Differences in the identification rate of inferior sagittal sinus among imaging modalities

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Received: 22 January 2022 / Accepted: 30 January 2022 / Published online: 16 February 2022
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To the editor:

We read with great interest the article by Ryu et al. titled, “Angiographic classification of the inferior sagittal sinus based on the venous drainage patterns” [1]. They showed the identification rate and pattern of inferior sagittal sinus (ISS) tributaries on digital subtraction angiography (DSA). Information of the ISS is important for neurosurgeons and radiologists.

Ryu et al. reported that the ISS was visualized in 52.1% of the patients using DSA. However, Tsutsumi et al. recently reported that the sagittal plane and maximum intensity projection (MIP) of three-dimensional (3D) contrast-enhanced-T1 weighted imaging (CE-T1WI) could identify the ISS in 97% of cases [2]. Ryu et al. did not discuss the detailed mechanism of the difference in the identification rate between DSA and 3D CE-T1WI. In DSA, contrast media are injected separately from the internal carotid arteries on both sides, and the ISS is visualized in the venous phase. If contrast media are injected from the right side, the ISS may be inadequately delineated because of laminar flow from the left internal carotid artery, which may cause the lower identification rate of ISS by DSA compared to 3D CE-T1WI. Ryu et al. reported that 10 of 248 patients with Type 0, i.e., ISS not identified by DSA, had complete hypoplasia in the rostral third of the superior sagittal sinus (SSS), as shown in Table 1. In these 10 cases, the rostral third of the SSS or ISS could not be identified by DSA; however, their

venous drainage routes might be functioning. To understand the relationship between ISS and SSS more precisely, the classification of ISS using 3D CE-T1WI by administering contrast media from the radial vein may be useful.

Recently, differences in the identification rate among imaging modalities have become an issue for the occipital sinuses. The identification rate of the occipital sinus has been reported to be 93.4% in adult cadavers, 8.6% in CT digital subtraction venography, and 10% in magnetic resonance venography [3, 4]. Although the exact reason for the difference in the identification rate among cadavers and imaging modalities may be unknown, it would be important for neurosurgeons and radiologists to know the identification rate of venous sinuses in imaging modalities, including DSA and 3D CE-T1WI. Future studies on the difference in ISS identification rates between DSA and 3D CE-T1WI in the same study population will be needed.

We appreciate the authors’ great effort towards revealing the identification rate and pattern of ISS tributaries using DSA.

References

1. Ryu B, Sato S, Mochizuki T, Shima S, Inoue T, Okada Y, et al. Angiographic classification of the inferior sagittal sinus based on the venous drainage patterns. *Jpn J Radiol*. 2021. <https://doi.org/10.1007/s11604-021-01198-2>.
2. Tsutsumi S, Ono H, Ishii H. Inferior sagittal sinus: magnetic resonance imaging study. *Surg Radiol Anat*. 2021;43:1353–7.
3. Balak N. Two cases of persistent falcine and occipital sinuses. *Brain Develop*. 2021;43:174.
4. Inui T, Shimanuki Y, Mori H, Haginoya K. Reply to: “Letter: two cases of persistent falcine and occipital sinuses.” *Brain Develop*. 2021;43:175.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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