Do T2-Hypointense GH-Secreting Pituitary Adenomas Behave Differently Under Somatostatin Analogues As Primary Therapy in Acromegaly?

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Introduction: Several predictive factors of response to treatment in acromegaly are currently used. Imaging criteria include pituitary adenoma size and cavernous sinus invasion which may impede surgical cure. However, there are no official imaging prognostic criteria of somatotropinoma response to somatostatin analogue (SSA) therapy. It is known that somatotropinomas are more frequently hypointense on T2-weighted MRI sequences than other types of pituitary adenomas. These T2-hypointense adenomas are usually smaller and therefore, 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.

Materials and 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 and statistically analysed. 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.

Results: 105 patients were included in the study (51 male, 54 female). These patients were diagnosed at 54 years (male 47 vs female 59). GH nadir levels during OGTT were 5.3 ng/ml (2.7-17.4), while IGF1% was 316% (229-385). T2-weighted signal was hypointense for 69 adenomas (65.7%), isointense for 21 adenomas (20%) and hyperintense for 15 adenomas (14.3%). T2-hypointense adenomas were smaller, had higher GH nadir and IGF1% levels and presented an invasion of the cavernous sinus or compression of the optic chiasm more rarely than the iso- or hyperintense groups. 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 84.6% (vs 20.9% for T2-isointense and 38.4% for T2-hyperintense, p=0.002) and IGF1% of 59.3% (vs 23.9% for T2-isointense and 41.8% for T2-hyperintense, p=0.003). The anti-proliferative response was also better for T2-hypointense adenomas with a decrease of the vertical diameter of 22% (vs 1.9% for T2-isointense and 11.8% for T2-hyperintense adenomas, p=0.0006).

Conclusions: T2-weighted signal of the pituitary adenoma on the diagnostic MRI of acromegalic patients allows the classification of somatotropinomas into different categories. The T2-hypointense adenomas, smaller and with a higher GH secretion, also present a better response to primary therapy with SSA, both anti-secretory and anti-proliferative.