

Case Report

Lung Cancer presenting as Central Diabetes Insipidus

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Abstract

A 62 year old smoker on evaluation of polyuria was detected to have central diabetes insipidus. On detailed workup he was diagnosed to have a mass lesion in the lung, although he did not report as having any respiratory symptoms. Further workup confirmed the diagnosis of Non Small Cell Lung Cancer (Adenocarcinoma). An extensive metastatic workup was done which revealed that apart from the loco-regional spread, the only extra thoracic metastasis was to the posterior pituitary. This is a very rare presentation of an isolated secondary malignant deposit of adenocarcinoma of lung to the posterior pituitary.

Key words : Diabetes Insipidus, Bronchogenic Carcinoma

Introduction

Diabetes insipidus is a very rare presentation of lung cancer. Herein we present the case of a 62 year old smoker, who presented with polyuria, and on evaluation was found to have central diabetes insipidus due to metastasis to the posterior pituitary from a non-small cell lung cancer from the right upper lobe of the lung. There are two unique features in this case: the only metastatic deposit outside the thoracic cavity was in the pituitary and despite having a mass in the lung, he was totally asymptomatic. This case is being reported to highlight these two aspects. To the best of our knowledge no similar case has been reported in the literature.

Case Report

A 62 yr old man presented to the urology OP of our hospital with symptoms of polyuria and increased thirst of two months duration. He had normal renal functions, electrolytes and a stag horn calculus in the right kidney revealed by tests done from outside. The post void

residual urine was 80ml. He was referred to the endocrinologist for further evaluation. There was no history of diabetes mellitus, systemic hypertension or psychiatric illness. He was a smoker (20 pack years) and used to take alcohol three days a week. There was no history of headache or visual symptoms. There were no symptoms pertaining to any other system.

On examination he was euvolumic. General examination did not reveal any abnormality. His pulse rate was 76/minute and the blood pressure was 140/90 mmHg. There was no goiter. His cardiovascular and respiratory systems were normal on examination. Abdomen was soft, no mass was palpable. Neurological examination was also normal. There were no visual defects. Basic investigations including complete blood count, urine and stool examination, hepatic and renal parameters were normal. TSH, sodium, potassium, calcium, phosphorus, and bicarbonate were also normal. The urine specific gravity was normal. Urine osmolarity was 105 milli osmol/kg of water. Serum osmolarity was 296m osm/kg water. In view of the pres-

ence of a stag horn calculus, a nephrogenic diabetes insipidus was considered as the clinical probability and hydrochlorothiazide was started at a dose of 12.5 mg and later increased to 25mg/day. He was followed up in the endocrinology clinic. He was asked to measure the intake of fluids and urine volume at home.

After two weeks of hydrochlorothiazide therapy, he was still symptomatic with polyuria and polydipsia persisting. His blood pressure was 120/84 mmHg. Serum sodium was 146mmol/L. In view of the persisting polyuria he was admitted for reassessment, and considering central diabetes insipidus as a possibility, a water deprivation test was planned. (Table1). He was admitted in the evening of the day before the test and fluid intake was avoided from midnight to promote overnight dehydration.

(Fig 1). The pituitary was also bulky. The bright spot was missing. There was also an altered tissue signal intensity of the posterior pituitary.

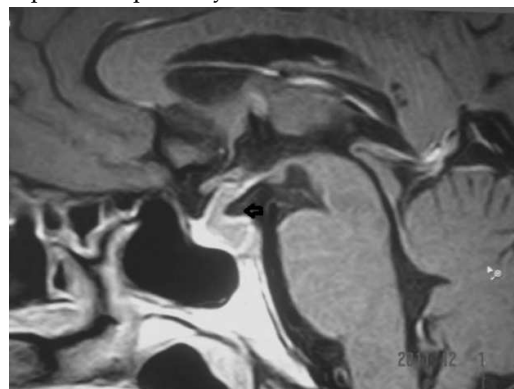


Fig 1 : Magnetic resonance Imaging showing thickening of the pituitary stalk and absence of the bright spot (Arrow head).

Table 1 :

	12 am	8 am	9 am	10 am	11 am	12 pm	1 pm	2 pm
Wt	73	70	70	72	72	72	74	74
BP	140/80	130/80	130/90	130//80	120/70	120/70	120/70	126/70
Urine Output (ml)	200	80	100	500	300	50	200	100
Urine osmol	139		305	295	327	557	591	-
Serum osmol	296	304	-	316	-	-	-	-
Serum Na	136	150	-	150	151	148	146	141

The urine output was 2030 ml between 12 am and 8 am on that day, without any fluid intake which resulted in hypertonic dehydration. In the morning he complained of extreme thirst, with weight loss of ~2% but remained hemodynamically stable. Investigations revealed hypertonic dehydration (Serum Na of 150 mmol/L, Serum osmolarity of 316 milliosmol/Kg of water), with dilute urine (osmolarity of 295 milliosmol/Kg of water). After confirmation of the presence of hypertonic dehydration, he was given injection Arginine Vasopressin (AVP): 5 units subcutaneously at 10:20 am and there was resultant rise of urine osmolarity of approximately 100%. This established the diagnosis of central diabetes insipidus. He was started on DDAVP nasal spray 1 puff (10 micro grams) twice daily, after which his symptoms and urine output dramatically improved and reached normal. Magnetic resonance imaging of the brain revealed thickening of the pituitary stalk



Fig 2: Chest X Ray PA view showing a mass lesion in the right upper lobe

He was worked up for all possible causes of central diabetes insipidus. A chest X Ray PA view (Fig 2) revealed the presence of a mass lesion in the right upper lobe although he denied having any symptom pertaining to the respiratory system. 3 consecutive smears for acid-fast bacilli were negative as were 5 consecutive smears for malignant cells in sputum. A tuberculin test was done which did not show any induration after 48 hours of administration. Further workup included thoracic imaging by a Computerised Tomogram, which in addition to the right upper lobe mass, showed the presence of multiple mediastinal nodes and ipsilateral pleural effusion (Fig 3

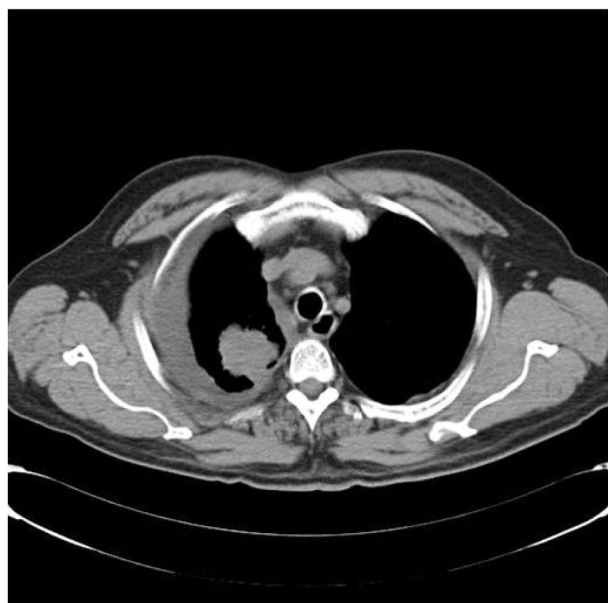


Fig 3: CT thorax showing the presence of a right upper lobe mass and pleural effusion

He underwent a flexible bronchoscopy, which did not show any intraluminal pathology. Specimen obtained from bronchial brushings and broncho-alveolar lavage (BAL) from the right upper lobe were all negative for malignant cells and acid fast bacilli. A transbronchial biopsy was attempted from the right upper lobe bronchus but yielded only normal lung tissue. Transbronchial needle aspiration was attempted from two sites – right lower paratracheal (Station 4) and sub-carinal lymph nodes (station 7). The material obtained from these sites showed presence of occasional atypical cells. A pleural tap was done, which yielded about 15 ml of hemorrhagic fluid, which satisfied the criteria for an exudative effusion (protein 5.5g%, sugar 90mg%). Pleural fluid cytology revealed the presence of adenocarcinoma cells (Fig 4). Immunohistochemistry with TTF1 was done on the cell block prepared from the sediments of pleural fluid after centrifuging. TTF-1 (Thyroid transcription factor-1) is a highly specific

marker for primary pulmonary adenocarcinoma and thyroid malignancy. TTF1 was strongly positive on the cell-block sections. As there was no features of thyroid malignancy even after detailed evaluation the primary in our patient should be from the lungs. A final diagnosis of Non Small Cell Lung Cancer with posterior pituitary metastasis producing central diabetes insipidus was made. A complete metastatic work up was done including bone scan and abdomen scan, which did not show the presence of any metastatic deposit elsewhere. He was referred to Regional cancer Centre, Trivandrum for further management. He was started on whole brain radiation and was advised chemotherapy. Within a week, he developed intense breathlessness and was found to have developed a massive right sided pleural effusion. The fluid was drained using an intercostal drain and subsequently pleurodesis was done using bleomycin. He was then started on chemotherapy with carboplatin and gemcitabine. Two months later on follow up he has shown significant improvement in terms of reduction of polyuria and breathlessness.

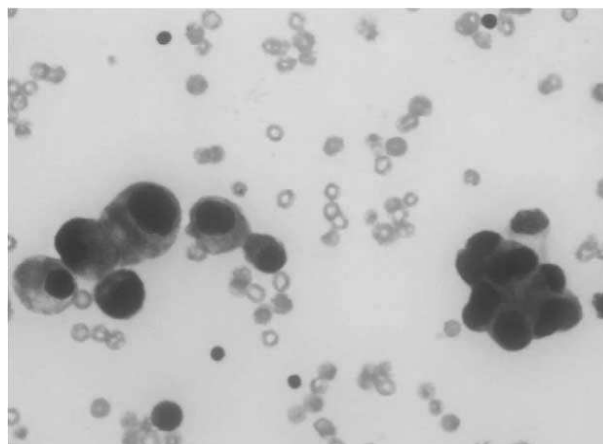


Fig 4: Pleural fluid cytology showing presence of adenocarcinoma cells (May Grunwald Giemsa, 40X)

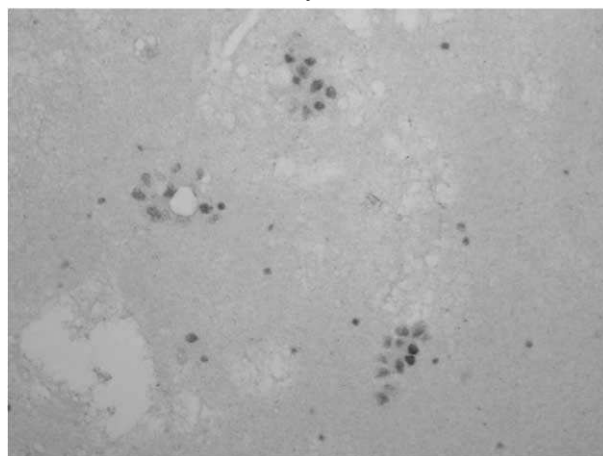


Fig 5: Immunohistochemistry on pleural fluid cell block showing Thyroid Transcription Factor-1 (TTF-1) positivity (20X)

Discussion

Tumour metastasis to the pituitary gland is a very rare phenomenon in systemic malignancy¹. It has been documented in 1 – 3.6% of patients with malignancy². Breast cancer and lung cancer are the most common malignancies that are described to metastasize to the pituitary. In lung cancer, it is the Non small cell lung cancer (NSCLC) that has a propensity to metastasize to the pituitary³. Metastasis are more frequently seen in the posterior pituitary than anterior and this posterior localization is attributed to the fact that the posterior lobe receives direct blood supply from the systemic circulation, whereas the anterior lobe is supplied by the hypophysial portal system¹.

Pituitary metastasis are usually asymptomatic, and symptoms are seen in only less than 10% cases⁴. Patients usually remain asymptomatic since they die from advanced complications of the primary neoplasm. Most common symptoms include diabetes insipidus, headache, visual defects, ophthalmoplegia, retro-orbital pain and anterior hypopituitarism. Of these the most frequent presentation is with diabetes insipidus since the posterior pituitary is predominantly involved¹. The incidence of metastasis producing diabetes insipidus is 5-14%⁵. In contrast, diabetes insipidus is seen only in 1-2% of patients with pituitary adenoma and this forms an important criterion to distinguish between these two⁶. Involvement of posterior pituitary is usually seen as part of disseminated disease and patients usually have evidence of metastasis elsewhere, in particular osseous metastasis by the time they develop diabetes insipidus.

Magnetic Resonance Imaging (MRI) along with clinical findings forms the basis of diagnosing pituitary metastasis. MRI also helps to differentiate metastasis from adenomas. Radiological features suggestive of metastasis include (a) Thickening of the pituitary stalk (b) loss of a high intensity signal from the posterior pituitary (c) isointensity on T1 and T2 weighted MRI images (d) invasion of the cavernous sinus and (e) sclerotic changes around the sella tursica².

Treatment options for patients with pituitary metastasis include surgical resection, chemotherapy and

radiotherapy². There is no difference in survival between surgical and non-surgical treatment. The overall prognosis is poor since the primary tumour is very aggressive and mean survival time is usually 6-7 months depending on the primary tumour¹.

In our case, there are two distinct standout features. Firstly, although the patient had a mass lesion in the lung, he surprisingly did not have any symptom pertaining to that at all. Secondly, apart from spread to adjacent mediastinal nodes and to the pleura, the only other area to where the tumour had metastasized was to the posterior pituitary. There were no bony or intra-abdominal metastatic deposits. To our knowledge, no such case has been documented in literature. Also no cases of lung carcinoma with posterior pituitary metastasis have been reported from India till date. All these features make our case very unique indeed.

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