

AbstractID: 2897 Title: Minimally-Invasive Intraoperative Radiotherapy (MIR): Technique development for treatment of canine bladder cancer

Purpose: To develop, model, and quantify the dose reduction on critical structures using Minimally-Invasive Intraoperative Radiotherapy (MIR) for the treatment of canine bladder cancer, and develop the technique for laparoscopic placement of the custom tissue expander.

Method and Materials: A custom tissue expander was constructed and implanted between the bladder and descending colon of three Beagle cadavers. Two of the implants were placed via laparotomy, and one was laparoscopically placed. The cadavers were positioned in a body fix mold, and CT scanned with the custom tissue expander inflated with saline solution and deflated. A radiation therapy treatment plan was constructed on the tomotherapy treatment planning system for the inflated and deflated CT scans of each cadaver. TLD chips were placed on the bladder and colon side of the laparoscopically placed tissue expander. Pre-treatment target localization was accomplished by using the onboard MVCT of tomotherapy. Both inflated and deflated treatment plans for one fraction of the laparoscopically placed cadaver were delivered.

Results: Keeping the dose to the bladder fixed, the average dose reduction when the tissue expander is inflated for the colon is 42.7%, spine is 38.7%, left kidney is 50.52%, and right kidney is 31.9%. A significant maximum dose reduction to these structures is also achieved. TLD chip measurements on either side of the inflated tissue expander showed a dose reduction of 55.1%.

Conclusion: The cadaver studies evaluated indicate the potential for a clinically significant dose reduction to the colon, spine, left and right kidneys using MIR. An effective laparoscopic technique was developed to allow for the quick placement of the custom tissue expander in the abdominal cavity with minimal incisions.

Conflict of Interest (only if applicable):

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