

Oncology

Lung malignancy in prostate cancer: A report of both metastatic and primary lung lesions

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1. Introduction

Prostate cancer is the most common non-cutaneous malignancy diagnosed in men. When it metastasizes, it usually spreads to bone and/or lymph nodes. A handful of cases have described prostatic metastases to the lung; however, this is usually in the setting of existing bone lesions [1]. Here we describe a unique case in which a patient was found to have both metastatic prostate cancer to the lung and a primary lung cancer in the absence of any other evidence of extra-prostatic disease.

2. Case presentation

This is a 60 year-old man who underwent a trans-urethral resection of his prostate (TURP); pathology returned as Gleason 4 + 4 = 8 (Grade group 4). Prostate specific antigen level (PSA) was 44ng/dL. Bone scan was negative but PET revealed an FDG-avid lesion in the left lung. This was further evaluated with a chest CT scan that confirmed a 2cm left upper lobe

lung mass (Fig. 1). He was referred to Thoracic Surgery for evaluation.

Pulmonary function tests were within normal limits however he had a 40+ pack-year smoking history. He underwent thoracoscopic resection of the lung mass. Incidentally, there were multiple small 2–3mm nodules present on the surface of the lower lobe. Several of these were removed with additional wedge resections and frozen sectioning was positive for malignancy. Given the diffuse disease, a mediastinal lymph node dissection was performed to ensure adequate pathological staging.

On final pathology, the nodule was interpreted as primary pulmonary adenocarcinoma (Fig. 2). The wedge resections contained nodules positive for PSA and were interpreted as metastatic prostatic adenocarcinoma (Fig. 3). The aortopulmonary lymph node was positive for prostatic adenocarcinoma and the rest were negative. Given his isolated primary lung cancer and high likelihood of response to therapy for metastatic prostate cancer, it was recommended that he undergo completion left upper lobectomy for treatment of his Stage I primary lung malignancy.

After completion lobectomy, final Pathology revealed no additional lung malignancy, but a small 2mm focus of prostate cancer. He was referred back to his Medical Oncologists and treated with 6 cycles of docetaxel and Lupron therapy. After treatment, repeat staging imaging was negative. His PSA following treatment was 0.7ng/dL. He is planned to continue with Lupron therapy, and will undergo routine surveillance for his T1bN0 stage IA lung cancer.

3. Discussion

Metastatic prostate cancer is a relatively common entity and typically presents with bone metastasis. Metastatic prostate cancer to the lungs is rare, however. In fact, in the absence of other metastatic lesions, less than 5 cases have been previously reported [1–4]. In their case report from 1999, Smith et al. describe a patient who underwent a radical prostatectomy for Gleason 4 + 5 = 9 (Grade group 5) disease. When his PSA levels rose,

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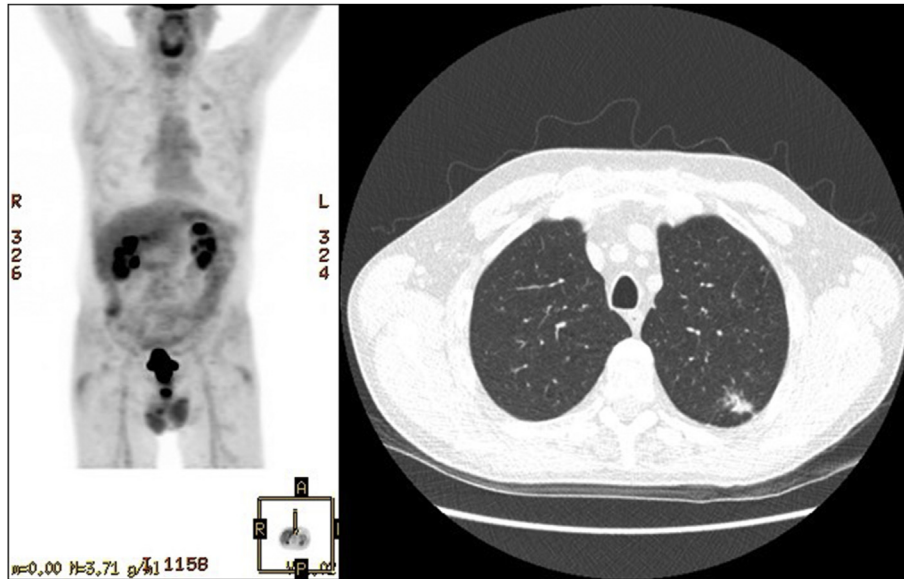


Fig. 1. Left lung lesion seen on PET (left) and CT Chest (right).

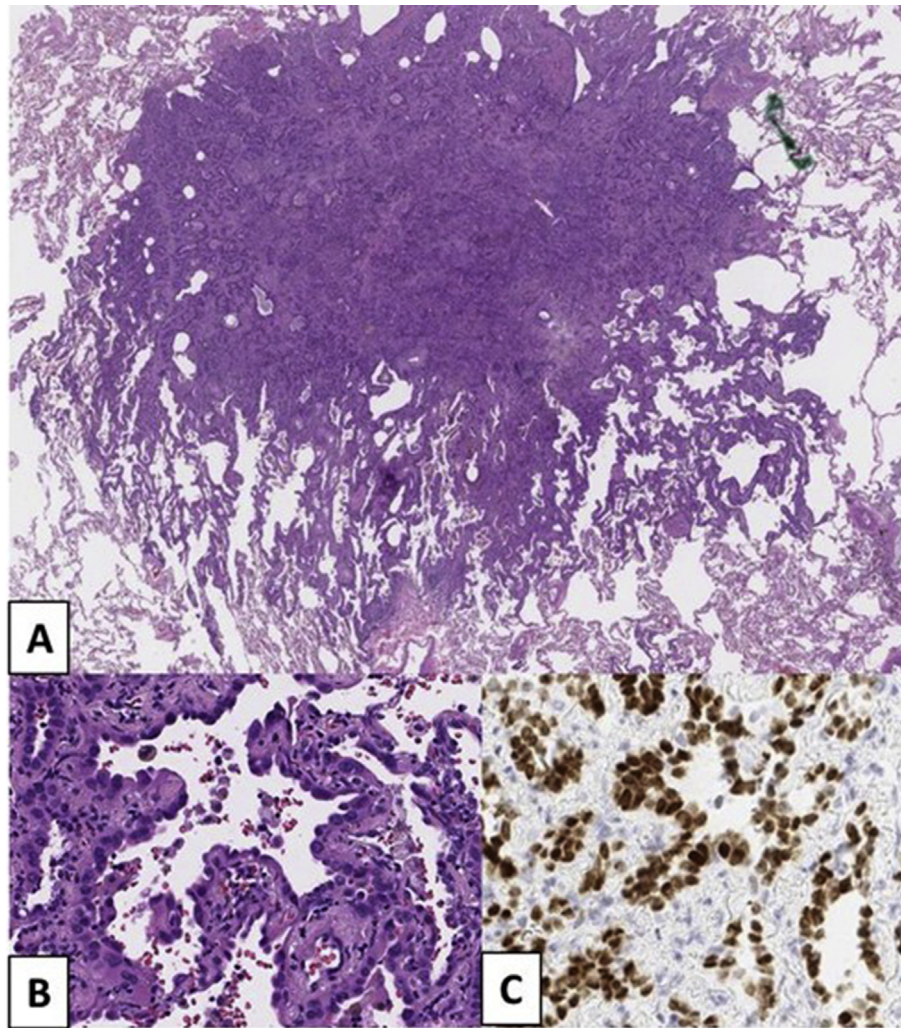


Fig. 2. (A) Left upper lobe wedge resection of the lung with 2.2 cm nodule of tumor (H&E, original magnification 100 \times); (B) High power image of left upper lobe tumor with lepidic and acinar growth pattern in the pulmonary parenchyma (H&E, original magnification 200 \times); (C) TTF-1 immunohistochemical stain of pulmonary tumor, consistent with lung primary (TTF-1, original magnification, 200 \times).

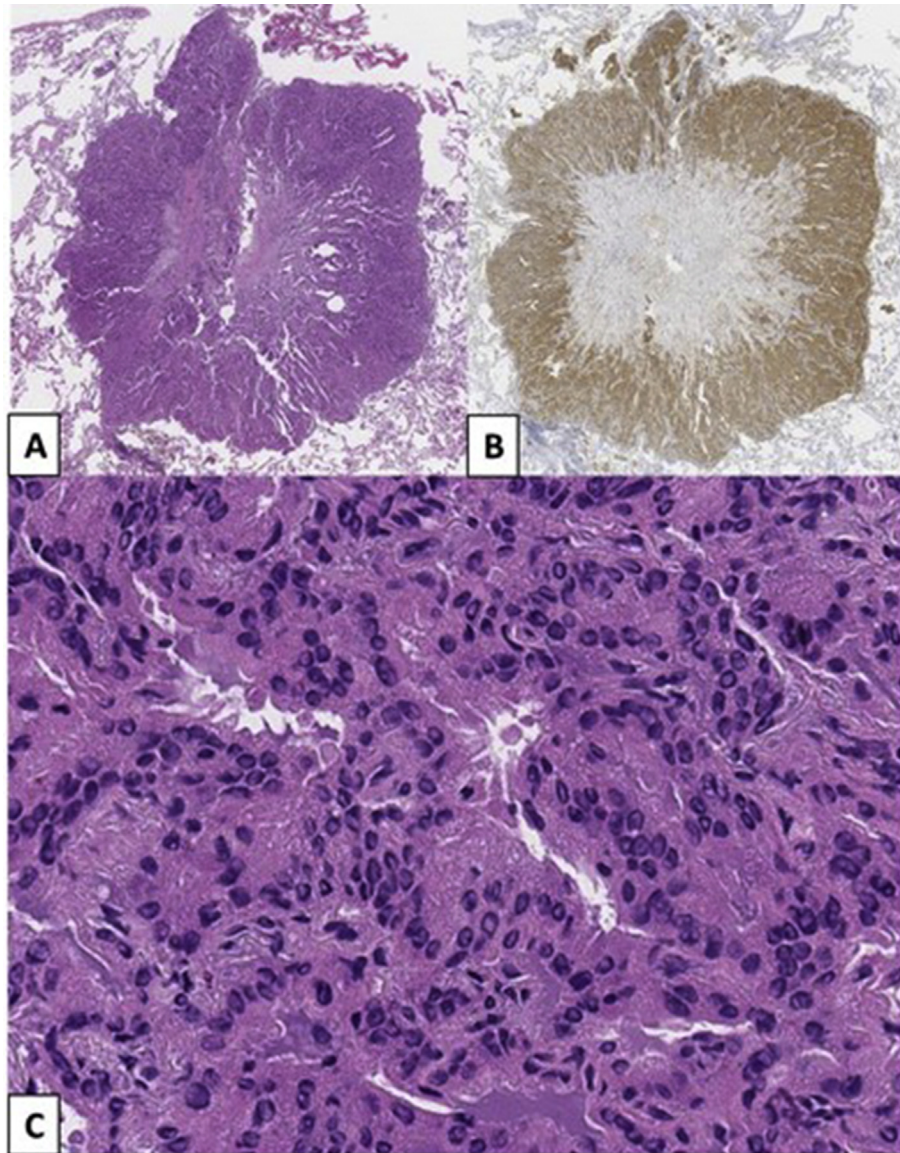


Fig. 3. (A) Wedge resection of the left lung lower lobe revealed a 0.3 cm, well circumscribed tumor nodule (H&E, original magnification 150 \times); (B) The nodule was negative for TTF-1 and positive for prostate specific antigen (PSA) (PSA immunohistochemical stain, original magnification 150 \times); (C) The nodule displayed similar coalescing glands with round nuclei and inconspicuous nucleoli, similar to the tumor morphology of the initial prostatic resection, confirming the diagnosis of concomitant metastatic prostatic adenocarcinoma (H&E, original magnification 200 \times).

metastatic work-up revealed a lung nodule. This was removed by Thoracic Surgery and the pathology returned as metastatic prostate cancer. The patient's PSA returned to an undetectable level post-operatively [2].

Hofland and Bagg described a 49 year-old man with Gleason 4 + 5 (Grade group 5) cancer who underwent radical prostatectomy. His PSA increased post-operatively and he underwent salvage radiation therapy, hormonal therapy, and ultimately bilateral orchiectomy. PSA after this was undetectable. Two years later, a chest x-ray revealed a nodule; his PSA was 1.0. The lesion was removed; pathology was positive for PSA. His PSA continued to rise after this and ultimately more lesions were found throughout his skeleton and in his brain. He was lost to follow-up [3].

Two other cases were reported by Kume et al. in the late 1980s. Both cases were 56 year-old men with biopsy proven prostate cancer (no Gleason grade given) and lung lesions identified on

staging. One patient underwent bilateral orchiectomy and the other received hormone therapy; both had complete resolution of their lung nodules.

In the most recent report, Gago et al. describe three patients with isolated pulmonary lesions after radical prostatectomy. One patient's lung lesions were discovered due to biochemical failure. The other two patients' lung lesions were found for other reasons; all had elevated PSA levels at the time of detection. One patient underwent chemotherapy but ultimately died from his disease. The other two were treated with hormonal therapy; one had a complete response and the other a partial response [4].

In the setting of a patient with a significant smoking history and a history of prostatic carcinoma, an FDG avid pulmonary lesion warrants biopsy. Differential diagnosis includes metastatic disease, primary lung cancer, benign, and infectious nodules. Transthoracic needle aspiration has a sensitivity of 90%, however it has a false

negative rate of up to 22%, and 10–15% risk of pneumothorax [5]. Other diagnostic modalities include EBUS which provides a diagnostic yield of 56% for peripheral nodules <2 cm in size, and bronchoscopy which has a success rate of only 34% for peripheral nodules <2 cm in size [5]. Thoracoscopic wedge resection remains the gold standard for diagnosis and staging as it affords a valuable opportunity to evaluate the pleural surfaces, lung parenchyma, nodal tissue and other structures for potential metastatic disease that is below the sensitivity of imaging, as was discovered in this case.

4. Conclusion

Metastatic prostate cancer to the lungs remains a rare, albeit not unheard of, diagnosis. Many of the case reports discussed above occurred several decades ago and would likely be detected and managed differently today. Here we present our case of both metastatic prostate cancer to the lungs in the absence of other metastatic sites and a second primary lung malignancy with good early response. When these cases present, they are best approached by a multidisciplinary team.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.eucr.2017.11.027>.

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