CASE REPORT

Prostate cancer with metastases to the kidney:
a rare manifestation of a common disease

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SUMMARY

A 66-year-old Caucasian man with a background of prostate cancer presented with a progressive history of nausea, reduced appetite, shortness of breath and a distended abdomen. Radiological imaging revealed a left-sided renal mass and gross ascites suggestive of metastatic renal cell carcinoma (RCC). Subsequent histological examination and immunostaining of renal mass biopsy revealed features characteristic of metastatic moderately differentiated to a focally poorly differentiated, large duct type of prostatic adenocarcinoma.

BACKGROUND

Prostate cancer is the second most common cancer in men. Advance disease can locally invade and metastasis to bones, lungs and visceral organs. Renal metastasis is extremely seldom; however, the possibility should not be overlooked when investigating a renal mass in this cohort.

CASE PRESENTATION

A 66-year-old Caucasian man had a background of T3b Gleason 4+4 adenocarcinoma of the prostate, localised to the right lobe, diagnosed 7 years previously. Initial neoadjuvant antiandrogen therapy was followed by radiotherapy to the prostate (65 Gy in 35 fractions). During follow-up, the patient had a biochemical relapse and was restarted on antiandrogen therapy 1 year prior with a prostate specific antigen (PSA) level of 25. Owing to further rise in PSA, the treatment was escalated to maximal androgen blockade. He was subsequently referred as an emergency and admitted under the care of the physicians with a progressive history of nausea, reduced appetite, constipation and worsening abdominal distension. On examination, he was found to have shifting dullness and a fluid thrill in keeping with gross ascites. His chest was clear, no stigmata of liver pathology were identified and routine observations were stable.

INVESTIGATIONS

Biochemically, liver function tests were normal and albumin was 42 g/L. Creatine was raised to 143 µmol/L, and tumour markers—carcinoembryonic antigen of 23 and PSA of 52.5—were recorded.

A CT scan of the chest, abdomen and pelvis was arranged and showed a left-sided 5.5 cm posterior mid-cortical renal mass consistent with a renal cell carcinoma (RCC) associated with extrarenal tumour extension. Multifocal peritoneal and mesothelial deposits and a probable metastatic liver

lesion with gross ascites were also noted (figure 1). An initially presumed RCC staging of T1bN0M1 was formulated.

Histological examination with renal mass biopsy showed fibrocollagenous stromal tissue, infiltrated by the tumour with papillary, glandular and focal cribriform architecture as the focal areas of necrosis. In addition tumour cells demonstrated prominent nucleoli and mitotic activity in abundance.

Immunostaining showed tumour cells to be positive for cytokeratin marker MNF116, CD10 and PSA and negative for CK7, CK20 and vimentin (figure 2). These features conclude a diagnosis of a metastatic moderately differentiated to a focally poorly differentiated, large duct type of prostatic adenocarcinoma.

DIFFERENTIAL DIAGNOSIS

Initial differential diagnosis would encompass primary and metastatic renal cell carcinoma, lymphoma and benign lesions such as angiomyolipoma or oncocytoma.

TREATMENT

In view of advanced disease the patient opted for palliative management and a long-term ascitic drain was sited for symptomatic relief.

OUTCOME AND FOLLOW-UP

The patient was referred for palliative input and was subsequently cared for in a hospice. He died 6 weeks after diagnosis.

Figure 1 Coronal CT scan demonstrating left renal mass and presence of gross ascites.

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Figure 2 Immunostaining of renal biopsy demonstrating tumour cell positivity for prostate-specific antigen.

DISCUSSION

Prostate cancer is currently the second most common cause of cancer death in men. In developed countries prostate cancer accounts for 15% of male-cancers compared with 4% of male-cancers in developing countries.¹ In theory cancer can cause metastatic spread to any part of the body, however prostate carcinoma is classically associated with skeletal, pulmonary or hepatic metastases and more locally invades the seminal vesicles, the bladder, the rectum and regional lymph nodes.

The sites of metastases are becoming progressively diverse. This can be attributed to an increase in the average age of the general population, or a better life expectancy of oncological patients with the current modern treatment options. These atypical metastatic locations being the ocular region, brain, respiratory tract, testes, mammary and parotid glands, the skin and the lymphatic system.

Prostate cancer has a high propensity to metastasise to bone, as the human bone marrow endothelial cells have a higher affinity than other cells for binding prostate tumour cells.²

It is this affinity for bone metastases that led to orbital metastases.³

Since the eye lacks lymphatics, orbital metastases arise secondary to tumoral emboli in the arterial system that reaches the uvea through the internal carotid, ophthalmic and anterior ciliary arteries. The sclera, an avascular structure is therefore usually spared. Intraocular metastases remain rare with less than 20 cases described. Five per cent of uveal metastasis in men originate from a prostate primary and only 15% of these are first manifestations of the tumour.^{4 5}

Rarely does prostate carcinoma metastasise to the brain or spinal cord.⁶ Blood flows during a Valsalva's manoeuvre from the inferior vena cava to the paravertebral venous plexus and vertebral veins to reach the skull base. From here the tumour can disseminate into the dural veins and reach the cerebral parenchyma. In addition it remains that cerebral metastasis is seldom the primary presentation for prostate cancer.⁷

With regard to testicular dissemination, three possible routes of extension have been described: arterial embolisation, retrograde venous extension (where venous blood flows back towards the testes during a Valsalva manoeuvre) and spread through the lumen of the vas deferens.⁸

The mammary gland and less commonly the parotid gland are also sites of metastases. Twenty-four cases have been reported at the mammary gland, with it clinically manifesting as bilateral gynaecomastia, painful unilateral nodules or enlargement of axillary lymph nodes.⁹

Cutaneous spread from a prostate primary is a rare event, occurs late and carries a poor prognosis. Recognition remains challenging and immunohistochemical staining assists in diagnosis. Usual sites affected include, the hypogastrium, legs and the external genitals. However, the thoracic region, nose and navel have also been described.^{10 11}

The typical description of the left supraclavicular lymph node and haematogenous embolisation to the lungs can be accounted for the frequent spread of prostate carcinoma through the lymphatic vessels. This being through the external iliac chain, followed by the para-aortic lymph nodes and finally to the thoracic duct and left supraclavicular node.¹²

Primary tumours commonly metastasising to the kidney include lung, breast, oesophagus and colon. In addition to our case report only a few cases have been reported for prostate cancer metastasising to the renal system.^{13–15} As kidneys are highly vascular organs, metastatic infiltration is most likely a result of arterial embolisation. Patients presenting with extensive clinical symptoms can be managed with interventional angiography and embolisation or radical surgery.

In conclusion the potential pitfall in overlooking renal metastatic disease from a prostate primary must be avoided by keeping a high index of suspicion when a renal mass is found in these patients.

Learning points

- ▶ Majority of renal masses are incidentally diagnosed through routine imaging and only 10–15% present classically with symptoms of loin pain, haematuria and a palpable mass.
- ▶ In theory cancer can cause metastatic spread to any part of the body; however, prostate carcinoma is classically associated with skeletal, pulmonary or hepatic metastases.
- ▶ Although rare, it is important to consider the possibility of prostatic carcinoma metastases to the kidney in patients presenting with renal mass on a background of prostate cancer.
- ▶ Treatment options are aimed at providing symptomatic relief for such advanced disease.

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