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Case report

# Malignant pleural effusion from prostate adenocarcinoma

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A B S T R A C T

Prostate adenocarcinoma is the most common newly diagnosed cancer in males. Pulmonary and pleural metastasis are not uncommon on autopsy, but malignant effusions are not common clinical findings. There are no current recommendations to guide prostate specific antigen level assessment in pleural fluid.

A 73 yo w/prostate cancer presented with complaints of subacute worsening of exertional dyspnea. He underwent a CT of the chest which excluded pulmonary emboli but did show moderate to large bilateral pleural effusions.

The patient had a thoracentesis performed which confirmed an exudative effusion with atypical cells and elevated PSA levels. Metastatic visceral & parietal foci of prostate adenocarcinoma were found on medical pleuroscopy. The patient was symptomatically treated with bilateral tunneled chest tube catheters for intermittent drainage.

Pulmonary metastasis secondary to prostate cancer is commonly found on autopsy, with pulmonary metastasis in 46% of patients and pleural metastasis in 21% of patients. Pleural effusions are not common, in one series, only 6/620 (1%) were found to have pleural masses/nodules or effusions. Diagnosis of pleural effusion secondary to metastatic prostate cancer can be achieved by direct cytology evaluation and/or PSA level elevation in the fluid. While specific, the sensitivity is not high enough to rule out disease if negative. Elevated pleural fluid PSA levels may aid in the diagnosis; however, there are no current recommendations as to what level may be considered diagnostic. Further studies are needed to define the sensitivity and specificity of PSA in pleural fluid.



## Introduction

A patient with metastatic prostate adenocarcinoma presented with subacute dyspnea and significant bilateral pleural effusions. The effusion was exudative with atypical cells and elevated prostate specific antigen (PSA) levels. Metastatic visceral & parietal foci of prostate adenocarcinoma were found on medical pleuroscopy. The patient was symptomatically treated with tunneled chest tube catheters for drainage.

## Case report

A 73-year-old former smoker with medical castration-resistant metastatic prostate cancer, currently on Abiraterone, presented with complaints of subacute worsening of exertional dyspnea. He underwent a CT of the chest with contrast which excluded pulmonary emboli but did show moderate to large bilateral pleural effusions.

A left sided thoracentesis revealed an exudative effusion with a total protein of 28 g/L (2.8 g/dL) and a serum to pleural fluid protein ratio of 0.57. The LDH, cholesterol, and glucose were within transudative range. Cell count showed 460 nucleated cells w/atypical cells that stained weakly positive for CEA. The PSA level in the pleural fluid was 1619 μg/L (ng/mL), the serum level was 2540 μg/L (ng/mL).

Removal of two liters of pleural fluid resulted in symptomatic improvement. The patient returned seven days later for recurrent dyspnea. A right sided thoracentesis was performed which resulted in improvement of symptoms. The pleural fluid PSA level was 1936 μg/L (ng/mL).

Given the rapid reoccurrence with symptomatic improvement after drainage, evaluation for pleurodesis was recommended. A medical pleuroscopy was performed which showed severely inflamed, nodular parietal and visceral pleurae with lung

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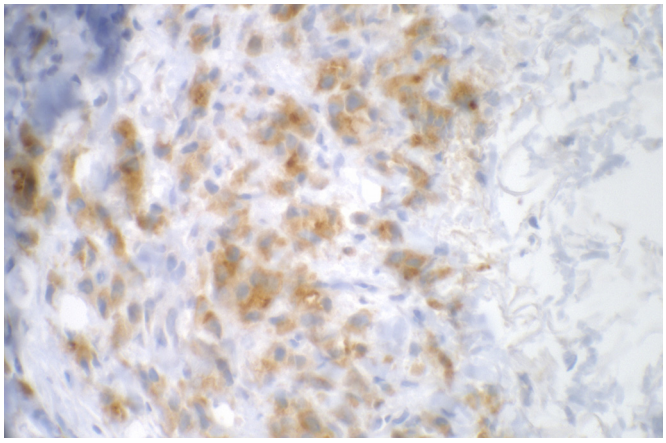

**Fig. 1.** Biopsy of pleural metastatic foci staining positive for prostate specific antigen staining [orange].

entrapment. Biopsies were consistent with adenocarcinoma of prostate origin. Bilateral tunneled drainage catheters were placed for intermittent drainage given the lung entrapment (see Fig. 1).

## Discussion

Prostate adenocarcinoma is the most common newly diagnosed cancer in males [1,2] and is the third leading cause of death in males following lung & colon cancer [3]. At the time of presentation, many patients will have distant metastases, most commonly involving regional lymph nodes (pelvic & abdominal retroperitoneal) & bone. Pulmonary metastasis secondary to prostate cancer is discovered in less than 1% of patients during their lifetime [4]. The prevalence of pulmonary metastatic disease is significantly higher on autopsy, with pulmonary metastasis in 46% of patients and pleural metastasis in 21% of patients [5]. A retrospective study of 508 patients with prostate cancer identified pulmonary involvement in only four cases, with no identifiable cases of pleural involvement or effusions [6]. Vinjamoori et al. determined the most frequent site of atypical metastasis, defined as any involvement outside the abdomen and pelvis, was the lung and pleura, occurring in 5% of total cases and in 40% of atypical metastatic cases. Of those cases with pulmonary involvement, only 1% were found to have pleural involvement or effusions. Interestingly, all of the patients with pleural metastasis had concurrent osseous metastases which predated the pleural involvement on imaging [7]. In a retrospective radiological evaluation of 198 patients with advanced prostate cancer performed by Apple et al., pleural effusions were found in 22% cases, 13.6% of these were confirmed to be malignant [8].

Diagnosis of pleural effusion secondary to metastatic prostate cancer can be achieved by cytologic examination with immunostaining for PSA. While specific, the sensitivity is not high enough to rule out disease if negative [9]. Cascinu et al. evaluated tumor markers in malignant pleural effusions and found PSA elevated in all effusions caused by prostate adenocarcinoma [10]. There has been at least one transudative pleural effusion caused by prostate adenocarcinoma diagnosed by elevated pleural PSA levels [11]. There is also a case report of prostate cancer diagnosed via malignant effusion without known disease elsewhere [12].

In summary, malignant effusions from prostate adenocarcinoma remain a rare clinical finding. Conventional cytology may miss the diagnosis. Elevated pleural fluid PSA levels can aid in the diagnosis. There are no current recommendations as to what level may be considered diagnostic. Our case and other reports support the finding that pleural fluid PSA levels are markedly elevated in malignant effusions secondary to prostate cancer. Further studies are needed to define the sensitivity and specificity of PSA in pleural fluid at a certain diagnostic threshold.

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