Surgical Management of Secondary Hyperparathyroidism in End-stage Kidney Disease: A Case Report

Leszek Sulkowski, Maciej Matyja, Artur Pasternak

ABSTRACT

A 56-year-old male patient with end-stage kidney disease (ESKD) on hemodialysis, presented with features of severe secondary hyperparathyroidism (SHPT). He failed to respond to conservative management. So he was evaluated for surgical treatment (parathyroidectomy). Radionuclide scintigraphy revealed hypertrophied and adenomatous parathyroid glands. He underwent parathyroidectomy, in which all parathyroid glands were excised. Postoperatively patient felt significant relief in bone pain. Parathyroidectomy can be offered to a patient of secondary hyperparathyroidism due to chronic renal failure if conservative measures fail.

Keywords: Secondary hyperparathyroidism, Technetium 99m Methoxy-Isobutyl-Isonitrile scintigraphy, Parathyroid gland, Parathormone, Parathyroidectomy, End-stage renal disease; Hemodialysis.

INTRODUCTION

Renal failure is the most common cause of secondary hyperparathyroidism (SHPT). Due to the nonactivation of vitamin D by failed kidneys, calcium absorption from the gut is reduced, leading to hypocalcemia. Phosphate excretion by kidneys is also reduced, leading to hyperphosphatemia. In response to hypocalcemia, parathyroid glands start overproducing parathormone. Over some time, parathyroid glands undergo hypertrophy and adenomas may also develop. Due to high levels of parathormone in blood, bones undergo demineralization, as a result of which the patient gets persistent pains in bones and joints. In the early stages, most of these patients can be managed successfully with drugs viz. phosphate binders, vitamin D₃ supplements, vitamin D, and cinacalcet. Some patients, especially in later stages fail to respond. They are the ones who may benefit from surgery, in the form of parathyroidectomy.

CASE REPORT

A 56-year-old male patient was undergoing hemodialysis thrice a week for end-stage kidney disease (ESKD) for 5 years. He started feeling increasing pain in his bones and joints. The pain became very troublesome and failed to respond to conservative management with low phosphate diet and drugs (phosphate binders, vitamin D₃, active vitamin D₃, and cinacalcet). So he was referred to our department by his treating nephrologist for evaluation for parathyroidectomy.

To evaluate the location and size of parathyroid glands, the patient underwent Technitium 99m Methoxy-Isobutyl-Isonitrile (Tc99m MIBI) scintigraphy. Two scans were taken, one 10 minutes and another 2 hours after radionuclide injection (Fig. 1). All four parathyroids were located in their usual anatomical positions behind thyroid gland, and all were enlarged. So he was taken up for parathyroidectomy under general anesthesia through a transverse skin incision over the neck. All four parathyroids were easily located (Fig. 2). They were enlarged and excised (Fig. 3). The patient made an uneventful recovery. He was put on calcium carbonate and alfacalcidol post-operatively. He was discharged on the 4th postoperative day. Histopathological examination of the parathyroid glands showed hypertrophy. The patient is currently on follow-up and admits significant relief in his symptoms (bone and joint pains).

DISCUSSION

Parathyroidectomy should be considered in a severely symptomatic patient of SHPT, who fails to respond to conservative management. Elevated parathormone levels come down and excessive bone demineralization stops. This leads to significant clinical improvement in
symptoms, as we saw in this patient. Before surgery, it is essential to locate parathyroid glands accurately. A 99mTc-MIBI scintigraphy is quite useful in finding the exact location of parathyroids and in evaluating their size. Some patients may have ectopic parathyroids also, located in the mediastinum or elsewhere. Radionuclide scintigraphy will reveal their presence, as well as that of normally positioned parathyroids. If a supernumerary or ectopic parathyroid is missed at surgery, surgery will be incomplete and so ineffective. Therefore, we believe, 99mTc-MIBI scintigraphy is an essential imaging investigation before carrying out parathyroidectomy.1,4

Other surgical procedures described are subtotal parathyroidectomy (in which 3 out of 4 parathyroids are totally excised, and most of the 4th parathyroid is also excised except a tiny part) and total parathyroidectomy with autotransplantation of one gland into the forearm. Both these procedures are aimed at retaining some parathormone secretion from the gland. Recurrence of SHPT is, however, possible if some part of the gland is retained. Autotransplantation in forearm has the advantage that it is easily accessible, should need for re-exploration arise.1,5

Quality of life of a patient of ESKD on hemodialysis is not quite satisfactory. If SHPT comes on top of it, causing severe pain in bones and joints, quality of life further worsens. So parathyroidectomy has a role to improve a patient’s quality of life a little, if conservative management fails, by relieving his symptoms.6,7

CONCLUSION
A case of SHPT in a patient of ESKD on hemodialysis, who failed to respond to conservative treatment with drugs, was subjected to parathyroidectomy. Before surgery, 99mTc-MIBI scintigraphy was carried out to locate the glands and evaluate their size. He made an uneventful recovery, and his symptoms of severe bone and joint pains showed marked improvement. Parathyroidectomy has a definite role in the management of SHPT in ESKD patients, in whom conservative management fails.

Figs 1A and B: 99mTc-MIBI scintigraphy. The scans took 10 minutes (A) and 2 hours (B) after radionuclide injection

Figs 2A to C: Intraoperative neck exploration: (A) Right inferior parathyroid gland; (B) Left inferior parathyroid gland; (C) Right superior parathyroid gland
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Fig. 3: Parathyroid glands postoperatively (yellow arrow head–right inferior PG; white arrowhead–left inferior PG; yellow arrow–right superior PG; white arrow–left superior PG)

REFERENCES


