

Lektrafuse™ Caiman™ in Laparoscopic Gastric Sleeve

A new laparoscopic RF vessel sealing and cutting instrument (CAIMAN™, Aragon Surgical® Inc.) has recently received FDA clearance. The instrument's first human use was performed with six laparoscopic sleeve gastrectomies on patients with a BMI of 30.9 - 43; in this Ethics Committee approved study, CAIMAN was utilized primarily for devascularization of the stomach but we also found it useful in sealing, cutting, grasping and blunt dissection in all of the cases. We found the instrument's unique ability to articulate and its 50mm sealing length provided much efficiency to this procedure.

CAIMAN

The CAIMAN has the longest jaw sealing length available (50 mm), more than twice as long as any other laparoscopic sealing instrument. It has the ability to both articulate and rotate. A unique jaw closure mechanism allows the tip to close and capture tissue first, while a floating hinge then compresses the captured tissue uniformly along the length of the jaws. This uniform compression coupled with a high overall compression force creates an ideal environment for optimal seal strength and durability. The RF generator, which runs the instrument, modulates RF energy using multiple tissue feedback parameters. This sophisticated energy control is designed to create not only a strong, durable seal but also to eliminate adhesion and charring while minimizing thermal spread to less than 1 mm.

SURGICAL TECHNIQUE

We used the CAIMAN primarily for devascularizing the stomach and to divide the greater omentum, beginning a safe distance from the pyloric valve and dissecting along the greater curvature to the fundus.

To begin the dissection the CAIMAN was used to seal and divide small bites of tissue, creating a window in the omentum. We then used the CAIMAN to seal and divide the tissue along the greater curvature. Using the articulation of the device tip, 5 to 10 consecutive 50 mm seals were performed, following the curvature of the stomach.

Because of the articulation we were able to rapidly devascularize the entire greater curvature. Using non-articulating devices we regularly find it necessary to use several ports in order to seal and cut at the various angles.

At the fundus of the stomach small bites were taken to separate the spleen and any other adhesions that remained from the stomach.

At the top of the stomach CAIMAN was utilized to move and retract the stomach and other organs. Tissue was atraumatically grasped in the jaws for normal tissue manipulation. Blunt dissection was also accomplished with the CAIMAN jaws in the open position. We found that the rotation and articulation made the device very agile in tight spaces near the fundus of the stomach not only for sealing and dividing but also for exploration.



Figure 1: CAIMAN sealing along the greater curvature. Note the integrity and lack of oozing from the previous seal.



Figure 2: CAIMAN's articulation enabled efficient devascularization of the stomach.

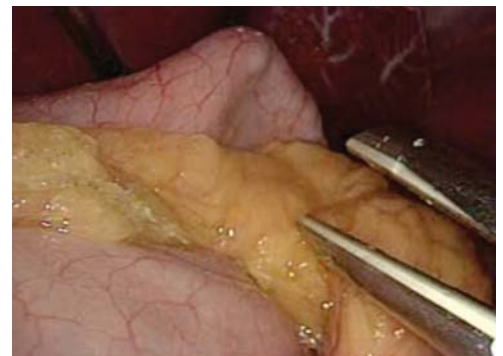


Figure 3: CAIMAN was used for blunt dissection and atraumatic grasping

No “double sealing” was necessary, as is often the case with other RF sealing devices. The seal lines were bloodfree with no oozing or small leaks. No suctioning of blood was required and at no time was cautery needed on the CAIMAN seal lines. Virtually no adhesion and very minimal thermal spread were observed. Because the seals were consistently complete and dry we were able to continue moving efficiently forward without having to revisit previous seals.

The outer jaws of the device remained cool during use, even after consecutive seals. Contact of the outer jaws with adjacent tissues and organs caused no thermal injury.

CONCLUSION

We found the ergonomics of the device to be excellent. Because of the instrument’s articulation we were able to easily access the entire greater curvature of the stomach from lateral ports. The articulation not only gave us easy access to the greater curvature but it also allowed us to seal in a pattern that followed very closely the curved structure in a way that traditional RF sealing devices cannot.

The jaw closure mechanism was simple to use and the cutting blade moved freely and easily for every cut with no dulling as the cases progressed. The electrodes were cleaned with saline to remove slight residue.

We found this new device to be very efficient and easy to use. In sleeve gastrectomies, by reducing the number of seals needed and eliminating the need for reseals and seal line cauterization, the device was able to allow us to significantly reduce procedure time and reduce surgeon fatigue. It provided a more suitable angle of sealing, allowing us to be more precise and therefore efficient with our seals. The CAIMAN’s ability to articulate allowed efficiency of movement along the curvature of the stomach and enhanced our ability to access difficult areas. Altogether, these factors reduce surgical time.

The seals produced were free of charring and adhesion and the less than 1 mm of thermal spread eliminated concerns over thermal damage to non-targeted tissue. The cool outer jaws allowed for the device to be safely used adjacent to other organs and the blunt tip allowed for use assisting in dissecting and retracting.

We found this device to be simple to use, more efficient than other devices we have used and to be a highly effective sealing method.

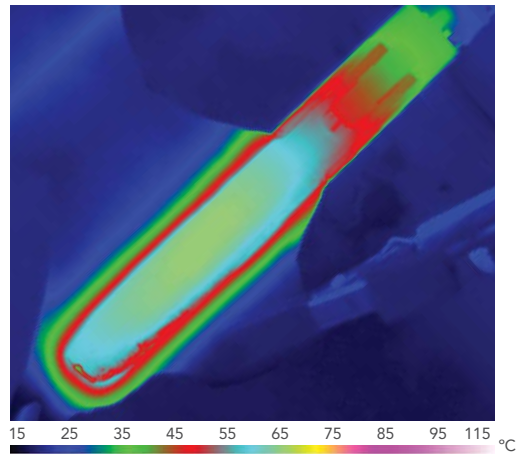


Figure 4: Thermal photography of CAIMAN at the end of a seal cycle shows average outside jaw temperatures of 65°C (in-vitro model)

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