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Tumor regression by means of magnetic drug targeting

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Systemic chemotherapies in patients with liver metastases are often not suitable for many, especially elderly patients due to toxicity and side effects. The objective of this study was the development of a therapy in which classical cytostatics are coupled with liquid iron oxides (Fe_3O_4) and concentrate via bloodstream selectively in the reticuloendothelial system (RES) in the liver and therefore result in a local treatment. This concept was tested successfully in an animal model. First patient was a 70-year old female patient with metastasized and exulcerated mammary carcinoma which could not be ablated due to a poor general condition and multiple liver metastases. A systemic therapy was out of question. The patient agreed to this experimental therapy consisting of mitoxantrone-iron oxide, coupled with mitoxantrone in the dosage 20 mg/m² body weight. The mitoxantrone-iron concentration in plasma was significantly lower compared to the liver. The imaging showed a clearly visible iron accumulation in the liver and showed a partial remission after the end of therapy. Due to improved liver values the patient became suitable for surgery and was ablated. The patient survived with the residual metastases without progression for approximately 2½ years and died independently from the tumor. Therefore it is possible by means of coupling chemotherapy to liquid iron to accumulate the combination in the liver for local therapy only.

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