

Summary

Introduction: The reason for the inability of performing the liver resection for colorectal carcinoma metastasis is usually insufficient remnant liver parenchyma after liver resection (future liver remnant volume - FLRV). The current standard method of increasing FLRV is the embolization of the branch of portal vein (portal vein embolization - PVE) on the side of the tumor, and then suspended after hypertrophy of the non-embolised lobe liver resection. Unfortunately, there are some patients who do not increase liver volume despite perfectly executed PVE. Besides that, FLRV occurs during the time necessary for hypertrophy progression of metastatic disease.

Therefore, we are trying to find the appropriate way to encourage the growth of remaining liver parenchyma and accelerate hypertrophy of the contralateral liver lobe.

From our previous experience (IGA MZ NS 10240), it is possible to be optimistic that there hope is the way of hematopoietic progenitor cells (HPC - adult stem cells) after previous PVE to non-embolised branches of the portal vein. These cells do not only accelerate liver regeneration, but are also able to improve its function (function of the liver) which is especially important for patients after neoadjuvant chemotherapy (steatohepatitis or steatofibrosis), and for patients with primarily damaged parenchyma (steatosis, cirrhosis).

Goals of the project: The main goal is the effort to increase the operability of colorectal liver metastases by a new method which accelerates liver regeneration with the use of stem cells. The second goal is to objectify the impact of PVE and of the new method PVE and applications of HPC on diseased livers, and to determine whether these methods are safe for the patient and do not pose a risk of early or late tumor progression. Another goal of the project is to evaluate the effect of preoperative levels of growth factors on the growth of the FLRV or possible tumor progression, and thereby evaluate the potential patient's prognosis through successful radical surgery and vice-versa to determine what factors indicate tumor progression in the liver. This project is unique to the Czech Republic and builds on the experience gained from previous grant projects within the Department of Surgery at the University Hospital in Pilsen. The main objective remains the effort to increase the

operability of patients with metastatic colorectal carcinoma to the liver by performing the new method of accelerating liver regeneration by using stem cells.

Methodology: We reviewed retrospectively the group of primarily inoperable patients in whom we used to hypertrophy of the liver parenchyma combination of the two methods and that PVE and application of stem cells. This group was subsequently been flattened with the group of patients (18 patients also), wherein the same time interval was used to hypertrophy of the liver parenchyma only the PVE. In exact time intervals were determined the values of the interleukins and of the growth factors. These values were statistically processed. The study ran from June 2010 to December 2014.

Results: The average age of patients the in the date of implementation PVE was 64 years. The gender representation was dominated by men (13-72%) to women (5-28%). A key indicator for us were the values hypertrophy of the liver parenchyma before PVE with HPC. The total liver volume (TLV) was 1719 ml (866-2121 ml). FLRV average value was 539 ml (179-880 ml), 31% (19-45%). TLV has not changed much after PVE and after the application of HPC (1721 ml). In contrary the value of FLRV has been significantly changed, before the resection was 698 ml (30%), i.e. 41% of the TLV. Radical surgery was proceeded by 14 patients after PVE and application HPC, so we were able to perform radical surgery in a total of 77% of the patients. From growth factors, we found a statistical significance for the growth of metastases in IL8 and TGF α for FLRV at IL2, IL8, IGF and EGF for the predicted percentage resection then with EGF, HGF, VEGF, IGF, IL-2, IL6, IL8 and TGF α .

Conclusion: Despite the small number of patients we may say that the portal vein embolization and application of hematopoietic stem cell is the new, relatively safe and promising method for exactly indicated patients with primary non-resectable colorectal liver metastases.