

# Metastatic Prostate Cancer Presenting as Acute Appendicitis: A Case Report

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**KEYWORDS:** prostate cancer, appendiceal metastasis, nuclear medicine

## PRESENTATION/HISTORY

A 71-year-old man with a history of prostate cancer, without any recent evidence of gross metastatic disease, presented with right-sided abdominal pain, nausea, and vomiting. An abdominal computed tomography (CT) was performed (**Figure 1**) and findings were consistent with acute appendicitis on imaging. Appendectomy was performed, and pathology unexpectedly

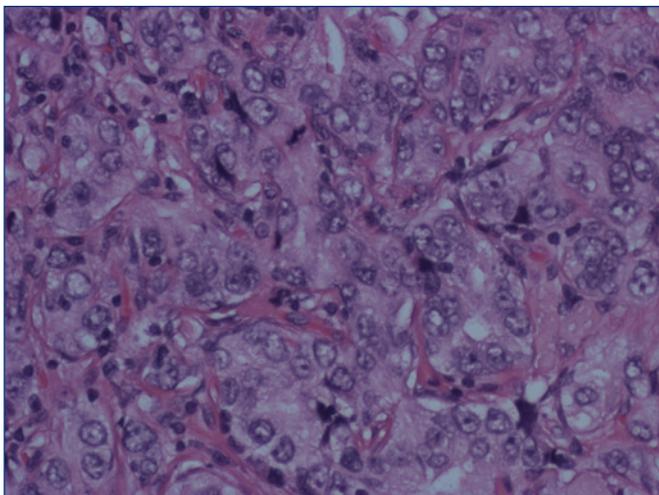
demonstrated metastatic prostate cancer to the appendix with secondary acute appendicitis (**Figure 2 and Figure 3**).

Initial diagnosis of the patient's prostate cancer was made by biopsy in 2001 (T1c NX MX), Gleason grade 4+4 with tertiary Gleason 5 pattern. Radical retropubic prostatectomy was performed and the patient was restaged to T3b N0 M0, with ten out of ten negative lymph nodes. Post-operatively the patient was deemed to have biochemical failure with a Prostate Specific Antigen (PSA) nadir of 0.95 ng/mL, despite salvage external beam radiation and androgen deprivation therapy. In 2004, a restaging PET scan showed no evidence of metastatic disease and a nuclear medicine ProstaScint study only showed mild increased uptake within a retroperitoneal

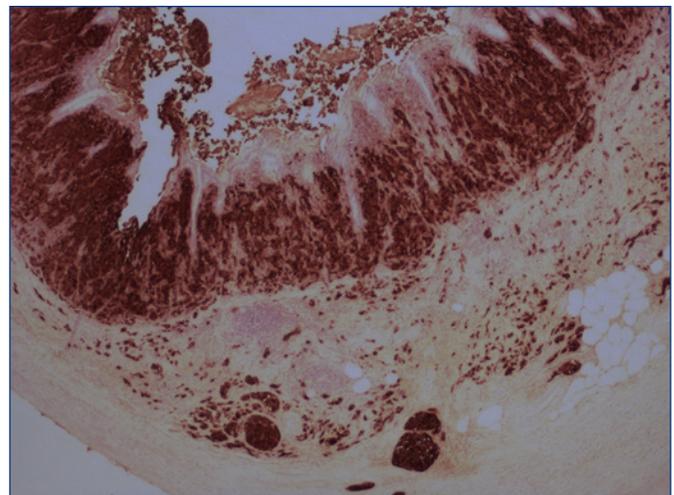
**Figure 1.** Axial and coronal images displayed in soft tissue windows from an abdomen and pelvis CT with IV demonstrates a dilated, elongated blind ending tubular structure arising from the base of the cecum with an appendicolith and surrounding periappendiceal inflammatory changes (white arrows) consistent with acute uncomplicated appendicitis on CT imaging.



**Figure 2.** High power view of appendiceal wall reveals an infiltrate of malignant epithelial cells with a subtle degree of glandular recapitulation (hematoxylin and eosin x 200 magnification).



**Figure 3.** Prostate specific antigen (PSA) immunoperoxidase stain reveals a transmural malignant infiltrate consistent with metastatic prostate carcinoma (x20 magnification).



lymph node. PSA remained stable until 2013, when it reached a peak of 5.8 ng/mL. A bone scan and CT of the abdomen and pelvis showed no evidence of gross metastatic disease. This patient did not demonstrate evidence of gross metastatic disease at the time of this presentation. The first definite evidence of metastatic disease was discovered from the appendectomy after histologic examination was performed.

## DISCUSSION

New cases of prostate cancer in the United States exceed 220,000 annually, making it the most common cancer - and second greatest cause of cancer-related mortality - in men.<sup>1</sup> Although increased screening and surveillance have led to earlier detection of the disease, prostate cancer commonly metastasizes, with particular affinity for lymph nodes, bone, lung and liver.<sup>2</sup> Primary metastatic disease to the gut, and particularly appendix, however, remain exceedingly rare, with only a few cases of the latter reported in the literature.<sup>3,4</sup>

The overall incidence of appendiceal tumors, however, is higher than one might expect. One retrospective review of nearly eight thousand appendectomy specimens found an incidental tumor occurrence approaching 0.9%.<sup>5</sup> The series revealed less than one third of tumors were secondary to metastatic spread, and none were from a prostatic source.

This unusual case highlights the challenges of radiologically assessing prostate CA metastasis in low-volume disease, particularly following prostatectomy. Bone scan and CT scans, though routinely ordered in the setting of biochemical recurrence, have a low yield in patients with PSA <10ng/mL. Magnetic resonance imaging (MRI) is showing promise for the evaluation of nodal prostate metastasis, particularly when used in conjunction with lymphotropic superparamagnetic nanoparticles such as monocrystalline iron oxide. These particles traverse the vascular and interstitial spaces and are transported by the lymphatics to lymph nodes, where, after being engulfed by macrophages, exert their influence on the imaging properties of MRI. Asymmetric or irregular accumulation of these nanoparticles, secondary to tumor infiltration, are therefore visualized on imaging.<sup>6</sup> Prospective studies comparing MRI with nanoparticles against a histopathologic gold standard have demonstrated patient-level sensitivities and specificities ranging from 55–100% and 85.5–95.7%, respectively, significantly higher than MRI alone.<sup>6–8</sup>

Advancements in nuclear medicine techniques offer additional tools for evaluating nodal as well as distant prostate cancer metastases, both in the context of pre-operative planning and in biochemical relapse. Pro- and retrospective studies show varying degrees of efficacy for <sup>11</sup>C-Choline positron emission tomography (PET)/CT for detecting lymph node metastases, with sensitivities and specificities ranging from 69–80% and 78–96%, respectively.<sup>9,10</sup> A recent prospective study suggests that <sup>18</sup>F-Choline PET/CT is superior to <sup>11</sup>C-Choline for lymph node and bone metastases as well as local recurrence, but is still inferior to surgical lymph node dissection.<sup>11,12</sup> More importantly, a prospective study evaluating <sup>11</sup>C-Choline PET/CT-guided salvage lymph node dissection in the setting of biochemical recurrence suggests that this technique may offer significant progression-free and cancer specific survival.<sup>13</sup>

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