

Electrocorticography in ganglioglioma: correlations with histopathology

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Background: Ganglion cell tumours (ganglioglioma and gangliocytoma) are associated with intractable epilepsy. Coexisting dysplastic changes may be present on neuropathologic examination. The relative content of neurons, glia- and microglia cells in these tumours varies. In vivo epileptogenicity as expressed by electrocorticographic spiking and its relation to these changes are largely unknown.

Methods: Specimens of 24 patients with a ganglioglioma or gangliocytoma were evaluated for the content of microglia cells, neurons and lesional glial cells and were stratified into three categories: 1) low (<10% of cells), 2) moderate (10%-30% of cells) and 3) high (>30% of cells). Balloon cells (BC) and coexisting cortical dysplasia (CD) were present or absent.

Electrocorticographic records were reviewed for the following spike patterns: 1) sporadic spikes occurring at one or more sites at irregular time intervals, 2) (almost) continuous spikes, 3) bursts of rhythmic spikes (frequency > 10Hz), 4) recruiting pattern (or electrographic seizure).

Results: Five patients showed low, ten moderate and nine a high amount of microglia cells. Eight showed low, 14 moderate and two a high amount of neurons. Two had a moderate while 22 a high amount of glia cells. Three patients had BC in the surgical specimen. Four patients showed CD.

Twenty-three patients had sporadic spikes, two patients had continuous spikes, eight patients had bursts of rhythmic spikes and four patients showed a recruiting pattern.

No patient without CD showed continuous spikes; this pattern was associated with CD with a sensitivity of 50% and a specificity of 100%. All patients with BC showed bursts of rhythmic spikes with a sensitivity of 100% and specificity of 76%.

Conclusion: Some patients with ganglioglioma show electrocorticographic spike patterns as found in patients with cortical dysplasia. In these tumours, bursts of rhythmic spikes are associated with BC while continuous spikes are associated with coexisting CD.

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