Unexpected outcome (positive or negative) including adverse drug reactions

Tumour-seeding: a rare complication of ablative therapy for clinically localised renal cell carcinoma

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Summary

Current evidence-based clinical practice guidelines identify surgical resection as the recommended treatment of small renal masses. Ablative approaches such as laparoscopic and percutaneous cryoablation and radiofrequency ablation offer the promise of complete tumour destruction by a less-invasive approach with regard to outcomes such as anaesthesia requirements, blood loss, length of stay and time to recovery, making them appealing to patients. However, evidence of therapeutic benefits, harms and costs for these methods remains limited. We report a case of applicator tract seeding by tumour following percutaneous cryoablation of renal cell carcinoma; a rare and potentially under-reported, yet catastrophic complication of ablative therapy.

BACKGROUND

Despite the lack of high-quality evidence supporting its comparative effectiveness, ablative therapy as a relatively new technology is finding increasing use in the treatment of clinically localised renal tumours, not limited to patients deemed poor surgical candidates. When considering the use of ablative techniques, physicians and patients should consider both the perceived benefits and harms of this approach. Case reports play an important role in helping to define the true harms of therapies, especially if the adverse outcome of interest is rare. In this case report, we describe the devastating complication of tumour seeding and rapid metastatic dissemination in a patient with renal cell carcinoma who underwent percutaneous cryoablation of a localised renal mass. Clinicians should inform patients, in particular those who are candidates for alternative treatment modalities, of this rare, yet potentially devastating complication of ablative procedures.^{1 2}

CASE PRESENTATION

An 84-year-old man was referred to urology clinic with an incidental CT finding of an asymptomatic 2.7 cm enhancing left lower pole renal mass. Prior biopsy had confirmed the diagnosis of a clear cell renal cell carcinoma and a chest x-ray showed no evidence of metastases. The patient's medical history was notable for coronary artery disease, myocardial infarction, percutaneous coronary angioplasty and stenting, endograft repair of an abdominal aortic aneurysm, mild dementia as well as biochemically recurrent prostate cancer status post local cryotherapy with no evidence of metastatic disease.

Despite his medical comorbidities, the patient remained highly functional and enjoyed an active lifestyle together with his wife. He had full decision-making capacity, was able to fully participate in the clinical decision-making with regard to his care and was informed about his diagnosis of renal cell carcinoma as well as its expected natural history. Treatment options discussed were surgical

removal, ablation and active surveillance. Following extensive counselling, the patient and his wife initially opted for an observant approach. He returned for follow-up visits and repeat cross-sectional imaging 6 and 12 months later. On both occasions, he remained asymptomatic with no haematuria or flank pain, but an interval size increase of the renal mass from 2.7 to 3.7 cm was noted during the last 6-month interval (figures 1 and 2).

In the light of this size progression, the patient was once again counselled about treatment options. Given his significant medical issues as well as advanced age, he was deemed a poor surgical candidate and ablative therapy was offered. Percutaneous cryoablation was performed under conscious sedation without immediate complication approximately 15 months after initial presentation.

The patient returned for a routine visit 3 months later with a follow-up CT scan, denying any new clinical

Figure 1 Enhancing mass arising from the inferior pole of the left kidney (arrow), coronal view.

Figure 2 Enhancing mass arising from the inferior pole of the left kidney (arrow), axial view.

complaints. The CT scan demonstrated no residual enhancement of the primary renal mass, suggesting successful and complete ablation, but showed numerous enhancing soft tissue nodules posterior to the kidney in the retroperitoneal and subcutaneous fat (figure 3). These findings were consistent with tumour seeding in the cryoablation probe tract. To confirm the diagnosis of locally recurrent renal cell carcinoma and establish a histological subtype to guide future systemic therapy, a needle biopsy of one of the new mass lesions was performed. This procedure was complicated by significant bleeding and was therefore aborted.

While the patient was being considered for further therapy, which included wide surgical resection, he

Figure 3 Numerous enhancing nodules along the applicator tract of the cryoablation procedure (arrows).

Figure 4 Progression of the retroperitoneal and subcutaneous lesions along the applicator tract of the cryoablation procedure (arrows).

developed a large palpable flank mass, which prompted further diagnostic imaging.

INVESTIGATIONS

A CT scan of the abdomen and pelvis demonstrated considerable interval progression of the retroperitoneal and subcutaneous lesions within a 2-month time period, the largest of which now measured 10.8 cm in largest diameter (figure 4). A CT scan of the chest further revealed numerous new lung nodules consistent with metastatic disease.

DIFFERENTIAL DIAGNOSIS

An important differential diagnosis of newly developed enhancing masses along the needle tract following the ablation of renal masses is benign, inflammatory nodules. These lesions are very rare, as well as self-limited in nature and usually regress and resolve within 4–6 months.³ In the light of the rapid progression of the lesion as well as metastatic seeding to the lungs, there was no doubt about the malignant nature of the patient's retroperitoneal masses.

TREATMENT

In the light of these new findings that indicated rapidly progressive disease, the patient was offered targeted systemic therapy in the hope of extending his survival. Considering his grim prognosis and likely limited impact that systemic therapy would offer, the patient opted for palliative care only at an institution closer to home.

OUTCOME AND FOLLOW-UP

Approximately 1 year after the cryoablation procedure the patient has no further imaging studies but remains alive.

DISCUSSION

Tumour seeding is a rare complication of ablative procedures used to treat renal neoplasms. A review of the literature identified only one similar case of cutaneous seeding following ablation of a renal cell carcinoma.^{1 4} Tumour seeding associated with diagnostic biopsies of renal masses appears to be a similarly rare event with an estimated incidence of less than 1 in 10 000 fine-needle and core biopsies of renal masses.^{5 6} Despite its rare occurrence, tumour seeding is a recognised concern, particularly for the ablative procedure with therapeutic intent which typically involves larger bore probes and may require multiple instrument passages back and forth between the level of the skin and the renal mass. To minimise the risk of seeding, specialised techniques have been advocated, which include 'hot withdrawal' of the heated radiofrequency applicator to potentially destroy any viable tumour cells alongside the tract.² Similarly, the use of a customised coaxial catheter system has been described as a conduit for needle biopsy to minimise both bleeding as well as tumour seeding. Multiple needle passages through skin can be reduced to one passage using the modified Seldinger technique, using smaller probes, and assuring complete freezing and engulfment of the lesion by the ice ball.⁷ All of the latter three techniques are routinely used at our centre. To date, there is no established role of adjuvant therapy for patients undergoing ablation of renal masses. Our case illustrates that this rare, yet potentially under-reported complication can have devastating effects. Awareness of this rare complication is particularly relevant to those patients who are potential candidates for surgical resection in the form of open or minimal-invasive partial nephrectomy.

Learning points

- Tumour seeding along the needle tract is a rare, yet potentially devastating complication of renal tumour ablation.
- Risk factors for tumour seeding remain poorly defined; the use of multiple large bore freezing probes, incomplete freezing and multiple passages of the needles may play an aetiological role.

- In accordance with current, evidence-based guidelines, renal tumour ablation should be reserved for patients who are neither candidates for active surveillance, nor surgical removal.
- Patients being considered for renal mass ablation should be carefully counselled about the possibility of tumour seeding.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. **Allen BC**, Remer EM. Percutaneous cryoablation of renal tumors: patient selection, technique, and postprocedural imaging. *Radiographics* 2010;**30**:887–900.
2. **Rhim H**, Dodd GD III, Chintapalli KN, *et al*. Radiofrequency thermal ablation of abdominal tumors: lessons learned from complications. *Radiographics* 2004;**24**:41–52.
3. **Lokken RP**, Gervais DA, Arellano RS, *et al*. Inflammatory nodules mimic applicator track seeding after percutaneous ablation of renal tumors. *AJR Am J Roentgenol* 2007;**189**:845–8.
4. **Krambeck AE**, Farrell MA, Charboneau JW, *et al*. Intraperitoneal drop metastasis after radiofrequency ablation of pararenal tumor recurrences. *Urology* 2005;**65**:797.e13–5.
5. **Volpe A**, Jewett MAS. Current role, techniques and outcomes of percutaneous biopsy of renal tumors. *Expert Rev Anticancer Ther* 2009;**9**:773–83.
6. **Smith EH**. Complications of percutaneous abdominal fine-needle biopsy. Review. *Radiology* 1991;**178**:253–8.
7. **Abraham JBA**, Gamboa AJR, Finley DS, *et al*. The UCI Seldinger technique for percutaneous renal cryoablation: protecting the tract and achieving hemostasis. *J Endourol* 2009;**23**:43–9.

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