

## Diagnosis of parathyroid adenoma in chronic kidney disease by Tc-99m-MIBI SPECT/CT imaging

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### **Case Report:**

A 68-year-old woman with a 7-year history of well-controlled diabetes and stage 4 chronic kidney disease (CKD) required increased doses of bisacodyl for her chronic constipation over the past year. Her baseline serum creatinine levels were 2.5-2.7 mg/dL. In one year, her serum creatinine levels increased up to 3.5 mg/dL and serum calcium levels increased from 2.32 to 2.81 mmol/L. Other laboratory tests revealed phosphate, 3.9 mg/dL; intact parathyroid hormone (iPTH), 440.7 pg/mL (reference range, 10-65 pg/mL); and proteinuria (1+). She denied exposure to nephrotoxic drugs or health foods containing calcium, and did not experience a pulmonary infection. Renal ultrasound demonstrated no stones or hydronephrosis. Parathyroid ultrasound indicated one 1.5-cm hypoechoic nodule posterior to the right thyroid with suspicion of parathyroid hyperplasia or adenoma. We administered Tc-99m-MIBI parathyroid scintigraphy with SPECT/CT (Fig 1), which disclosed an intense round focus in the lower pole of the right thyroid with high suspicion of parathyroid adenoma. The patient underwent right parathyroidectomy and the pathology (Fig 2) revealed a parathyroid adenoma. Her renal function and constipation stabilized, and hypercalcemia and iPTH resolved rapidly following resection.

In the setting of advanced CKD, distinguishing parathyroid adenoma from hyperplasia is difficult with ultrasound and contrast CT, which also have pitfalls in detecting ectopic lesions. Tc-99m-MIBI is the most sensitive technique for detecting parathyroid adenomas than hyperplasia. Tc-99m-MIBI uptake can be graded according to a semi-quantitative scale. An intense uptake indicates a low probability of success with medical treatment, and thus, a parathyroidectomy should be considered. Moreover, SPECT/CT has superior sensitivity and produces detailed anatomical imaging of ectopic foci. The case shows that Tc-99m-MIBI

SPECT/CT can aid in the prompt *decision-making* of determining the treatment strategy for CKD patients that present with hypercalcemia, modestly high iPTH levels, and equivocal results on ultrasound.