Neoadaptoma needle track seeding: a real hazard after percutaneous radiofrequency ablation for colorectal liver metastasis

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INTRODUCTION

Radiofrequency ablation (RFA) is a well-established local ablative treatment for primary or secondary hepatic neoplasms. Despite a relatively low complication rate, the percutaneous application of RFA carries a potential risk of needle track seeding. As reported by a recent systematic review[1], the seeding risk after percutaneous RFA for hepatocellular carcinoma (HCC) is around 0.6%. However, such a seeding risk in secondary liver tumors is less well defined. Reports on tumor seeding after percutaneous RFA for colorectal liver metastasis are rare. The following report illustrates a patient with cutaneous tumor seeding after percutaneous RFA for a small colorectal liver metastasis.

CASE REPORT

A 46-year-old female, who had no other major medical illness, was referred to our unit for stage IV rectal cancer with liver metastasis after receiving laparoscopic anterior resection of the primary rectal tumor in the private sector. Preoperative staging computed tomography (CT) of the abdomen showed no distant metastasis. The operation for the primary rectal tumor was uneventful. However, a suspicious liver lesion was incidentally found on the surface of the liver intra-operatively and was biopsied. Histopathology revealed a T3N2 well-differentiated adenocarcinoma of the rectum and a metastatic adenocarcinoma of the liver. A postoperative re-staging CT scan identified a 1.7 cm solitary subcapsular liver metastasis at segment 4 of the liver (Figure 1). A
subsequent positron emission tomography scan excluded additional distant metastasis. Unfortunately, the patient refused curative hepatic resection. Hence, a single session of CT-guided percutaneous RFA of the liver lesion using a 3 cm 17-gauge LeVeen® needle electrode (Super-slim, Boston Scientific, United States) with a single puncture was performed (Figure 2). Thermal ablation of the needle tract was not done in this case. She was subsequently put on a complete course of oxaliplatin-based chemotherapy.

Six months after RFA, she presented with a 2 cm ulcerating skin nodule at the previous RFA puncture site (Figure 3). Fine needle aspiration cytology of the nodule confirmed a metastatic adenocarcinoma of primary colorectal origin. At the same time, a CT scan revealed multiple simultaneous recurrences at the left liver. Left hepatectomy for the liver lesions and wide local excision of the cutaneous tumor were performed. Multiple suspicious peritoneal deposits were incidentally identified intra-operatively and they were all resected. Final histopathology revealed metastatic disease in the liver, skin and peritoneum. She then received further courses of palliative chemotherapy in view of likely recurrence. In the subsequent follow-up period, no cutaneous recurrence was identified at the RFA needle track. However, she developed progressive disease with lung metastasis and carcinomatosis. The patient finally died around 5 mo after the second operation.

DISCUSSION
Neoplastic seeding is an uncommon but well-recognized complication following percutaneous diagnostic and therapeutic procedures for primary liver cancer. For diagnostic percutaneous biopsy, the risk of neoplastic seeding was approximately 2.2%[1]. As for therapeutic RFA of HCC, initial results from a small-scale Spanish study suggested an alarmingly high risk of 12.5%[2]. A recent large-scale multicenter study by Livraghi et al[3] in contrast identified a substantially lower risk of only 0.9%. As highlighted by a recent systematic review[3], such a seeding risk for HCC was definitely lower with
an overall median risk of only 0.6%. For secondary liver tumors, objective evidence on the seeding risk following percutaneous RFA is lacking. In the English literature, there were only two related case reports identified[4,5] (Table 1).

Several associated risk factors have been identified for neoplastic seeding following RFA for HCC, notably subcapsular tumor location[2,6], poor tumor differentiation grade[7], multiple RFA sessions[4], multiple electrode placements[8] and history of previous biopsy[8]. In an Italian study by Latteri et a[1], the risk of neoplastic seeding after open RFA was virtually zero but the risk was as high as 1.4% after percutaneous RFA. Remarkably, most of these identified factors were based on seeding risk for HCC. As for our patient, tumor seeding in the RFA needle track was possibly related to its unfavorable subcapsular location and the use of an expansion-type electrode. The previous use of laparoscopic biopsy in such a subcapsular tumor was probably a major detrimental factor related to its peritoneal dissemination. Nevertheless, potential risk factors of neoplastic seeding solely for secondary liver tumors were still undefined. To evaluate the seeding risk, a larger-scale prospective cohort study for secondary liver tumors is required. However, these sorts of studies are practically difficult to conduct because of the rare occurrence.

To prevent neoplastic seeding, some investigators advocated the application of thermocoagulative ablation along the needle track while withdrawing the RFA needle[8]. However, this ablative technique may not be technically feasible in cases of subcapsular lesions as in our case. With regard to treatment, surgical excision with a wide margin seems to be the most justifiable option. Alternatively, different novel techniques had been described. Shibata et al[9] successfully treated a chest wall neoplastic seeding from HCC by transarterial embolization of the feeding vessel. Espinoza et al[8] suggested the use of RFA again for ablating the metastatic seeding tract as treatment.

To conclude, despite its rare occurrence, needle track seeding is a real hazard following percutaneous RFA for secondary liver tumors. Prophylactic ablation of the needle track should be performed whenever possible for high risk patients. Otherwise, alternative routes of tumor ablation like laparoscopic or open RFA should be considered.

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