

Hong Kong Association of Endocrine Surgeons  
4<sup>th</sup> Clinical Meeting on 8 Oct 2021

# A patient with parathyroid adenoma

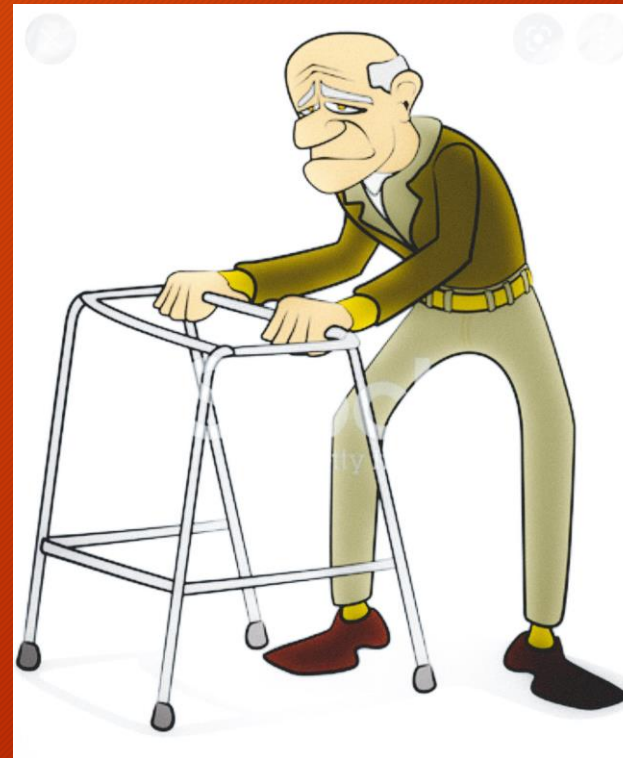
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(Private Practice)

# History

- M/61 CLH
- Retired civil servant (driver)
- FHx:
  - Father died of HCC at age 80+
  - Younger brother died of malignant tumor of muscle
  - Younger sister had CA colon
- Presented to private orthopaedic surgeon for back pain, progressive muscle weakness, weight loss 20lb and bone pain over one year
- Appetite normal
- No history of fall or fracture

# History

- Found osteopenia, increase ALP to 376 U/L in Sep 2017
- Private DEXA scan:
  - Hip T score -2.6, BMD 0.475
  - L2-4: T score -4.8, BMD 0.612
- Attend AED, then admitted to Medical Department in HA Nov 2017

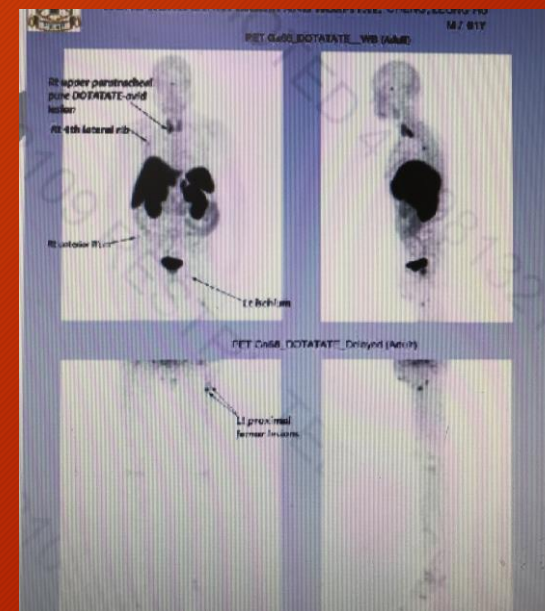
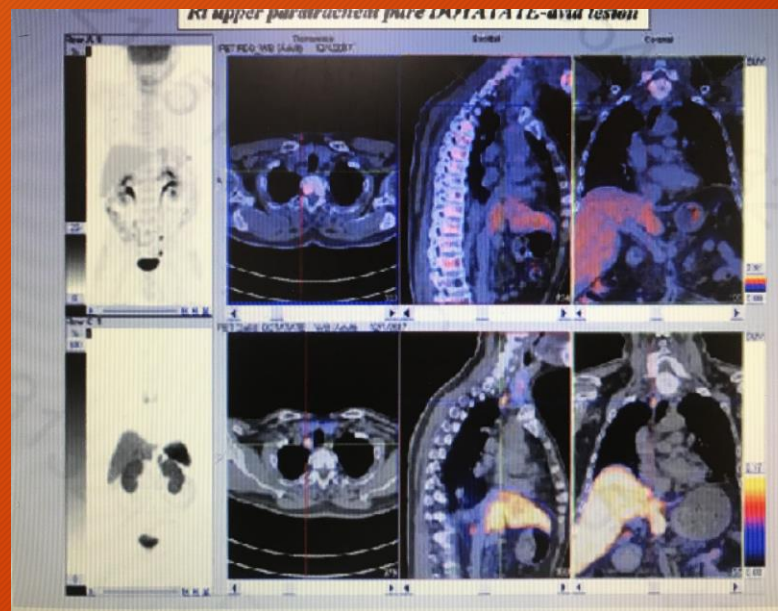


- Blood test:

- Normal calcium 2.2 - 2.4 mmol/l
- Low phosphate 0.31 - 0.38 mmol/l
- ALP increase 142 - 376 U/L
- Parathyroid hormone (PTH) markedly increase 103-116 pmol/L (1.6-6.9)
- 25-OH Vitamin D level: 17 nmol/L (moderate deficiency)
- All tumor markers negative

- Skeletal survey:
  - degenerative changes over TS & LS
  - Bony osteoporosis
  - No vertebral collapse
- USG neck at HA:
  - multiple thyroid nodules , no evidence of enlarged parathyroid

- Private 68-Gallium Dotatate & FDG PET CT at HKS&H:
  - Uptake at right paratracheal region 13x22mm, SUV max 9.3
  - Multiple mild uptake at rib, ilium and femur, SUV max 1.7 - 4.6 suggestive of osteomalacia



- 24-Hr Urine

- Creatinine 5.78 mmol/D (normal)
- Phosphate 15.7 mmol/D (normal)
- TmP/GFR 0.32 (low)

- Plan to check fibroblast growth factor 23 (FGF-23)

- Working Dx:

- occult tumor causing malignancy induced osteomalacia (Osteogenic osteomalacia)

- But the patient attended private hospital for further workup
- Review by endocrinologist
  - HA result reviewed
- 24-Hr Urine
  - Calcium 4.1 mmol/D (normal)
  - Phosphate 86.9 mmol/D (13-42)
- Given phosphate and rocaltrol

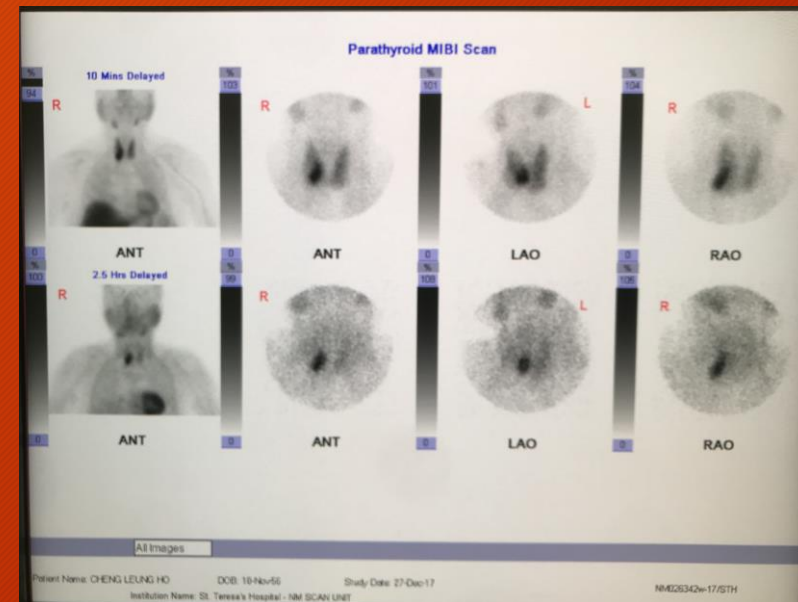


- CT thorax:
  - Contrast enhancing lesion 14x20x40mm at right side of trachea and oesophagus at thoracic outlet, corresponding to 68-Ga Dotatate lesion on PET
  - CT appearances are non-specific
  - But clinical scenario is suspicious of an endocrine tumor originated from parathyroid gland or adjacent soft tissue
- Patient referred to me at this juncture

- USG neck repeated at private hospital:
  - Multiple cysts and hypoechoic nodules, all with benign features
  - 1.5 x 1cm oval shape hypoechoic lesion below right thyroid is seen deep to mid to lower pole of right thyroid, with faint fatty hilum which may represent a mildly enlarged lymph node or parathyroid, the lower border is not well visualized

- MIBI scan:

- MIBI avid lesion measuring 1.9 x 1.6 x 3.2cm located posterior to the right thyroid lower pole near thoracic inlet region
- Consistent with a solitary parathyroid adenoma at right lower pole
- No evidence of multifocal disease
- No ectopic lesion is present in the mediastinum



- Offer surgery:
  - Right parathyroidectomy with focus approach +/- neck exploration

# Operation

- On exploration
  - 4cm elongated right parathyroid gland located below right thyroid is seen
  - Consistent with CT findings
  - Adhered to oesophagus, located behind recurrent laryngeal nerve
  - Frozen section: Consistent with abnormal parathyroid tissue
- Final histology
  - Benign parathyroid adenoma



# Post operative progress

- Hungry bone syndrome
- Intravenous calcium supplement were given
- followed by oral calcium, phosphate supplement and rocaltrol were given upon discharge
- Back to HA for follow up

# Further follow up in HA

- PTH drop from 103 to 11.8 pmol/L
- ALP drop 376 to 265 U/L
- Calcium 1.97 mmol/L
- Phosphate 0.88 mmol/L
- Total 25 OH Vitamin D: 17 to 29 nmol/L
  
- No more bone pain
- No cramping

# Discussion

- Normocalcemic primary hyperparathyroidism
- Vitamin D Deficiency
- Osteogenic Osteomalacia
- Ectopic parathyroid location



# Normocalcemic Primary Hyperparathyroidism

- No hypercalcaemia but high PTH
- May uncovered during workup for osteoporosis or low bone mineral density (BMD)
- Hypothesis:
  - “early” type of primary hyperparathyroidism
  - Target organ resistance to action of PTH
- Check serum / ionized calcium low at two occasions
- Exclude secondary causes:
  - Vitamin D deficiency
  - Reduced creatinine resistance
  - Loop diuretics and lithium
  - Hypercalciuria

# Vitamin D Deficiency

- Affect calcium absorption
- Parathyroid hormone production increases
- Calcium is mobilized from bones
- Increase bone resorption
  
- → secondary hyperparathyroidism

# Osteomalacia

- Disease characterized by impaired bone metabolism due to inadequate level of available phosphate, calcium and vitamin D
- Most common cause of osteomalacia is Vitamin D deficiency
- Less common causes:
  - Hereditary deficiencies of Vitamin D or phosphate
  - Malignancy

# Osteogenic Osteomalacia

- Development of a tumor that causes bone to be weakened
- Tumor secretes FGF 23
- Inhibit the ability of kidneys to absorb phosphate
  - Hypophosphatemia and hyperphosphaturia
- Majority are small or slow-growing tumor (usually benign) in the skin, muscles, or bones of extremities or in the paranasal sinus of head

# Ectopic Parathyroid location

- Due to embryological development and migratory descent to lower neck
- Account for 4-16% cases of hyperparathyroidism
- Mostly in anterior mediastinum
- May cause failure in primary surgery for hyperparathyroidism
- MIBI is more sensitive than USG neck

Thank you very much