

## Parathyroid Adenoma Diagnosed with Endoscopic Ultrasound with Bronchoscope (EUS-B) guided biopsy in Asymptomatic Patient with Primary Hyperparathyroidism

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### Abstract

Endobronchial Ultrasound (EBUS) is being increasingly used to sample the hilar and mediastinal lymph nodes along with other accessible soft tissue masses. We report a first case of atypical parathyroid adenoma diagnosed using Endoscopic Ultrasound with Bronchoscope (EUS-B) guided biopsy. 48 year old patient presented with dysphagia and a provisional diagnosis of oesophageal intramural mass was made based on a CT scan with subsequent normal oesophagostomy. EUS-B was utilised to acquire a histological sample which was consistent with parathyroid adenoma. Subsequent biochemical investigations revealed asymptomatic severe hypercalcaemia due to primary hyperparathyroidism which was initially medically managed. Further study with a sestamibi scan showed activity in that lesion which was surgically excised and found to be consistent with atypical parathyroid adenoma.

**Keywords:** Endobronchial Ultrasound (EBUS); Endoscopic Ultrasound Using Bronchoscope (EUS-B); Parathyroid Adenoma; Primary Hyperparathyroidism; Primary Hypercalcaemia

### Abbreviations

EBUS: Endobronchial Ultrasound; EUS-B: Endoscopic Ultrasound Using Bronchoscope

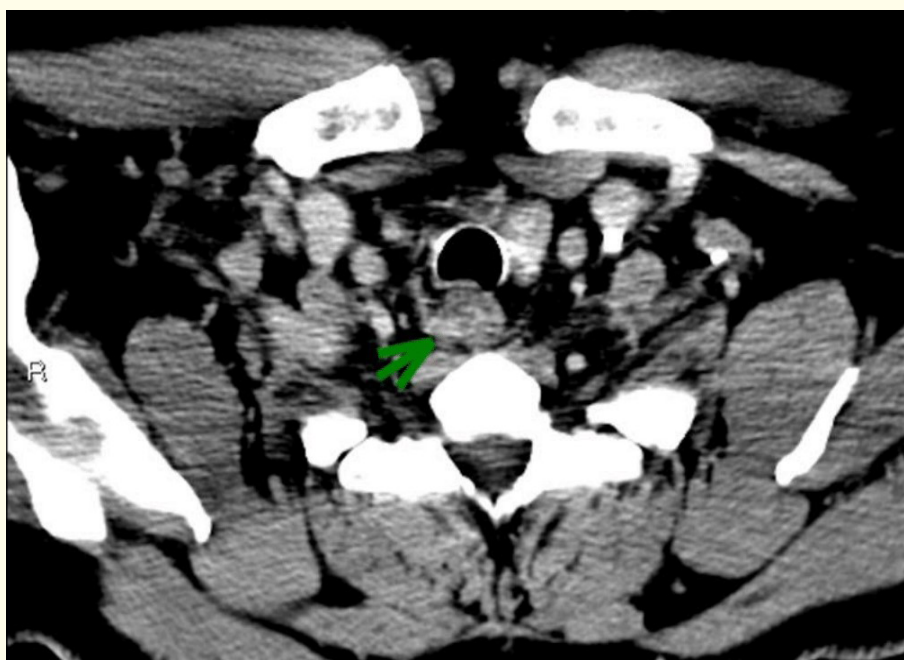
### Introduction

Endobronchial ultrasound (EBUS) is an accurate and minimally invasive tool for hilar and mediastinal lymph nodes sampling. It is being increasingly used to biopsy other hilar accessible structures [1,2]. When an EBUS scope is passed through the oesophagus to scan the mediastinal structures, it is termed an Endoscopic Ultrasound with Bronchoscope (EUS-B). It is being frequently used to sample the mediastinal structures through the oesophagus [3]. There are a few case reports where EBUS was used to sample paratracheal lesions which led to the diagnosis of thyroid disease. There are only two published cases in the literature in which EBUS was used to sample the mediastinal mass in patients with known hyperparathyroidism. EBUS biopsy confirmed the aetiology as parathyroid adenoma [4,5]. To our knowledge, there is no reported case where EUS-B was utilised to acquire histological diagnoses in parathyroid disease. We report the first case of previously unknown parathyroid disease diagnosed using EUS-B.

### Case Report

A 48 year old male presented with progressive mixed dysphagia and associated exertional dyspnoea over the last six months. There were no other constitutional symptoms. His co-morbidities included hypertension controlled with irbesartan/hydrochlorothiazide,

frusemide, and amlodipine; and gout controlled with allopurinol. Examination was unremarkable including negative Pemberton sign (venous congestion in head and neck upon raising arms above head level and it represent thoracic inlet obstruction due to the lesion). Barium swallow revealed external impression or indentation on right side of upper oesophagus. Neck ultrasound revealed a 3 mm colloid cyst in the left lobe of the thyroid gland but no other abnormalities were identified corresponding to barium swallow examination. The CT scan of the neck revealed a 21 mm seemingly intramural oesophageal density of soft tissue character with a central hypodense area, posterior to upper trachea at the level of thoracic inlet without any tracheal compromise. Oesophagogastroscopy did not reveal any endoluminal lesion (Figure 1).

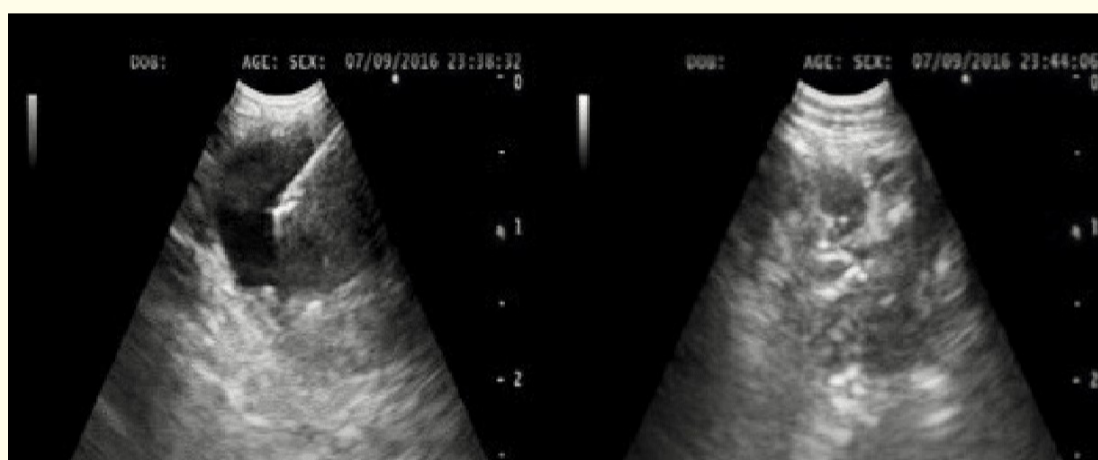


**Figure 1:** CT scan of neck showing a soft tissue mass abutting the oesophagus and behind upper trachea at the level of thoracic inlet.

Using Endobronchial Ultrasound (EBUS), a 30 mm cystic lesion was identified just below the cricoid cartilage at the 6 o'clock position. The lesion was more accessible via the oesophagus (EUS-B) (Figure 2). About 1 ml straw coloured fluid was aspirated which made the needle aspiration of solid component easier. Four passes were made with EUS-B and 2 passes were made with EBUS. Post aspiration residual volume decreased to 20 mm resulting in symptomatic relief of dysphagia (Figure 3).

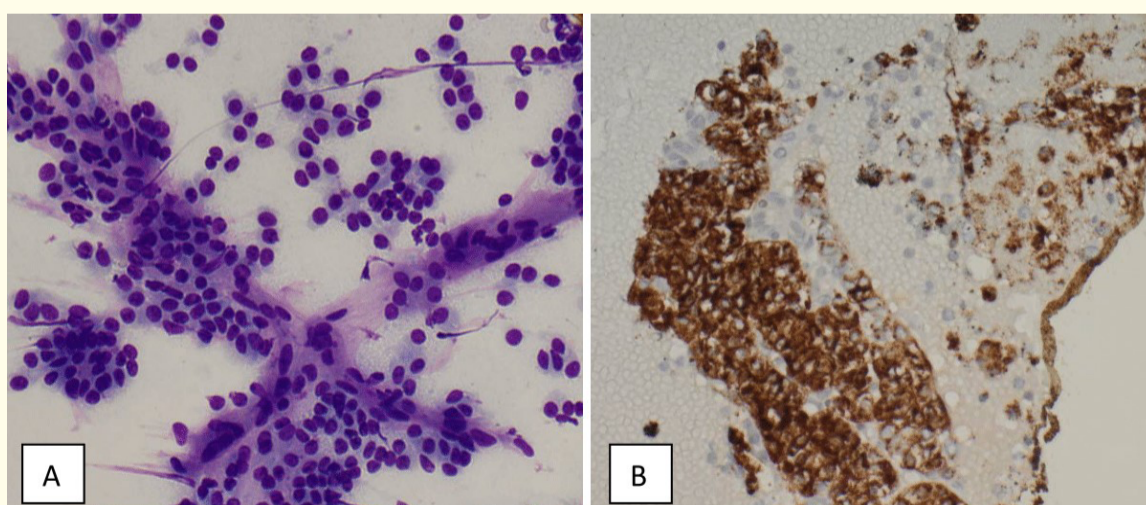


**Figure 2:** Endobronchial ultrasound showing a cystic mass just below the level of cricoid cartilage.



**Figure 3:** Right: EUS-B needle through the wall of cystic lesion; Left: Residual lesion at the end of procedure.

Histocytological examination of aspirates from both samples (EBUS and EUS-B) revealed cuboidal cells in large complex sheets with marked positive staining for parathyroid hormone and chromogranin A which was consistent with parathyroid adenoma (Figure 4). There was not enough tissue for performing parafibromin and PGP9.5 immunohistochemistry at this stage.



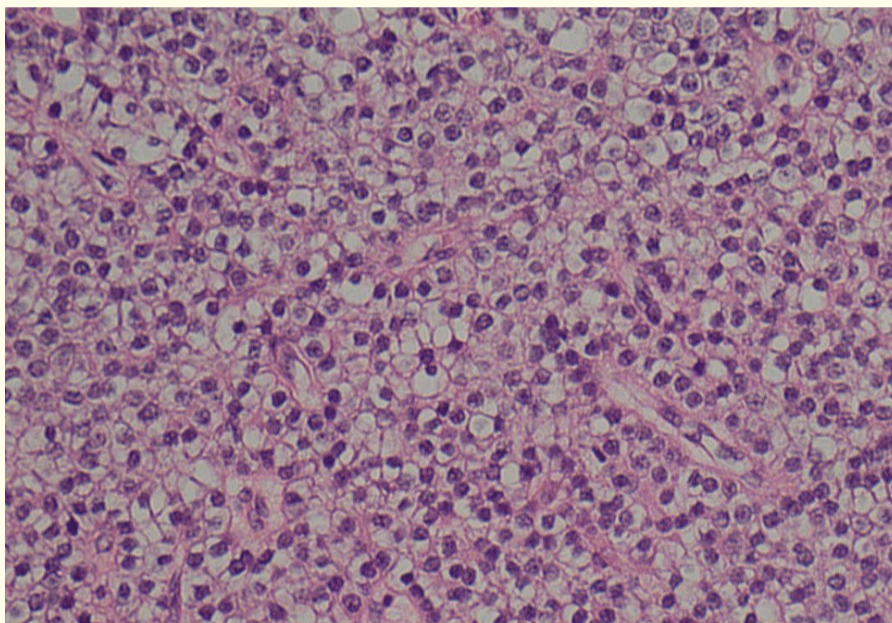
**Figure 4:** Panel A shows features of parathyroid chief cells in a Diff-Quik stain on initial needle aspirate. Panel B shows special immunoperoxidase stain for parathyroid hormone performed on the cell block made from initial needle aspiration.



After a diagnosis of parathyroid adenoma was established, his total calcium level was found to be significantly elevated at 3.78 mmol/L (2.10 - 2.60) as he remained asymptomatic. His ionised calcium was 1.71 mmol/L (1.01 - 1.22), phosphate was 0.75 mmol/L (0.75 - 1.50), intact parathyroid hormone (PTH) 601pg/L (15 - 68) and 25-OH vitamin D3 was 36 nmol/L. He was discovered to have mild asymptomatic acute kidney injury with creatinine 120 micromol/L and eGFR 61 ml/min/1.73m<sup>2</sup>. Thyroid function tests were normal. Patient was admitted for treatment of asymptomatic severe hypercalcaemia secondary to primary hyperparathyroidism with parenteral fluids and calcitonin.

Subsequent radionuclide sestamibi parathyroid scan showed two areas of moderate sestamibi activity of which one corresponds to a mass seen on CT scan and other was at the inferior pole of the right thyroid lobe. PET-CT scan did not reveal any FGD avid lesion. Multi-disciplinary team reviewed his case and planned to proceed with surgical excision with pre-operative Ca 2.81 mmol/L and Chromogranin A 1.6 nmol/L (< 3). Intact PTH level dropped significantly to 61 pg/L on post-operative day 1. His calcium normalised and subsequently he developed hungry bone syndrome which is characterised by hypocalcaemia and hypophosphataemia due to suppressed parathyroid hormone in setting of parathyroidectomy and was managed medically.

Excisional histology confirmed well circumscribed parathyroid gland with no evidence of malignancy (Figure 5). The immunohistochemistry was positive for parafibromin and PGP9.5 suggesting atypical parathyroid adenoma [6].



**Figure 5:** It shows parathyroid chief cells in a haematoxylin and eosin stain.

## Discussion

The majority of patients with primary hyperparathyroidism have asymptomatic hypercalcaemia. Classic symptoms of bones, stones, abdominal moans, and psychic groans are very uncommon in the developed world. The most common complication is renal calculi. The aetiology of primary hyperparathyroidism is adenoma in 85% cases whereas diffuse hyperplasia accounts for 15% cases. Malignancy is a rare cause of hyperparathyroidism [7].

Our patient presented with dysphagia which itself is a very rare primary presentation of parathyroid disease. There have been only two reported cases where EBUS was used to acquire a tissue diagnosis in patients who were already known to have primary hyperparathyroidism with prior lesion localisation with radionuclide test. The first case reported a 9 cm sestamibi scan positive right parathyroid adenoma in a patient who presented with symptomatic hypercalcemia [4]. EBUS biopsy was consistent with a parathyroid adenoma which was later confirmed on surgical excision. The other reported case is of known neurofibromatosis who presented with hypercalcaemia. The imaging revealed a 4 cm retro-tracheal mass which proved to be a parathyroid adenoma on EBUS biopsy which was confirmed on surgical excision [5].

## Conclusion

To our knowledge, this is the first case where EUS-B was used in conjunction with EBUS to diagnose a case of previously unknown parathyroid adenoma with hyperparathyroidism. EUS-B can be a valuable tool along with EBUS to assess and biopsy accessible mediastinal structures besides lymph nodes in experienced hands with good results and may reduce the need for mediastinoscopy to acquire tissue for biopsy. This could be even more useful for hospital where EBUS is available but EUS facilities are lacking.

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