# **ORAL PRESENTATION**



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# Association between high biomarker probability of Alzheimer's disease and improvement of cognition and gait after shunt surgery in patients with idiopathic normal pressure hydrocephalus

Hiroaki Kazui<sup>\*</sup>, Hideki Kanemoto, Yukiko Suzuki, Syunsuke Sato, Takashi Suehiro, Shingo Azuma, Kenji Yoshiyama, Toshihisa Tanaka

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### Introduction

In Alzheimer's disease (AD), the concentration of amyloid  $\beta$ 1-42 (A $\beta$ 42) in cerebrospinal fluid (CSF) is low and that of total tau (t-tau) is high. We evaluated the relationship between high CSF biomarker probability of AD and improvement of cognition and gait after shunt surgery in idiopathic normal pressure hydrocephalus (iNPH).

## Methods

The subjects of this study were 37 iNPH patients (75.7 $\pm$ 5.8 years, MMSE:22.2 $\pm$ 4.2) who showed improvement of one of the triad symptoms at least after shunt surgery. We classified the patients into 16 patients with and 21 patients without the combination of low A $\beta$ 42 and high t-tau in CSF. We compared the improvement on cognitive and gait examinations 3 months after the shunt between the two groups with an analyses of covariance (ANCOVA), in which the score at 3 months after the shunt was entered in the model as a dependent variable, the baseline score as a covariate and the group as a categorical variable.

#### Results

In 37 iNPH patients, significant improvement 3 months after shunt surgery was shown in the Timed Up and Go test (p<0.001), MMSE (p<0.001), attention/concentration of the WMS-R (p=0.028), and digit symbol substitution of the WAIS-III (p<0.001), but not in delayed recall of the short story in the Rivermead behavioral memory test (RBMT) (p=0.46). The ANCOVA revealed that the iNPH

patients without high CSF biomarker probability of AD showed significantly greater improvement in the delayed recall of the RBMT 3 months after shunt surgery than those with high CSF biomarker probability of AD (p=0.017). In addition, in the latter group, the change 3 months after the shunt was not significant (p=0.14). The ANCOVA showed no significant differences in the improvement 3 months after the shunt surgery between the two groups on the other evaluations.

#### Conclusion

The delayed recall ability might not improve after shunt surgery in iNPH patients with AD pathology.

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#### References

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Osaka University Graduate School of Medicine, Japan



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<sup>\*</sup> Correspondence: kazui@psy.med.osaka-u.ac.jp