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Spontaneous Regression of Primary Renal Neoplasm after Percutaneous Biopsy in a Patient with History of Contralateral Oncocytoma, Case Report and Review

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Abstract

Background: Increased use of cross-sectional imaging has led to a significant rise in the detection of solid renal masses, the majority of which represent Renal Cell Carcinoma (RCC). Spontaneous regression of RCC is a rare, but well-documented phenomenon most often observed in the setting of metastatic disease. Spontaneous regression of primary RCC is a much more rare occurrence. Recently it has been reported that spontaneous regression can occur following percutaneous renal mass biopsy.

Methods: This article describes a case of spontaneous primary tumor regression following percutaneous biopsy in a patient with a history of contralateral oncocytoma. We also present a comprehensive review of other published reports describing spontaneous regression of a primary tumor following percutaneous biopsy.

Results: In addition to our case we identified 4 confirmed cases of spontaneous regression of RCC following percutaneous biopsy. We also identified 3 cases of spontaneous metastatic lesion regression following initial remote treatment of the primary lesion, and subsequent biopsy of metastatic lesion.

Conclusion: We present a case and a review of spontaneous regression of a primary and metastatic RCC after percutaneous biopsy. Though the exact mechanism of spontaneous regression is not known it is a likely cause/effect relationship with biopsy.

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Introduction

Spontaneous regression of renal cell carcinoma metastases is a rare, but well-documented phenomenon. Recently it has been reported that spontaneous regression can occur following percutaneous renal mass biopsy [1]. Only a few such cases have been described [1,2]. The pathophysiologic mechanism for this regression remains unclear. This article describes a case of spontaneous tumor regression following percutaneous renal mass biopsy in a patient with previously resected oncocytoma in the contralateral kidney. We also present a comprehensive review of other published reports demonstrating spontaneous regression of a primary tumor following percutaneous biopsy.

Case Presentation

A 73-year-old male, former-smoker, initially presented to an outside institution in May 2012 for evaluation of chronic cough. A Computed Tomography (CT) study of the chest demonstrated incidental solid, enhancing mass in the upper pole of the left kidney. Dedicated abdominal imaging revealed a 6.0cm solid, enhancing mass in the upper pole of the left kidney. The study also demonstrated a 2.6cm solid, enhancing mass in the anterior lower pole of the right kidney. The patient underwent attempted left robotic-assisted partial nephrectomy in July 2012. The procedure was complicated by intra operative bleeding and converted to an open left partial nephrectomy. Final pathology returned oncocytoma.

The patient subsequently transferred care to our institution. He required evaluation and management of the right lower-pole lesion. Interval CT performed in April 2013 demonstrated significant loss of left renal parenchyma from the prior partial nephrectomy and stable appearance of right lower pole lesion. The radiologic characteristics were very similar in appearance to the resected left lesion and thought also to represent an oncocytoma. Based on the lesion size, the radiographic characteristics, and the patient's disappointing experience with his prior partial nephrectomy he

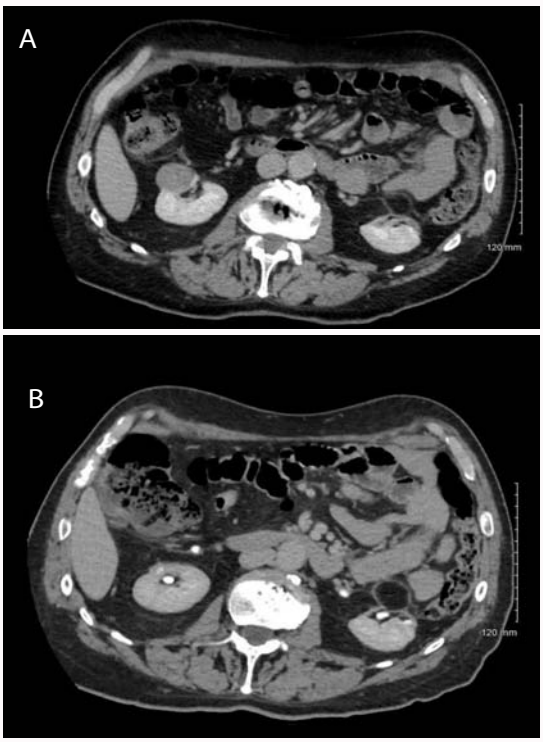

Figure 1:

was elected to pursue Active Surveillance (AS). He was offered a biopsy at that time. Per his preference he was followed at regular six-month intervals with physical examination, imaging and laboratory evaluation. CT in May 2015 demonstrated interval growth of the right lesion to 3.4cm (Figure 1a). To establish a diagnosis and stratify the risk of this lesion he agreed to a percutaneous CT-guided biopsy in September 2015. Pathology report returned favoring chromophobe Renal Cell Carcinoma (RCC) eosinophilic variant; versus oncocytoma. With this relatively favorable histology he declined definitive therapy and elected to continue AS. CT performed in April 2016at a routine 6-month follow-up, revealed a 6mm focal hypodensity and cortical irregularity at the site of the previous right renal lesion (Figure 1b). This was consistent with near-total resolution or involution of the lesion. Repeat biopsy was not performed. There was no evidence of metastatic spread or recurrence in resection bed of left kidney. The patient remains on AS with plan for repeat CT at 6-month intervals.

Discussion

Increased use of cross-sectional imaging for the evaluation of a multitude of disease processes has led to a significant, yet serendipitous rise in the detection of solid renal masses. The majority of these masses are considered small (<4cm) [3]. However up to 85% of solid renal masses confined to the kidney may represent malignancy, primarily renal cell carcinoma (RCC) [4]. Given the increased detection of solid renal masses the role of biopsy for these lesions has been an area of increased interest and investigation. While not indicated for all patients, biopsy can be a safe and effective diagnostic tool in the evaluation of small renal masses [5]. There are several management options for kidney-confined solid renal masses, particularly in the setting of stage T1a disease (tumor <4cm). These include AS, surgical treatment in the form of partial or radical nephrectomy, and local thermal ablation. Cancer-specific survival (CSS) for patients with cT1a disease is greater than 90% [6].

Spontaneous regression is defined as "the partial or complete disappearance of a malignant tumor in the absence of all treatment or in the presence of therapy which is considered inadequate" [7]. Spontaneous regression of RCC is a rare, but a well-described phenomenon, observed in <1% of cases [1-2,9-11]. It has typically been observed in the setting of metastatic disease after extirpative treatment of the primary tumor with subsequent regression of metastatic lesions [8]. There are greater than 100 cases of spontaneous regression of metastatic RCC reported in the literature [1]. Spontaneous regression of primary RCC following percutaneous biopsy is a much more rare phenomenon, with only 4 identified cases reported in the literature [1,2]. An additional case describing regression of primary renal tumor with caval thrombus after biopsy has also been described, though not histologically proven to be RCC [12]. Similar to regression of primary lesion, three cases of regression of a metastatic lesion following initial remote treatment of the primary lesion and subsequent biopsy, in the absence of other therapeutic interventions, have been described [9-11]. All 8 of these cases, including the case reported here, are summarized in Table 1. The largest series of spontaneous regression of primary RCC reported by Dickerson includes three patients. In this series regression was observed after percutaneous biopsy in patients on AS. Time to regression after biopsy ranged from 6-12 months. Biopsy demonstrated papillary RCC in 2 patients and chromophobe in the 3rd patient. Another report by Jawanda describes gradual regression of a primary papillary type I RCC over a 2-year surveillance period after biopsy.

A case report by Edwards describes a patient with likely regression of primary and metastatic disease following renal mass biopsy. Their patient presented with left-side renal mass, multiple pulmonary nodules and enlarged periaortic lymph nodes. Biopsy of the renal lesion confirmed RCC for which the patient initially refused therapy. In the absence of intervention the pulmonary nodules were noted to completely regress at a period of 1 year and significant size reduction of primary tumor was also observed. At this time the patient agreed to undergo radical nephrectomy which revealed residual renal cell carcinoma with marked fibrosis and calcification. The tumor extended into the left renal vein, where marked necrosis was again found. The periaortic nodes were negative for malignancy, revealing only fibrosis and calcification. A case by Lim describes a patient with a history of type II papillary RCC for which he had undergone radical nephrectomy. Metastatic work-up, including CT of the chest was negative at the time of surgery. However at 6 year follow-up the patient was noted to have a solitary pulmonary nodule. Percutaneous biopsy yielded RCC and the patient refused definitive wedge resection. In the absence of other therapy complete spontaneous resolution of the nodule was observed at 12 months. A final case of spontaneous resolution after percutaneous biopsy for RCC, described by Nakajima was observed in a patient with a history of pT1aN0M0 RCC who had undergone a radical nephrectomy. The patient presented 2 years later with anterior chest pain and was found to have an 8cm sternal lesion; which was biopsied and discovered to be metastatic RCC. The patient subsequently underwent resection of this mass and final pathology revealed granulation tissue and tissue necrosis with extensive infiltration of inflammatory cells and fibroblasts, leading the others to conclude that spontaneous regression of the tumor had occurred.

There are several mechanisms that are hypothesized to play a role in spontaneous regression. These include disruption of local blood supply in the setting of percutaneous biopsy, leading to tumor ischemia. The series by Dickerson et al. [1] hypothesized that

Table 1: Spontaneous regression of RCC following percutaneous biopsy.

Case	Cell Type	Size (cm)	Age	Time to regression (months)	Gender	Prior management	Reference
1	Chromophobe	3.4	75	6	M	Contralateral partial nephrectomy	Current case
2	Chromophobe	2.7	62	12	M	Ipsilateral lesion biopsy, Papillary RCC	Dickerson et al.
3	Papillary Type I	3.1	78	10	M	None	Dickerson et al.
4	Papillary	1.4	58	6	F	None	Dickerson et al.
5	Papillary	2.2	63	18	M	None	Jawanda et al.
6	Unspecified (lung, periaortic nodes)		44	12	M	Attempted pulmonary nodule biopsy	Edwards et al.
7	Papillary Type II (lung)		82	12	M	Right radical Nephrectomy pT3	Lim et al.
8	Clear Cell (sternum)	8	70	2	M	Right radical nephrectomy pT1a	Nakajima et al.

thrombotic agents injected at the time of biopsy, as prophylaxis for post-procedure hemorrhage, may enhance this mechanism. Another theory proposes immune system response to new exposure to tumor antigens in the setting of trauma such as biopsy or tumor resection [13]. While the exact mechanism is unknown it is possible that either of these mechanisms may play a role in spontaneous tumor regression. Thought exceptionally rare, spontaneous resolution of primary RCC is most often described after percutaneous biopsy. As illustrated in the literature, metastatic lesions can demonstrate the same phenomenon following biopsy.

Conclusion

In the era of increased detection of small renal masses it is likely the role of biopsy will continue to evolve. We present a case and a review of spontaneous regression of a primary and metastatic RCC after percutaneous biopsy. Though the exact mechanism of spontaneous regression is not known it is a likely cause/effect relationship with biopsy. Further investigation into this mechanism could lead to development of more targeted and effective therapies.

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