Case 12574

Hepatocellular carcinoma
recurrence from needle-track
neoplastic seeding
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ISSN: 1563-4086
Section: Abdominal imaging
Area of Interest: Liver Lung
Procedure: Biopsy
Procedure: Staging
Procedure: Surgery
Imaging Technique: Percutaneous
Imaging Technique: CT
Special Focus: Neoplasia Case Type: Clinical Cases
Authors: Tonolini Massimo, MD1, Crespi Michele, MD2
Patient: 76 years, male

Clinical History:
An elderly man presented with a painless, firm-consistency midline swelling of the anterior abdominal wall in the epigastrium. His past medical history included diabetes, hepatitis B-virus-related chronic liver disease, radical prostatectomy and lymphadenectomy for prostatic carcinoma. Twenty months earlier, he had a partial left hepatectomy for hepatocellular carcinoma (HCC).

Imaging Findings:
Twenty months earlier, multidetector CT (Fig. 1) showed a 5x3.5 cm well-demarcated, lobulated subcapsular mass in the left liver lobe, with early hyperenhancement, subsequent contrast washout, and a central hypoattenuating scar-like area. Fine-needle aspiration biopsy (FNAB, Fig. 2) diagnosed HCC.

After partial left hepatectomy (normal early postoperative CT appearance in Fig.3), histopathology confirmed trabecular HCC not involving the resection margins. Follow-up CT 6 months after surgery (Fig. 4) excluded signs of local or distant recurrence.

Currently, increased (1547 ng/ml) alpha-fetoprotein suggested HCC recurrence. Repeated CT (Fig. 5) showed a round 8 cm median solid mass centred in the epigastric subcutaneous fat, with heterogeneous hypervascularization and "mosaic" washout, without signs of liver or distant HCC recurrence.

After surgical excision (postoperative CT in Fig. 6), histopathology confirmed diagnosis of recurrent trabecular HCC from neoplastic seeding along the previous FNAB needle track.

Four months later, lung metastases (Fig. 7) appeared, without recurrent HCC in the liver and along the previous needle track.

Discussion:
In patients with hepatocellular carcinoma (HCC), needle-track tumour seeding (NTNS) is an uncommon but important complication of percutaneous diagnostic and therapeutic procedures such as biopsy (either with aspiration or end-cutting needles), ethanol injection and radiofrequency ablation. Defined as new neoplastic disease arising outside the liver capsule (either in the subcutaneous tissue or peritoneal cavity), NTNS develops after a median 10 months from needle biopsy and/or local ablative therapy, sometimes after liver transplantation. The risk is higher with diagnostic biopsy (1.6-3.4%) compared to therapeutic procedures (ethanol injection 1.4%, radiofrequency
ablation 1-2.5%). Other risk factors include large tumour size, poor histological differentiation, number of needle passes and thickness of liver parenchyma overlying HCC [1-6].

Although accepted as a safe, accurate minimally invasive diagnostic technique, ultrasound-guided fine-needle aspiration biopsy (FNAB) of HCC is controversial due to the potential risk of NTNS, particularly in patients being considered for liver transplantation. According to the European Association for the Study of the Liver (EASL) guidelines HCC is often treated without prior histological confirmation in patients with consistent imaging and laboratory features. While imaging currently obviates the need for tissue sampling in most patients, biopsy may be sometimes required for diagnostic confirmation or differentiation from other neoplastic or tumour-like lesions [1, 5-7]. As this case exemplifies, NTNS presents with palpable nodules in the location of the previous biopsy tract or with raising serum tumour markers, sometimes years after ablative or surgical treatment of HCC. Therefore, the possibility of thoracic-abdominal wall implants should be considered during interpretation of cross-sectional imaging studies in patients with history of percutaneous diagnostic procedures and/or ablation therapy. CT findings of NTNS include circumscribed oval or round nodules (usually measuring 1-6 cm) located along the needle tract, mostly in the subcutaneous fat (with or without skin involvement) or the intercostal muscle layers. The CT features resemble those of the original biopsied or ablated HCC, including basal soft-tissue attenuation similar to the abdominal wall muscles, hyperenhancement on hepatic arterial phase and iso-hypodensity in equilibrium phase [2, 3, 5, 8].

Indications for surgery for implanted HCC include: a) limited number of lesions, b) intrahepatic lesions absent or predicted to be locally controllable, and c) sufficient hepatic functional reserve. After surgical excision, repeated NTNS may occur in 25% of patients. Following effective treatment by en-bloc wide resection, NTNS does not significantly alter the long-term prognosis, which is related to intrahepatic HCC progression and hepatic failure [7, 9].

**Differential Diagnosis List:**
Recurrent hepatocellular carcinoma from needle-track neoplastic seeding, Haematogenous metastasis, Lymphadenopathy, Postoperative collection, Incisional hernia, Second unrelated malignancy

**Final Diagnosis:** Recurrent hepatocellular carcinoma from needle-track neoplastic seeding

**References:**


Description: Unenhanced CT acquisition showed a 5x3.5 cm subcapsular mass (demarcated by arrowheads) in the left liver lobe, mildly hypoattenuating compared to the surrounding parenchyma.

Origin: Tonolini Massimo, Department of Radiology, "Luigi Sacco" University Hospital – Milan (Italy)
Description: On arterial- (b,c), portal venous (d) and delayed (e) phase images, the lesion (arrowheads) appeared well-demarcated, slightly lobulated, with early hyperenhancement and subsequent contrast washout, a central hypoattenuating scar-like area. Origin: Tonolini Massimo, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
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Origin: Tonolini Massimo, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
**Description:** The subcapsular liver lesion of the left liver lobe (demarcated by arrowheads) appeared mildly hypoechoic compared to the surrounding hepatic parenchyma. Note dotted biopsy track. **Origin:** Tonolini Massimo, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)

**Description:** Cytologic sampling was obtained by means of fine-needle aspiration biopsy (note needle tip indicated by thin arrow). **Origin:** Tonolini Massimo, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Unenhanced (a), arterial-(b), portal venous (c,d) and delayed (e) acquisitions showed normal early postoperative appearances at the surgical site of resection, including metallic clips and a hypoattenuating nonenhancing collection (arrows). Origin: Tonolini Massimo, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
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Figure 4

Description: Unenhanced (a), arterial-(b), portal venous (c) and delayed (d) phase acquisitions showed normal course of the surgical site of liver resection (arrows) without signs of local or distant recurrence. Origin: Tonolini Massimo, Department of Radiology, "Luigi Sacco" University Hospital – Milan (Italy)
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Description: The palpable mass corresponded to a round 8 cm median well-demarcated lesion (*) with solid unenhanced attenuation values, occupying the subcutaneous fat and anterior abdominal wall. Normal appearance at the surgical site of liver resection (arrows). Origin: Tonolini Massimo, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Dynamic study including arterial-(b,c), portal venous (d,e) and delayed (f) phase acquisitions showed the mass (\*) with heterogeneous hypervascularization and "mosaic" washout. Normal appearance at the surgical site of liver resection (arrows). Origin: Tonolini Massimo, Department of Radiology, "Luigi Sacco" University Hospital – Milan (Italy)
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Description: Sagittal reformatted image from portal venous acquisition showed the heterogeneous mass (*) with "mosaic" washout, centered in the subcutaneous fat, which displaced the thin abdominal wall musculature posteriorly. Origin: Tonolini Massimo, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
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Description: Unenhanced (a), arterial-(b), portal venous (c) and delayed (d) phase acquisitions showed normal appearances at both the previous site of liver resection (arrows) and recent site of excision (*) of abdominal wall recurrence. Origin: Tonolini Massimo, Department of Radiology, "Luigi Sacco" University Hospital – Milan (Italy)
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