CASE REPORT

Renal malakoplakia mimicking a malignant renal carcinoma: a patient case with literature review

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SUMMARY

Malakoplakia, a medical, surgical, pathological and radiological enigma, is an infrequent chronic inflammatory condition that can affect many organ systems, including the gastrointestinal tract, integument, skeletal system and genitourinary tract. Review of the literature has shown that malakoplakia presents in paediatric as well as adult populations, and that it is associated with impaired immune function. Variable clinical manifestations as well as the sometimes non-specific radiological findings of malakoplakia can be misleading, making diagnosis quite difficult. We present a clinical case of renal malakoplakia mimicking a malignant renal carcinoma in a 62-year-old woman. This report highlights the importance of awareness of malakoplakia in the differential diagnosis for renal masses and renomegaly. This case can serve as a reminder that things are not always what they seem, and it reinforces the idea that unusual disease entities should be explored to aid in achieving a correct diagnosis and, thus, potentially avoid unnecessary treatment.

BACKGROUND

Malakoplakia, meaning soft plaque, describes the appearance of a solitary or multifocal lesion as it appears in an organ,¹ and was first seen in humans by an oncologist, von Hanseemann, on 14 May 1901.² Although he coined the term malakoplakia, he did not publish his work on the condition until 1903.² Interestingly, in 1902, Dr Gutmann, von Hanseemann's assistant, and Dr Michaelis, a biochemist, published a paper on the condition, making theirs the first in the Western literature to describe the pathology. However, it is a historical fact, likely lost during translation of this paper from German to English, that von Hanseemann was the first to describe this condition. Because of the contributions of each individual, the condition includes the eponyms Hanseemann cells, which are histiocytes with small nuclei and granular acidophilic cytoplasm, and Michaelis-Gutmann bodies, which are granular basophilic periodic acid-Schiff, diastase-resistant and calcific inclusions seen within the histiocytes.³

Malakoplakia is a granulomatous inflammatory condition that appears as soft plaques in various organs and results from defective macrophage function.³ It is an uncommon condition that has a predilection for the genitourinary tract, but has been known to affect the gastrointestinal tract, bone, lungs, lymph nodes and skin,³ with a female

predominance.⁴ The aetiology of this granulomatous inflammatory condition has not been fully explicated, but it is proposed that it is associated with immunosuppression, infection and systemic illnesses.⁴ We present a case of malakoplakia arising in the background of recurrent urinary tract infections (UTI).

CASE PRESENTATION

A 62-year-old African-American woman presented with a 3-week history of worsening right-sided abdominal pain that radiated to her back. She admitted to one episode of non-bloody emesis and nausea. Two previous episodes of abdominal pain were temporarily relieved with ciprofloxacin and sulfamethoxazole/trimethoprim, as prescribed by her primary care physician. These episodes were accompanied by fever, chills and sweating, which resolved. Her medical history included type 2 diabetes mellitus, hypertension, arthritis, gout, asthma, left renal cysts and pancreatitis.

On admission, her vital signs were as follows: blood pressure of 102/57 mm Hg; oxygen saturation of 99% on room air; respiratory rate measuring 20 bpm; and a pulse rate of 107 bpm. Pertinent physical findings included tenderness in the right upper and right lower quadrants of the abdomen, as well as significant right costovertebral angle tenderness. Pertinent lab values were as follows: haemoglobin and haematocrit of 8 g/dL and 24.6%, respectively; white blood cell (WBC) count of 30 000/ μ L; blood urea nitrogen (BUN) of 59 mg/dL; and creatinine of 3.1 mg/dL. On urine analysis, WBCs were too numerous to count, and had large leucocytes.

Based on the patient's clinical presentation, a diagnosis of severe sepsis was made secondary to acute right pyelonephritis. Piperacillin/tazobactam and extended spectrum penicillin were prescribed. The initial clinical impression also included anaemia, uncontrolled diabetes and chronic renal disease. An abdominal ultrasound (images not shown) revealed indistinct lateral margins of the right kidney, with a suspected mass. A non-contrast CT scan (contrast not administered initially due to the renal function, which ultimately improved with hydration) was subsequently obtained. CT imaging (figures 1) showed a large 5×3 cm (measured in short axis) right pararenal mass that infiltrated the right posterior lateral abdominal wall. There was some reduction in the size of the mass following percutaneous drainage of the right flank, which revealed bacteria and leucocytes, but no abnormal

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Figure 1 Malakoplakia mimicking renal cancer with abscess. Transverse CT image shows slightly heterogeneous lobular mass (between white arrows) involving the perirenal and right pararenal spaces with indistinct margin from the right renal cortex (yellow asterisk).

cells; the mass was thought to be a retroperitoneal abscess at this time. Follow-up CT images, postdrainage, were more revealing for a mass-like appearance arising from (vs abutting) the lateral margin of the right kidney (figure 2), suggesting a neoplasm with smaller peripheral abscess-like collections. As such, urology was consulted to evaluate for renal malignancy with abscess.

Owing to the appearance of the mass on imaging, the patient underwent right retroperitoneal exploration with subsequent right radical nephrectomy, which is generally indicated for solid renal masses. The specimen was sent to pathology and gross examination showed a 3.3×2.9×2.4 cm tan yellow shaggy friable mass lesion on the external lateral aspect of the kidney (figure 3). On cut section, the mass was ill defined and was found to be in continuity with the renal cortex. Cut surfaces of the lesion showed soft tan yellow tissue. The remainder of the

Figure 2 Malakoplakia mimicking renal cancer with abscess. Contrast-enhanced transverse CT image, postdrainage, shows residual enhancing soft tissue mass arising from the lateral cortex of the right kidney.

Figure 3 Right kidney (11.1×7.1×5.8 cm, 209 gm), bisected. A tan/yellow, shaggy mass lesion is present on the external lateral aspect of the kidney, 5.9 cm from superior pole, 5.1 cm from the interior pole and 0.7 cm from the renal sinus fat. It is grossly contiguous with the renal cortex.

renal cortex was soft and yellow, and contained multiple indistinct soft tan yellow areas similar to the mass-like lesion. The renal papillae were erythaematous and there were multiple renal cysts in the upper and lower poles ranging in size from 0.3 to 1.9 cm in diameter. The cysts were filled with haemorrhagic and necrotic material. The separately received fragments of soft tissue from the retroperitoneum contained adipose tissue admixed with firm tan/white lesions, ranging from 2.5 to 4.1 cm in greatest dimensions. Cut surfaces of these lesion revealed soft yellow necrotic debris. Histological examination of the kidney and retroperitoneal soft tissue revealed marked chronic granulomatous inflammation with associated necrosis (figure 4).

There were also numerous epithelioid histiocytes (von Hanseman histiocytes) with granular eosinophilic cytoplasm. The histiocytes contained round basophilic intracytoplasmic inclusions (Michaelis-Gutmann bodies) (figure 5). The inclusions varied from 3 to 10 microns in size. A Prussian Blue stain highlighted the iron present in the inclusions (figure 6). These findings were consistent with a diagnosis of malakoplakia. The residual renal parenchyma showed glomerulosclerosis, chronic inflammation with thyroidisation changes and vascular congestion. Pathology also described the histology of the remaining normal kidney tissue, which showed non-specific findings of benign nephrosclerosis including scattered hyalinised glomeruli, arteriolosclerosis and arterial sclerosis, and patchy tubular atrophy showing thyroidisation. This tissue did not show Kimmelstiel-Wilson nodules, which are suggestive of nodular diabetic glomerulosclerosis.

INVESTIGATIONS

This patient was not involved in a clinical trial.

DIFFERENTIAL DIAGNOSIS

Malakoplakia, retroperitoneal abscess, renal cell carcinoma with abscess, benign renal mass.

OUTCOME AND FOLLOW-UP

The patient underwent right radical nephrectomy status post right retroperitoneal exploration in December 2012, secondary to studies suggestive of an infected solid renal mass. During her first follow-up appointment with urology 1 month later, her UTI symptoms had resolved, and BUN and creatinine were 22

Figure 4 Markedly inflamed renal parenchyma, H&E, $\times 20$. Note the marked chronic inflammatory infiltrate and distortion of the renal architecture. Again, note the necrotic debris within the tubules.

and 3.3 mg/dL, respectively. During her most recent visit to urology 1 year later, she was again asymptomatic, but had a BUN and creatinine of 58 and 3.4 mg/dL, respectively, which, we believe, is her new baseline for renal function. The patient has not had any further clinical manifestations of malakoplakia in any organ system nor has she presented with any septic episodes or UTI since the nephrectomy.

DISCUSSION

Malakoplakia is an inflammatory condition associated with immunosuppression, infection and systemic illness. In our particular patient, recurrent UTIs and uncontrolled diabetes are suspected causative factors contributing to the development of this entity. Researchers believe that malakoplakia results from inadequate killing of phagocytosed microorganisms by monocytes and macrophages, leading to decreased levels of intracellular cyclic guanosine monophosphate and decreased release of β glucuronidase. Owing to decreased intracellular cyclic guanosine monophosphate levels, microtubular function and lysosomal activity are not adequate, leading to an incomplete elimination of bacteria from the phagocytes.⁴

Renal malakoplakia commonly presents with fever, flank pain and a palpable mass, and often resembles other renal

Figure 5 Lesion with Michaelis-Gutmann bodies, H&E, $\times 100$. High power view of intracytoplasmic Michaelis-Gutmann bodies within the dense histiocytic infiltrate.

Figure 6 Lesion with Michaelis-Gutmann bodies, Prussian Blue $100\times$. High power view of intracytoplasmic Michaelis-Gutmann bodies with iron stain.

pathologies, as in our case.⁵ As a result, it is necessary to distinguish malakoplakia from renal tumours or other processes, including xanthogranulomatous pyelonephritis, since work up and treatment of these entities differ. Making a clinical diagnosis of malakoplakia can prove difficult due to its somewhat non-specific findings, but the condition should be suspected if a kidney is enlarged in the presence of a UTI. These findings require work up with renal biopsy.¹ While the gross presentation of the condition may resemble carcinoma, which indicates nephrectomy, malakoplakia calls for more conservative measures—medicinal therapy is indicated.⁶

The presence of Michaelis-Gutmann bodies on histological examination is pathognomonic for the diagnosis. These bodies are basophilic structures that exist within clusters of macrophages, termed von Hansemann cells, which are amalgamated with lymphocytes and plasma cells.⁶ A Michaelis-Gutmann body can also be found extracellularly among bundles of collagen producing fibroblasts within the stroma, and its composition includes organic components as well as calcium, phosphorus and iron.^{3,4}

Treatment of malakoplakia is contingent on the extent of the disease and the underlying conditions of the patient.⁷ Typically, patients with bilateral or multifocal diseases are cured after using antibiotics, including quinolones, rifampin, doxycycline and vancomycin.⁸ In addition, a cholinergic agonist, such as bethanechol chloride, is used in combination with antibiotics to correct lysosomal defects.^{5,7} Surgical excision is the choice treatment of unifocal diseases;⁴ but nephrectomy is indicated when the disease extends into the upper, mid and lower poles of the kidney—when damage to the kidney is extensive.⁸

In conclusion, malakoplakia must be included in the differential diagnosis when a patient presents with the following: fever, flank pain, a renal enlargement or mass and/or a history of recurrent UTI, as well as a medical history of an infectious disease such as tuberculosis. Patients who are immunocompromised and concomitantly experiencing any of the aforementioned symptoms should be evaluated for possible malakoplakia with imaging studies plus needle aspiration or biopsy. The pathogenesis of this condition needs to be fully expounded on in order for better diagnostic and treatment options to become available, and for a better understanding of the disease as its own entity. Increased awareness of the disease will aid in achieving the correct diagnosis and, thus, potentially avoid delayed or unnecessary treatment.

Learning points

- ▶ Renal malakoplakia commonly presents with fever, flank pain and a palpable mass, thus it may often resemble other renal pathologies and needs to be distinguished, for proper treatment. Renal biopsy would be useful on the discovery of these signs and symptoms; and because biopsy would not delay treatment, it is essential for the diagnosis of the disease and differentiation of the condition from other processes.
- ▶ Malakoplakia is believed to be the result of the inadequate killing of phagocytosed microorganisms by monocytes and macrophages.
- ▶ Treatment of malakoplakia is contingent on the extent of the disease, and patients with bilateral or multifocal diseases are typically cured after using quinolones, rifampin, doxycycline and/or vancomycin in combination with a cholinergic agonist such as bethanechol chloride. Ultimately, conservative medical management with the appropriate antibiotics should be considered prior to a partial or total nephrectomy.
- ▶ Michaelis-Gutmann bodies are pathognomonic for malakoplakia. Once discovered, conservative treatment is ideal, as the patient's nephrons will be spared, allowing him or her to avoid nephrectomy and stress to the remaining kidney, as well as circumventing the need for haemodialysis and its associated complications.

Contributors All the authors read and approved the manuscript. PC performed the surgery. BD provided radiological information. RB-S provided pathological information. SDKP prepared and submitted the manuscript and photographs. The corresponding author is the guarantor of submission.

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REFERENCES

- 1 Gillenwater J, Grayhack J, Howards S, *et al.* *Adult and pediatric urology*. 4th edn. Philadelphia, PA: Lippincott Williams & Wilkins, 2002.
- 2 Dasgupta P, Womack C, Turner A, *et al.* Malakoplakia: von Hansemann's disease. *BJU International* 1999;84:464–9.
- 3 Wielenberg AJ, Demos TC, Rangachari B, *et al.* Malakoplakia presenting as a solitary renal mass. *AJR Am J Roentgenol* 2004;183:1703–5.
- 4 Yousef G, Naghib B. Malakoplakia outside the urinary tract. *Arch Pathol Lab Med* 2007;131:297–300. (accessed 07 Aug 2014).
- 5 Kajbafzadeh A, Baharnoori M. Renal malakoplakia simulating neoplasm in a child: successful medical management. *Urol J* 2004;1:218–20. (accessed 10 Feb 2014).
- 6 Diwakar R, Else J, Wong V, *et al.* Enlarged kidneys and acute renal failure—why is a renal biopsy necessary for diagnosis and treatment? *Nephrol Dial Transplant* 2007;23:401–3.
- 7 Abolhasani M, Jafari A, Asgari M, *et al.* Renal malakoplakia presenting as a renal mass in a 55-year-old man: a case report. *J Med Case Rep* 2012;6:379. (accessed 11 Feb 2014).
- 8 Ayllon J, Verkarre V, Scotte F, *et al.* Renal malakoplakia: case report of a differential diagnosis for renal cell carcinoma. *Am J Case Rep* 2012;13:38–40.

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