

Neurosurgical forum

Letters to the editor

Kernohan's contributions to neurosurgery

TO THE EDITOR: I read the contribution by Safavi-Abbasi and colleagues¹⁵ in the April issue of *Neurosurgical Focus* with interest and personal appreciation (Safavi-Abbasi S, Maurer AJ, Archer JB, et al: From the notch to a glioma grading system: the neurological contributions of James Watson Kernohan. *Neurosurg Focus* 36(4):E4, April 2014). However, it appears that the authors did not fully appreciate the impact of Fig. 4 of their article, hinting, as it does, at the laterality-indexed nature of what is known as the Kernohan-Woltman phenomenon.^{5,12} Accordingly, on examination, 50% (17 of 35) of Kernohan and Woltman's subjects with supratentorial lesions had ipsilateral pyramidal signs even though nearly all had contralateral peduncular notching (discounting the latter as an irrelevant artifact). In this context it is crucial to understand that consciousness resides exclusively within the major hemisphere, which handles speech,^{5,12} and that the influence of the major hemisphere on its counterpart through the corpus callosum is excitatory.^{7,8,16} It is also critical to remember that speech occurs exclusively as we exhale, pointing to the less well-known role of the major hemisphere as the pacemaker for breathing (making such lesions lethal).^{6,10}

It is therefore not surprising that seizures are commonly associated with a period of apnea and that the incidence of epilepsy in lesions that are evenly distributed between the two hemispheres is always less than 50% (i.e., only one of two hemispheres is capable of generating seizures).^{2,17,19} On the other hand, lesions affecting both hemispheres of a person (thus resulting in tetraplegic cerebral palsy) are associated with epilepsy at rates approaching 100%.² Similarly, the incidence of postoperative cognitive decline after iatrogenic hypotension is less than 50%.^{9,13,18} Similar statistics may be cited regarding occurrences of laterality-indexed presentations pathognomonic of injury to the minor hemisphere. One such syndrome is the conjugate deviation of the eyes toward the damaged minor hemisphere (Prévost syndrome); the other is occurrences of neglect or anosognosia in lesions affecting the minor hemisphere.^{8,13}

Based on the abovementioned facts, the historical "baneful experiences" described by Kernohan and Woltman were indeed physiological consequences of von Monakow's interhemispheric diaschisis and not those of cerebral herniations caused by increased intracranial pressure, which may or may not be present in cases similar to those described by Kernohan and Woltman.^{1,3-5,11,12,14}

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Disclosure

The author reports no conflict of interest.

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RESPONSE: We thank Dr. Derakhshan for his insightful reading of our article on Dr. Kernohan. We are aware of the impact of Dr. Derakhshan's further analysis of the Kernohan notch phenomenon, as can be noted in our comments on the laterality issues, and that is why his study was referenced. However, it was not our intent, nor did we have the space in the article, to include a lengthy physiological analysis of the notch phenomenon. Indeed, as Dr. Derakhshan noted, he has published on the consequences of tumor laterality, along with others who have studied this topic. Our article was not intended to be a complete modern analysis or review of the Kernohan notch phenomenon with regard to clinical neurophysiology and neuropathology. In fact, much of this analysis has been published in recent clinical series we cited that, since the time of Dr. Kernohan, provide a more complete observa-

tion, confirmation, and analysis. Rather, our article was meant to provide a perspective on the most impactful work of Dr. Kernohan, using his own words, and to give a personal historical perspective on his career.

It is our impression that, in fact, many neurologists and neurosurgeons do not actually understand the physiological principles or anatomical events surrounding the clinical sequelae of Kernohan notch involvement. Hopefully the enthusiastic reader will be inspired to follow up for a more in-depth understanding of the Kernohan notch phenomenon by reading studies such as those by Dr. Derakhshan.

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