Introduction

Percutaneous renal mass biopsy is a commonly used technique to diagnose renal cell carcinoma prior to renal surgery. It is invaluable in determining malignancy, disease staging, and appropriate treatment prior to renal surgery. During percutaneous needle biopsy, tumor seeding may occur, a process in which malignant cells may be carried into normal tissues along the track of a needle. The mechanism by which this occurs is thought to be the mechanical force of the biopsy directly displacing malignant cells as well as dissemination of cells caused by bleeding and fluid movement. In the modern medical environment, many radiologists are utilizing coaxial sheaths to minimize the risk of tumor seeding. The coaxial sheath approaches the target of the biopsy such that, upon the needle's withdraw, it does not seed tumor cells into surrounding tissues. To date, there are seven reported cases of tumor seeding resulting from renal cell carcinoma, renal sarcoma, and uroepithelial malignancy biopsies alone. We present the case of a 54-year-old man who underwent a core needle biopsy procedure of a papillary renal cell carcinoma resulting in tumor seeding.

Case presentation

The patient is a 54-year-old man who presented with a left adrenal nodule and 2.3cm kidney mass. His medical history was notable for bowel obstructions, hernias, and multiple abdominal surgeries. These masses were discovered incidentally on CT scans taken to evaluate a potential bowel obstruction. His imaging was interpreted as an adrenal adenoma and plasma-free metanephrines were within normal limits. His renal mass was suspicious for malignancy and, as such, a percutaneous renal mass biopsy was performed at an outside hospital. This confirmed renal cell carcinoma.

It is unclear whether or not the biopsy utilized a coaxial sheath, though it was performed in 2017 in a modern medical environment. He underwent open partial nephrectomy and partial adrenalectomy without intraoperative problems. The adrenal nodule was diagnosed as a 2.0cm pheochromocytoma that was contained within the organ. No cardiovascular consequences resulting from the removal of the pheochromocytoma without blockade were encountered. Immunostaining for chromogranin and synaptophysin is positive in tumor cells. S100 highlights sustentacular cells consistent with the diagnosis. The fat overlying the kidney growth contained small foci of renal cell carcinoma involving fat, correlating to an initial diagnosis of pT3a disease. Immunostaining for PAX8 and racemase highlight tumor cells. The kidney tumor itself was a 3.2 × 3.0 × 2.5 cm, unifocal, ISUP nuclear grade II papillary renal cell carcinoma absent for tumor necrosis. After confirming the patient's history of a prior renal biopsy, the specimen was re-examined and the tumor foci were confirmed to be within fibrous bands consistent with prior biopsy tract. As a result, the final stage was revised from pT3a to pT1a. To date, the patient has undergone routine cancer surveillance without any evidence of tumor recurrence.

Discussion

Percutaneous renal mass biopsy is a common diagnostic procedure that is invaluable in the diagnosis of potentially malignant cells. The minimally invasive procedure has numerous benefits, including the identification of potentially malignant cells and the development of an appropriate treatment plan based on results. As with any procedure, percutaneous renal mass biopsies have associated risks. One such risk is tumor seeding, which is generally considered to be a theoretical risk due to an estimated occurrence rate of less than 0.01%. In some cases, tumor cells that were previously contained within the tissue of origin are now seen in other tissues along the biopsy tract. This can increase the potential for disease recurrence following treatment and the risk of local development if the treatment area did not concurrently cover the biopsy tract and the site of origin.

Conclusion

Tumor cell seeding due to needle aspiration is a very uncommon phenomenon and is generally considered to be a theoretical risk. The patient discussed in this case was a 54-year-old man with a pT1a left renal mass that, after biopsy, had concern for pT3a disease. Due to its significant benefits, percutaneous renal mass biopsy should be utilized when deemed appropriate. However, it is crucial that patients understand associated risk factors. If there is concern for tumor seeding, consistent follow-up in a manner similar to locally advanced disease.
may be appropriate for good oncologic surveillance (See Fig. 1).

References

1. Bai RY, Staedtke V, Xia X, Riggins GJ. Prevention of Tumor Seeding during Needle Biopsy by Chemotherapeutic-releasing Gelatin Sticks. Oncotarget; 2017.

2. Caoili Elaine M, Davenport Matthew S. Role of percutaneous needle biopsy for renal masses. Semin Intervent Radiol. 2014;31:20–26.

3. Figure 1. Pathology Slide Reveals Tumor Foci within Fibrous Bands Consistent with Prior Biopsy Tract. Obtained from Johns Hopkins Brady Urological Center, June 13, 2017.