

Abstract:

Adenocarcinoma of the prostate is the most common form of cancer in men, typically affecting men over the age of fifty. The etiology of prostatic adenocarcinoma is unclear, although there are several factors suspected in contributing to the disease such as; age, race, hormone levels and environmental influences. The tumor can be incidentally discovered with little clinical significance or it can be an aggressive and lethal cancer. Prostate cancer is graded with the Gleason system which divides prostate cancers into five grades. The higher the grade, the poorer the prognosis for the patient. Metastasis more than likely occurs with advanced prostate cancer and has a tendency to spread to the bone via hematogenous spread.

Background:

The decedent is a 71 year old male with a history of metastatic prostate cancer, hypertension, coronary artery disease, and atrial fibrillation who presented to the hospital with worsening back pain, incontinence and altered mental status. The patient was diagnosed with Gleason score 9 prostatic adenocarcinoma on biopsy pursuant to a rapidly rising PSA. Therapy was initiated with leuporelin and he was randomized on the PREVAIL trial (MDV3100) with a subsequent reduction in PSA. Recent radiology demonstrated widespread bony metastasis and bilateral adrenal involvement. A spinal MRI was negative for spinal compression, so he was treated with intravenous fluids and opiates for pain relief. His mental status changes were thought to be secondary to opiate and/or steroid use. His pain improved, but he developed atrial fibrillation with rapid ventricular response, was placed on dabigatran and transferred to the CCU. Following cardioversion and treatment with metoprolol and amiodarone, his heart rate normalized. Subsequently, he developed shortness of breath, hypoxemia and bilateral infiltrates on chest X-ray lead to intubation. Passage of the endotracheal tube was associated with significant hemorrhage and the patient had elevated PT/PTT, consistent with diffuse intravascular coagulation. The blood loss raised concern for diffuse alveolar hemorrhage. The patient then developed hypotension, which combined with a cortisol value of <1.0ug/dL, raised concern for adrenal insufficiency. Blood cultures and serial troponins were negative. The patient was liberated from the ventilator and was subsequently extubated. Due to poor his prognosis and severe pain, following a discussion with his family, his goals of care were advanced to DNR-B. His pain was treated with dilaudid and the patient developed worsening respiratory failure and expired. His wife consented for the autopsy.

Rationale and Hypothesis:

Based on the decedent's clinical history, the prostate and spinal column were expected to reveal abnormal changes on gross examination. There was a clinical concern for pulmonary hemorrhaging which was thought to be the cause of death of the patient.

Methodology:

The post mortem examination included an external examination revealing a well-developed, well-nourished male, measuring 170 cm and weighing 175 lbs. The internal examination included the usual "Y" shaped incision, disclosing musculature of normal hydration and a panniculus measuring 2.5 cm. The mediastinum was unremarkable. The organs of the thoracic and abdominal cavities were in their normal anatomic positions.

Results:

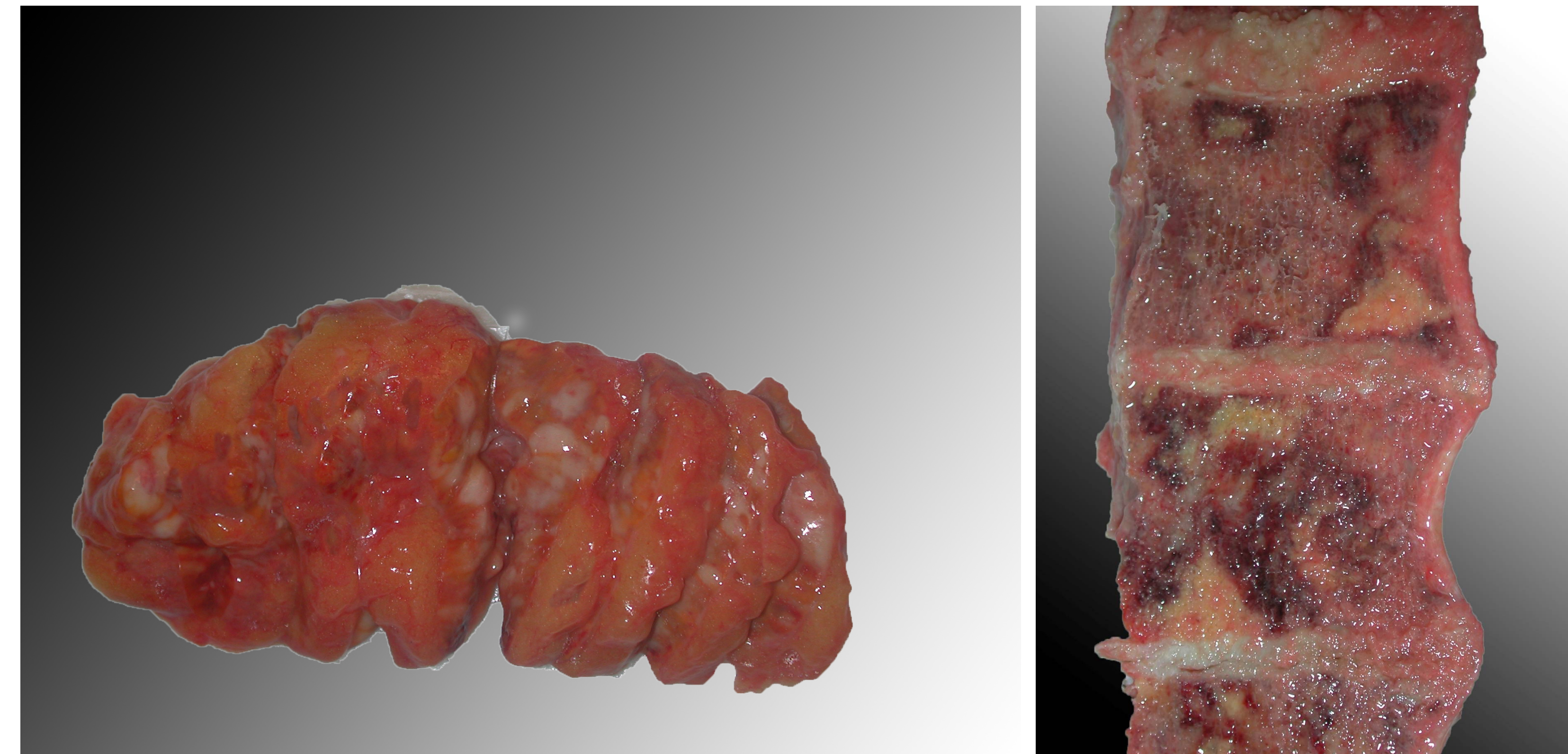


Figure 1. Gross Photos of Adrenal Gland and Spinal Column. a) Enlarged, multinodular adrenal gland. b) White, patchy, destructive lesions throughout spinal column.

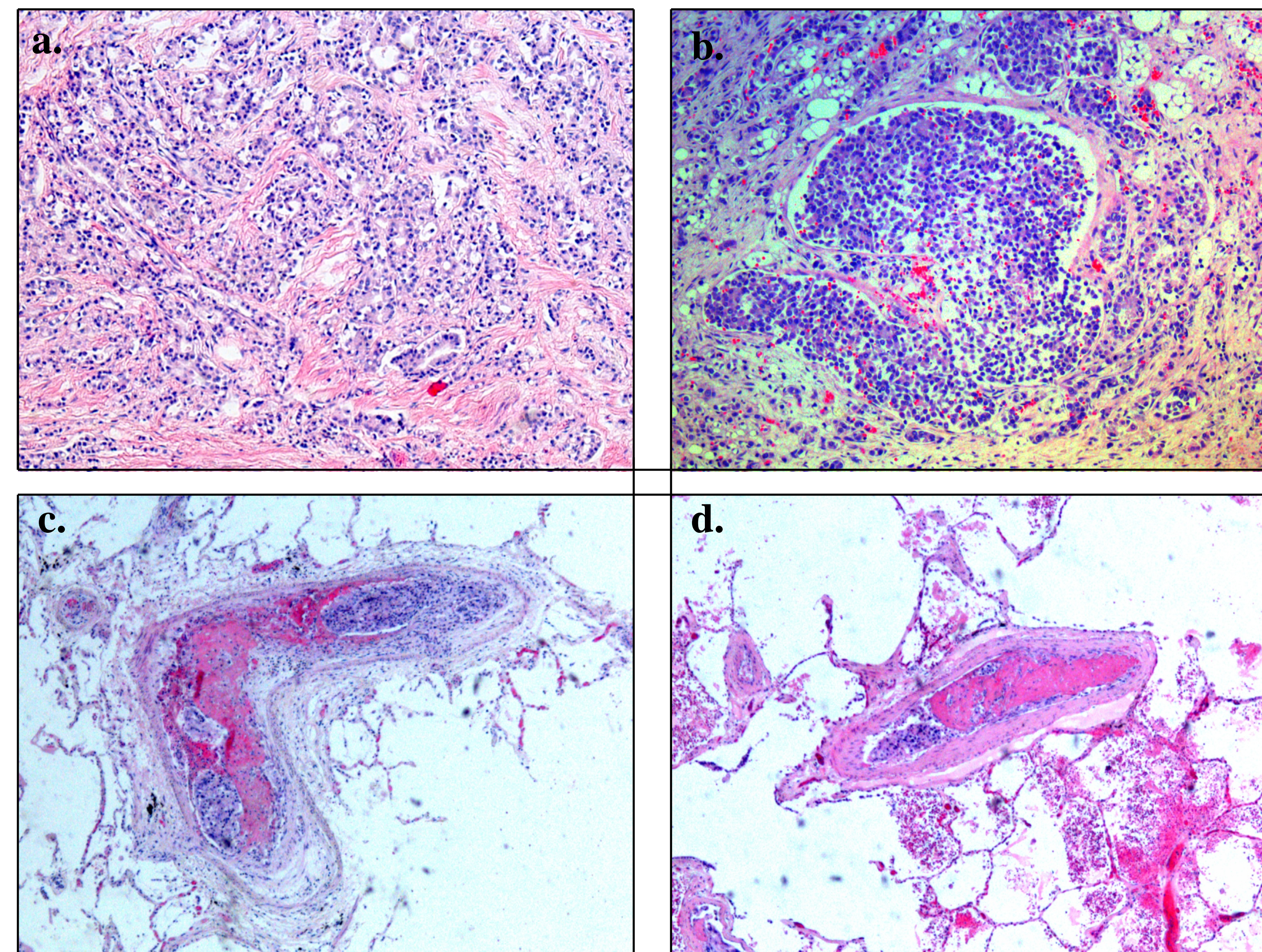
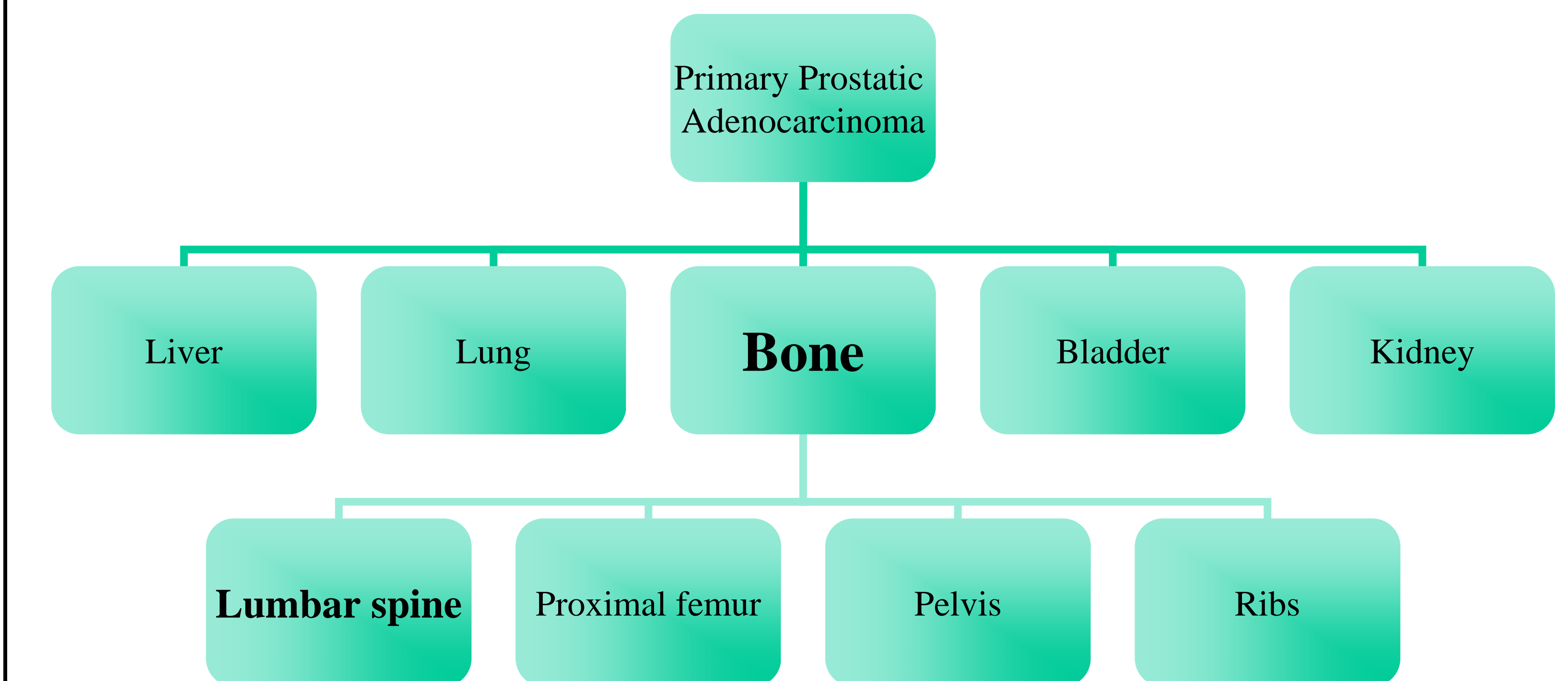


Figure 2. a) Photomicrograph depicting the prostate parenchyma with adenocarcinoma with perineural invasion. b) Adrenal gland tissue with carcinoma morphologically consistent with metastatic adenocarcinoma. c-d) Lung tissue with scattered intra-parenchymal hemorrhage with occluded vasculature caused by tumor emboli.

Discussion:

Primary metastatic adenocarcinoma of the prostate can spread via lymphatics or hematogenous route. The obturator nodes are typically the first lymph nodes affected followed by the para-aortic nodes. The axial skeleton is particularly affected by hematogenous spread.



The decedent's spinal column, adrenal glands, and prostate gland showed clear evidence of abnormal changes upon gross examination. The spinal column and adrenal glands grossly appeared to be consistent with metastases. The lungs were larger than normal with the right lung weighing 710g and left lung weighing 610g (Normal weights: 375-550 gms, right; 325-450 gms, left.) There was scattered foci of small red areas of firmness and bilateral serosanguinous pleural effusions, right 200mL and left 400 mL. There was no gross evidence of diffuse alveolar hemorrhage or a pulmonary embolus.

Conclusion:

There was a clinical concern for diffuse pulmonary hemorrhage which was not grossly apparent at autopsy. The lungs showed scattered foci of small red areas of firmness and bilateral serosanguinous pleural effusions, totaling 600 mL. Microscopically, the lung vasculature showed diffuse tumor emboli with some thrombi and diffuse intra-alveolar hemorrhage. The patient's deteriorating status was likely compounded by the diffuse intravascular spread of the prostatic adenocarcinoma throughout all lobes of the lungs. His hypoxemia was likely due to this factor.

In summary, the patient's cause of death was due to tumor related pulmonary thrombotic microangiopathy secondary to metastatic adenocarcinoma.

References:

Robbins and Cotran, Kumar, V., Abbas, A., Fausto, N., Aster, J. 2010. *Pathologic Basis of Disease, Eighth Edition*. Philadelphia, PA: Saunders, an imprint of Elsevier Inc.