Clinical summary

- Female 44 year-old with well-differentiated papillary thyroid carcinoma treated with total thyroidectomy followed by $^{131}$I ablation therapy
- Presents with rising thyroglobulin levels on follow-up
- Diagnostic $^{131}$I scan shows no abnormal iodine-avid disease
- FDG PET/CT performed for identification of de-differentiated disease
PET/CT findings

Intense FDG uptake in the right thyroid bed (A) and upper mediastinal nodes (B & C), consistent with recurrent disease. No distant disease seen elsewhere.

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Clinical summary

• Male 59 year-old with papillary thyroid carcinoma and local nodal disease at presentation

• Managed with total thyroidectomy and modified neck resection, followed by $^{131}$I ablation therapy

• The patient presents with nodal recurrence 3 years later, treated with further $^{131}$I ablation

• The patient developed a mass in left neck 4 years after 2$^{nd}$ therapy, with a markedly elevated thyroglobulin level, but a diagnostic $^{131}$I scan did not reveal any abnormal $^{131}$I uptake

• FDG PET/CT was performed for further evaluation
Intense FDG uptake noted in the palpable left cervical lymph node (A), left parapharyngeal space mass extending into the hypopharynx (B), subcutaneous nodule overlying the left sternocleidomastoid (C- arrow), with distant metastases in the right lung (D).
Clinical summary

- Female 46 year-old presents with radioiodine-negative metastatic thyroid carcinoma to left femoral head
- FDG PET/CT was performed for further evaluation
The PET/CT scan is consistent with multiple metabolically active lytic bony metastases in the vertebrae, pelvis and left hip.
Teaching points

- FDG PET/CT is useful for detection of occult disease in follow-up of patients with differentiated thyroid carcinoma presenting with elevated serum thyroglobulin levels and negative diagnostic $^{131}$I scan after treatment.

- FDG PET/CT is also useful to assess disease extent in well differentiated thyroid carcinoma.

- The diagnostic accuracy for detection of differentiated thyroid cancer is up to 93% for PET/CT.

Clinical summary

- Female 38 year-old with medullary thyroid carcinoma treated with total thyroidectomy and neck dissection
- Presents with elevated serum calcitonin levels 2 years post-surgery
- Ultrasonography revealed a few left neck nodes which were confirmed as disease on nodal dissection
- On follow-up, a rising trend of serum calcitonin level was again noted, but neck ultrasound was normal
- FDG PET /CT was performed to rule out metastatic disease
The PET/CT scan shows FDG uptake in a right retrosternal node (A & B), with milder FDG uptake in the lytic lesion in the right ilium (C & D).
Teaching points

• Detection of medullary thyroid carcinoma with FDG PET is related to volume of disease as evidenced by serum calcitonin levels.

• FDG PET/CT may be useful in identification of occult disease in the setting of rising tumour markers, such as calcitonin and CEA.

• PET/CT is critical as metastatic lesions may be small and can occur throughout various organ systems