

Incidental evidence of hypointensity in brain grey nuclei on routine MR imaging: when to suspect a neurodegenerative disorder?

Maurizio Morelli^{1,2}, A. Quattrone¹, G. Arabia^{1,2}, B. Vescio³, M.G. Vaccaro⁴, A. Mechelli¹, F. Rocca⁴, A. Gambardella^{1,4}, A. Quattrone^{2,4}

¹Institute of Neurology, Department of Medical and Surgical Sciences, Magna Graecia University, Catanzaro, Italy

²Neuroscience Centre, Magna Graecia University, Catanzaro, Italy

³Biotechnomed, S.C.aR.L, Catanzaro, Italy

⁴Neuroimaging Research Unit, Institute of Molecular Bioimaging and Physiology, National Research Council, Catanzaro, Italy

Introduction: Deep grey nuclei of the human brain accumulate minerals both in aging and in several neurodegenerative diseases. Mineral deposition produces a shortening of the transverse relaxation time which causes hypointensity on magnetic resonance (MR) imaging. The physician often has difficulties in determining whether the incidental hypointensity of grey nuclei seen on MR images is related to aging or neurodegenerative pathology.

Methods: We investigated the hypointensity patterns in globus pallidus, putamen, caudate nucleus, thalamus and dentate nucleus of 217 healthy subjects (ages, 20-79 years; men/women, 104/113) using 3T MR imaging.

Results: Hypointensity was detected more frequently in globus pallidus (35.5%) than in dentate nucleus (32.7%) and putamen (7.8%). A consistent effect of aging on hypointensity ($p < 0.001$) of these grey nuclei was evident. Putaminal hypointensity appeared only in elderly subjects whereas we did not find hypointensity in the caudate nucleus and thalamus of any subject.

Conclusions: The evidence of hypointensity in the caudate nucleus and thalamus at any age or hypointensity in the putamen seen in young subjects should prompt the clinician to consider a neurodegenerative disease.