

SUMMARY

Imaging methods in the evaluation of the effects of liver tumours therapy

Objectives. Liver resection is the only potential curative therapy of liver tumours today. Small future liver remnant volume (FLRV) after the resection is a limitation with the risk of hepatic failure. The increase of FLRV after portal vein embolization (PVE) is often inadequate. PVE with contralateral application of hematopoietic stem cells (HSC) can facilitate the regeneration of liver. CT liver volumetry enables to evaluate the increase of FLRV and the safety of liver resection. By automatic CT liver volumetry it is possible to determine the size of liver segments, the volume of the tumour and to make a 3D reconstruction of liver vessels. The aim of the first prospective study was to verify the effect of HSC on the liver growth. The impact of both HSC derived from peripheral blood and from bone marrow was compared. The second, retrospective study aimed to evaluate the accuracy and the speed of the automatic CT liver volumetry in comparison to manual CT volumetry.

Material and methods. 20 patients (the group I) underwent PVE with the contralateral application of HSC in the 1st study. In the control group II (n = 20) was performed PVE only. By the manual CT volumetry (Syngo Volume, Siemens Healthineers, Forchheim, Germany) was assessed the growth of FLRV. The analysis of the effect of HSC derived from peripheral blood (n = 10) and from bone marrow (n = 10) was compared in the group I. The aggregate from 1st study was extended by 26 patients, who underwent PVE only. The analysis of the total liver volume and FLRV was performed by both the manual and the automatic (Syngo.via, Siemens Healthineers, Forchheim, Germany) CT volumetry. Times of the measurements and liver volumes were evaluated. Both automatic and manual volumetry was performed by two different experienced radiologists. The interpersonal agreement was studied.

Results. Statistically significant higher increase of FLRV was found after the application PVE with HSC (the group I) in comparison to PVE only (the group II) in the 1st study (p = 0,015). Significantly higher increase of FLRV was observed by using HSC from peripheral blood compared to HSC from bone marrow in the group I (p = 0,009). Statistically significant faster analysis by the automatic CT volumetry compared to the manual volumetry was discovered in the 2nd study (p = 0,0001). No statistically significant different value of detected liver volumes were found by manual and automatic method (p = 0,909 for total liver volume and p = 0,175 for FLRV). High inter - rater agreement was found in aquired times and volumes.

Conclusion. PVE with HSC facilitates higher increase of FLRV in comparison to PVE only. This is a promise for reducing the risk of hepatic failure after the resection. Using HSC from peripheral blood seems to be the advantage. The automatic CT volumetry is faster with the same accuracy compared to the manual method. No impact of the duration of radiologist's experience was found.