

Skeletal Survey of Primary Hyperparathyroidism

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Abstract: Parathyroid hormone plays a key role in maintaining calcium homeostasis in the human body. Excess production of parathyroid hormone results in hyperparathyroidism which can be further classified as primary, secondary and tertiary depending on its aetiology. Although biochemical estimation of serum calcium, phosphate and parathyroid hormone provides definitive diagnosis of hyperparathyroidism, modalities like conventional radiography, ultrasound, CT and MRI helps in localisation and better assessment of disease severity. We review a case of 28 year old female with a history of muscle weakness, anorexia with pain in hip joint and legs. Subsequent radiographic and biochemical findings were consistent with primary hyperparathyroidism.

Keywords: parathyroid hormone, hyperparathyroidism, radiographic, biochemical

1. Case Presentation

A 28 year old female presented with history of severe pain in hip joint and legs since 5months. She had difficulty in walking and was restricted to wheelchair. Patient also had history of progressive muscle weakness and anorexia. Radiograph of pelvis and femur revealed multiple well defined osteolytic lesions in proximal shaft of right femur and left iliac blade. [FIGURE 1]. MRI study showed multiple intramedullary solid cystic lesions of varied size in proximal and mid femoral shaft with predominant cystic lesions appearing hypo intense on T1WI, T2WI. Solid lesions appeared hypo intense on T1WI and T2WI with post contrast enhancement. [FIGURE 2A, 2B and 2C]. Possibility of Brown's tumour or osteitisfibrosacystica was kept. Radiograph of hands showed subperiostealresorption along phalanges of fingers and a small lucent lesion in shaft of 3rd metacarpal on right side [FIGURE 3]. USG neck revealed a large well defined hypoechoic lesion in right side of neck overlying right thyroid gland with increased vascularity within. Provisional diagnosis of parathyroid adenoma was made. It was further confirmed on CECT neck which showed a well-defined heterogeneously enhancing nodular mass lesion of approximate size 33x24x23mm noted in right side of neck posterior to right lobe of thyroid which was mildly abutting trachea. [FIGURE 4] Biochemical studies revealed hypercalcemia - 12.5 mg/dl, raised alkaline phosphatase [530U/L] and increased parathyroid hormone levels [311pg/ml]. Imaging and biochemical studies confirmed the diagnosis of primary hyperparathyroidism.

2. Discussion

Calcium homeostasis in human body is maintained by Parathyroid gland by production of parathyroid hormone. This hormone mobilises calcium release from bone by increasing osteoclastic activity. It also increases renal tubular resorption of calcium as well as increases urinary phosphate excretion thereby preventing loss of urinary calcium.¹

Hyperparathyroidism is an endocrinological disorder due to overproduction of parathyroid hormone resulting in abnormal calcium homeostasis. Primary hyperparathyroidism results from unregulated parathyroid production from the gland itself. It is seen in number of disorders such as parathyroid adenoma, parathyroid hyperplasia and rarely parathyroid carcinoma.² Secondary

hyperparathyroidism occurs as a result of overproduction of parathyroid hormone in response to hypocalcaemia, seen in condition like chronic renal failure. Chronic overstimulation of hyperplastic parathyroid glands is seen in tertiary hyperparathyroidism leading to autonomous secretion of parathyroid hormone.³

Parathyroid adenoma is the most common cause of primary hyperparathyroidism. On ultrasonography parathyroid adenoma appear as well circumscribed oval homogeneously hypoechoic lesion overlying thyroid gland. Sometimes an echogenic thyroid capsule distinguishing thyroid gland from lesion may be visualised. Doppler demonstrates vascularity within the lesion as well as at its periphery.²

There are many characteristic imaging features of hyperparathyroidism pertaining to skeletal system. On radiography osteopenia either localised or generalised may be appreciated. Subperiostealresorption is a pathognomonic feature of hyperparathyroidism, predominantly affecting phalanges of middle and index fingers. Subligamentousresorption is another feature of hyperparathyroidism. X-ray skull demonstrates well defined lucent lesions in the calvaria giving classical pepper pot skull appearance.⁴

Brown's tumour or osteitisfibrosacystica is also one of the manifesting feature of hyperparathyroidism. They appear as multiple well defined osteolytic lesions on radiographs. Associated pathological fracture may also be visualised.⁵ On MRI depending upon compositions these tumours may appear cystic, solid or mixed. Cystic component appears hyperintense on T2WI while solid component appears hypointense on both T1WI and T2WI. Sometimes fluid-fluid level may also be appreciated. Enhancement of solid component and septa is seen on post contrast study⁶

3. Images



Figure 1: XRAY AP PELVIS with FEMUR: multiple well defined osteolytic lesions in proximal shaft of right femur and left iliac blade

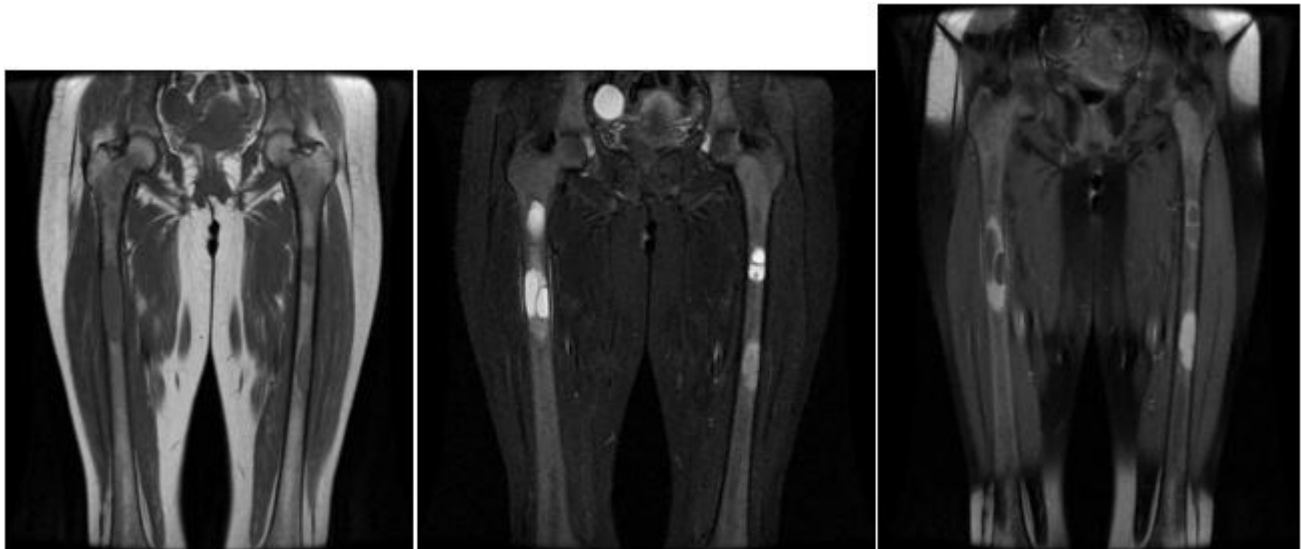


Figure 2A, 2B, 2C: Solid lesions appeared hypo intense on T1WI and T2WI with post contrast enhancement



Figure 3: Radiograph of hands showed subperiosteal resorption along phalanges of fingers and a small lucent lesion in shaft of 3rd metacarpal on right side

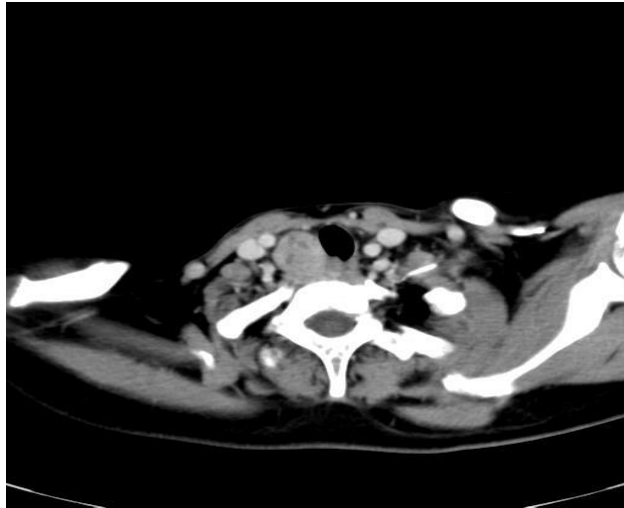


Figure 4: CT Neck reveals well-defined heterogeneously enhancing nodular mass lesion of approximate size 33x24x23mm noted in right side of neck posterior to right lobe of thyroid which was mildly abutting trachea.

References

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