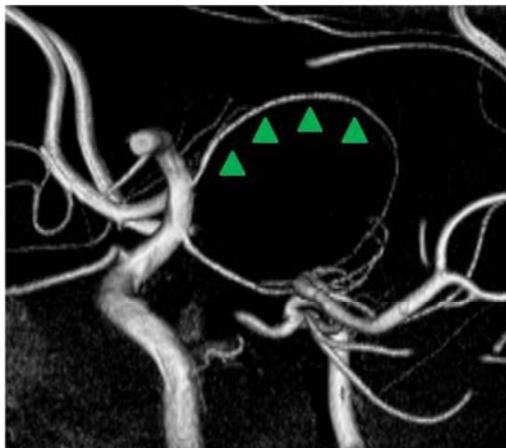


Fig.2. 7T-MRA clearly shows the cisternal portion of the AchA (arrow heads) in a patient with recurrent pituitary adenoma.

Table 1. Identification of AchA on 7T-MRA.

Type of AchA	with CA*		without CA*	
	Right side	left	right	left
Single AchA	7/7cases	6/7	7/7	6/7
Double AchA	0/7	1/7	0/7	1/7

\*: CA: Contrast agent

## DISCUSSION:

In this study, the AchA in patients with brain tumor was evaluated using 7T-MRA at the first time. 7T-MRA could display the AchA in patients with sella and parasella tumors. The ability of visualization of the AchA in 7T-MRA without contrast agents was equivalent to that with contrast agents. The contrast of the AchA was considerably different from that of the adjacent tumor in 7T-MRA without contrast agents. Mandy et al. described that 7T-MRA depicted all of the AchA with a mean diameter of 0.83mm. <sup>1</sup> 3D-CT angiography and digital subtraction angiography depicted 37% and 88% of the AchA, respectively. <sup>2</sup> Thus, 7T-MRA is most valuable for anatomical evaluation of the AchA and this information is useful for planning of surgical procedure. In two of 3 patients who underwent microsurgery through craniotomy, although two AchAs were intraoperatively identified, 7T-MRA displayed only one AchA. 7T-MRA might not depict very small AchA.

## REFERENCES:

[1] Mandy MAC, et al. Eur Radiol 2009;19:2986-2992. [2] Villablanca JP, et al. AJR 2007;188:593-602.