Cleveland Clinic Innovations

PRODUCT
Multi-tube esophageal brachytherapy catheter

INDICATIONS
Optimized intraluminal treatment of esophageal cancer including tumors extending beyond the gastroesophageal junction.

VALUE PROPOSITION
- Optimized radiation dose conformity and Dice Coefficient.
- Significant reduction in dose to surrounding normal tissue.
- Decreased risk of fistula by decreasing the “hot spots” associated with single channel applicators.
- Improved dosimetry can shift brachytherapy to a frontline therapy in stage 1-2 cancers for medically inoperable patients.

INTELLECTUAL PROPERTY
US Patents 9,764,158 and 10,335,609 and issued patents in UK, France, Germany, and China.

DEVELOPMENTAL STAGE
- Minimally Viable Product
- Completion of a 6 patient IRB study in 2020

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Multi-tube Esophageal Brachytherapy Catheter

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PROBLEM
Esophageal cancer is one of the fastest growing and deadliest cancers in the world. It is the 8th most common cancer worldwide with a poor five-year survival rate of only ~15-20%. Brachytherapy can be used for curative treatment of select stage 1-2 esophageal cancers, and for palliative treatment of advanced, obstructive esophageal tumors to relieve symptoms, allowing patients to resume normal swallowing. High-dose-rate (HDR) brachytherapy is an intraluminal technique which allows for high doses of radiation to be delivered directly to the tumor while sparing the surrounding normal tissues. In previous single catheter brachytherapy studies, complications such as esophageal fistula and stenosis were noted.

SOLUTION
To improve the HDR brachytherapy technique, inventors at Cleveland Clinic have developed a multichannel applicator to optimize the 3D radiation dose for treatment of esophageal cancer, allowing for significant improvement in dose modulation. It is a sheathed catheter with a tapered end, making insertion into a stenotic esophageal lumen easier. The applicator tubes are arranged around an inner balloon, which, when inflated, pushes the tubes against the wall of the esophagus. A balloon at the distal end anchors the catheter in the stomach for the duration of the procedure. The improved radiation dose mapping lowers exposure to surrounding radiosensitive normal tissues, decreasing the chance of complications such as fistula and stenosis.