

# Comparative Study of 3.0- and 1.5-T MR in the follow-up of Moyamoya Disease

Q. Jin<sup>1</sup>, T. Noguchi<sup>1</sup>, H. Irie<sup>1</sup>, M. Nishihara<sup>1</sup>, T. Hirai<sup>1</sup>, M. Kawashima<sup>2</sup>, T. Matsushima<sup>2</sup>, and S. Kudo<sup>1</sup>

<sup>1</sup>Radiology, Saga University Hospital, Saga, Japan, <sup>2</sup>Neurosurgery, Saga University Hospital, Saga, Japan

## BACKGROUND

Miki [1] group researched imaging difference between 1.5- and 3.0-T MR in moyamoya disease (MMD). However, the difference of these two equipments at the point from clinical view has not been fully estimated. We evaluated the imaging findings of 1.5- and 3.0-T MR in patients with MMD to find the difference between these two equipments from the clinical assessment.

## PURPOSE

To retrospectively compare 3.0- and 1.5-T magnetic resonance (MR) findings in patients with moyamoya disease (MMD), and assess the relationship and difference between those two modalities in the follow-up of MMD.

## MATERIALS AND METHODS

The study included 60 (120 sides) MMD patients (15 male and 45 female patients, age range/mean age: 5 to 60/ 27 years, number of post/pre-operative patients: 44/ 16). Among the 60 patients, 25 had performed 3.0-T MR and one year interval follow-up 1.5-T MR (3.0T~1.5T), 43 had performed 3.0-T MR and one year interval follow-up 3.0-T MR (3.0T~3.0T), 12 had performed 1.5-T MR and one year interval follow-up 3.0-T MR (1.5T~3.0T), and 9 had performed 1.5-T MR and one year interval follow-up 1.5-T MR (1.5T~1.5T). No patient had performed operation during the follow-up period. We evaluated the MRA score (from 0 to 10) of each patient by using modified MRA grading method, then compared MRA score between 1.5- and 3.0-T MR of each hemisphere.

## RESULTS

Upgrading rate, downgrading rate, and difference rate between upgrading and downgrading rate were shown in the table.

## CONCLUSION

In 3.0T~3.0T, the difference rate would reflect natural steno-occlusive progress of intracranial vessels. In 3.0T~1.5T, upgrading rate might be due to both different teslas and interval progress of disease, which would cause higher difference rate than that in 3.0T~3.0T. In 1.5T~3.0T, both effects might be balanced. In 1.5T~1.5T, estimation error because of less numbers or overestimating effects caused by lower tesla MR unit might be the reasons of the highest upgrading rate.

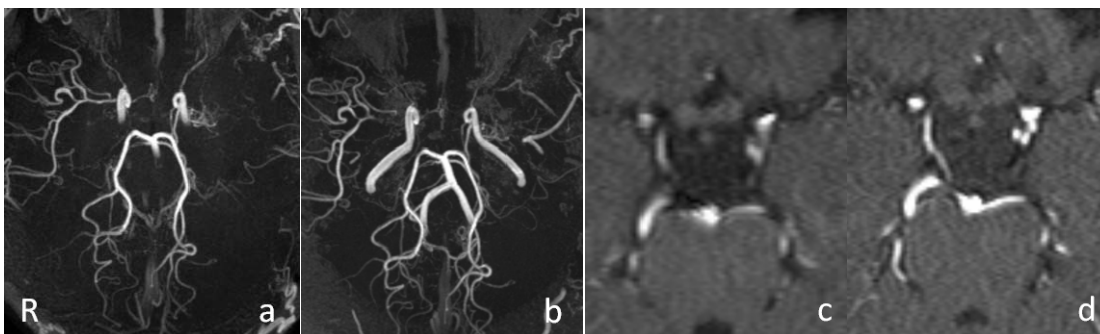
## DISCUSSION

Regardless of disease progressing, we should be careful about 1.5-T MR in evaluating steno-occlusive severity of intracranial vessels in MMD for its possibility with higher overestimating rate compared with 3.0-T MR.

## REFERENCES

1.Fushimi Y, Miki Y, Kikuta K, Okada T, Kanagaki M, Yamamoto A, et al. Comparison of 3.0- and 1.5-T three-dimensional time-of-flight MR angiography in moyamoya disease: preliminary experience. *Radiology* 2006; 239:232-237.

MR equipment	No. of hemispheres	upgrading rate (No. of sides)	downgrading rate (No. of sides)	difference rate (No. of sides)
3.0T ~ 3.0T	86	12.0% (10)	5.0% (4)	7.0% (6)
3.0T ~ 1.5T	50	10.0% (5)	0.0% (0)	10.0% (5)
1.5T ~ 3.0T	24	13.0% (3)	13.0% (3)	0.0% (0)
1.5T ~ 1.5T	18	17.0% (3)	0.0% (0)	16.7% (3)



One-year follow-up 3.0-T MR revealed right middle cerebral artery discontinuity (b) compared with previous 3.0-T MR examination (a), which might reflect natural steno-occlusive progress of intracranial vessels in MMD.

One-year follow-up 3.0-T MR revealed right posterior communicating artery (PCoA) continuity (d), but previous 1.5-T MR showed right PCoA discontinuity (c), this downgrading might due to overestimation of 1.5-T MR.