

# Relationship between the Position of Brainstem and Clinical Symptoms in Chiari Malformations type 1

Tomohiro Murakami MD PhD; Izumi Koyanagi; Takahisa Kaneko MD; Kazuhisa Yoshifuji; Michio Inoue MD, PhD; Shigeki Matsumura MD; Nobuhiro Mikuni

Dept. of Neurosurgery, Sapporo Miyanosawa Neurosurgical Hospital, Sapporo, JAPAN

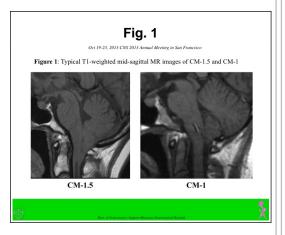


### Introduction

Chiari 1.5 malformation (CM-1.5) is defined as a Chiari malformation type 1 (CM-1) with downward displacement of the obex. Radiological definition is clear but clinical differences between CM-1.5 and CM-1 patients are unclear. The purpose of this study is to clarify the clinical and radiological differences in CM-1.5 and CM-1.

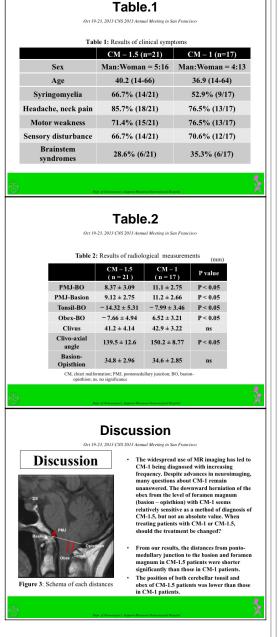
### **Methods**

Thirty-eight patients with CM-1 aged from 14 to 66 years (mean: 38.8 years) who were treated between 2000 and 2013 were retrospectively analyzed. Their clinical symptoms and the following measurements were analyzed: the distances from the basion-opisthion (BO) to tip of the cerebellar tonsil, from BO to the obex, and from basion to opisthion, the clivo-axial angle, and the length of the clivus using T1-weighted sagittal images of the cervical spine.



# Fig. 2 Oct 19-21, 2013 CNS 2013 Annual Meeting in Sun Francisco Figure 2: Each measurements about the position of pontomedullary junction and cerebellar tonsil, length of clivus, clivo-axial angle PMJ-Ba is the distance between the pontomedullary junction (PMJ) and the basion-position line (DO, white line), BO-Tonsil is the distance from the basion-opishion line to the object is the distance from the basion-opishion line to the object is the distance from the basion-opishion line to the object is the distance from the basion-opishion line to the object is the distance from the basion-opishion line to the object is the distance from the basion-opishion line to the object is the distance from the basion-opishion line to the object is the distance from the tonsillar is positioned below the foramen magnum. The length of the clivus is measured from the top of the dorsum sella (DS) to the basion.

There were 9 men and 29 women. In whom 21 patients (55.3%) with obex below the foramen magnum were diagnosed as Chiari 1.5 malformation (CM-1.5). Twenty-three patients had syringomyelia, 13 of them (65%) were in CM-1.5. In 17 CM-1 patients, headache and neck pain, motor weakness, sensory disturbance, and brainstem syndromes were 76.5%, 76.5%, 70.6%, and 35.3%, respectively. In CM-1.5, these symptoms were 85.7%, 71.4%, 66.7%, and 28.6%, respectively. The mean value of clivo-axial angle and the positions of both cerebellar tonsil and obex in CM-1.5 patients were lower than in CM-1 patients significantly. The length of the clivus and the distance between basion and opisthion were similar in both patients.



### Discussion

19-23, 2013 CNS 2013 Annual Meeting in San Francisco



brainstem syndromes.

The CM-1.5 patients tended to have a syringomyelia

syringomyelia.

The volume of the posterior cranial fossa w considered to be associated with the downw

 These may lead their clinical symptoms and syringomyelia.

# Figure 4: Schema of distance and

## Conclusions

From our study, the positions of cerebellar tonsil and obex were significant different, however, the patients in CM-1.5 and CM-1 had similar clinical symptoms except brainstem syndromes. The precise differential diagnosis between Chiari malformation type 1 and Chiari 1.5 malformation may be controversial because the difference is only the position of obex excluded the degree of tonsillar herniation.

### **Learning Objectives**

By the conclusion of this session, participants should be able to: 1)
Describe the importance of both position of cerebellar tonsil and brainstem in Chiari malformation type 1., 2) Discuss, in small groups, about the relationship between clinical symptoms and radiological features.

3) Identify an effective treatment for

Chiari malformation type 1. "