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Hypertrophy of the contralateral hepatic lobe after selective internal radiation therapy

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1. Introduction

Lobar radioembolisation or selective internal radiation therapy (SIRT) of the liver can result in ipsilateral lobar volume reduction as well as in contralateral lobar hypertrophy.^{1–4} Theoretically, hypertrophy of the contralateral liver lobe after SIRT could increase the chance of a successful liver resection especially in patients with limited liver function reserve. This preliminary study aims to evaluate the early effects of SIRT with yttrium-90 (⁹⁰Y) resin microspheres on liver lobe and spleen volumes.

2. Methods

We retrospectively investigated 24 patients (12 female, 44–78 years old) with different types of cancer and liver-dominant metastatic disease who underwent SIRT of the liver with ⁹⁰Y resin microspheres (SIR-Spheres, Sirtex Medical) between 2008 and 2009. Volume alteration of the liver lobes and spleen was quantified using computed tomography scans before and approximately 4 to 8 weeks after treatment.

3. Results

Seventeen patients had metastases in both liver lobes (group A) and 7 had metastases in the right liver lobe only (group B). The patients in group A underwent sequential treatment starting with the right liver lobe. The median administered dose was 1.75 GBq. SIRT was associated with a median increase of 34% ($P < 0.001$) of the left lobe volume (LLV) and a median decrease of 11% ($P = 0.03$) of the right lobe volume (RLV). The spleen volume (SV)

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showed a median increase of 17% ($P=0.01$). Separate analysis of the two groups showed a median LLV increase of 30% ($P=0.001$) in group A and 70% ($P=0.01$) in group B. There was no correlation between the injected dose and the volume alteration ($0.1 < r < 0.3$).

4. Discussion

Hepatic malignancies are commonly unresectable both at initial manifestation and at recurrence due to the presence of extrahepatic disease and bilobar hepatic involvement but also insufficient remnant liver volume. Both the risk of liver failure after resection as well as postoperative morbidity are directly correlated to the remnant liver volume.⁵ The degree of hypertrophy after portal vein embolisation ranges between 7% and 16% at 4–8-week follow-up.⁶ Our study revealed a more prominent hypertrophy of LLV following SIRT with ⁹⁰Y resin microspheres compared with portal vein embolisation. This effect of SIRT was over and above our main intention which was the treatment of the tumours in the right lobe. Our results are in agreement with other published studies investigating contralateral lobar hypertrophy after SIRT. Such a hypertrophy has not been reported after TACE.

5. Conclusion

SIRT of the right liver lobe with ⁹⁰Y resin microspheres causes a significant increase in the LLV. This may facilitate liver resection in patients with metastases in the right hepatic lobe and a small left hepatic lobe.

Conflict of interest statement

The authors have no conflict of interest.

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