Interesting images

Incidental uptake of $^{123}$I MIBG in brown fat

Captación incidental de $^{123}$I MIBG en grasa parda

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Abstract

Brown fat is a potential source of false positive results in Nuclear Medicine studies. The literature mentions that most of these incidental findings are observed when $^{18}$F-FDG is used as the tracer. Few cases of the uptake of $^{123}$I MIBG in brown fat as a possible cause of false positives have been described. On histological comparison of brown fat with the remaining adipose tissue, the former is characterized by containing small, multiloculated cells with a large number of mitochondria, an increase in vascularization and abundant noradrenergic sympathetic innervation. Norepinephrine is a key regulator of brown fat since it stimulates lipolysis and glucose transportation as well as an increase in the number of adipocytes in brown fat. The quantity and distribution of brown fat may vary with age, nutrition, and environmental temperature, detecting a larger number of cases with incidental uptake of brown fat in cold months. Excessive sympathetic stimulation due to high concentrations of circulating catecholamines may increase metabolic activity and the uptake of tracer by brown fat as may be found in patients with pheochromocytoma. Radiotracers which evaluate adrenergic function may be useful to understand the physiology of brown fat and they are currently of interest in the study of obesity and glucose homeostasis. In addition to finding the uptake of brown fat in studies with $^{18}$F-FDG and $^{123}$I MIBG, cases using $^{99m}$Tc-tetrofosmin and $^{18}$F-6 fluorodopamine (F-DA) have been described in the literature.

We present the case of a 15-year-old male with bilateral pheochromocytoma 4 years previously who underwent bilateral suprarenalectomy. He was referred to our department in September 2011 for a control study with $^{123}$I MIBG. The catecholamine blood levels were not available. The images at 4 h showed a focal moderate increased uptake in the epigastric region which increased in intensity in the images at 24 h (Figs. 1 and 2). As incidental finding a bilateral laterocervical increased uptake in the images at 4 h which diminished at 24 h, probably related to uptake in brown fat (Figs. 1 and 2) was observed. This case demonstrates the importance of the nuclear physician to be able to interpret these images.
A 15-year-old male who underwent a scan with $^{123}$I MIBG in September 2011. The image at 4 h shows focal moderate pathological uptake in the epigastric region which increased in intensity in the images at 24 h, suggestive of pathologic chromaffin tissue with adrenergic innervation. Incidental observation of an increase in bilateral laterocervical uptake in the images at 4 h which notably diminished at 24 h, probably in relation to uptake in brown fat (arrows).

and recognize this pattern of uptake and thereby avoid confusion with pathologic images and possible false positive results.

References