Electrode Array for Radiofrequency Tissue Ablation

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a faster method of bipolar RF ablation that uses an electrode array to heat tissue between electrodes.

OVERVIEW

The liver is a common site for both primary and metastasizing cancer. Surgical resection, the preferred treatment for liver cancer, is a time consuming procedure during which the surgeon must cut through tissue while avoiding or closing large blood vessels. Blood loss during resection can increase the chance of post-operative complications and decrease patient survival rates.

One method of reducing blood loss is radiofrequency (RF) ablation, which involves passing an electrical current from a probe inserted into the tissue to a ground pad situated on the patient’s skin. The electric current coagulates tissue near the probe with heat, sealing it against blood flow. RF ablation originally involved inserting, removing and reapplying a single mono-polar probe at many locations along a tissue slice, a process that generally took too long for clinical practice.

THE INVENTION

UW-Madison researchers have developed a faster method of bipolar RF ablation that uses an electrode array to heat tissue between electrodes. The electrodes are inserted into the tissue along a resection cut line. To heat the tissue, RF energy is applied in bipolar mode between pairs of probes set in a comb-like configuration. Power is switched between pairs of electrodes in half-second intervals, allowing all probes to heat the tissue, but avoiding increased impedance, which compromises effective heating.

APPLICATIONS

• Thermal coagulation of tissue during surgery to minimize blood loss
KEY BENEFITS

• More rapidly ablates areas of tissue than previous methods
• Allows a surgeon to thermally coagulate tissue, rather than having to close tissue surgically, saving time and preventing blood loss
• Coagulates vessels up to five mm in diameter; in contrast, mono-polar probes can only coagulate vessels up to three mm
• No ground pads are necessary, eliminating risk of skin burns below the pads.
• May be used on any solid organ, including the liver, kidney, spleen, or brain
• Heat is concentrated between electrodes, allowing ablation of thin slices of tissue.
• Ablation region can have a variety of shapes.
• Electrodes may be inserted separately to mold to the organ’s shape or rapidly inserted in unison.
• Feedback control and localized application of power result in uniform ablation despite varying tissue characteristics.

ADDITIONAL INFORMATION

Tech Fields
Medical Devices - Surgical devices
Radiation Therapy - Ablation

CONTACT INFORMATION

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