

**IORT Alternative: Minimally Invasive Helical Tomotherapy (MIHT)**

Minimally invasive helical tomotherapy is a new method for the irradiation of tumor volumes located near dose-limiting normal tissues. Traditional intraoperative irradiation therapy (IORT) implements large doses of radiation applied in a single fraction with shielding placed between the tumor and normal tissue during surgery. MIHT uses intensity-modulated, helically delivered external beam radiation therapy (EBRT) in conjunction with a shaped, inflatable separator laparoscopically inserted in the abdominal cavity between the tumor and surrounding sensitive structures. The separators are inserted through catheters and filled with either a gas or an isotonic solution during treatment. The goal of MIHT is to increase the dose to the irradiated tumor volume and spare dose-limiting structure by displacing them with the separators, creating a steep dose gradient away from the irradiated tumor volume. The advantage of MIHT is that it utilizes the radiobiological advantages of fractionated irradiation with less risk of normal tissue damage or necrosis. Moreover with an increase of total biological effective dose (BED), better local control of the tumor may possibly be achieved since it has been shown that local control increases with increasing irradiation doses. The improvement in local control may lead to the transformation of non-resectable to resectable tumors. MIHT is a promising technique that will have an application for a variety of tumors including cancer of the bladder, stomach, and pancreas.

This work was partially supported by a grant from the NIH (P01 CA088960) and a contract from TomoTherapy Inc.