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Case Report

Tumor Seeding after Renal Mass Biopsy: is it Something to Worry About? A Case Report and Literature Review

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Abstract

Fine needle aspiration and renal biopsy are crucial steps in the diagnostic process for incidental renal masses. In the last decades, the utilization of renal biopsy has significantly increased, accompanied by growing concerns about the safety of the procedure. Here, we report a case of tumor seeding after percutaneous renal mass biopsy in a 67-year-old man, and we provide a review of the literature on the subject.

Keywords: Percutaneous renal biopsy; Renal cancer; Renal mass; Tumor seeding

Introduction

The global incidence of renal cancer has progressively increased over the last decades, with western countries reporting a higher incidence compared to other regions [1]. This difference may be attributed to the more extensive use of abdominal imaging, leading to accidental discovery of small renal masses [1]. According to WHO statistics, renal cancer ranks as the 9th most common cancer in men and the 14th in women worldwide, accounting for 2.4% of all cancers [1]. The most frequent histological type is renal cell carcinoma, representing almost 90% of renal malignancies. Despite an increasing incidence, renal cancer mortality is decreasing in western countries, a trend that is primarily explained by the higher detection rate in early disease stages [2]. Notably, over half of renal cancers are discovered as incidental finding [2]. In this context, guidelines recommend to obtain an early histological diagnosis before initiating any form of treatment, both for localized and metastatic tumors [3]. Fine needle aspiration and renal biopsy are useful diagnostic tools and, despite some safety concerns, are frequently performed as routine investigation [3-5]. Here, we present the case of a 67-year-old patient with cancer cells seeding along the needle track after renal biopsy. We raise concerns about the risk of neoplasm seeding following biopsy and briefly discuss the relevant literature.

Case Presentation

A 67-year-old male patient, reported to be in good general health and without relevant cardio-vascular risk factors, presented to the Emergency Department of our hospital in early May 2023 complaining right arm and leg weakness, insecure gait and right eminegligence. At the clinical examination we observed anisocoria with fixed miosis of the right pupil and mild ipsilateral ptosis, leftward lateralized Romberg sign and slight dysmetria of the left upper limb. A brain CT-scan revealed multiple edematous, supratentorial and infratentorial located nodularities, compatible with metastatic lesions. A complete work-up was performed,

including a contrast-enhanced thoraco-abdominal CT-scan, which revealed a left renal lesion measuring 6.6x5.5x4.8 cm with a satellite nodularity (approximately 10 mm) in the perirenal adipose tissue, and three nodular pulmonary metastasis. We performed a percutaneous, ultrasound-guided biopsy of the renal mass, using a 18G automatic needle, with two passes (Figure 1). Histology confirmed the diagnosis of clear cell renal carcinoma, WHO/ISUP grade 2, cT1b, cN0, cM1, intermediate risk according to the IMDC criteria [6].

The patient received stereotactic radiation therapy in the left frontal occipital region for the metastases responsible for the majority of the neurological symptoms and a combined systemic therapy with a tyrosine kinase inhibitor and anti-PD1 immunotherapy. Despite the treatment, we observed a progression of the disease between August and October 2023, with increase of metastasis size and further dissemination of the disease to lung, liver, bone and adrenal glands. The progression of the disease was particularly marked in the peri-renal region in correspondence with the track of the biopsy needle, involving the muscles, the subcutis and the skin up to the puncture site, and suggesting cancer seeding following the renal biopsy (Figure 2). The patient died in November 2023 after a neoplastic intestinal perforation.

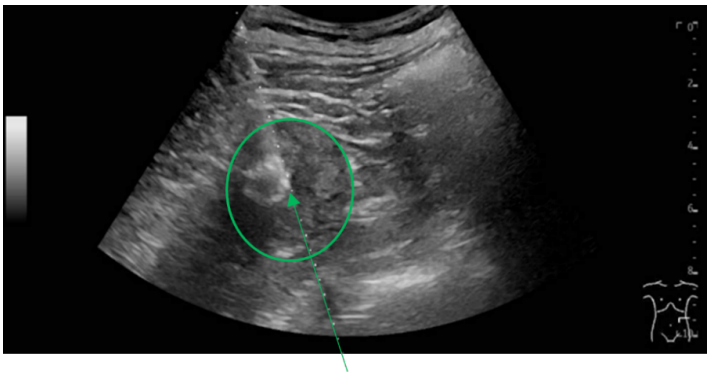

Figure 1: ultrasound image of the percutaneous renal mass biopsy. green circle: mass in the left kidney; arrow: tip of the biopsy needle.

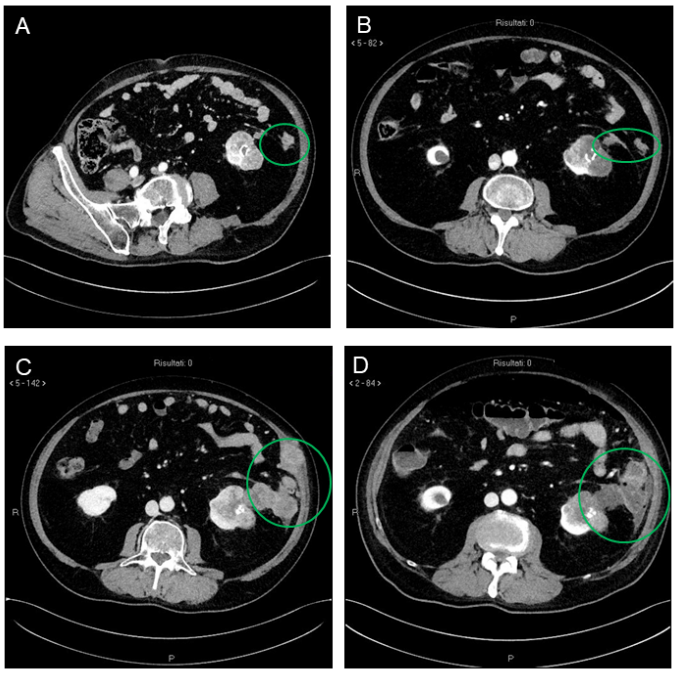

Figure 2: serial abdomen contrast-enhanced CT-scan, centred on the biopsy needle track. **(A)** initial diagnosis (may 2023); **(B)** 3-month follow-up (august 2023); **(C)** 4-month follow-up (september 2023), **(D)** 5-month follow-up (october 2023). green circle: progression of the nodular tumor masses in the perirenal tissue and along the biopsy track to the skin.

Discussion

The seeding of cancer cells along the percutaneous renal biopsy tract is an infrequent complication, reported only once in a meta-analysis outlining renal biopsy complications. This meta-analysis included 37 references, covering a cumulative patient cohort exceeding 4'000 individuals [4]. This data aligns with the historical incidence of 0.01% described in the 1990s [7]. However,

two recent case series reported higher frequencies of 1.2% and 6%, when cancer seeding was systematically searched on histological specimens after surgical resection [8,9]. Notably, among the 13 cases described by combining the two mentioned series, only one developed clinically manifested tumour recurrence at the site of the previous biopsy [8,9]. To the best of our knowledge, only 25 cases of tumor seeding after percutaneous renal mass biopsy have been reported so far, with half of them belonging to the two histological case series described above [8,9]. Most of the cases involve papillary renal carcinomas, which however, account only for 15-20% of renal malignancies [1,8,10]. Our patient was diagnosed with a clear cell renal carcinoma, for which needle track seeding has been rarely described until yet, despite being the most frequent histological type of renal carcinoma. A potential explanation for the higher incidence of seeding in the papillary histotype may be its tissue friability and the lack of peritumoral pseudo-capsule, facilitating the release of tumor cells from the needle during procedure [8,10].

In recent decades, percutaneous renal sampling techniques have significantly improved. Needle core biopsy has been proven to be more accurate than fine-needle sampling, while both ultrasound and CT guidance appear to be equivalent [4]. Current guidelines recommend using a small (18G) needle with a coaxial canula to reduce the procedural morbidity and the risk of tumor seeding [3]. The number of samplings seems to be correlated with both diagnostic accuracy and morbidity, and recommendations suggest to obtain at least two good-quality biopsies [3,7]. In our case, an automatic 18G needle without an introducer was used, and only two passes were performed. Despite the concerns discussed above, percutaneous biopsies remain a central diagnostic tool for the evaluation of suspected renal tumors, as they proved to reduce overtreatment of benign masses [3,11]. As an example, in a recent series of 182 patients, percutaneous biopsy revealed a benign diagnosis in 27.5% of cases, allowing to avoid surgery or cryotherapy [12].

Conclusion

The rising incidence of renal incidentalomas will lead to an increase in the number of renal biopsies, potentially raising the incidence of tumor seeding along the biopsy's needle tract. While this complication is considered rare, its incidence is probably underestimated, as it appears to be mostly infraclinical, detectable only by histological examination of the resection specimen. The potential occurrence of tumor seeding in the biopsy tract should be considered before proceeding with biopsy of a renal mass, and should not be underestimated after the procedure, especially in cases with histological diagnosis of papillary carcinoma. Furthermore, to minimize the risk of seeding, it is advisable to consistently use an introducer, employ the fewest possible number of passes, and restrict needle size to no larger than 18G.

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