



HOW TO MINIMIZE THE RISKS OF ENERGIZED DISSECTION

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HOW TO MINIMIZE THE RISKS OF ENERGIZED DISSECTION

TECHNOLOGIES

HI FREQUENCY

monopolar, bipolar, quasibipolar

ULTRASONICALLY ACTIVATED DEVICES

CUSA, longitudinal, torsional US devices

RADIOFREQUENCY

floating ball

WATER DISSECTION

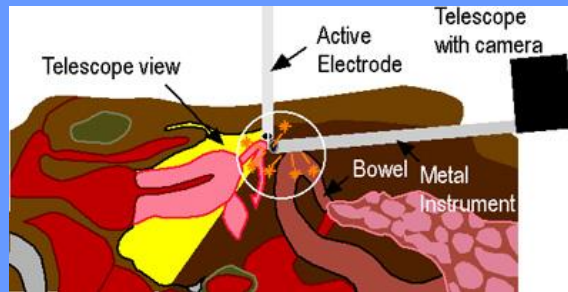
hydrodissection, high-velocity water-jet dissection

TISSUE RESPONSE ELECTROSURGERY

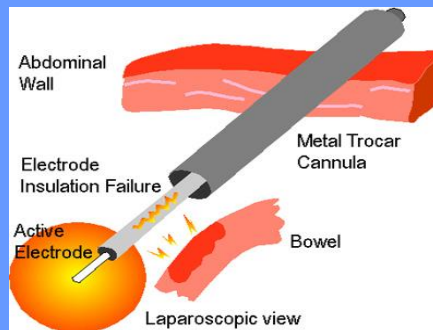
ligasure

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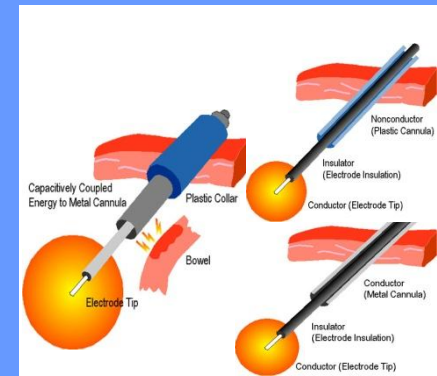
SAFETY



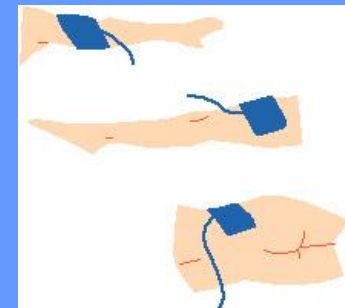
Direct coupling



Insulation failure



Capacitive coupling



Burn at pad site



TO AVOID COMPLICATION IN LAPAROSCOPIC ELECTROSURGERY KEEP IN MIND

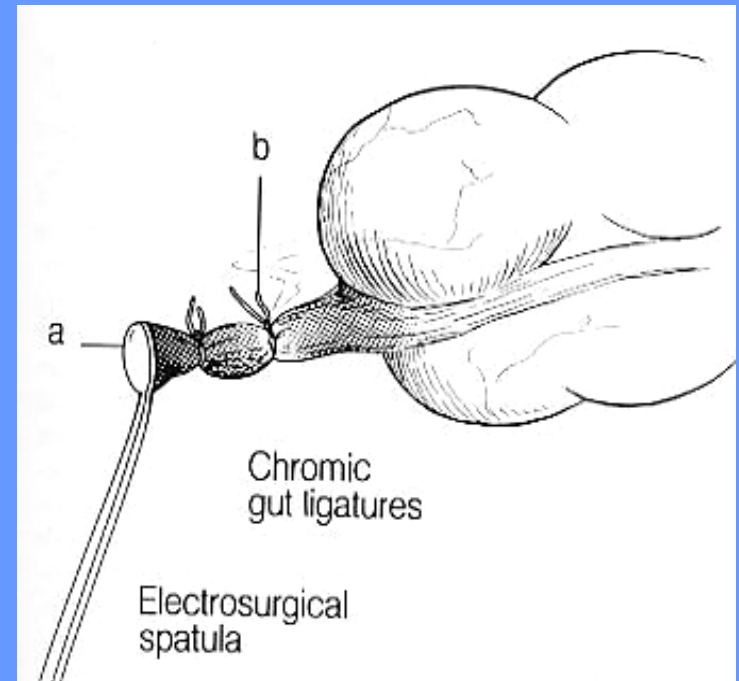
- Inspect insulation carefully
- Use lowest possible power setting
- Use a low voltage waveform (cut)
- Use brief intermittent activation vs. prolonged activation
- Do not activate in open circuit
- Do not activate in close proximity or direct contact with another instrument
- Use bipolar electrosurgery when appropriate
- Select an all metal cannula system as the safest choice. Do not use hybrid cannula systems that mix metal with plastic
- Utilize available technology, such as a tissue response generator to reduce capacitive coupling or an active electrode monitoring system, to eliminate concerns about insulation failure and capacitive coupling

HF DISSECTION

APPENDIX STUMP COAGULATION-DIVISION

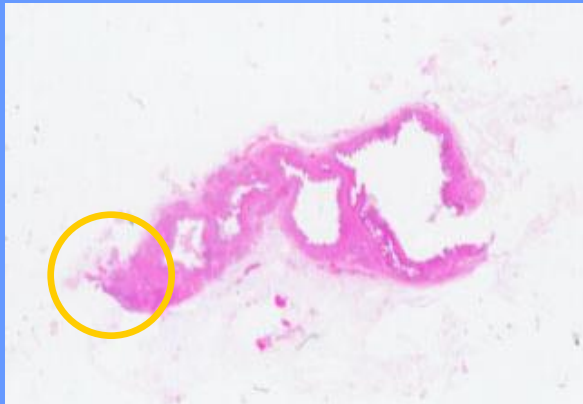
Monopolar electrocautery after stump ligation. If a ligature reduces the diameter of the appendix by 50%, it reduces the cross sectional area by 75%.

At the point of ligation the current density is 4 times as great as at the point of contact (1/cross sectional area), thus heating is 16 times the heating at the point of contact!

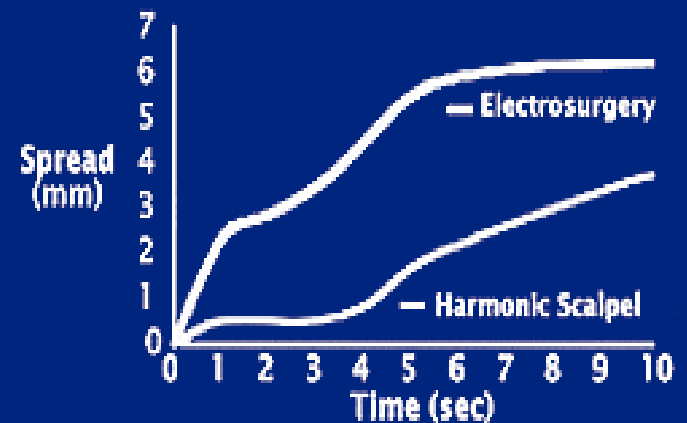


TERMAL TISSUE DAMAGE

HARMONIC VERSUS HF MONOPOLAR ELECTROSURGERY



Controls Lateral Spread of Thermal Injury



Amaral JF, Chrostek CA, SAGES, 1995.

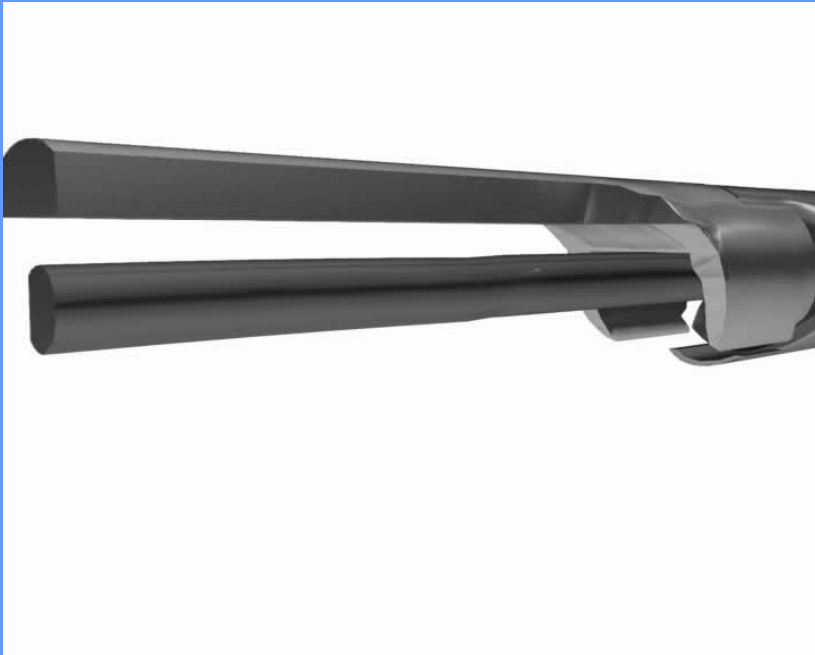
ULTRASONICALLY ACTIVATED DEVICES

HARMONIC ULTRACISION



SONOSURG

HOW TO MINIMIZE THE RISKS OF ENERGIZED DISSECTION



US DISSECTION LONGITUDINAL ACTION

US DISSECTION TORSIONAL ACTION



ULTRASONIC DEVICES USE LONGITUDINAL OR TORSIONAL MECHANICAL WAVES WITH A FREQUENCY GRATER THAN 20,000 CYCLES PER SECOND



ULTRASONIC DISSECTION AND TISSUE INTERACTION: WHAT TO KEEP IN MIND



POSSIBLE INJURIES BY CAVITATION

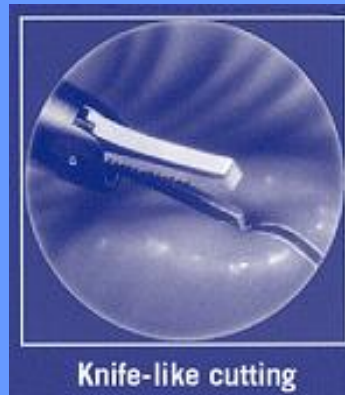
POSSIBLE THERMAL INJURIES

**THERMAL INJURIES DIFFICULT TO BE
DETECTED**

MIST GENERATED BY VIBRATION

FEATURES OF ULTRASONIC COAGULATION

More power Level 5 (100 microns)		♦ Faster cutting ♦ Less hemostasis
Less power Level 3 (70 microns)		■ Slower cutting ■ More hemostasis



1. **Vessels are sealed or welded**
2. **Vessel walls are not eroded.**
3. **Coagulum does not stick to blade.**
4. **Coagulation is a function of :
time - power - pressure - tension**

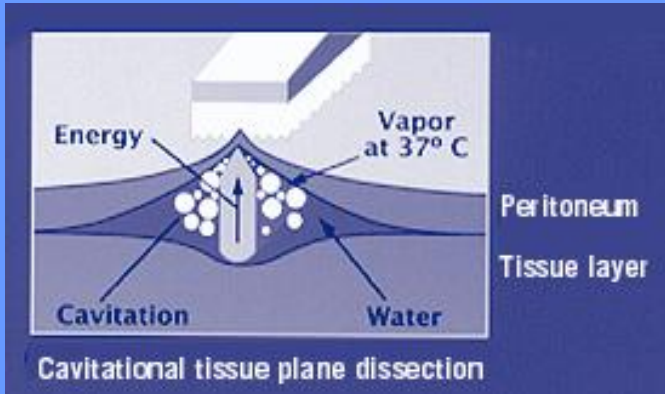
ULTRASONIC DISSECTION



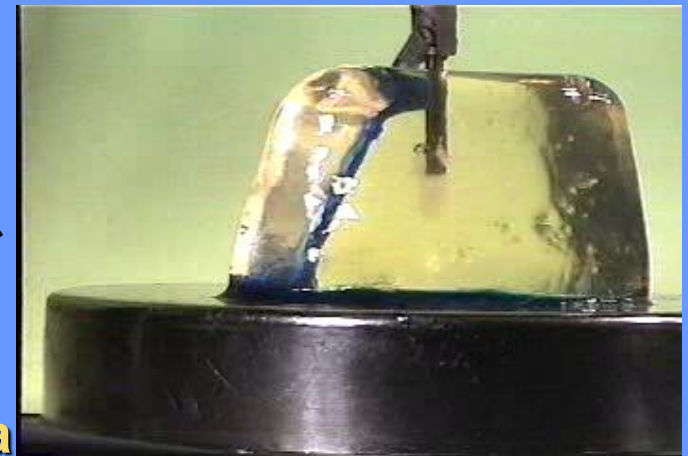
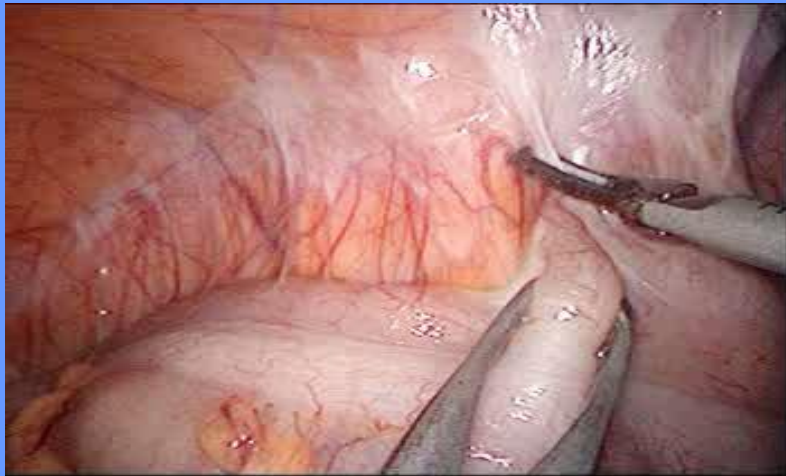
MULTIPLE FUNCTION DEVICE
grasping dissection
cutting coagulation
ONE ACTIVE BLADE

**MULTIPLE FUNCTIONS THAT
ACT SINERGISTICALLY AT
THE SAME TIME**

CAVITATION EFFECT

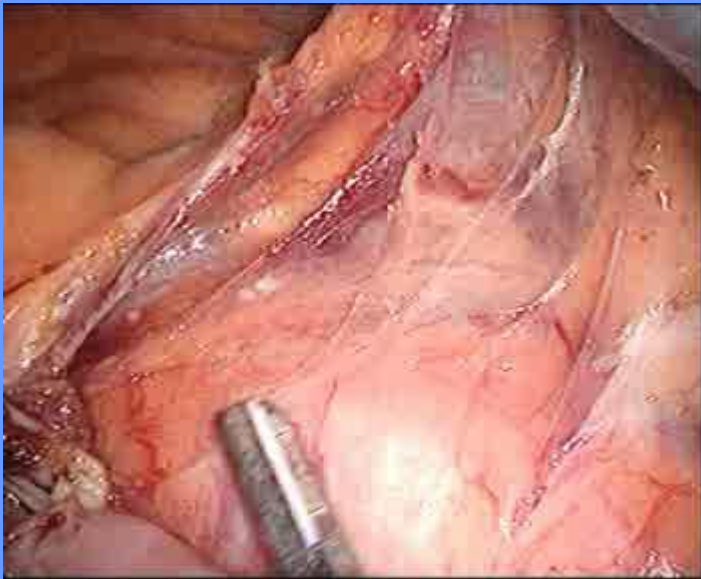


An effect that occurs ahead of the tip of instrument in longitudinal action devices

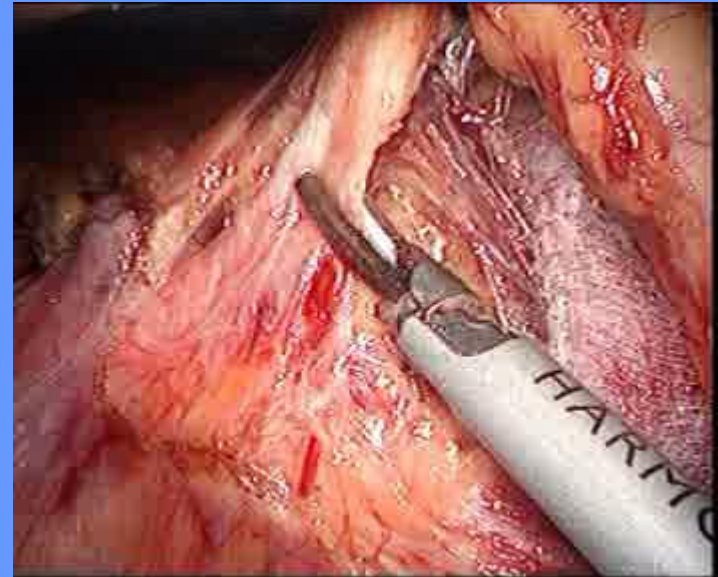


courtesy E. Kanehira

BLOODLESS DISSECTION

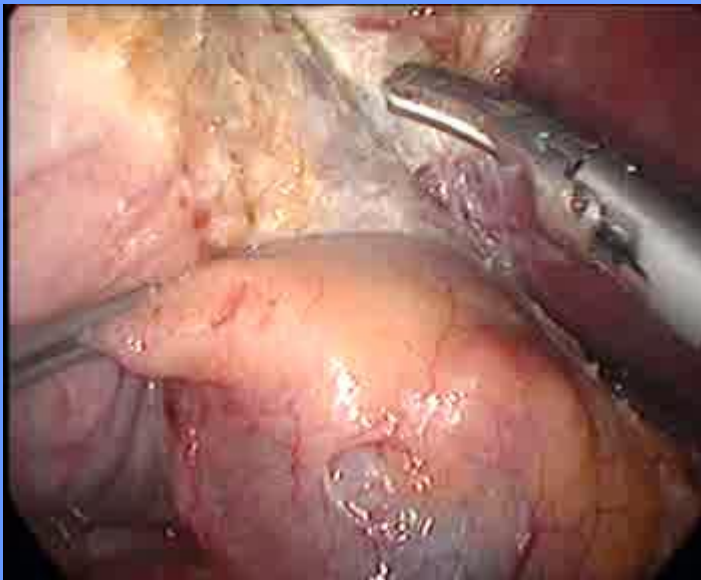


Toldt-Gerota plane

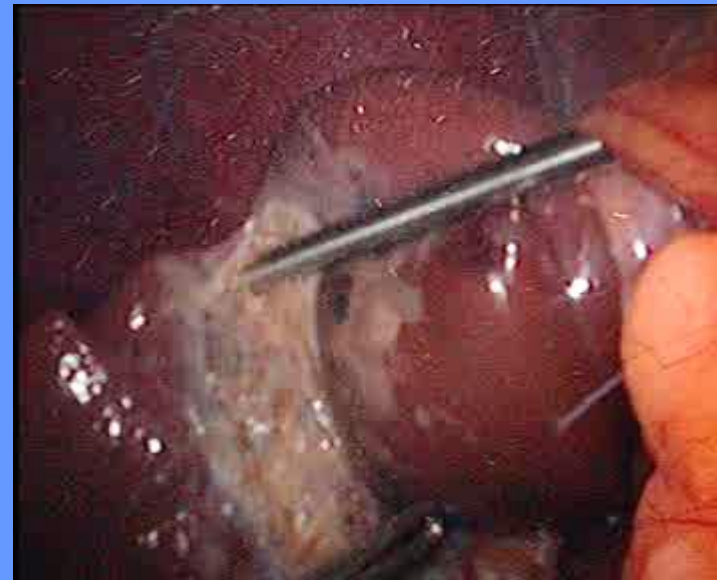


**subadventitial nerve sparing
Inferior Mesenteric a.**

THERMAL EFFECT



**thermal lesion on liver
the beginning**



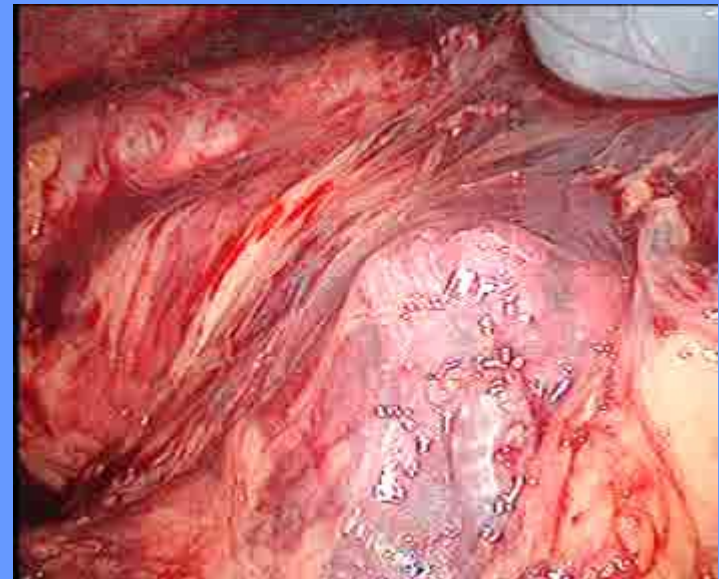
**thermal lesion on liver
the end**

HOW TO MINIMIZE THE RISKS OF ENERGIZED DISSECTION

TRICKS



gallbladder dissection



**rightward dissection of
the gastrocolic ligament**

FLOATING BALL



Saline solution is infused at the point of tissue contact by means of a ball at the end of the device coupling radio-frequency (RF) energy to seal tissue.

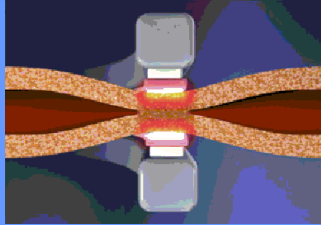
The wet energy cools tissue and keeps temperatures around 100°C, preventing tissue burning, eschar, and dangerous smoke — all side effects of dry electrosurgery that can cause re-bleeding, obscured vision, and health hazards to the OR staff.

benefits

impaired coagulation,
not effective on major
vessels

risks

LIGASURE



- feedback-controlled response system that diagnoses the tissue type in the jaws (initial tissue resistance).
- The generator produces a high-current (4amps), low-voltage output (<200v) that corresponds to at least four times the current of a standard electrosurgery generator, with one-fifth to one-twentieth the amount of voltage.
- Advanced feedback system that recognizes changes in tissue 200 times per second, and adjusts voltage and current accordingly to maintain appropriate power.
- The feedback control adjusts the pulsed generator output to the exact tissue type and quantity in the instrument jaws to create a consistent, reliable tissue effect.

An optimized combination of pressure and energy creates the seal by melting the collagen and elastin in the vessel walls and reforming it into a permanent, plastic-like seal. It does not rely on a proximal thrombus

Aemostasis achieved even without vessel dissection: concerns in oncology surgery



CONCLUSIONS

- 1. There is no perfect energised dissecting device**
- 2. In advanced laparoscopic surgery choose the most suitable for the tissue to be dissected and the procedure to be performed**
- 3. A learning curve does exist to use properly and safely any energised dissecting tool**