

# IMAGING GAMUT

## False-positive mediastinal parathyroid adenoma on $^{99m}\text{Tc}$ -MIBI scanning in a patient with parathyroid carcinoma

Kashif Niyaz\*, Akhtar Ahmed, Javed Mehboob, Waqar Hussain, Maseeh uz Zaman, Abid Hameed

Karachi Institute of Radiotherapy and Nuclear Medicine

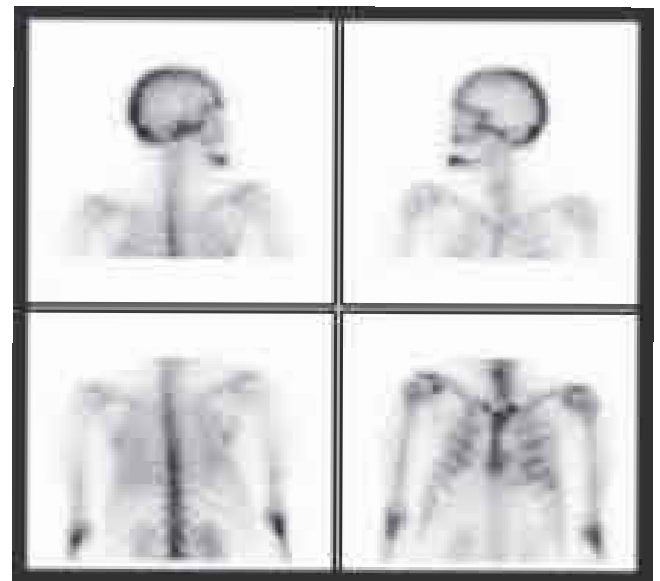
**Key Words:** Parathyroid adenoma, MIBI parathyroid scan, parathyroid carcinoma

**Background** A 39-year-old male presented with complaints of backache and progressive loss of hearing for three months. Biochemical tests reveals serum calcium at 17.7 mg/dl (normal range 8.5-10.3 mg/dl), blood urea at 129 mg/dl (normal range 7-30 mg/dl), serum creatinine at 2.4 (normal range 0.7- 1.4 mg/dl) and serum parathyroid hormone, PTH, raised at 882 pg/ml (normal range 11-54 pg/ml). In light of the patient's symptom and the laboratory findings suggestive of hyperparathyroidism, the patient was referred to the nuclear medicine department for parathyroid and skeletal scintigraphy.

**Procedure** Whole-body skeletal scintigraphy was performed with  $^{99m}\text{Tc}$ -methylene disphosphonate. Dual-phase planar  $^{99m}\text{Tc}$ -MIBI scintigraphy was performed after injection of 740 MBq of  $^{99m}\text{Tc}$ -MIBI at 20- and 120-minute postinjection. A SPECT scan was also performed at 150-minute postinjection.

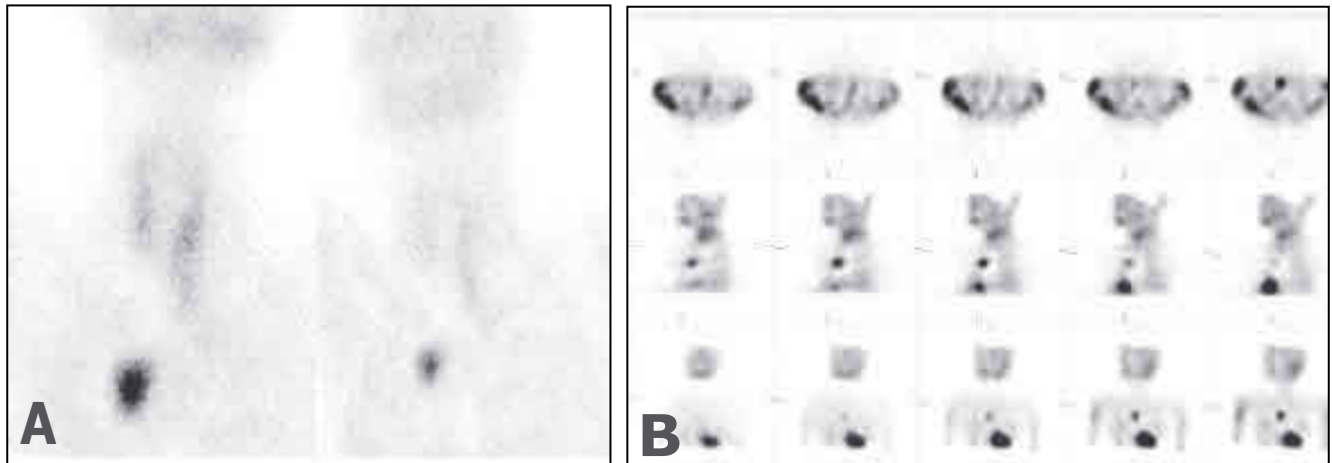
### \*Correspondence

Dr. Kashif Niyaz  
Department of Nuclear Medicine KIRAN, University road Karachi, Pakistan  
Tel: 92-021-99261601-4  
Fax: 92-021-99261610  
Email: drkashif11

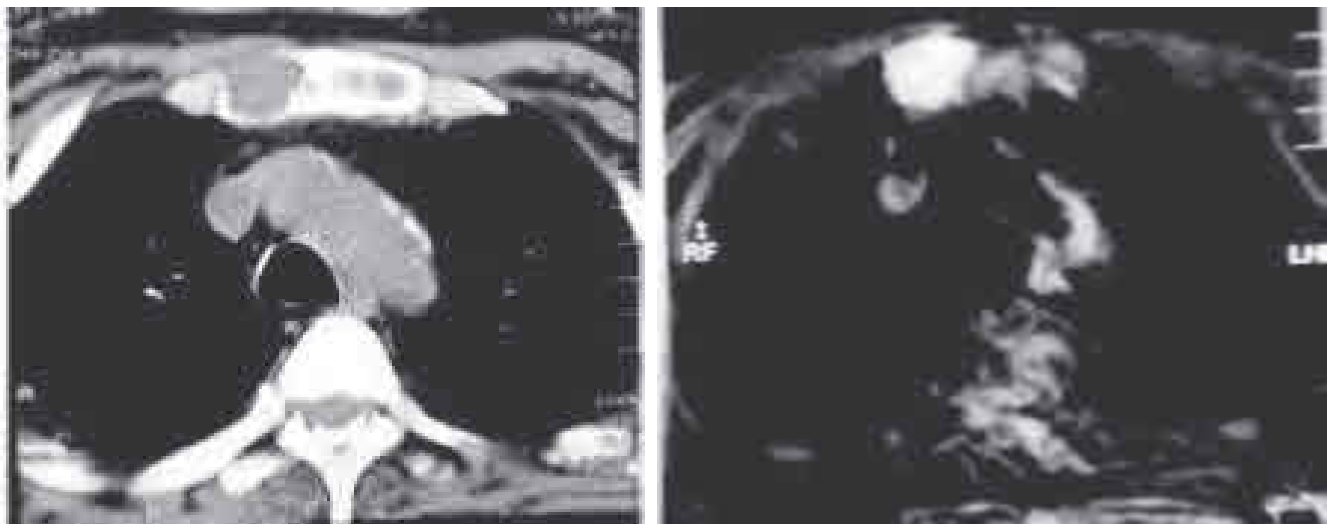


**Figure 1** Whole-body skeletal scintigraphy with  $^{99m}\text{Tc}$ -MDP is essentially normal

**Findings** The whole-body bone scan revealed diffuse calvarial uptake with no focal pathology documented (Figure 1) Both the early and the late planar MIBI scans showed a focal area of intense increased uptake in the chest together with faint localised uptake adjacent to the lower pole of the left lobe of the thyroid (Figure 2A). However, there was no abnormality noted at this site on the SPECT scan, which only showed the abnormal focus of uptake in the anterior mediastinum (Figure 2B). The chest lesion was thought to represent an ectopic parathyroid adenoma.



**Figure 2** (A) Planar dual-phase  $^{99m}\text{Tc}$ -MIBI scintigraphy at 20-minute (left) and 120-minute (right); (B) SPECT scan acquired at 150-minute postinjection



**Figure 3** CT scan viewed on the bone window (left) and MRI chest (right)

The MRI images of the chest revealed an expansile lesion with an abnormal signal in the right of the manubrium sternum without any evidence of a mediastinal lesion seen (Figure 3A). The CT scan confirmed the MRI findings of a lytic lesion with an anterior cortical break involving the right side of the manubrium sternum (Figure 3B).

The CT findings were suggestive of brown tumour. On surgical exploration, a firm parathyroid nodule (2.4x1.9x1.5 cm) at the lower pole of the left lobe of thyroid was found.

Histopathology of the specimen nodular and hypercellular tumour with evidence of capsular invasion. Most of the cells were chief cells with some pleomorphism and calcification with the appearances consistent with parathyroid adenocarcinoma.

**Conclusions** The  $^{99m}\text{Tc}$ -MIBI parathyroid scan showed intense focal uptake in a brown tumour which seemed to mimic an ectopic parathyroid adenoma but the scan failed to identify the culprit lesion in the parathyroid.

**Comments** Parathyroid carcinoma is a very rare cause of PTH-dependent hypercalcaemia, accounting for less than 1% of all cases of hyperparathyroidism [1].

In primary hyperparathyroidism, brown tumour is an uncommon bone disease [2] but sternal involvement has been previously reported [3-5]. An awareness of this potential cause of a false-positive parathyroid scan result with <sup>99m</sup>Tc-MIBI is important to avoid this rare but important diagnostic pitfall.

## References

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