

Exuberant Malakoplakia of the Prostate Presenting as Prostatic Abscesses in an Immunocompromised Patient

Samuel Bidot, MD,¹ Aaron H. Lay, MD,² Peter A. Harri, MD,³ and Lara R. Harik, MD¹

Abstract

Background: Malakoplakia is a rare benign lesion, usually associated with deficient intralysosomal degradation of microorganisms, more commonly, *Escherichia coli*. Malakoplakia occurs in various organ systems, the most frequently affected site being the urinary bladder. We report a rare case of isolated extensive malakoplakia involving the prostate, diagnosed on transurethral resection performed for radiologically suspected prostatic abscesses.

Case Presentation: A 61-year-old African American male presented with symptoms of urinary obstruction for the past 2 months. His medical history was significant for immunosuppression (liver transplantation 3 months prior and diabetes mellitus). He reported four episodes of *E. coli*-associated urinary tract infection after his liver transplantation. Serum prostate specific antigen was 1.83 ng/cc (normal inferior to 4 ng/cc), and urine culture was positive for *E. coli* sensitive to ceftriaxone. Pelvic magnetic resonance imaging was suggestive of prostatitis with prostatic abscesses; cystoscopy was unremarkable. The patient was started on intravenous ceftriaxone therapy. A standard bipolar transurethral resection of the prostate was performed, and purulent-like material was encountered in the resected tissue. Histologic examination demonstrated extensive infiltration and replacement of the prostatic tissue by sheets of pink histiocytes with targetoid inclusions consistent with Michaelis–Gutmann bodies, ultimately confirming malakoplakia of the prostate.

Conclusion: Prostatic malakoplakia is an unexpected diagnosis in patients suspected of having malignancy or prostatitis. Its exact pathogenesis is unknown, but it involves defective bacterial degradation after phagocytosis. *E. coli* is often cultured from the patients' urine. Immunosuppression, present in our patient, is a well-known associated factor. Prostatic malakoplakia can radiologically masquerade as prostatic adenocarcinoma, despite the use of cutting-edge imaging technology. With the growing use of multiparametric 3T prostate magnetic resonance imaging to screen for prostate cancer, it is possible that urologists, radiologists, and pathologists will encounter prostatic malakoplakia more frequently in the future.

Keywords: prostate, malakoplakia, transurethral resection of the prostate, immunosuppression, abscess

Introduction and Background

MALAKOPLAKIA IS A BENIGN uncommon infection-associated condition that has been reported in various locations, usually in the urinary tract, but also in extraurinary sites, including the gastrointestinal tract, female genital tract, the lungs, the skin, the tongue, the testes, and the parotid glands. Herein, we report an unusual case of prostatic malakoplakia extensively involving the prostatic tissue, obtained during transurethral resection of the prostate for suspected prostatic abscess.

Presentation of Case

A 61-year-old African American male originating from Sudan consulted our urology department for progressive symptoms of urinary obstruction for 2 months. His medical history was significant for cirrhosis of unknown origin, status postliver transplant 3 months before presentation, on multiple immunosuppressive drugs (tacrolimus, mycophenolate mofetil, and prednisone), and diabetes mellitus type 2. He reported four episodes of *Escherichia coli*-associated urinary tract infection after his liver transplantation, for which he was

Departments of ¹Pathology, ²Urology, and ³Radiology, Emory University School of Medicine, Atlanta, Georgia, USA. The present material was not submitted anywhere else.

started on prophylactic trimethoprim–sulfamethoxazole. Subacute prostatitis was suspected on digital rectal examination; otherwise, abdominal and genitourinary examination was unremarkable. Serum prostate specific antigen (PSA) was 1.83 ng/cc (normal inferior to 4 ng/cc), and urine culture was positive for multidrug-resistant *E. coli* (including trimethoprim–sulfamethoxazole). Antibiotic sensitivity studies showed that the *E. coli* is sensitive to ceftriaxone.

Pelvic MRI showed diffuse edema with diffuse restricted diffusion and focally increased restricted diffusion within the prostatic gland, suggestive of prostatitis with prostatic abscesses (Fig. 1). Cystoscopy did not show any abnormalities. He was started on intravenous ceftriaxone, and a standard bipolar transurethral resection of the prostate was performed to expeditiously relieve the patient's obstructive symptoms and unroof the prostatic abscesses. Purulent-like material was encountered and drained, admixed with the resected tissue.

Histologic hematoxylin and eosin examination of the specimen demonstrated extensive infiltration and replacement of the prostatic tissue by sheets of pink histiocytes containing Michaelis–Gutman bodies (Figs. 2 and 3). Neutrophilic inflammation was scant, and no neutrophilic collections was observed. No mycobacteria or fungi was seen on acid-fast bacilli and Grocott's methenamine silver stains, respectively. In view of the findings, extensive malakoplakia of the prostate was diagnosed. On follow-up, the patient's urinary issues had resolved, and he has not had recurrent infections.

Discussion and Literature Review

We present an unusual case of prostatic malakoplakia caused by a multidrug-resistant *E. coli* in a patient with

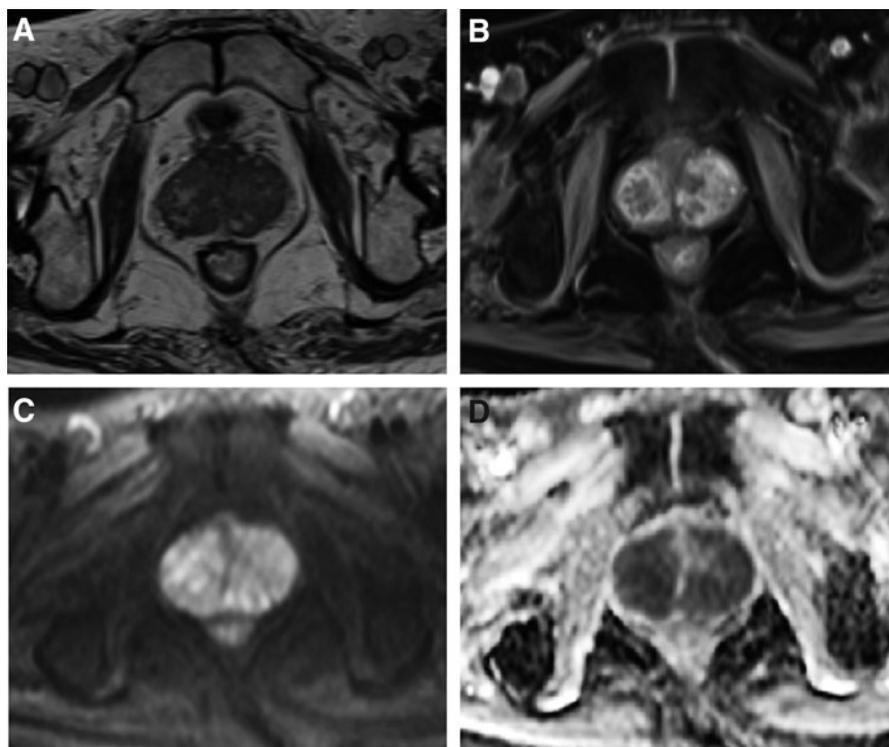
more than one condition causing an immunosuppressed state (status postliver transplantation and diabetes mellitus type 2). Attention to the results of the antibiotic sensitivity tests led to the administration of an effective antibiotic. Swift intervention, through transurethral resection of the prostate, helped expedite the relief of the patient from the presenting obstructive symptoms and decrease the bacterial load.

Malakoplakia is a rare disorder that occurs most frequently in the urinary tract, particularly the urinary bladder. It can also occur in various other sites across the body. Malakoplakia is thought to arise because of defective degradation of phagocytosed bacteria, caused by a yet unknown mechanism. Partially digested bacteria accumulate in histiocytes (Hansemann's cells), and bacterial material becomes coated with calcium and iron, leading to the formation of the pathognomonic Michaelis–Gutmann bodies and mass-like lesions in response.

Similar to malakoplakia of the urinary bladder, prostatic malakoplakia is associated with recurrent urinary tract infections and the growth of microorganisms on urine culture, most commonly *E. coli*. Despite the proximity of the prostate to the urinary bladder, malakoplakia of the prostate remains rare, with only 50 patients reported in the literature, often as individual cases or short case series.^{1–4} Our patient's cystoscopy was unremarkable, similar to other patients in the literature. Usually, reported patients with prostatic malakoplakia had either unremarkable cystoscopic examination or demonstrated nonspecific cystitis, suggesting that prostatic malakoplakia often occurs in isolation.

Intuitively, prostatic malakoplakia appears associated with a history of transrectal prostatic needle core biopsies with subsequent development of malakoplakia, in particular in patients with recurrent urinary tract infections.⁴ Our patient

FIG. 1. (A, B) MRI of the pelvis without and with contrast. The T2-weighted sequence (A) demonstrates diffuse decrease in signal throughout the peripheral and transitional zones that correspond to avid contrast enhancement on the T1 weight postcontrast sequence (B), restricted diffusion on diffusion-weighted sequence, B800 (C), and marked low ADC on the ADC map (D) with ADC value as low as 435. This is compatible with a PI-RADS 5 lesion. ADC, apparent diffusion coefficient; PI-RADS, prostate imaging reporting and data system.



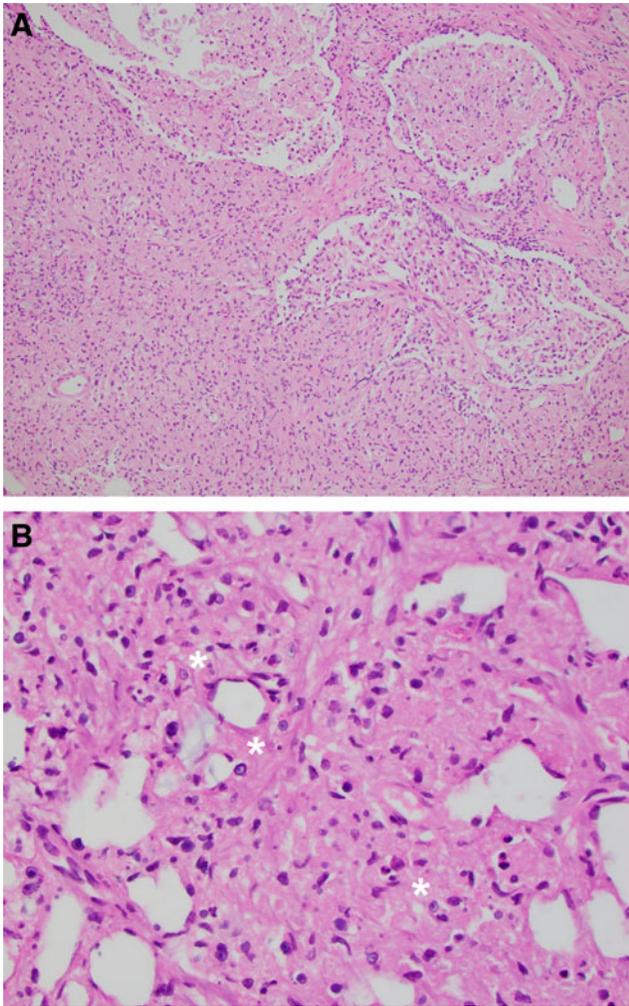


FIG. 2. (A, B) Prostate, hematoxylin, and eosin stain, original magnification X100 (A) and X400 (B). Extensive infiltration and replacement of the prostatic tissue by histiocytes with abundant eosinophilic cytoplasm and poorly defined borders, and targetoid inclusions consistent with Michaelis–Gutmann bodies (*asterisks*).

had a history of recurrent urinary tract infections; however, he had not undergone prior prostatic needle core biopsies and his PSA was clinically within normal limits.

Malakoplakia often arises in immunocompromised patients, similar to our patient. Various causes for the immunocompromised state of these patients have been described, including immunosuppression because of organ transplantation and diabetes, similar to our case, but also AIDS, hematopoietic neoplasms, and iatrogenic, caused by steroid intake. The extensive replacement of the prostate seen in our case is expected because of the many causes for immunocompromised state and the history of repeat urinary tract infections.

Rare reports of prostatic malakoplakia describe a clinical picture of prostatic abscesses.¹ Our patient's MRI revealed multifocal prostatic abscesses and his cultures grew multidrug-resistant *E. coli*, justifying transurethral resection to surgically drain the abscesses. Prostatic malakoplakia is

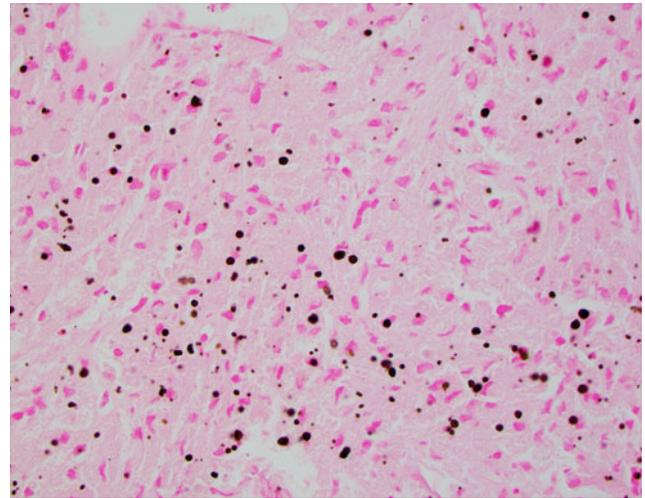


FIG. 3. Prostate, Von Kossa stain, original magnification X400. Michaelis–Gutmann bodies are composed of bacterial debris coated with iron and calcium that cannot be digested by histiocytes. Von Kossa stain stains calcium in brown, highlighting the Michaelis–Gutmann bodies.

most often an unexpected pathologic finding in patients in whom prostatic tissue was obtained because of suspicion of malignancy either on abnormal radiologic studies or on abnormal digital rectal examination of the prostate. It remains a radiologic mimicker of prostate cancer, even when using the most recent imaging technology. For example, in one patient ultimately found with prostatic malakoplakia, multiparametric 3T prostate MRI using the recent prostate imaging reporting and data system (PI-RADS) revealed high-grade PI-RADS lesions.²

With the growing use of multiparametric 3T prostate MRI to detect prostate cancer, because of its higher sensitivity and specificity over digital rectal examination and ultrasonography, urologists, radiologists, and pathologists might encounter prostatic malakoplakia more frequently in the future. The risk could be higher since some of these patients are referred for MRI-guided biopsies specifically because of prior negative standard ultrasound-guided needle core biopsies, in the setting of persistently elevated PSA levels and a radiologically detected high-grade PI-RADS lesion. Careful attention to the clinical history could be helpful in including prostatic malakoplakia in the differential diagnosis.

Conclusion

Prostatic malakoplakia is a rare benign condition that could radiologically masquerade as prostate cancer. It is often associated with recurrent urinary tract infections and/or prior needle core biopsies of the prostate. Patients are frequently immunosuppressed because of various causes. It is possible that we will see an increase in the detection of prostatic malakoplakia with the increased use of multiparametric 3T prostate MRI, especially smaller foci that would have remained undetected otherwise.

Disclosure Statement

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Address correspondence to:

Lara R. Harik, MD
Department of Pathology
Emory University School of Medicine
1364 Clifton Road NE
Atlanta, GA 30322
USA

E-mail: lara.harik@emory.edu

Abbreviations Used

MRI = magnetic resonance imaging
PI-RADS = prostate imaging reporting and data system
PSA = prostate specific antigen

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