OBJECTIVE: The posterior fossa (PF) has been found to be small in various forms of Chiari malformation. Explanations involving a connection between growth hormone deficiency (GHD) and Chiari I malformation (CIM) have been proposed. However, to date, no quantitative analysis of the PF of patients with CIM and GHD has been performed. Our study was performed to determine the geometry of the PF in children with GHD and CIM.

METHODS: Morphometric analysis of the PF was performed in 10 children with GHD and CIM (group 1), 20 children with GHD and no CIM (group 2) and 50 controls.

RESULTS: PF volumes for group 1 ranged from 128 to 259 +/- 33 ml, and for group 2, they ranged from 115 to 186.2 +/- 25.4 ml. Lengths of the foramen magnum for groups 1 and 2 had means of 36 and 38 mm, respectively. The mean basiocciput length and tentorial angle for groups 1 and 2 were 20 and 19 mm and 89 and 87.5 degrees, respectively.

CONCLUSIONS: We have determined that children with GHD with or without CIM have no significant difference in their PF volume compared to controls. However, our data demonstrate significant underdevelopment of portions of the bony PF in both patients with GHD alone and in patients with GHD and CIM. Tentorial angles were elevated in noncontrol groups. We
propose that this association is not due to an increased rate of 'midline' defects seen in GHD but rather a structurally distorted PF that is not capacious enough to house the entire developing rhombencephalon. These data will hopefully aid in the further understanding of the pathophysiology of CIM.

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