

A complex case of parathyroid carcinoma

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We report a case of a female student with metastatic parathyroid carcinoma who initially presented at the age of 19 with renal colic secondary to stone formation: we have no record of a serum calcium at that time. At the age of 30 she was referred to an orthopaedic surgeon in Scotland with a 5 year history of intermittent left knee pain. Xray showed radiological features consistent with a brown tumour in the upper left tibia. She had a history of type 1 diabetes from childhood. On further questioning she complained of a two year history of polyuria, polydipsia, constipation and lethargy. On examination a 3cm palpable mass located in the right side of the neck was found: biochemistry demonstrated a corrected calcium of 3.4 mmol/l, PTH of 53 pmol/L (1.6-6.9) and ALP of 1160 IU/L. A Sestamibi radionuclide scan confirmed an abnormal right upper parathyroid gland. She underwent a parathyroidectomy and a right upper parathyroid gland weighing 3.5 grams and measuring 2.5cm was removed. Histology revealed a parathyroid carcinoma that was adherent to thyroid tissue. She was referred to an oncologist; a CT scan of her neck and thorax and FDG PET scan were normal. Whole body octreotide scanning with SPECT showed uptake in the left knee corresponding to the brown tumour. She was *MEN1* mutation negative. Over the next 2 years her calcium and PTH levels remained normal.

At the age of 33 years biochemistry demonstrated a rising calcium and PTH levels and an ultrasound scan and Sestamibi scan showed a recurrence with an abnormal right upper parathyroid gland. She underwent a second parathyroidectomy with aggressive clearance resulting in the removal of the right upper and lower parathyroid glands, right lobe of the thyroid gland and clearance of her level 6 lymph node compartment. Histology of the right upper gland (1.7cm) was consistent with a parathyroid carcinoma with focal invasion of the adjacent thyroid tissue. CT and FDG-PET scans now revealed pulmonary metastases. The patient declined chemotherapy, but was considering immunotherapy.

She was referred to St Bartholomew's Hospital at the age of 35 years due to persistent hypercalcaemia. Biochemistry revealed a corrected calcium of 2.98 mmol/L, PTH 82.7 pmol/l (1.6-6.9), 25-OH-vitamin D <18 nmol/L and urinary calcium 12.9 mmol/24hr. She was commenced on cinacalcet and ergocalciferol. CT showed 4 pulmonary metastases bilaterally which had increased in size over a period of one year and there were sclerotic bone lesions in the thoracic vertebrae suggestive of bone metastases. Ultrasound of the neck revealed no parathyroid or thyroid lesions. On cinacalcet 90mg BD the corrected calcium initially normalised to 2.51 mmol/l. However, 4 months later it had risen to 2.89 mmol/L and thus an infusion of zoledronate was given. A CT showed that over a 6 month period the pulmonary metastases had increased in volume by 30%. A Sestamibi scan revealed no uptake in the parathyroid or lung metastases. Octreotide scanning with SPECT revealed octreotide avid disease in the sternum, left side of the neck and thyroid, but the lung metastases were not octreotide avid. FDG-PET showed the bone metastatic deposits had moderate FDG avidity while the lung metastases had a lack of uptake.

The patient now expressed a strong desire for future fertility. The management plan changed to attempt to debulk metastatic tumour tissue and thus reducing the need for cinacalcet prior to any attempted pregnancy. The patient underwent radiofrequency ablation of two of the pulmonary metastases on the right thorax. The procedure was complicated with a right haemopneumothorax which required a chest drain. Currently, 2 months after the procedure, the cinacalcet dose has been reduced to 60mg OD and there is normalisation of the calcium levels and significant reduction in the PTH levels. She will be considered for radiofrequency ablation to the single left sided pulmonary lesion with the aim of further reducing tumour bulk and allowing her cinacalcet dose to be further lowered, so that the patient can attempt conception.

In summary, we present a complex case of a 36 year old lady who has parathyroid carcinoma with pulmonary and bone metastases. It is now 6 years since she was originally diagnosed and she has expressed a strong desire for fertility, which has presented us with a complex management issue. There is only one previously described case report of the use of radiofrequency ablation for pulmonary metastases from parathyroid carcinoma¹. In our patient radiofrequency ablation of her pulmonary metastases with reduction of her tumour volume has brought a significant decline in her calcium and PTH levels with the aim of reducing or

stopping potentially teratogenic medications in order to allow the possibility of future conception.

¹ Iguchi T, Yasui K, Hiraki T et al. Radiofrequency ablation of functioning lung metastases from parathyroid carcinoma. *J Vasc Interv Radiol* 2008; 19(3):462-464.