Case Report

Metastatic prostatic adenocarcinoma diagnosed in a bronchoalveolar lavage specimen: An unusual presentation of a common tumor

ABSTRACT

Metastatic prostatic adenocarcinoma presenting as a primary lung disease is rare. We present a 52-year-old male with a 3-month history of cough, shortness of breath, and weight loss with clinical and radiological findings suggestive of a primary lung disease: Bilateral interstitial and alveolar opacities with blunting of the costophrenic angles, multiple diffuse foci of consolidations and nodules, predominantly subpleural and located in the lower lobes, and diffuse interlobular septal thickening and peribronchial thickening. The patient underwent bronchoscopy and bronchoalveolar lavage (BAL) was obtained. Cytospin smears were diagnostic for a low-grade adenocarcinoma. Clinically, the patient had elevated serum prostate-specific antigen (PSA) levels greater than 5,000 ng/mL. Because of this, immunocytochemistry for PSA was performed which was positive, confirming the diagnosis of metastatic prostatic adenocarcinoma. This unusual case of metastatic adenocarcinoma of the prostate first diagnosed by BAL highlights the significance of available clinical information and the use of immunocytochemistry for proper diagnosis.

Key words: Bronchoalveolar lavage (BAL); prostatic adenocarcinoma; prostate-specific antigen (PSA)

Introduction

Prostatic adenocarcinoma is a common disease with approximately one man out of seven being diagnosed within his lifetime. It is the second leading cause of cancer deaths in American men.[1] Most patients are asymptomatic and lung symptoms are very rare. We present a 52-year-old male with a 3-month history of cough, shortness of breath, and weight loss with clinical and radiological findings suggestive of a primary lung disease, who was found to have prostatic adenocarcinoma in a bronchoalveolar lavage (BAL) specimen. This unusual presentation highlights the importance of clinical history, laboratory data, and immunocytochemistry in diagnostic cytopathology.

Case Report

A 52-year-old male with no past medical history presented to our institution with a 3-month history of shortness of breath, severe cough without sputum production, fatigue, and a 6.8 kg weight loss over the past 3 months. Review of symptoms was significant for burning on urination. Chest x-ray demonstrated bilateral interstitial and alveolar...
opacities mainly in the mid to lower lobes with blunting of the costophrenic angles. Computed tomography (CT) of the chest demonstrated multiple diffuse foci of consolidations and nodules, predominantly subpleural and located in the lower lobes, and diffuse interlobular septal thickening and peribronchial thickening. Cystic fluid-density lesions in the left kidney prompted further abdominal imaging. A CT of the abdomen demonstrated left-sided hydronephrosis and hydrourerter with thickening of the proximal and mid left ureter with soft tissue filling defect within the lumen, thickened with focal hyperdensities along the lateral walls of the bladder, enlarged, heterogeneous appearing prostate with compression against the posterior and inferior urinary bladder wall, and bilateral, necrotic enlarged lymph nodes measuring up to 3 cm. On admission, the patient’s prostate-specific antigen (PSA) was reported as >5,000 ng/mL. Subsequently, the patient underwent bronchoscopy with BAL and middle lobe-lateral segment transbronchial biopsy. The patient was found to have metastatic prostatic adenocarcinoma to the lung and was started on androgen-deprivation therapy with bicalutamide. As an outpatient, he receives monthly leuprolide (Lupron) injections.

BAL was obtained using a flexible fiberoptic bronchoscopy, the recovery sample was received in saline and mucolytic agent and preservative (Saccomanno) was added. Sample was centrifuged and two drops of the supernate were placed on the glass slide. Two slides were prepared and immediately fixed in 95% isopropyl alcohol. The slides were stained by the Papanicolaou (Pap) method. Immunocytochemistry was performed directly on one slide without the destaining procedure. Briefly, the slides were rehydrated in descending grades of ethanol. The endogenous peroxidase activity was blocked using 6% hydrogen peroxide. The slide was immersed in target retrieval solution (DM828, DakoCytomation) and heated at 90°C in a vegetable steamer for 10 min to achieve optimal epitope retrieval, after placing the slide buffer for 5 min. The slide was incubated with primary antibody, PSA (rabbit polyclonal, Dako, RTU). Hematoxylin was applied to the slide as a counterstain.

Alveolar lavage cytospin slides showed three-dimensional cohesive, round cluster of cells with smooth borders admixed with acinar-forming structures in a background of alveolar macrophages. The cells were small with scant cytoplasm and the nuclei were eccentrically or centrally located with fine chromatin. The cells were positive for PSA immunostain [Figures 1a-c]. The corresponding histology specimen demonstrated acinar pattern in a background of dense fibrous tissue [Figure 1d]. These cells were also positive for PSA, confirming the diagnosis of metastatic prostatic adenocarcinoma.

Discussion

When prostatic adenocarcinoma metastasizes it usually spreads via lymphatics, with the most common locations being the regional lymph nodes and the bones of the pelvis and axial skeleton.[2] Involvement of the lung is not as common. While there have been many autopsy studies finding a high prevalence of lung metastases, such as Bubendorf et al. who found 46%, clinically apparent lung metastasis has been quoted between 4% and 27%.[3,4] When prostatic adenocarcinoma does spread to the lungs, it usually occurs in advanced disease. Metastatic deposits are typically located on the visceral surfaces,[2] making it unlikely for tumor cells to be present in a BAL specimen.

In addition to the rarity of lung metastasis, initial presentation of prostatic adenocarcinoma as a pulmonary primary lesion is rare.[5] Tohfe et al. recently described a patient with a similar presentation who was found to have prostatic adenocarcinoma metastatic to the lung diagnosed on a trucut biopsy.[5] Diagnosis of metastatic prostatic adenocarcinoma on cytologic material (i.e., BAL specimen) is uncommon and difficult. In 1991, Verstraeten et al. first described a patient with metastatic prostatic adenocarcinoma in a BAL specimen in a patient who was clinically and radiologically suspected of having lymphangitic carcinomatosis.[6]
Other unusual locations include nose and paranasal sinuses, kidney, testis, skin, and breast. These unusual locations of metastatic prostatic adenocarcinoma highlight the significance of knowing clinical history for accurate diagnosis and quality patient care.

PSA antibody immunostain has changed the ability to diagnose adenocarcinoma of an unknown primary site. This antibody is specific for prostatic adenocarcinoma, and its utility in diagnosing prostatic adenocarcinoma in tumors of unknown etiology has been utilized for decades. We presented an unusual case of metastatic prostatic adenocarcinoma in the lung diagnosis rendered cytologically and confirmed by the use of immunocytochemistry for PSA on a previously alcohol-fixed Pap-stained cytospin slide.

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Conflicts of interest
There are no conflicts of interest.

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