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Tetracyclic Antidepressant Causing Altered Biodistribution of MIBG

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We present the case of a 61-year-old man who underwent I-123 metaiodobenzylguanidine (MIBG) scintigraphy based on clinical suspicion of pheochromocytoma. The study was nondiagnostic secondary to diffuse muscle uptake. On review of his medications, the patient was found to be taking mirtazapine, a tetracyclic antidepressant (Remeron). We hypothesize that the MIBG biodistribution was altered by mirtazapine-mediated blockade of the presynaptic alpha-2 receptor. To our knowledge, tetracyclic antidepressants have not been previously reported to cause altered biodistribution on I-123 MIBG scans.

Case Report

A 61-year-old man presented with elevated urinary vanillylmandelic acid levels. Pheochromocytoma was suspected. He underwent I-123 MIBG whole body scanning after 2 days of thyroid blockade with Lugol's solution. Following the intravenous administration of 314.5 megabecquerels of I-123 MIBG, planar images of the chest, abdomen and pelvis were acquired at 24 hours post injection (Fig. 1)

On review of his medications, the patient was found to be on phenoxybenzamine (an alpha-blocker used to treat hypertension, known to not alter biodistribution of MIBG) and was also taking mirtazapine (a tetracyclic antidepressant).

Discussion

Pheochromocytoma is a rare neuroendocrine tumor, most commonly originating in the adrenal glands. Diagnosis is made by identification of abnormal plasma and urine metanephrine and normetanephrine levels in most cases. Computed tomography (CT) can identify 95% of adrenal pheochromocytomas measuring 1 cm or larger. Magnetic resonance imaging (MRI) is superior to CT for the detection of extra-adrenal pheochromocytomas [1-3]. I-123/I-131 MIBG scintigraphy detects up to 85% of pheochromocytomas, and is highly specific (95–100%) [4-6].

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Abbreviations: MBIG, metaiodobenzylguanidine

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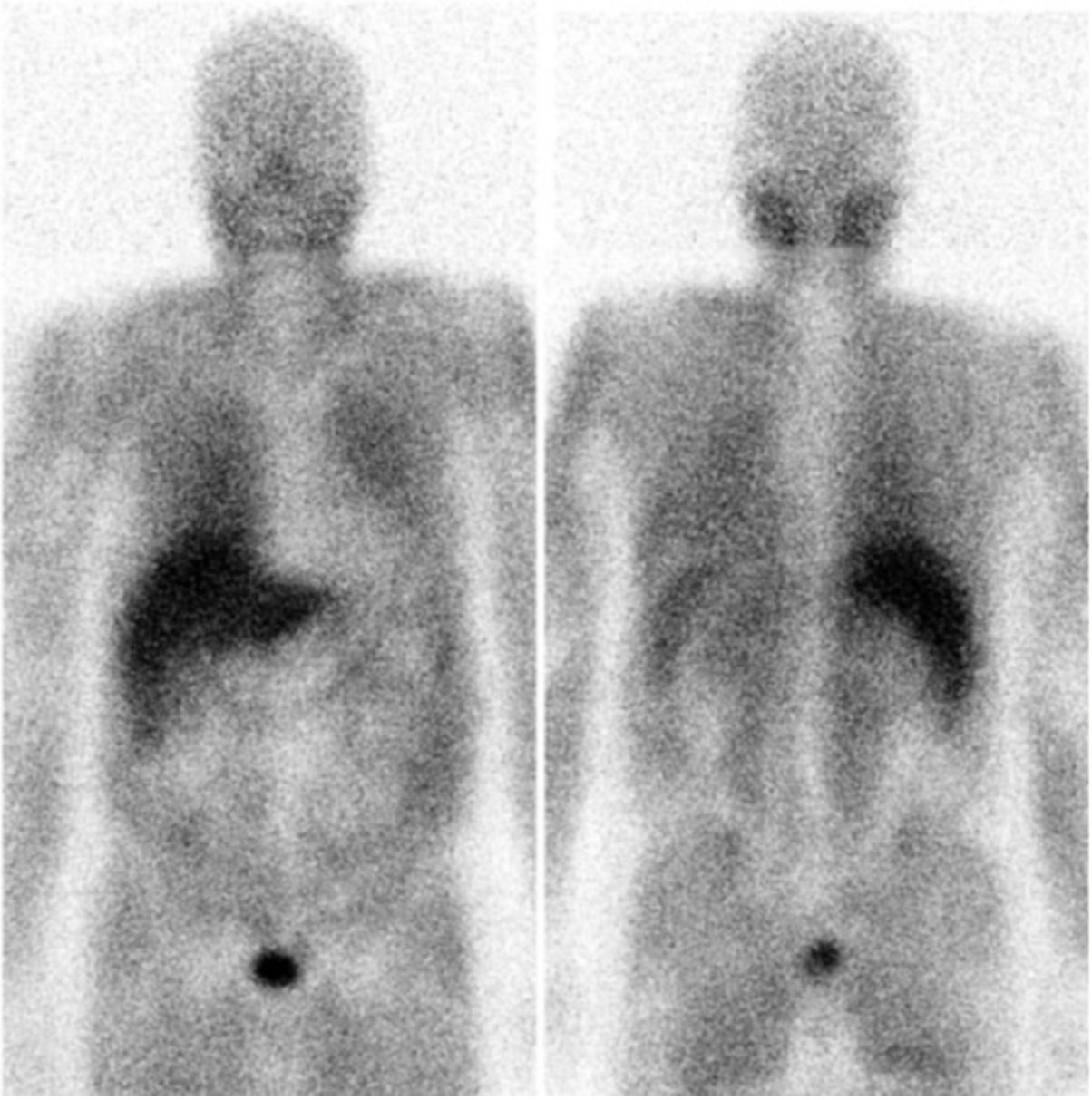

Figure 1. 61-year-old man with suspected pheochromocytoma. Anterior and posterior I-123-MIBG scintigraphy at 24 hours demonstrates abnormal diffuse uptake of tracer throughout the muscles. No focal areas of MIBG uptake that would suggest pheochromocytoma are identified.

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It is well known that MIBG biodistribution may be altered by labetalol, reserpine, calcium channel blockers, tricyclic antidepressants, sympathomimetics, cocaine, adrenergic neuron blockers, and some tranquilizers. These drugs should be discontinued one week before MIBG scintigraphy.

Interference of MIBG uptake by mirtazapine has not been previously described. Mirtazapine has a specific mode of action: it induces enhanced noradrenergic and serotonergic neurotransmission by antagonizing presynaptic α2-receptors and thus blocking neurotransmitter re-uptake (uptake-1 mechanism). Drugs including labetalol are known to block MIBG uptake via uptake-1 inhibition and therefore it is likely that the effect of mirtazipine in this patient was mediated by the same mechanism.

This is the first known report of altered MIBG biodistribution secondary to a tetracyclic antidepressant (mirtazapine). We feel that it should be added to the list of drugs that interfere with MIGB scans.

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