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Treatment of vertebrobasilar system aneurysms: a surgical dead end? — comment on Szmygin et al., *Polish Journal of Neurology and Neurosurgery*, 2021

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In the (now canonical) work ‘Seven aneurysms’ (a handbook guiding readers through the microsurgical treatment of cerebral aneurysmal malformations), the great author Michael T. Lawton writes: “Aneurysm surgery is, and should remain, an important element of neurosurgical culture, even as endovascular techniques advance in popularity and sophistication.” [1]. However, maintaining this legacy, based mostly on the hands-on experience of generations of neurosurgeons, is becoming an increasingly difficult task, in particular regarding the technically more demanding, and less commonly treated, aneurysms. Growing interest in endovascular strategies is clearly mirrored in the rising number of patients being treated with endovascular techniques at a time when the clipping rate is falling or remaining relatively constant; this trend is being seen across the world [2, 3] and also in Poland [4]. Nonetheless, it would be a premature step to grimly pronounce the eclipse of clipping culture. The vivid discussion as to the pros and cons of both therapy methods seems to be fuelled by numerous reports appraising the value of coiling or clipping in different constellations of cerebral aneurysmal disease, regarding aneurysm rupture, the age of the patient, and, particularly, the size and anatomical location of the aneurysm.

The work by Szmygin et al. [5] published in the current issue of the *Polish Journal of Neurology and Neurosurgery* is an important contribution, fuelling this debate in regard to aneurysms located in the posterior part of the cerebral circulation.

In Szmygin et al.’s opinion, having studied the previous evidence, the treatment of vertebrobasilar aneurysms in general carries a significant periprocedural risk that seems to be acceptably low in the cases treated with use of endovascular procedures, including plain coiling, stent- or balloon-assisted

coiling or flow diversion. Szmygin et al.’s own data was gathered in a population of 44 patients followed up after coiling of a vertebrobasilar aneurysm over a period of at least six months. Szmygin et al. documented the procedural complication rate to be as low as 4.5%. They have also reported that complete, or at least sufficient, aneurysm occlusion could be achieved in over 95% of cases. These results are not far away from those published by Gruber et al. [6], and even better than those obtained in larger series by Eskridge et al. (150 patients, 75% success rate) [7] and Pandey et al. (247 patients, 87.5% success rate) [8]. In addition, some established economic calculations (including length of hospital stay and total treatment costs) tip the scales in favour of endovascular treatment over microsurgical clipping in this specific anatomical location of aneurysms both ruptured and unruptured [9, 10].

Bearing these impressive outcome statistics of endovascular treatment in mind, what conclusions should be drawn for neurosurgeons versatile in microsurgical approaches and experienced in aneurysm treatment? Should we limit our participation to cases with multiple aneurysms, drawing a firm line between catchment areas for microsurgical vs. endovascular treatment (as for example described by James Ling et al. [11])? Certainly, this case report is a prime example of excellent cooperation between both specialisms, an example to be followed even if the microsurgical and endovascular treatment modes are provided not by one dual-trained or hybrid specialist but rather by different teams [12]. Or, possibly, should the microsurgical treatment of a posterior circulation aneurysm be limited to the occasional case where surgery needs to be performed for another reason or in the case of opportunely located multiple aneurysms? Or perhaps we

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should abandon clipping aneurysms in the vertebrobasilar area completely?

In our opinion, this is not the case. Certainly, the advantages of the coiling procedure in the vertebrobasilar area have been clearly delineated by several analyses, including the publication under discussion here. However, recent advances in microsurgical techniques of neurovascular procedures, including endoscopic visualisation [13–15] and bypass techniques [16, 17] still allow an appreciation of the microsurgical treatment of posterior circulation aneurysms to be either a crucial amendment, or a valid competitive therapy, to endovascular procedures [18–20], with success rates of 88% [21, 22] up to 98% [19] (in a series of 217 surgical patients reported by Sansai et al.). This option is of great value especially if for any reason coiling or flow diversion seem to carry a lower chance of success than expected, e.g. due to complex neck anatomy or if a more durable treatment is desired [20, 22, 23].

In conclusion, the study by Szmygin et al. and previous reports on the efficacy of endovascular treatment in the vertebrobasilar area are very valuable signposts for all specialists (including neurosurgeons, neuroradiologists, neurologists and neurointensivists), who plan the route of treatment for patients with aneurysms of the vertebrobasilar area.

However, for all those engaged in microsurgical aneurysm clipping, the evidence should not be interpreted as signalling a ‘dead end’ but rather a sign indicating a bumpy road ahead, encouraging travel along the treatment path of these challenging cases as members of a multidisciplinary crew, instead of just turning around and giving up when the road becomes steep and challenging.

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