

How T2-weighted signal intensity of GH-secreting adenomas correlates with response to primary somatostatin analogue therapy in acromegaly

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Aim of the work: In order to ensure the best management of acromegalic patients with the varied therapeutic possibilities now available, identifying predictive factors of response to treatment is essential. In terms of imaging criteria, pituitary adenoma size and cavernous sinus invasion announce low chances of surgical cure. However, there are no recognized imaging predictive factors of somatotropinoma response to somatostatin analogue (SSA) therapy. Somatotropinomas are the only type of pituitary adenoma that often present as hypointense on T2-weighted MRI sequences. These T2-hypointense adenomas are usually smaller, more rarely invasive and correspond to higher IGF1 levels. However, an evaluation of the response, both anti-secretory, as well as anti-proliferative, of somatotropinomas to primary therapy with SSA has not been comprehensively studied and constitutes the purpose of our work.

Methods: Acromegalic patients treated with SSA as primary therapy were included in this multicentric, international study, both prospectively and retrospectively. The duration of therapy varied from 3 to 12 months. The results of biological and MRI evaluations at baseline

and after treatment were recorded. T2-weighted signal of the adenoma was classified as hypointense, isointense or hyperintense compared to the normal pituitary tissue or when the latter was not visualized, to the grey matter of the temporal lobe. For a quantitative assessment, ROI measurements of the adenoma, normal pituitary tissue and grey matter were recorded. The ratio between adenoma and pituitary tissue/grey matter ROI was used in the statistical analysis to eliminate variations between different examinations.

Main results: 106 patients were included in the study (52 male, 54 female). T2-weighted signal was hypointense for 76 adenomas (71.6%), isointense for 14 adenomas (13.2%) and hyperintense for 16 adenomas (15%). Treatment duration did not vary significantly between the T2-hypo-, iso- or hyperintense groups. However, T2-hypointense adenomas had a better biological response to SSA with a decrease in GH of 88.6% (vs 20.9% for T2-isointense and 23.8% for T2-hyperintense, $p < 0.0001$) and IGF1% of 59.6% (vs 11.7% for T2-isointense and 33.2% for T2-hyperintense, $p = 0.002$). The anti-proliferative response was also better for T2-hypointense adenomas with a decrease of adenoma volume of 38.1% (vs 7.4% for T2-isointense and 2.48% for T2-hyperintense adenomas, $p < 0.0001$). Quantitative T2-measurement validated the results of the visual assessment. Adenomas with lower T2-weighted signal intensity had more important GH, IGF1% and volume reductions under treatment.

Conclusions: T2-weighted signal intensity of pituitary adenomas assessed on the diagnostic MRIs of acromegalic patients allows the classification of somatotropinomas into different categories. T2-hypointensity appears to confirm itself as a marker of a more favourable response to primary therapy with SSA, in terms of both anti-secretory and anti-proliferative effects.