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Clinical Image

CLINICAL IMAGE

Dramatic response to selective internal radiation therapy for unresectable hepatocellular carcinoma

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Abstract

A 54-year-old woman with a known history of multifocal hepatocellular carcinoma was treated with selective internal radiation therapy (SIRT) using yttrium-90 (^{90}Y) microspheres, despite disease relapses after surgical resection and transarterial chemoembolization. She developed a dramatic clinical, radiological and metabolic response after 9 weeks. This case provides visual illustration of the potential roles of SIRT in the treatment of hepatocellular carcinoma.

CASE REPORT

A 54-year-old woman with a known history of multifocal hepatocellular carcinoma was treated with initial right partial hepatectomy and subsequently transhepatic arterial chemoembolization (TACE) for recurrent unresectable disease 12 months after surgery. Five months post TACE, she developed worsening abdominal discomfort, and fluorodeoxyglucose positron emission tomography with computed tomography (FDG-PET/CT) scan showed evidence of progressive disease with increased FDG uptake in lesions involving segments 2, 3, 7 and 8 (Fig. 1a). She was treated with selective internal radiation therapy (SIRT) using yttrium-90 (^{90}Y) microspheres (SIR-Spheres®), which were infused into left, middle and right hepatic arteries (Fig. 1a). At 9-week follow-up, her abdominal discomfort had resolved and FDG-PET/CT scan demonstrated a near complete metabolic response (Fig. 1b). Subsequent angiography revealed parasitized arterial supply to the segment 7 tumour from the inferior phrenic artery, which would explain the inadequate perfusion and dose delivery of ^{90}Y microspheres (Fig. 1a, cross-hairs) with only a partial response of the single lesion (Fig. 1b, cross-hairs).

DISCUSSION

Hepatocellular carcinoma is the second leading cause of cancer death worldwide, resulting in between half to one million deaths globally per year [1]. Despite therapeutic advances, most patients are not amenable to curative treatments such as surgical resection or liver transplantation, and median survival is ~11 months in patients with advanced disease [2]. SIRT using ^{90}Y-tagged resin

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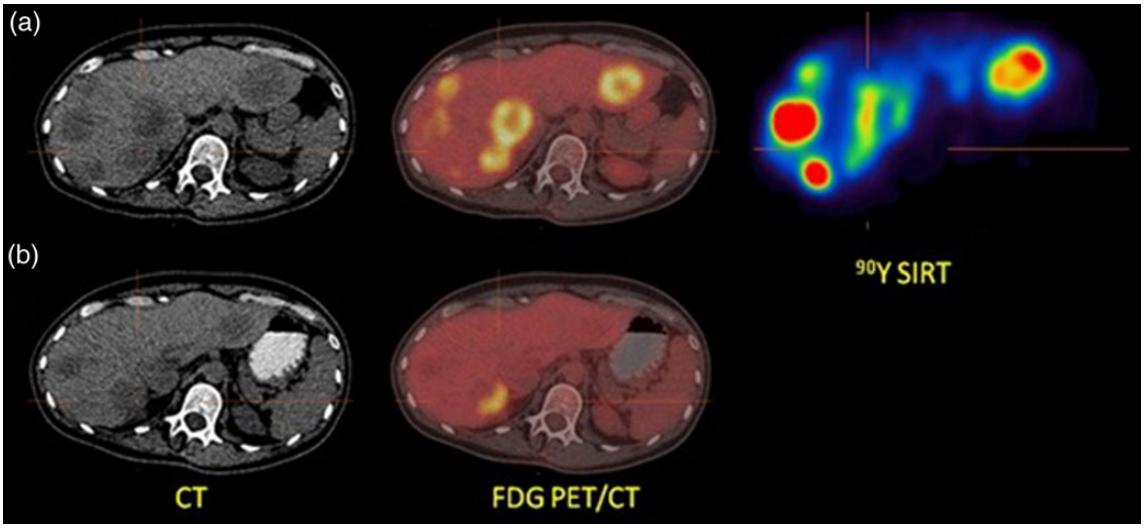

Figure 1: (**a**) FDG-PET/CT with axial views showing recurrent multifocal hepatocellular carcinoma and perfusion of injected ^{90}Y-tagged resin microspheres. (**b**) Follow-up FDG-PET/CT at 9 weeks after injection of ^{90}Y microspheres showing a radiological response with tumour necrosis and a near complete metabolic response.

microspheres emit high-energy beta radiation towards locoregional tumours [3, 4]. Observational studies from Europe and the USA have demonstrated the safety and efficacy of SIRT for unresectable hepatocellular carcinoma [3, 4]. However, due to the lack of randomized controlled trial data, SIRT has not been incorporated into international guidelines such as the Barcelona Clinic Liver Cancer treatment strategy as a standard of care [2]. FDG-PET was shown to be a superior imaging modality for response assessment after SIRT [5]. The dramatic clinical and FDG-PET/CT response seen in this case illustrates the potential roles for SIRT in the treatment of hepatocellular carcinoma, both in symptom palliation and surgical downstaging. Well-designed and conducted clinical trials could inform new treatment strategies and provide hope for patients suffering from this deadly disease of global epidemic proportions.

CONFLICT OF INTEREST STATEMENT

None declared.

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