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Abstract: This article reports a patient who had a pheochromocytoma identified on 123I MIBG scintigraphy following incidental detection of an adrenal mass on abdominal CT. The CT study was performed to evaluate ongoing severe lower abdominal pain and changes in bowel movements.

Pheochromocytoma: An Unexpected Finding.

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Foot line: PHEOCHROMOCYTOMA ON MIBG

ABSTRACT

This article reports a patient who had a pheochromocytoma identified on ^{123}I MIBG scintigraphy following incidental detection of an adrenal mass on abdominal CT. The CT study was performed to evaluate ongoing severe lower abdominal pain and changes in bowel movements.

KEY WORDS: MIBG, pheochromocytoma, scintigraphy, subtraction

INTRODUCTION

A 29 year old female was referred from general practice for computed tomography (CT) evaluation of pelvic discomfort and changes in bowel movements. The CT study found a left adrenal 'incidentaloma'. The adrenal mass was 2.9cm by 1.6cm and demonstrated soft tissue density without any calcification. Contrast enhancement demonstrated heterogeneity. The CT findings were reported to be consistent with an adenoma rather than a pheochromocytoma. A follow-up CT scan was referred from general practice while an MIBG (metaiodobenzylguanidine) scan was requested by the endocrinologist.

The follow-up CT scan offered little additional information, reporting a left supra renal enhancing mass of 3.2cm by 1.8cm by 2.5cm with a measured density of 80Hz. The lesion was thought to represent either an adenoma or pheochromocytoma.

Whole body and planar scintigraphy was performed at 4 and 18 hours post intravenous (IV) administration of 300 MBq ^{123}I MIBG. On completion of the 18 hour data set, 300 MBq of $^{99\text{m}}\text{Tc}$ DTPA was administered IV to aid in lesion localization. The patient was pre-treated with Lugol's solution to block thyroid uptake.

The 18 hour whole body MIBG study (figure 1) demonstrated a focally intense accumulation of the radiopharmaceutical medially in the left upper quadrant of the abdomen. Uptake elsewhere reflected normal biodistribution including; salivary glands, liver, heart, thyroid, kidneys and bladder. Posterior planar projections, including $^{99\text{m}}\text{Tc}$ DTPA images, suggest the lesion is localized in the supero-medial aspect of the left kidney (figure 2). ^{123}I MIBG / $^{99\text{m}}\text{Tc}$ DTPA summation images failed

to adequately delineate lesion location due to contrast limitations. Normalized subtraction imaging, however, confirmed lesion location to the supero-medial aspect of the left kidney (figure 3).

The focally intense increase in radiopharmaceutical accumulation was thought to be consistent with a pheochromocytoma. No metastatic disease was noted. The diagnosis of pheochromocytoma was supported by increased noradrenaline levels in plasma and urine. On further investigation, the patient noted increasing incidence and severity of panic attacks. ^{123}I MIBG provided both diagnosis and pre-surgical localisation.

Figure 1: Whole body ^{123}I MIBG demonstrating focal accumulation of radiopharmaceutical medially in the left upper quadrant.

Figure 2: Posterior planar ^{123}I MIBG and $^{99\text{m}}\text{Tc}$ DTPA images.

Figure 3: Normalized subtraction imaging for improved lesion localization.

DISCUSSION

It is quite common for CT to detect unexpected adrenal masses (1,2).

Pheochromocytomas are a rare catecholamine producing tumor with potentially fatal consequences if undetected (2-4). Patients tend to present with hypertension, sweating, pallor, anxiety attacks and severe headache (3,4).

While the most sensitive test to confirm diagnosis remains unclear (4), the most common tests performed are urinary normetanephrine and platelet norepinephrine (2,4). MIBG imaging has been reported to improve the sensitivity of these procedures to nearly 100% (4). More importantly, after confirmation localization is crucial for surgical resection (3,4).

Structurally, MIBG resembles norepinephrine and guanethidine and concentrates in neurosecretory granules (4-6). The overall sensitivity and specificity of ¹²³I MIBG for pheochromocytomas is 91-96% and 100% respectively (7-8). MIBG is primarily used for pre-surgical localization and whole body screening for ectopic or metastatic pheochromocytoma but is also useful for detection of pheochromocytomas, especially in the absence of positive biochemical markers (4,6).

This case study illustrates the importance of ¹²³I MIBG in the evaluation of incidental radiological findings of the adrenal glands. It further highlights the value of ¹²³I MIBG in pre-surgical localization of pheochromocytoma and evaluation for metastatic disease. Finally, the study demonstrates the potential of renal subtraction scintigraphy in more accurate lesion localization.

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FIGURES LEGEND

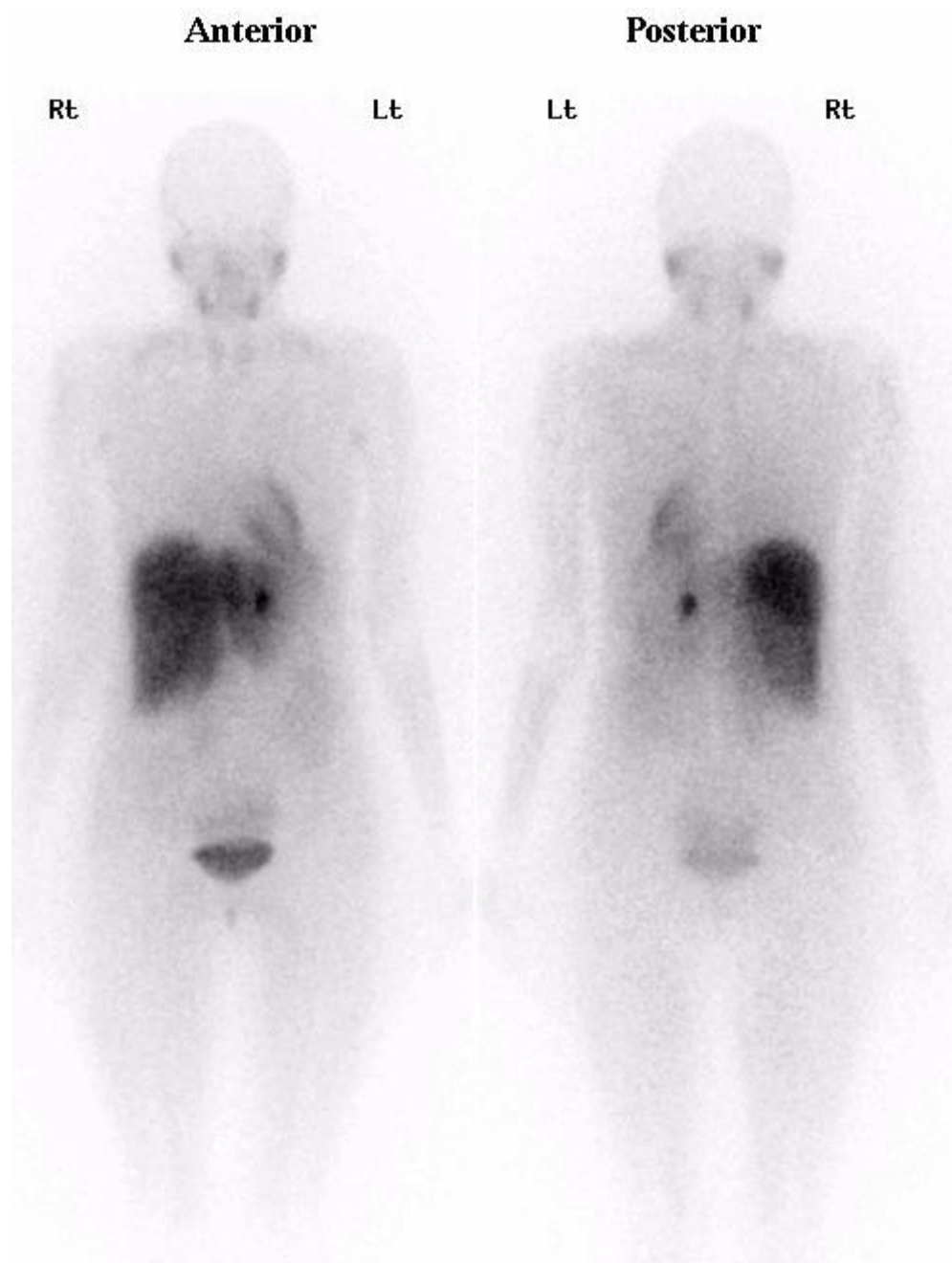


Figure 1: Whole body ^{123}I MIBG demonstrating focal accumulation of radiopharmaceutical medially in the left upper quadrant.

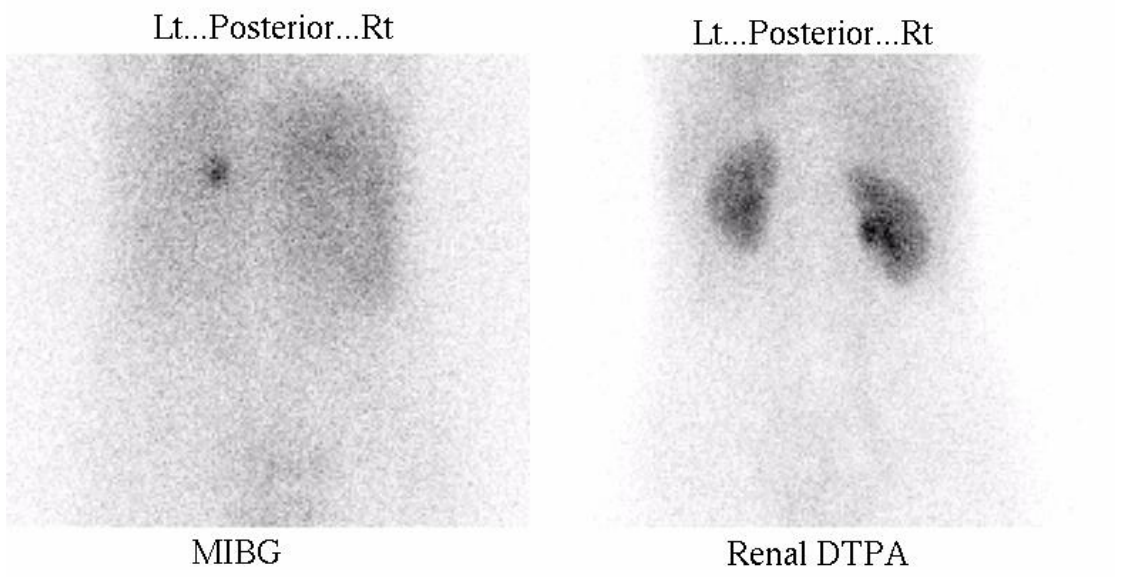


Figure 2: Posterior planar ^{123}I MIBG and $^{99\text{m}}\text{Tc}$ DTPA images.

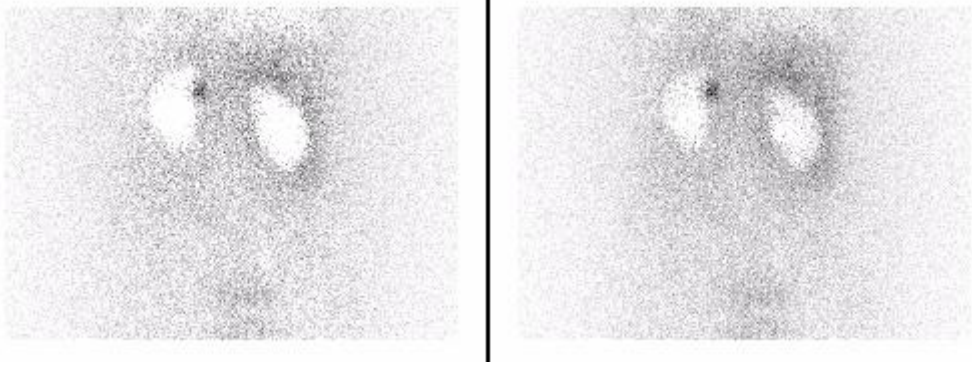


Figure 3: Normalized subtraction imaging for improved lesion localization.