Radiation lobectomy: Time-dependent analysis of future liver remnant volume in unresectable liver cancer as a bridge to resection.


Department of Radiology, Section of Interventional Radiology and Division of Interventional Oncology, Northwestern University, Chicago, IL, USA.

Abstract

BACKGROUND & AIMS: Portal vein embolization (PVE) is a standard technique for patients not amenable to liver resection due to small future liver remnant ratio (FLR). Radiation lobectomy (RL) with (90)Y-loaded microspheres (Y90) is hypothesized to induce comparable volumetric changes in liver lobes, while potentially controlling the liver tumor and limiting tumor progression in the untreated lobe. We aimed at testing this concept by performing a comprehensive time-dependent analysis of liver volumes following radioembolization.

METHODS: 83 patients with right unilobar disease with hepatocellular carcinoma (HCC; N=67), cholangiocarcinoma (CC; N=8) or colorectal cancer (CRC; N=8) were treated by Y90 RL. The total liver volume, lobar (parenchymal) and tumor volumes, FLR and percentage of FLR hypertrophy from baseline (%FLR hypertrophy) were assessed on pre- and post-Y90 CT/MRI scans in a dynamic fashion.

RESULTS: Right lobe atrophy (p=0.003), left lobe hypertrophy (p<0.001), and FLR hypertrophy (p<0.001) were observed 1 month after Y90 and this was consistent at all follow-up time points. Median %FLR hypertrophy reached 45% (5-186) after 9 months (p<0.001). The median maximal %FLR hypertrophy was 26% (-14→86). Portal vein thrombosis was correlated to %FLR hypertrophy (p=0.02). Median Child-Pugh score worsening (6→7) was seen at 1 to 3 months (p=0.03) and 3 to 6 months (p=0.05) after treatment. Five patients underwent successful right lobectomy (HCC N=3, CRC N=1, CC N=1) and 6 HCCs were transplanted.

CONCLUSIONS: Radiation lobectomy by Y90 is a safe and effective technique to hypertrophy the FLR. Volumetric changes are comparable (albeit slightly slower) to PVE while the right lobe tumor is treated synchronously. This novel technique is of particular interest in the bridge-to-resection setting.

Copyright © 2013 European Association for the Study of the Liver. Published by Elsevier B.V. All rights reserved.

KEYWORDS: %FLR hypertrophy, (90)Y-loaded glass microspheres radioembolization, AFP, CC, CP, CRC,
Radiation lobectomy: Time-dependent analysis of future liver remnant hypertrophy

CT, Child-Pugh, FLR, Future liver remnant, HCC, Hypertrophy, INR, Liver resection, MRI, PVE, PVT, RL, Radiation lobectomy, Radioembolization, Y90, alpha-fetoprotein, cholangiocarcinoma, colorectal cancer, computed tomography, hepatocellular carcinoma, international normalized ratio, magnetic resonance imaging, percentage increase in FLR hypertrophy from baseline, portal vein embolization, portal vein thrombosis, radiation lobectomy, ratio (expressed as percentage) of the future liver remnant (segments 2/3) to the total liver parenchymal volume

PMID: 23811303 [PubMed - in process]