

NEUROTRANSMITTER OR NEUROCARDIAC IMAGING

By Andrés Ricardo Pérez Riera

CONCEPT: The technique of neurocardiac imaging constitutes the only non-invasive method to visualize the pre- and post-synaptic function of the nervous and autonomous system (NAS), allowing for the examination of sympathetic integrity.

Findings have a potential impact in understanding neuro-psychopathology and pathology in patients with Brugada Syndrome.

At the beginning, the isotope metaiodine-benzil-guanidine (MIBG) was developed for diagnostic purposes in pheochromocytoma. It is currently used for this entity either in case of failure of CT and MRI, or in cases of multiple tumors¹. It is related with an analogous of epinephrine and guanetidine, considered a false neurotransmitter with uptake, transportation, storage and elimination properties similar to noradrenaline in the presynaptic endings of the heart (uptake 1).

The metabolism of the radiopharmaco is very similar to that of natural epinephrine, uptaken in the cells and stored in vesicles. It is not catabolized.

It is additionally uptaken by the nervous tissue (uptake 2).

The clearance of MIBG is 5% to 12% in 3 to 4 hours, and coincident with that of noradrenaline.

The cardiac uptake of [1231] MIBG in the heart is inhibited by tricyclic antidepressants and by imipramine. These agents accelerate the rate of [1231] MIBG loss in blood and urine.

Phenilpropanolamine and sympathomimetic drugs take norepinephrine out of the neurons, increasing the loss of [1231] MIBG in blood and urine.

Studies made with this compound have demonstrated its large capacity to limit regional denervation in the heart. Generalized neuropathies, like diabetic neuropathy, are associated with a remarkable decrease of uptake 1 of [1231] MIBG in the heart².

Future quantitative investigations of the presynaptic and postsynaptic sympathetic and parasympathetic branches of the cardiac autonomic nervous system may clarify whether these observations represent a primary adrenergic dysfunction or an imbalance between sympathetic and parasympathetic innervation of the heart.

Metaiodobenzylguanidine (MIBG) scanning

Wichter et al observed an abnormal [1231] MIBG uptake in patients with Brugada syndrome, indicating presynaptic sympathetic dysfunction of the heart.

CLINICAL USE OF NEUROCARDIAC IMAGING

- HEART FAILURE STUDY³.
- HYPERTROPHIC MYOCARDIOPATHY ;^{4;5;6;7;}.
- IDIOPATHIC DILATED CARDIOMYOPATHY⁸.
- DIABETES MELLITUS.

- ACUTE MYOCARDIAL INFARCTION ^{7;8;9;10;1}.
- HEART TRANSPLANTATION¹².
- ARRHYTHMOGENIC RIGHT VENTRICULAR DYSPLASIA¹⁵.

- LQTS.
- BRUGADA SYNDROME^{16 ;17 ;18} .
- GENUINE IDIOPATHIC VENTRICULAR FIBRILLATION¹⁹.
- CARDIAC TOXICITY BY ANTINEOPLASIC THERAPY²¹.

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