

# Investigation of the Electrophysiological and Thermographic Safety Parameters of Surgical Energy Devices during Thyroid and Parathyroid Surgery in a Porcine Model

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## Materials

Name	Company	Catalog Number	Comments
Automatic periodic stimulation (APS)	Medtronic, Jacksonville, FL		2.0 mm
Advanced bipolar surgical energy devices (SEDs)	Medtronic, Minneapolis, MN	LigaSure Exact Dissector (Device A)	Generator: Valleylab LS10 energy platform Power setting: Default
Bipolar electrocautery			Generator: ForceTriad energy platform Power setting: 30 watts
Duroc-Landrace pigs			3–4 months old; weighing 18–30 kg
Electromyography (EMG) Endotracheal tube (ETT)	Medtronic, Jacksonville, FL	#6 NIM Standard Tube	Recording electrodes
Ferromagnetic SEDs	Domain Surgical, Salt Lake City, Utah	FMwand, and Fmsealer	Generator: FMX G1 Generator Power setting: FMwand (Max 45); FMsealer (Max 3)
Hybrid SEDs (Ultrasonic and Advance bipolar SEDs)	Olympus Co Inc, Tokyo, Japan	Thunderbeat	Generator: Thunderbeat generator ESG USG 400 Power setting: SEAL&CUT mode (Level 1); SEAL mode (Level 3)
Monopolar electrocautery			Generator: ForceTriad energy platform Power setting: 15 watts
Nerve Integrity Monitoring (NIM) system	Medtronic, Jacksonville, FL	NIM 3.0	Intraoperative neuromonitoring (IONM) equipment

Sevoflurane			1% to 2% for anesthesia maintenance
Tiletamine/Zolazepam			2 mg/kg for anesthesia induction
Thermal imaging camera	Ezo Corp., Taiwan	Thermal camera D4A (384x288 pixels)	Thermal image recording equipments
Ultrasonic SEDs	Ethicon, Johnson and Johnson, Cincinnati, OH	Harmonic Focus+	Generator: Ethicon Endo-Surgery Generator G11 Power setting: Level 5
Ultrasonic SEDs	Medtronic, Minneapolis, MN	Sonicision	Generator: Sonicision Reusable Generator Power setting: maximum power mode (55 kHz)