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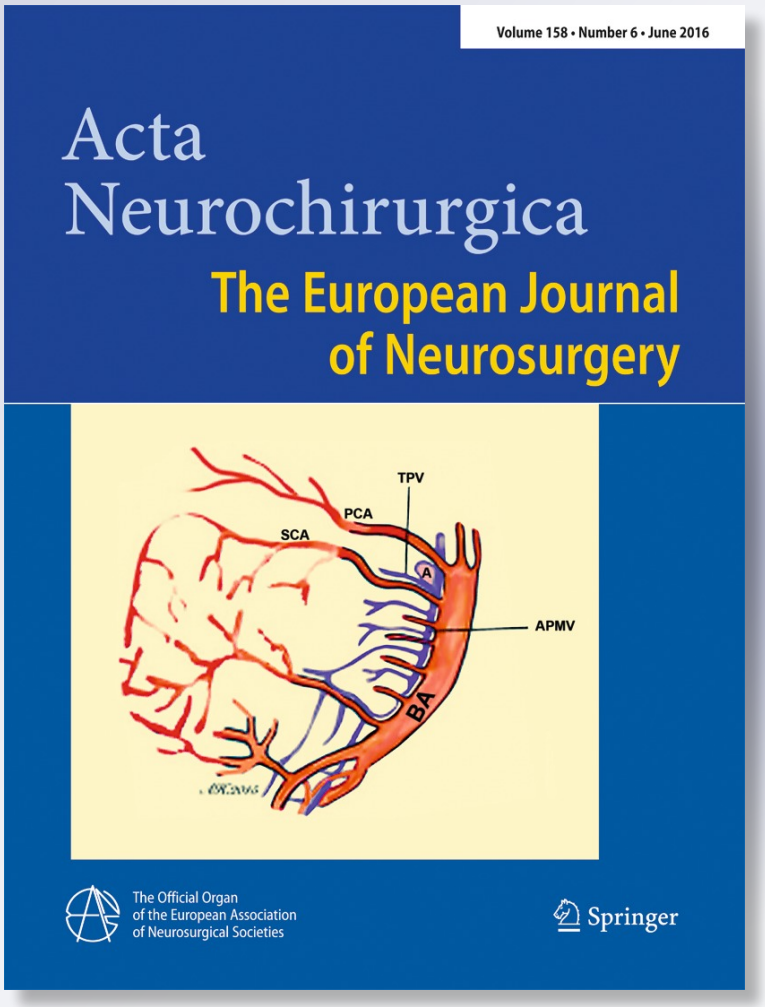

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LETTER TO THE EDITOR - EDITORIAL

If it can be done, it should be done,… or not? Response to Prof. Grotenhuis

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Dear Editor,

We have been pleased to see that our short technical note recently published in Acta Neurochirurgica aroused interest, curiosity, and debate [1]. We would like to thank Prof. Andrè Grotenhuis for his thorough, rigorous, and compelling comment on our paper [2]. His excursus through philosophical and ethical considerations is fascinating and sharable. We totally agree with the profound meaning of his editorial, which is the reminder of the Hippocratic lesson "*primum non nocère*". Therefore, we will limit our brief letter to the answer to his technical questions.

As Prof. Grotenhuis, we were also puzzled about the imaging of our patient at first. Comparing the initial MRI that the patient had 8 years prior to admission and the one immediately before operation, the cyst enlargement is clear. Also the enlargement of the third ventricle (downward displacement of the floor) and the dilation of the lateral ventricles (thinning of corpus callosum, which is displaced upward) are evident. However, as it was pointed out, the size of the fourth ventricle had not significantly changed, although the caudal two-thirds of the aqueduct did actually enlarge, as shown in Fig. 2b, and later confirmed by direct endoscopic inspection. Therefore, progressive obstruction of all three outlets of the fourth ventricle did develop indeed, otherwise how can one explain the development of hydrocephalus? To explain the fact that the fourth ventricle was apparently the only ventricle that did not enlarge, we hypothesized that the compression exerted by the cyst in the posterior fossa somehow counteracted the enlargement of the fourth ventricle.

We also wondered whether the patient's symptoms were mainly due to hydrocephalus or cyst enlargement. Both of them were present, and there was no way to know which one was prevailing. This is why we opted for an attempt to treat them both. The reasons leading us to choose the transaqueductal route have been detailed in our paper. Prof. Grotenhuis is right when he says that although we planned surgery with the first aim of doing an ETV, we fenestrated the cyst at first. As it may happen intraoperatively, our presurgical planning did actually change after we performed an initial exploration of the ventricles, realizing that an attempt to fenestrate the cyst was possible and relatively safe.

Obviously, the frontal approach implies damage to the cortex and the subcortical white matter in order to cannulate the lateral ventricle with a peel-away sheath. However, we know that this unavoidable injury is silent if complications (which can happen with any approach) do not occur. The damage is proportioned to the peel-away size, whose diameter is 4.7 mm. The flexible scope (Karl Storz-Endoskope, Tuttlingen, Germany) has a diameter of 3.7 mm. This size allows a relatively safe navigation not only through the foramen of Monro but also through a non-stenotic cerebral aqueduct. Actually, the cerebral aqueduct can be considered as the ventricle of the mesencephalon, and similarly to the other ventricles it shows some compliance. It has already been published that navigation is possible and safe not only in the case of dilated aqueduct, as in our patient, but also through a normal-sized aqueduct [3–6]. Prof. Grotenhuis is right when he says that during the exploration of the fourth ventricle we do not have continuous visual control at the level of both the foramen of Monro and the aqueduct.

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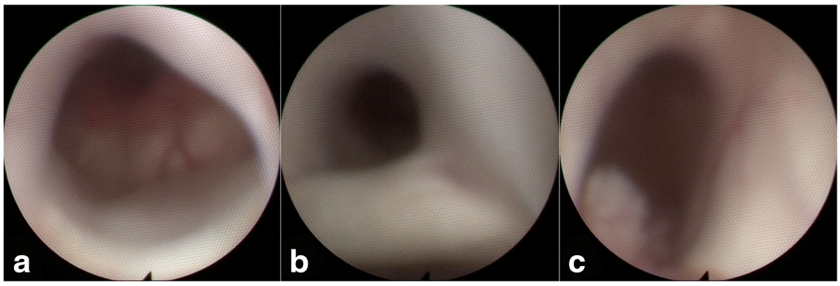

Fig. 1 Final inspection, at the end of flexible endoscopic surgery, of aqueduct lumen (**a**) and adytus (**b**), and Monro foramen, confirming the absence of traumatic injury

However, the flexible scope slowly slides along these structures without exerting significant pressure against them, as it can assume an italic S shape. If the surgeon, withdrawing the endoscope from the fourth ventricle, appropriately bends the scope, retracing exactly the same path used to enter the ventricle, there is no absolute need of direct inspection of the foramen of Monro and the aqueduct aditus. Longatti, one of the authors of this letter (AF), and other colleagues reported only one case of postoperative neurological deficit (mild diplopia) in over 300 endoscopic procedures and 52 transaqueductal navigations (currently almost 600 procedures and about 100 transaqueductal navigations), and this complication was due to an aqueductoplasty, not to transaqueductal navigation itself [3, 4]. While in a few cases there might be some minute ependymal contusion on the walls of the aqueduct, these have always been asymptomatic, so far. Moreover, intraoperative video-recordings never show contusions or damage to the fornices at the end of our endoscopic procedures. Particularly in our case, no damage could be detected on the aqueduct and on the fornix ependyma after completing the fenestration of the posterior fossa cyst (Fig. 1). The flexible endoscope has clear limitations, as the quality of images and the diameter of the working channel. However, it is delicate and steerable, adapting to the irregular ventricular cavities. These features make it adequate for the exploration of the ventricular system, even beyond the "Hercules columns" represented by the cerebral aqueduct.

Compliance with ethical standards

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