Letter to the Editor

The Kernohan–Woltman phenomenon and laterality of motor control: Fresh analysis of data in the article “Incisura of the crus due to contralateral brain tumor”☆

Dear Editor:

In as much as Hussain et al. in their article, Brainstem ischemia in acute herniation syndrome [1], like Ritter et al. [2] in Brain stem blood flow, pupillary response and outcome in patients with severe head injuries have argued in favor of an alternative explanation (vascular, as opposed to mechanical) for the clinical findings in those with expanding hemispheric lesions, i.e. the presence of ipsilateral pyramidal signs, the following analysis of data in the Kernohan and Woltman article [3] provides fresh insight as to the physiological nature of the problem (hitherto ignored).

As seen in the Fig. 7 of Kernohan and Woltman (reproduced below), whereas all of the 35 cases with supratentorial tumors had notching in the contralateral cerebral peduncle, only half of those (17 cases) where “symptomatic” (showed ipsilateral pyramidal signs). The remainder (18 cases) was “asymptomatic.” Clearly, notching of peduncles in the series by Kernohan and Woltman had nothing to do with presence of signs ipsilateral to the expanding lesion. The only alternative explanation under these circumstances would be the emergence of ipsilateral signs as a result of withdrawal of normal excitatory influences arising from the command center (major hemisphere) in the 17 symptomatic cases; causing physiological paralysis of the minor hemisphere and the emergence of pyramidal signs ipsilateral to the lesion (i.e. deafferentation, diaschisis, of the nondominant hemisphere).

On the other hand, expanding lesions of the minor hemisphere in the asymptomatic camp did not cause ipsilateral signs (notwithstanding the presence of notching), because there are no motor communications from the minor to major hemisphere (hemisphere of action) [4–6]. This new analysis of the unique series of Kernohan and Woltman provides for an alternative physiological explanation for variations of symptoms in similar cases mentioned by the authors [3]: without resorting to the presence of destructive vascular events that may exist in some but not in other instances of the phenomenon [4–8].

Legend on the left of the original figure read as follows (from top to bottom):

- Total cases, 42; Cases with notching, 40; Marked homolateral pyramidal signs, 7 [infratentorial cases, 5]; Slight homolateral pyramidal signs (without notching, 2) 17; Notching without signs, 18.

Note: Only the 35 supratentorial cases of this series are the subject of this analysis.

References


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Dedication: The author dedicates this note to the loving memory of his sister, Farkhondeh Derakhshan, Melbourne, Australia.

Fig. 7. Incisura of the crus due to contralateral tumor of the brain.

☆ Comment from the editor-in-chief The corresponding author of the article has not provided a response.