REF #	CITATION	EVIDENCE TYPE	SAMPLE SIZE/ POPULATION	INTERVENTION(S)	CONTROL/ COMPARISON	OUTCOME MEASURE(S)	CONCLUSION(S)	SCORE
1	Gawel EM, Keenehan KR, Akella DS, Carr MM. Adverse events related to suction electrocautery devices in adenotonsillectomy: Analysis of the MAUDE database. *Am J Otolaryngol*. 2024;45(5):104404.	Nonexperimental	36 adverse events from MAUDE database related to suction electrocautery use during adenotonsillectomy procedures	n/a	n/a	Presence of burn injury or device malfunction	Suction electrocautery devices can malfunction and lead to patient burn injuries. Device failures can result from inadequate device insulation, coagulation problems, or detachment of device accessories.	IIIA
2	Brinkmann F, Huttner R, Mehner PJ, et al. Temperature profile and residual heat of monopolar laparoscopic and endoscopic dissection instruments. *Surg Endosc*. 2022;36(6):4507–4517.	Quasi-experimental	4 different monopolar laparoscopic/endoscopic instruments	Different power levels and activation/cutting intervals	n/a	Instrument temperature	The maximum temperature during activation and residual heat of monopolar laparoscopic and endoscopic instruments depends on the power setting and activation duration. After activation, wait at least 15 seconds before contacting tissue with the laparoscopic hook and at least 4 seconds with the endoknife to prevent injury. Users should also avoid contacting the tissue with the instrument shaft during activation.	IIB
3	Kim WJ, Son GM, Lee IY, et al. Capacitive coupling leading to electrical skin burn injury during laparoscopic surgery. *J Minim Invasive Surg* . 2022;25(3):106–111.	Quasi-experimental	1 pig to simulate laparoscopic conditions	Open circuit activation 5 cm from intestinal wall	Closed circuit activation while cutting intestinal wall	Impedance, temperature, voltage, current around the trocar	Trocar-site burns can occur via capacitive coupling if an open circuit is formed during activation of a laparoscopic electrosurgical instrument that has intact insulation when not in contact with tissue. Care should be taken to avoid creating an open circuit during activation of laparoscopic electrosurgical instruments to reduce the risk of capacitive coupling and burn injuries at the trocar site.	IIB
4	Paskey TL, Ren M, Arvind V, Tyler WK, Bogue JT, Strauch RJ. Antecubital Burn Resulting From Antenna Coupling: A Case Report. *JBJS case connect* . 2024;14(1).	Case Report	n/a	n/a	n/a	n/a	Case report of a 54-year old male patient who underwent hip disarticulation and experienced a third-degree burn to the left antecubital fossa requiring skin graft likely as a result of "antenna coupling" during electrosurgery. Recommend avoiding coiling or running electrosurgical device cords with other cords.	VA
5	Won H, Lee S, Ahn YJ, Yang M, Kim Y. An Unexpected Complication Resulting from Radiofrequency Ablation for Treating Facet Joint Syndrome: A Case Report. *Medicina* (Kaunas). 2023;59(11).	Case Report	n/a	n/a	n/a	n/a	Case report of a 69-year old female patient who experienced a third-degree burn to the lumbar area related to damaged needle insulation after percutaneous radiofrequency ablation for lumbar facet joint syndrome.	VA
6	El-Sayed SM, Saridogan E, El-Sayed MM. Complications of electrosurgery: mechanisms and prevention strategies. Facts Views Vis Obgyn. 2024;16(4):473–484.	Literature Review	n/a	n/a	n/a	n/a	Narrative review addressing complications associated with electrosurgery, the causal mechanisms, and strategies to prevent.	VB
7	Yamasaki A, Bhattacharyya N. Rare electrosurgical complications in tonsillectomy: Analysis of national adverse event reporting. Laryngoscope. 2020;130(5):1138–1143.	Nonexperimental	652 adverse events reported	n/a	n/a	Complication severity and patient disposition	Analysis of adverse event reports from a national database shows that devices used for tonsillectomy can cause significant harm to patients and providers. These cases are likely underreported. Surgeons should have an awareness of how these complications occur to facilitate safe patient care.	IIIA
8	Kimura H, Takada K, Imai K, et al. Low-power pure-cut hot snare polypectomy for colorectal polyps 10-14 mm in size: a multicenter retrospective study. J Gastroenterol Hepatol. 2024;39(9):1903–1909.	Nonexperimental	337 patients undergoing endoscopic resection of 10-14 mm colorectal polyps	n/a	n/a	Incidence of adverse events, R0 resection rate, en bloc resection rate	Low-power pure cut hot snare polypectomy was found comparable to conventional endoscopic mucosal resection in terms of similar resection ability and incidence of adverse events, suggesting that it is a safe and effective method for removing 10-14 mm nonpedunculated colorectal polyps.	IIIB

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9	Shah R, Shah HP, Rohrbaugh T, Reeder A, Kohli N, Maurrasse SE. Comparing nationally reported adverse events associated with coblation vs. PlasmaBlade for tonsillectomy. Am J Otolaryngol. 2023;44(4):103894.	Nonexperimental	538 adverse event reports for patients undergoing tonsillectomy	n/a	n/a	Adverse events related to coblator or PEAK plasmablade use	Plasmablade technology was associated with more burn injuries compared to a coblator device, but there were more adverse events reported with coblator use. Further study is needed to determine the incidence and prevalence of adverse events associated with use of these devices in tonsillectomy.	IIIB
10	Lee E, Elzomor A, Boulos S, et al. Complications associated with PEAK PlasmaBlade from 2010 to 2020 from MAUDE. BAYLOR UNIV MED CENT PROC. 2022;35(5):615–620.	Nonexperimental	361 medical device reports on PEAK PlasmaBlade devices (424 adverse events)	n/a	n/a	Device malfunctions, patient injuries, operator injuries	PEAK PlasmaBlade 3.0 and 4.0 devices can be useful in surgery, but they have been associated with adverse events that lead to injuries to patients and users. Educating physicians on the potential risks and proper use of these devices could help reduce complications. Additional studies with standardized reporting are needed.	IIIB
11	Carmack D,Jr, Hegeman E, Vizurraga D. Orthopaedic Operating Room Fire Risks: FDA Database and Literature Review. JBJS rev. 2023;11(2).	Literature Review	n/a	n/a	n/a	n/a	Summarizes fire data from the MAUDE database and fire safety literature. Proposes updates to the fire safety assessment and management algorithm.	VB
12	Tieppo Francio V, Barndt B, Eubanks J, Smith M. Third-degree full-thickness burns as a complication of cervical radiofrequency ablation. BMJ Case Rep. 2021;14(11).	Case Report	n/a	n/a	n/a	n/a	Describes the case of a 46 year old female who experienced a full thickness third-degree burn to the lumbar region attributed to the placement of the return electrode during cervical radiofrequency ablation for chronic neck pain.	VC
13	McGuire JA, Hayanga J, Barry C, et al. Inadvertent Intraoperative Defibrillation Secondary to Electrocautery Grounding Pad Placement. Cureus. 2022;14(9):e29391.	Case Report	n/a	n/a	n/a	n/a	Describes the case of a 67 year old male with an automated implantable cardioverter defibrillator (AICD) who experienced inadvertent defibrillation with use of electrocautery during a robotic-assisted anterior total hip arthroplasty. The inadvertent defibrillation stopped after changing the location of the return electrode pad and application of a magnet over the AICD. The anesthesia professional should evaluate the patient and their pacemaker dependency, the device interrogation, operative site, and return electrode pad	VA
14	Goel V, Shankar H, Mulpuru SK, Ramakrishna H. Inappropriate Defibrillator Shocks During Cervical Medial Branch Radiofrequency Ablation: A Case Report. A A Pract. 2020;14(11):e01286.	Case Report	n/a	n/a	n/a	n/a	Describes a case of pacing inhibition and inappropriate shocks to a patient with a cardiac defibrillator during radiofrequency ablation of cervical medial branch nerves under sedation.	VA
15	Qureshi A, Ahmed I, Khan AH. Pacemaker Failure to Capture Caused by Electrocautery: A Rare Pacemaker Pulse Generator Change Complication. Cureus. 2022;14(8):e28252.	Case Report	n/a	n/a	n/a	n/a	Report of electrosurgery causing an 88-year old male patient's dual-chamber pacemaker to unexpectedly lose pacing function for 30 seconds. Recommend following a standard algorithm that includes preoperative device interrogation and switching to asynchronous mode intraoperatively to avoid unexpected complications. Closed-loop communication during the procedure is also important.	VB

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16	Singleton MJ, Fernando RJ, Bhave P, et al. Inappropriate Implantable Cardioverter-Defibrillator Therapy With the Use of an Underbody Electrosurgery Dispersive Electrode. J Cardiothorac Vasc Anesth. 2022;36(1):236–241.	Case Report	n/a	n/a	n/a	n/a	Presents two cases of inappropriate antitachycardia therapy that occurred intraoperatively with use of an underbody dispersive electrode during infraumbilical surgery. The authors recommend that the umbilicus not be used as a landmark in determining risk of EMI for patients with ICDs, that all ICDs should have antitachycardia therapy suspended when using an underbody dispersive electrode, and the use of a five-second or longer delay between applications of electrosurgery to reduce the risk of inappropriate antitachycardia therapy.	VB
17	Lefevre RJ, Crossley GH, Sorabella LL, Siegrist KK, Eagle SS. Unintended ICD discharge in a patient undergoing bladder tumor resection utilizing monopolar cautery and full-body return electrode. J Cardiovasc Electrophysiol. 2020;31(10):2762–2764.	Case Report	n/a	n/a	n/a	n/a	Describes the case of a 76 year old male with single chamber implantable cardioverter-defibrillator (ICD) who underwent bladder surgery with monopolar cautery and a full-body return electrode. Patient movement during electrosurgery use was observed and ICD interrogation showed that the device discharged multiple times during surgery due to electrosurgery interference. The authors recommend caution when using full-body return electrodes in patients with cardiac implantable electronic devices and that clinicians consider disabling the implantable electronic device therapy or use traditional return electrodes when interference is likely. The authors changed their practice to avoid full-body return electrodes for patients with cardiac implantable electronic devices when possible.	VB
18	Tully BW, Gerstein NS, Schulman PM. Electromagnetic Interference With an Underbody Dispersive Electrode in a Patient With an Implantable Cardioverter-Defibrillator Undergoing Noncardiac Surgery: A Case Report. A A Pract. 2020;14(11):e01285.	Case Report	n/a	n/a	n/a	n/a	Reports a case of electromagnetic interference during surgery below the umbilicus in a patient with an implantable cardioverter-defibrillator (ICD) where monopolar electrosurgery and an underbody return electrode were used. Recommends disabling the antitachycardia function of an ICD if using an underbody electrode or using an appropriately placed conventional return electrode instead of an underbody electrode for patients with a cardiac implantable electronic device.	VB
19	Urits I, Orhurhu V, Charipova K, Delfin E, Viswanath O, Ngo A. Cardiac implantable electronic device discharge during intrathoracic tumour radiofrequency ablation. *Anestezjol Intens Ter*. 2019;51(3):249–252.	Case Report	n/a	n/a	n/a	n/a	Presents case of electromagnetic interference leading to suspected inappropriate shock delivered to a patient with ICD undergoing radiofrequency ablation for a metastatic lung mass.	VC
20	Grauer JS, Kana LA, Alzouhayli SJ, Roy S, Cramer JD. Surgical Fire in the United States: 2000-2020. *Surgery* . 2023;173(2):357–364.	Nonexperimental	565 reports of surgical fires resulting in harm to patients (531 reports) or surgical personnel (50 reports)	n/a	n/a	Contributing factors and characteristics of surgical fire events that resulted in patient and personnel harm; nature of harm/injury.	Identified common themes associated with surgical fires - they are most likely to occur near the anesthesia circuit, particularly in presence of open oxygen; be related to mishandling of flammable materials, particularly alcohol-based skin antiseptics when not completely dried; damaged equipment is a potential ignition source. Recommend emphasizing device maintenance and surveillance for damage, confirming alcohol-based skin prep is dry during the time out, more rigorous reporting of fire events, and education of surgeons and staff.	IIIB

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21	Gupta A, Mudie LI, Yen MT. Flammability of Ocular Surface Lubricants. Ophthalmic Plast Reconstr Surg. 2023;39(6):632–635.	Quasi-experimental	9 ophthalmic lubricants	Monopolar cautery, bipolar cautery, high temperature cautery; 6 L/min 100% oxygen	Room air, open flame lighter	Ignition, sparking, smoking, change in lubricant appearance	The tested ophthalmic lubricants presented an overall low fire hazard with some conducting electricity during monopolar cautery, which could lead to burns. Two of the tested lubricants produced smoke when a high temperature cautery was used in the presence of room air, indicating they could be potential fuel sources. Bipolar cautery did not produce any reactions among any of the tested lubricants.	IIB
22	Maamari RN, Custer PL. Operating room fires in oculoplastic surgery. Ophthalmic Plast Reconstr Surg. 2018;34(2):114–122. [IIIB]	Nonexperimental	259 oculoplastic surgeons	n/a	n/a	Surgical fire encounters and characteristics, fire trends, management of burn injuries	Nearly 1/3 of survey participants experienced an OR fire in their career. Common features of these fires included monitored IV sedation, use of a cautery device (eg, battery powered, monopolar), open oxygen delivery, and use of drapes that covered the face. Concluded that study findings support adoption of fire safety measures specific to oculoplastic surgery.	IIIB
23	Jardaly A, Arguello A, Ponce B, Leitch K, McGwin G, Gilbert S. Catching Fire: Are Operating Room Fires a Concern in Orthopedics? 2022;18(3):225–229.	Nonexperimental	172 orthopedic surgeons; 14 OR fires during orthopedic cases	n/a	n/a	Incidence of OR fires and characteristics, characteristics of hospital policies, perspective on OR fires	Surgeons should be aware of the oxidizers and ignition sources in the OR and cautiously use them in the presence of fuel sources (eg, gauze, bone cement). Education of OR personnel and physicians can help prevent OR fires.	IIIC
24	Jones TS, Black IH, Robinson TN, Jones EL. Operating Room Fires. Anesthesiology. 2019;130(3):492–501.	Literature Review	n/a	n/a	n/a	n/a	Reviews literature on the elements of the fire triad and discusses team training, surgical checklists, and strategies to manage OR fires.	VA
25	Ventura Spagnolo E, Mondello C, Roccuzzo S, et al. Fire in operating room: The adverse "never" event. Case report, mini-review and medico-legal considerations. Leg Med (Tokyo). 2021;51:101879.	Case Report	n/a	n/a	n/a	n/a	Describes case of a 65 year old woman who reported burns to the neck from an OR fire during thyroidectomy. Medico-legal analysis showed professional liability due to not waiting for skin prep solution to dry before activating the electrosurgical unit. Recommends implementing national and local reporting procedures and root cause analysis to manage risk and prevent OR fires.	VB
26	Rodger D. Surgical fires: Still a burning issue in England and Wales. J Perioper Pract. 2020;30(5):135–140.	Literature Review	n/a	n/a	n/a	n/a	Presents existing literature on components of the fire triad and how to manage and prevent surgical fires.	VB
27	Roy S, Smith LP. Preventing and Managing Operating Room Fires in Otolaryngology-Head and Neck Surgery. Otolaryngol Clin North Am. 2019;52(1):163–171.	Expert Opinion	n/a	n/a	n/a	n/a	Identifies electrosurgical devices as an ignition source in the fire triad and describes their contributing role to OR fires and ways to reduce risk. Provides recommendations for fire prevention when using electrosurgery including selecting alternative technology when operating in the trachea	VB
28	MAUDE: Manufacturer and User Facility Device Experience. US Food & Drug Administration. Accessed June 30, 2025. https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfMAUDE/search.CFM	Regulatory	n/a	n/a	n/a	n/a	FDA MAUDE database.	n/a

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29	Wright R. Guideline for a Safe Environment of Care. Kyle E, ed. e-Subscription ed. AORN, Inc.; 2025.	Guideline	n/a	n/a	n/a	n/a	Provides guidance for a safe environment of care, including fire and electrical safety.	IVA
30	Burlingame B. Guideline for Laser Safety. In: Wood A, ed. Guidelines for Perioperative PracticeAORN, Inc; 2025	Guideline	n/a	n/a	n/a	n/a	Provides guidance for the safe use of lasers in the perioperative setting.	IVA
31	Jones E. Guideline for Surgical Smoke Safety. Kyle E, ed. AORN; 2025.	Guideline	n/a	n/a	n/a	n/a	Provides guidance for surgical smoke evacuation and filtration.	IVA
32	Wright R. Guideline for Minimally Invasive Surgery. Kyle E, ed. e-Subscription ed. AORN, Inc.; 2025.	Guideline	n/a	n/a	n/a	n/a	Provides guidance for minimally invasive surgery.	IVA
33	Schlosshauer T, Kiehlmann M, Riener MO, Rothenberger J, Sader R, Rieger UM. Effect of low-thermal dissection device versus conventional electrocautery in mastectomy for female-to-male transgender patients. International wound journal. 2020;17(5):1239.	Quasi-experimental	17 transgender patients undergoing mastectomy	PEAK PlasmaBlade	Monopolar electrosurgery	Thermal injury depth, drain output volume, complications	The benefits of using PEAK PlasmaBlade compared to monopolar electrosurgery include less thermal tissue damage and total drain output volume, shorter drain duration, and faster wound healing in female-to-male transgender patients undergoing mastectomy.	IIA
34	Mittal S, Wilkoff BL, Poole JE, et al. Low-temperature electrocautery reduces adverse effects from secondary cardiac implantable electronic device procedures: insights from the WRAP-IT trial. Heart rhythm. 2021;18(7):1142.	Quasi-experimental	5205 patients undergoing cardiac implantable electronic device procedure with electrosurgery	Low-temperature electrosurgical device (PlasmaBlade)	Standard electrosurgery	Incidence of procedure or lead-related adverse events	Low-temperature PlasmaBlade significantly reduces adverse effects during cardiac implantable electronic device procedures compared to standard electrosurgery.	IIB
35	Stefanovic S, Sutterlin M, Gaiser T, et al. Microscopic, Macroscopic and Thermal Impact of Argon Plasma, Diode Laser, and Electrocoagulation on Ovarian Tissue. In Vivo. 2023;37(2):531–538.	Quasi-experimental	60 fresh bovine ovaries	Argon plasma coagulation (APC), diode laser	Conventional monopolar or bipolar energy	Thermal tissue damage	Findings suggest that preciseAPC and monopolar devices cause less ovarian tissue damage than bipolar, diode laser, and forcedAPC devices in a bovine model.	IIB
36	Gu K, Kang TW, Han S, et al. Gastrointestinal tract perforation after radiofrequency ablation for hepatic tumor: Incidence and risk factors. Eur J Radiol. 2024;177:111560.	Nonexperimental	4799 patients who underwent radiofrequency ablation for malignant hepatic tumors	n/a	n/a	Thermal injury of the GI tract	The overall incidence of GI tract perforation following radiofrequency ablation for hepatic tumors is rare but associated with high mortality. Close proximity of the index tumor to small intestine is a risk factor but not within physician control. Recommend that physicians exercise caution in managing patients with tumors of or near the small intestine after ablation and continue monitoring patients post-procedure for complications.	IIIA
37	Best CAE, Hussain J, Johnson-Obaseki S. Alternative Sources of Cautery in Thyroid Surgery and the Risk of Recurrent Laryngeal Nerve Injury: A Retrospective, Risk-Adjusted Analysis From the National Surgical Quality Improvement Program. J OTOLARYNGOL HEAD NECK SURG. 2024;53:1–6.	Nonexperimental	13,961 adult patients who underwent thyroid surgery	n/a	n/a	Recurrent laryngeal nerve injury	Recurrent laryngeal nerve injury was not significantly different between cautery methods, so other factors, like cost-effectiveness, availability of resources, and surgeon comfort, can be considered when selecting a cautery method for thyroid surgery.	IIIA

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38	Blereau C, Radloff S, Grisham J. Up in Flames: The Safety of Electrocautery Trephination of Subungual Hematomas with Acrylic Nails. WEST J EMERG MED. 2022;23(2):183–185.	Nonexperimental	200 acrylic nails affixed to simulated digits	n/a	n/a	Ignition events	A high incidence of ignition reinforces the current practice of avoiding electrocautery for trephination of the nail bed when treating subungual hematoma in the presence of acrylic nails.	IIIA
39	Ananwattanasuk T, Jame S, Bogun FM, et al. Lead damage after cardiac implantable device replacement procedure: Comparison between electrical plasma tool and electrocautery. J Cardiovasc Electrophysiol. 2021;32(4):1124–1128.	Nonexperimental	820 patients undergoing cardiac implantable electronic device replacement procedures	n/a	n/a	Pacing lead impedance, incidence of lead damage, complications	The incidence of complications, including lead damage requiring revision, was not significantly different between procedures using conventional electrosurgery and PEAK PlasmaBlade. Careful use of conventional electrosurgery is as safe as using the PEAK PlasmaBlade and less costly in cardiac implantable electronic device generator replacement procedures.	IIIA
40	Cattoni M, Rotolo N, Nardecchia E, De Maio S, Dominioni L, Imperatori A. Energy devices safety and impact on video-assisted thoracoscopic lung lobectomy postoperative course: monopolar electrocautery versus ultrasonic dissector. J Cardiothorac Surg. 2021;16(1):40.	Nonexperimental	140 adult patients undergoing video-assisted thoracoscopic lobectomy and lymphadenectomy for lung cancer	n/a	Monopolar electrocautery (L-hook) or ultrasonic dissector (Harmonic ACE plus)	Energy-instrument related intraoperative accidents, hemothorax/chylothorax incidence, total pleural effusion volume at 48 hrs postoperative, chest tube duration	The monopolar electrosurgery and ultrasonic dissection devices were both safe and had similar short-term outcomes in patients undergoing video-assisted thoracoscopic lobectomy and lymphadenectomy. The findings suggest that selection of energy device could be left to surgeon preference.	IIIB
41	Miller KC, Morrow BR, Sorrels JH, Arnholt CM, Mihalko WM. Electrocautery Induced Damage of Total Knee Implants. J Arthroplasty. 2021;36(3):1126–1132.	Nonexperimental	Laboratory testing of 3 different types of femoral component used in total knee arthroplasty	n/a	n/a	Surface damage; surgeon use of electrocautery after component implantation	Electrosurgery use can cause damage to the bearing surface of implants used in total joint arthroplasty. Survey results showed that surgeons often use electrosurgery after implant placement in primary and revision arthroplasty. More research is needed to determine the whether the surface damage to implants is clinically significant.	IIIB
42	Cundy PJ, Antoniou G, Mascarhenas A, Freeman BJC, Cundy WJ. Chromium Metal Ion Release During Instrumented Spinal Surgery in Children: The Effects of Electrosurgery. Spine. 2020;45(23):1619–1624.	Nonexperimental	11 children undergoing spinal fusion for scoliosis	n/a	n/a	Chromium levels of serum samples, intraoperative wound washings, in vitro fluid samples	The results showed high chromium metal ion concentrations in intraoperative and early postoperative samples, challenging the previous belief that metal ion release was from metal implants. The findings suggest that electrosurgery electrode tips contribute to increased chromium ion levels. Recommend thorough irrigation of the operative wound to dilute the chromium ion load and consideration of selecting alternative electrosurgery electrode tips or methods to coagulate during surgery.	IIIB
43	Amin SD, Homan KB, Assar M, Lee M, Housewright CD. Hyfrecation and Interference With Implantable Cardiac Devices. Dermatol Surg. 2020;46(5):612–615.	Nonexperimental	45 adult patients with implanted cardiac devices who underwent dermatologic procedures using a hyfrecator device	n/a	n/a	Adverse perioperative and postoperative outcomes, device malfunction	No adverse symptoms or events attributed to use of the hyfrecator were reported among the patients included in the study. Although a lack of reported complications in patients with implanted cardiac devices undergoing procedures using the hyfrecator is reassuring, more studies are needed to validate safety.	IIIB

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44	Türkan a, akkurt G, Yalaza M, et al. Effect of LigaSure™, Monopolar Cautery, and Bipolar Cautery on Surgical Margins in Breast-Conserving Surgery. BREAST CARE. 2019;14(4):194–199.	Nonexperimental	30 patients undergoing lumpectomy for breast cancer	Monopolar cautery, bipolar cautery, LigaSure	Scalpel	Thermal damage at the surgical margin	Thermal tissue damage to the surgical margins of breast lumpectomy specimens was not significantly different between monopolar cautery, bipolar cautery, and LigaSure and could lead to false-positive or false-negative results. More research with larger sample sizes is needed to evaluate the effects of energy modality on surgical margin evaluation in lumpectomy for breast cancer.	IIIB
45	Liang J, Xing H, Chang Y. Thermal damage width and hemostatic effect of bipolar electrocoagulation, LigaSure, and Ultracision techniques on goat mesenteric vessels and optimal power for bipolar electrocoagulation. BMC Surg. 2019;19(1):147.	Nonexperimental	210 in vivo goat mesenteric vessel samples	Advanced bipolar Ligasure at 3/5, ultrasonic Ultracision at 3	Bipolar electrocoagulation at 80 W, 75 W, 70 W, 65 W, 60 W, 55 W, 50 W	Hemostatic effect, thermal damage, burst pressure	Bipolar electrocoagulation was optimal at 60 W of power. Advanced bipolar more reliably achieved hemostasis compared to ultrasonic and bipolar electrocoagulation devices. The ultrasonic device produced the least thermal damage. Bipolar electrocoagulation at 60 W can be used for simplicity and low cost.	IIIB
46	Schlosshauer T, Kiehlmann M, Ramirez P, Riener MO, Djedovic G, Rieger UM. Comparative analysis on the effect of low-thermal plasma dissection device (PEAK PlasmaBlade) versus conventional electro surgery in post-bariatric body-contouring procedures: a retrospective randomised clinical study. International wound journal. 2019;16(4):932.	Nonexperimental	24 patients undergoing upper arm or medial thigh lift	n/a	n/a	Thermal injury depth, drain output volume, complications	The results suggest PEAK PlasmaBlade is superior to monopolar electrosurgery for post-bariatric body contouring procedures because there was significantly less total drain output, less tissue damage, and fewer postoperative seromas.	IIIB
47	Wang JJ, Huang T, Wu C, et al. Improving Voice Outcomes After Thyroid Surgery - Review of Safety Parameters for Using Energy-Based Devices Near the Recurrent Laryngeal Nerve. Front Endocrinol (Lausanne). 2021;12:793431.	Literature Review	n/a	n/a	n/a	n/a	Reviews literature on safety parameters for the use of energy-based devices in thyroid surgery with a focus on maintaining a safe distance from the recurrent laryngeal nerve and cooling duration to avoid thermal injury.	VA
48	Koplay TG. Comparison of two different electrosurgical devices in reduction mammoplasty: Monopolar electrocautery versus plasmakinetic cautery. World J Surg. 2024;48(8):1929–1933.	Nonexperimental	68 women undergoing reduction mammoplasty	Plasmakinetic cautery set to 7	Monopolar cautery set to 60 W	Postoperative drainage, drain duration, nipple areolar complex sensation, complications	The only advantage of plasmakinetic cautery in reduction mammoplasty is decreased drainage volume.	IIIB
49	Shibao K, Joden F, Adachi Y, et al. Repeated partial tissue bite with inadequate cooling time for an energy device may cause thermal injury. Surg Endosc. 2021. doi:10.1007/s00464-021-08322-3.	Quasi-experimental	Ex vivo benchtop model using porcine muscle slices	Two ultrasonic devices, one advanced bipolar device; full tissue bite, partial tissue bite	n/a	Device and tissue temperature, dissection time, thermal spread, cooling time	Repeated long activation with inadequate cooling time could increase the risk of thermal injury during surgery when using an ultrasonic device with a partial tissue bite technique. The results suggest that energy devices should be used properly with an understanding of the risk of adjacent tissue damage that could result from misuse of the device.	IIB

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50	Kang YJ, Stybayeva G, Hwang SH. Effect of the BiZact™ Low-Temperature Dissecting Device on Intra- and Postoperative Morbidities Related to Tonsillectomy-A Systematic Review and Meta-Analysis. Medicina (Kaunas). 2024;60(9):1415.	Systematic Review w/ Meta-Analysis	1880 participants in 6 studies investigating outcomes of tonsillectomy with BiZact vs. control intervention	n/a	n/a	Operating time, intraoperative blood loss, postoperative bleeding and pain	Meta-analysis of 1880 participants from 6 studies showed that the BiZact device significantly reduced operative time but did not significantly reduce intraoperative or postoperative bleeding and pain compared to control interventions used for tonsillectomy.	IIIA
51	Ortenzi M, Agresta F, Vettoretto N, et al. Use of High Energy Devices (HEDs) versus electrocautery for laparoscopic cholecystectomy: a systematic review and meta-analysis of randomised controlled trials. Surg Endosc. 2023. doi:10.1007/s00464-023-10060-7.	Systematic Review w/ Meta-Analysis	26 studies included (RCTs and non-RCTs)	n/a	n/a	n/a	The findings suggest that high energy devices, including ultrasonic, radiofrequency, and hybrid devices, significantly reduced operative time and intraoperative bleeding for laparoscopic cholecystectomy compared to electrosurgery, but no significant differences in complications. The overall quality of evidence was low to moderate for different outcomes, so these findings should be interpreted with caution and viewed as a major limitation of the evidence.	IIIB
52	Singh A, Anand S, Pakkasjärvi N, Verma A, Bajpai M. Energy Devices for Clipless-Sutureless Laparoscopic Appendectomy: A Systematic Review and Meta-Analysis on Utility and Safety. Medicina (Kaunas). 2022;58(11):1535.	Systematic Review w/ Meta-Analysis	6 comparative studies	n/a	n/a	n/a	Clipless-sutureless laparoscopic appendectomy using energy devices was found to be safe and advantageous in terms of shorter operative duration, less postoperative ileus, and shorter hospital stay. There were no differences in SSI when compared to procedures using clips or suture. The included studies had considerable risk of bias, so additional research is needed.	IIIA
53	Patrone R, Gambardella C, Romano RM, et al. The impact of the ultrasonic, bipolar and integrated energy devices in the adrenal gland surgery: literature review and our experience. *BMC Surg.* 2019;18:123–5.	Nonexperimental	75 patients undergoing laparoscopic adrenalectomy	n/a	n/a	Operating time, intraoperative blood loss, hospitalization time, complications and conversion rate	Laparoscopic adrenalectomy with Thunderbeat seems to significantly decrease operating time and intraoperative blood loss compared to Ligasure and Harmonic Scalpel. Hospitalization duration was not significantly different among the groups.	IIIB
54	Murphy HG, Dendrinos ML, Rosen MW. Postoperative Bleeding Two Weeks After Longitudinal Vaginal Septum Resection with the LigaSure Device: A Case Report. J Pediatr Adolesc Gynecol. 2023;36(6):563–565.	Case Report	n/a	n/a	n/a	n/a	Describes two cases of significant postoperative bleeding following surgical removal of longitudinal vaginal septum using a LigaSure device. Suggests that sloughing of eschar secondary to LigaSure use may elevate risk for delayed postoperative bleeding and that other surgical techniques, like cold knife excision with suturing, could be more appropriate. Cites need for additional research comparing surgical techniques for resection of longitudinal vaginal septum and postoperative complications.	VB
55	Bommakanti KK, Moss WJ, Weisman RA, Weissbrod PA. Zenker's diverticulotomy with bipolar tissue sealer: Retrospective review of safety and short-term outcomes. Am J Otolaryngol. 2020;41(1):102325.	Organizational Experience	19 patients undergoing endoscopic diverticulectomy with the Enseal device	n/a	n/a	n/a	The results indicate that using the Enseal device for endoscopic diverticulectomy is safe and effective in the short-term. Appealing device features include low line of sight profile, articulation/rotation capability, ease of use, and low risk of collateral thermal injury.	VB
56	Ultrasonic Surgical Units. Emergency Care Research Institute (ECRI); 2024.	Expert Opinion	n/a	n/a	n/a	n/a	Describes ultrasonic surgical units and considerations for pre-purchase evaluation.	VB

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57	Electrosurgical Units; Argon-Enhanced Coagulation. Emergency Care Research Institute (ECRI); 2024.	Expert Opinion	n/a	n/a	n/a	n/a	Provides product comparison of argon-enhanced coagulation electrosurgical units.	VB
58	Electrosurgical Return Electrodes: Weighing the Clinical and Cost Factors. Emergency Care Research Institute (ECRI); 2020. https://members.ecri.org/guidance/electrosurgical-return-electrodes-weighing-the-clinical-and-cost-factors	Expert Opinion	n/a	n/a	n/a	n/a	Provides background information for return electrodes used in electrosurgery.	VB
59	Iqbal AM, Li KY, Mahmood M, Gautam S. Safety of fluoroless radiofrequency catheter ablation for atrial fibrillation in patients with pre-existing cardiac implantable electronic device: A single-center study. Pacing Clin Electrophysiol. 2023;46(11):1387–1392.	Nonexperimental	25 patients with pre-existing cardiac implantable electronic devices undergoing fluoroless radiofrequency catheter ablation for atrial fibrillation	n/a	n/a	Pre- and post-procedure CIED interrogations to identify changes in functioning	Radiofrequency ablation for atrial fibrillation can be performed safely without fluoroscopy when a patient has a CIED.	IIIB
60	Lennerz C, O'Connor M, Schaarschmidt C, et al. Pulsed field ablation in patients with cardiac implantable electronic devices: an ex vivo assessment of safety. J Interv Card Electrophysiol. 2024. doi:10.1007/s10840-024-01758-2.	Nonexperimental	44 cardiac implantable electronic devices	n/a	n/a	Sensing and pacing functionality, integrity of shock circuits, device damage	Ex vivo testing of cardiac implantable electronic devices (CIEDs) during application of pulsed field ablation (PFA) showed that bipolar PFA did not damage CIEDs or leads or result in device malfunction. Clinically relevant EMI did lead to oversensing and pacing inhibition without tachycardia detection. Peri-procedural programming may mitigate this. Study findings suggest that there are no long-term safety concerns for the use of PFA in patients with CIEDs, however, in vivo testing is needed to confirm these study findings.	IIIB
61	Kyle, E. Guideline for Medical Device and Product Evaluation. In: Kyle E, ed. Guidelines for Perioperative Practice AORN, Inc; 2025	Guideline	n/a	n/a	n/a	n/a	Provides guidance for medical device and product evaluation.	IVA
62	Benze C, Spruce L, Groah L. Standards of Perioperative Nursing. 2021. Accessed June 30, 2025. https://www.aorn.org/guidelines-resources/clinical-resources/standards-of-practice	Consensus	n/a	n/a	n/a	n/a	Perioperative nursing standards of practice.	IVA

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63	Manton RN, Molina A, Gavin N, Hazari A. Hair extensions need to be considered during preoperative assessment. J Perioper Pract. 2019;29(12):398–399.	Case Report	n/a	n/a	n/a	n/a	Reports the case of a 51 year old woman who underwent a mastectomy with breast reconstruction. This patient had recently received hair extensions and the perioperative team was unaware of this preoperatively, noticing the metallic clips during positioning. The hair extensions were removed before beginning the procedure due to concerns about procedure length and potential for development of pressure injury as well as potential for injury related to alternative current conduction. The removed extensions were returned to the patient after the procedure and the facility plans to include asking patients about hair prosthetic devices in the preoperative assessment.	VC
64	Investigating Device-Related Skin "Burns". Emergency Care Research Institute (ECRI); 2006.	Expert Opinion	n/a	n/a	n/a	n/a	Outlines potential causes of device-related skin injuries, rationale for describing these injuries as "lesions" rather than "burns," and an approach for investigating skin injuries.	VB
65	Nelson G, Morris ML. Electrosurgery in the gastrointestinal suite: knowledge is power. Gastroenterol Nurs. 2015;38(6):430-439.	Expert Opinion	n/a	n/a	n/a	n/a	Summary of best practices for application of grounding pad and use of the ESU in a gastro-endoscopic setting.	VA
66	Using Electrosurgery on Patients with Jewelry, Body Piercings, and Tattoos. Emergency Care Research Institute (ECRI); 2023.	Expert Opinion	n/a	n/a	n/a	n/a	Jewelry or piercings should be removed if located in an area near the surgical site where they might be contacted by the ESU device or other conductive instruments or if located in a moist body compartment (eg, oral cavity). Return electrodes placed over tattooed skin will not increase the risk of burns, however, ECRI recommends avoiding placement of return electrodes over tattoos when other appropriate sites are available.	VB
67	Vilos GA. Understanding and practising safe electrosurgery in the operating room. J Obstet Gynaecol Can 2018;40(10):1337-1347	Expert Opinion	n/a	n/a	n/a	n/a	Describes principles of electrosurgery and basic safety.	VA
68	Sheldon RR, Loughren MJ, Marenco CW, et al. Microdermal implants show no effect on surrounding tissue during surgery with electrocautery. J Surg Res. 2019;241:72-77.	Quasi-experimental	4 swine with 3 implants in each.	Skin temperature at site between active and passive electrode sites	Skin temperature at site of dermal implant between active and passive electrode sites	Skin temperature at stainless steel dermal implant sites between the active and passive electrode sites	It appears that leaving stainless steel dermal implants during surgery even when located near an active electrosurgical device and return electrode pad, could be safe.	IIB
69	Bisinotto FMB, Dezena RA, Martins LB, Galvão MC, Sobrinho JM, Calçado MS. Burns related to electrosurgery—report of two cases. Rev Bras Anestesiol. 2017;67(5):527-534.	Case Report	n/a	n/a	n/a	n/a	Case study with recommendations for electrosurgical safety.	VC

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70	Talati RK, Dein EJ, Huri G, McFarland EG. Cutaneous burn caused by radiofrequency ablation probe during shoulder arthroscopy. Am J Orthop (Belle Mead NJ). 2015;44(2):E58-E60.	Case Report	n/a	n/a	n/a	n/a	Avoid contact between the active radiofrequency ablation device and other metal objects.	VA
71	Fire caused by improper disposal of a battery-powered electrocautery pen. Health Devices. 2013;42(10):346.	Case Report	n/a	n/a	n/a	n/a	Case report of a fire caused by a battery-powered electrocautery pencil device.	VC
72	Using Multiple Electrosurgical Units on One Patient: What to Do When You Can't Avoid It. Emergency Care Research Institute (ECRI); 2018.	Expert Opinion	n/a	n/a	n/a	n/a	Recommendations for using multiple electrosurgical units on one patient.	VB
73	Hachach-Haram N, Saour S, Alamouti R, Constantinides J, Mohanna PN. Labelling of diathermy consoles when multiple systems are used: should this be part of the WHO checklist? BMJ Qual Saf. 2013;22(9):775-776.	Organizational Experience	n/a	n/a	n/a	n/a	Recommends labeling ESU and corresponding accessories when more than one ESU is used.	VB
74	Huang Y, Zhang Y, Ding X, Liu S, Sun T. Working conditions of bipolar radiofrequency on human articular cartilage repair following thermal injury during arthroscopy. Chin Med J (Engl). 2014;127(22):3881-3886.	Quasi-experimental	Osteochondral explants	Bipolar power levels of 2, 4 and 6;	2, 5 and 10 seconds	Percentage and depth of cell damage	A lower power level creates less cellular damage.	IIB
75	Itoi T, Isayama H, Sofuni A, et al. Evaluation of effects of a novel endoscopically applied radiofrequency ablation biliary catheter using an ex-vivo pig liver. J Hepatobiliary Pancreat Sci. 2012;19(5):543-547.	Quasi-experimental	Pig livers	5, 10, 15, and 20 W	60,90,120 seconds	Effects of RF ablation	The duration of exposure and the power settings should be based on the size of the masses.	IIB
76	Sutton PA, Awad S, Perkins AC, Lobo DN. Comparison of lateral thermal spread using monopolar and bipolar diathermy, the Harmonic Scalpel and the Ligasure. Br J Surg. 2010;97(3):428-433.	Quasi-experimental	Porcine muscle	Monopolar at 20, 30 and 40 Watts	5, 10 or 15 seconds	Thermal spread	There is increased thermal spread with higher power settings.	IIB
77	Robinson TN, Pavlovsky KR, Looney H, Stiegmann GV, McGreevy FT. Surgeon-controlled factors that reduce monopolar electrosurgery capacitive coupling during laparoscopy. Surg Laparosc Endosc Percutan Tech. 2010;20(5):317-320.	Quasi-experimental	Experimental laboratory setting	Power setting of 25,50,75,100 Watts; mode of cut or coagulation; surgical techniques (desiccation, fulguration, open air activation)	n/a	Capacitive coupling	Lower power settings should be used to reduce capacitive coupling.	IIA

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78	Robinson TN, Barnes KS, Govekar HR, Stiegmann GV, Dunn CL, McGreevy FT. Antenna coupling—a novel mechanism of radiofrequency electrosurgery complication: practical implications. Ann Surg. 2012;256(2):213-218.	Quasi-experimental	Bovine model	Cords placed apart	Cords near each other	Thermal injury at the camera trocar incision	The cords on the sterile field should be separated to reduce antenna coupling.	IIB
79	Townsend NT, Jones EL, Paniccia A, Vandervelde J, McHenry JR, Robinson TN. Antenna coupling explains unintended thermal injury caused by common operating room monitoring devices. Surg Laparosc Endosc Percutan Tech. 2015;25(2):111-113.	Quasi-experimental	Porcine model	Nonelectrically active neuromonitoring and cardiac-monitoring leads placed in proximity to the monopolar pencil and its cord. ESU set at 15 & 30 watts.	Nonelectrically active neuromonitoring and cardiac-monitoring leads were placed away from the monopolar pencil and its cord.	Tissue temperature	To reduce antenna coupling, decrease the power, separate the cords, and utilize low voltage devices.	IIB
80	Shotts SD, Welsh DV, Nakamura A, Stromberg AJ. Very-Low Energy Monopolar Reduces Post-Tonsillectomy Hemorrhage Versus Standard Energy Techniques. Laryngoscope. 2021;131(11):2505–2511.	Quasi-experimental	11,348 tonsillectomies	Very-low energy transfer monopolar technique	Standard monopolar energy; mixed hot energy (monopolar, coblation, CO2 laser, plasma knife, or any combination)	Post-tonsillectomy hemorrhage requiring surgical intervention rate (ie, primary, secondary, repeat)	Primary and secondary post-tonsillectomy hemorrhage requiring surgical intervention was significantly more likely to occur when using standard energy "hot" techniques than when using very-low energy transfer monopolar technique.	IIA
81	Rey JF, Beilenhoff U, Neumann CS, Dumonceau JM; European Society of Gastrointestinal Endoscopy (ESGE). European Society of Gastrointestinal Endoscopy (ESGE) guideline: the use of electrosurgical units. Endoscopy. 2010;42(9):764-772.	Guideline	n/a	n/a	n/a	n/a	Clinical guideline on managing patients with an IED.	IVC
82	AST Standards of Practice for Use of Electrosurgery. Association of Surgical Technologists (AST); 2012. https://www.ast.org/AboutUs/Surgical_Technologists_Responsibilities/	Guideline	n/a	n/a	n/a	n/a	Provides guidance on the use of electrosurgery.	IVC
83	Sabzi F, Niazi M, Ahmadi A. Rare case-series of electrocautery burn following off-pump coronary artery bypass grafting. J Inj Violence Res. 2014;6(1):44-49.	Case Report	n/a	n/a	n/a	n/a	Case reports of alternate site burns after off-pump coronary artery bypass graft procedures.	VB
84	Alternate-site burns from improperly seated or damaged electrosurgical pencil active electrodes. Health Devices. 2012;41(10):334.	Expert Opinion	n/a	n/a	n/a	n/a	Properly seat the active electrode tip into the hand piece.	VC

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85	Recommendations to reduce surgical fires and related patient injury: FDA Safety Communication. US Food and Drug Administration. https://www.fda.gov/medical-devices/safety-communications/recommendations-reduce-surgical-fires-and-related-patient-injury-fda-safety-communication. Updated July 18, 2018. Accessed March 30, 2020.	Expert Opinion	n/a	n/a	n/a	n/a	Recommendations to reduce fires in the OR and injuries from capacitive coupling, including the use of a holster.	VB
86	Jones DB, Brunt LM, Feldman LS, Mikami DJ, Robinson TN, Jones SB. Safe energy use in the operating room. Curr Probl Surg. 2015;52(11):447-468.	Literature Review	n/a	n/a	n/a	n/a	Provides a review of the different types of injuries caused by electrosurgery.	VA
87	Munro MG. Complications of hysteroscopic and uterine resectoscopic surgery. Obstet Gynecol Clin North Am. 2010;37(3):399-425.	Expert Opinion	n/a	n/a	n/a	n/a	Provides recommendation for preventing electrosurgical injuries.	VB
88	Baker JC, Ramadan HH. The effects of an antistick phospholipid solution on pediatric electrocautery adenoidectomy. Ear Nose Throat J. 2012;91(1):E20-E23.	RCT	61 Pediatric adenoidectomies	Application of phospholipid antistick solution	No antistick solution	Surgery time and number of hand backs	Application of antistick solution decreased surgical time and number of hand backs.	IA
89	Roy S, Buckingham H, Buckingham E. The effects of an antistick phospholipid solution on bipolar electrocautery efficacy in rhytidectomy. Am J Cosmet Surg. 2017;34(3):156-160.	RCT	50 patients having rhytidectomy	Application of phospholipid antistick solution	No antistick solution	Surgery time and number of times bipolar cautery tip was cleaned	Application of antistick solution decreased surgical time and number of hand backs.	IB
90	Robinson TN, Jones EL, Dunn CL, et al. Separating the laparoscopic camera cord from the monopolar "Bovie" cord reduces unintended thermal injury from antenna coupling: a randomized controlled trial. Ann Surg. 2015;261(6):1056-1060.	RCT	84 patients undergoing laparoscopic cholecystectomy	Separated active electrode/camera cords.	Active electrode/camera cords placed parallel and close together	Thermal injury at the camera trocar incision	The laparoscopic camera cord and the active electrode cord should be separated to decrease antenna coupling at the camera trocar incision.	IA
91	Jones EL, Robinson TN, McHenry JR, et al. Radiofrequency energy antenna coupling to common laparoscopic instruments: practical implications. Surg Endosc. 2012;26(11):3053-3057.	Nonexperimental	Bovine liver	n/a	n/a	Temperature at end of scope and grasper.	The electrosurgical cords should be as far as possible from the light cords and the lowest power setting should be used.	IIIB

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92	Townsend NT, Jones EL, Overbey D, Dunne B, McHenry J, Robinson TN. Single-incision laparoscopic surgery increases the risk of unintentional thermal injury from the monopolar "Bovie" instrument in comparison with traditional laparoscopy. Surg Endosc. 2017;31(8):3146-3151.	Nonexperimental	Laboratory simulation	n/a	n/a	Temperature increase at the end of the telescope and the Maryland	Active electrode and camera cords should be separated during 4 port laparoscopic procedures but no benefit was seen during simulated single port procedures.	IIIC
93	Townsend NT, Nadlonek NA, Jones EL, et al. Unintended stray energy from monopolar instruments: beware the dispersive electrode cord. Surg Endosc. 2016;30(4):1333-1336.	Nonexperimental	Laboratory simulation	n/a	n/a	Temperature increase at the end of the telescope	Passive electrode and camera cords should be separated during laparoscopic procedures.	IIIC
94	Montero PN, Robinson TN, Weaver JS, Stiegmann GV. Insulation failure in laparoscopic instruments. Surg Endosc. 2010;24(2):462-465.	Nonexperimental	165 reusable laparoscopic insulated active electrodes and 61 disposable	n/a	n/a	Insulation failure	Insulation failure is frequently present and an inspection should be performed before and during use.	IIIB
95	Munro MG. Mechanisms of thermal injury to the lower genital tract with radiofrequency resectoscopic surgery. J Minim Invasive Gynecol. 2006;13(1):36-42. Erratum in: J Minim Invasive Gynecol. 2007;14(2):268.	Nonexperimental	Simulated female lower genital tract	n/a	n/a	Presence and degree of burns	Higher ESU output power results in more injuries than lower output. Damage to the insulation on the active electrode results in injury to the tissue via capacitive coupling.	IIIB
96	ANSI/AAMI ST79:2017/(R)2022, Comprehensive guide to steam sterilization and sterility assurance in health care facilities. Amendment 2: Inspection of insulated instruments. Association for the Advancement of Medical Instrumentation (AAMI); 2022.	Consensus	n/a	n/a	n/a	n/a	This amendment provides guidance for the inspection and integrity testing of insulated instruments.	IVC
97	Wood, A. Guideline for cleaning and care of surgical instruments. In: Guidelines for Perioperative Practice. Denver, CO: AORN, Inc; 2025.	Guideline	n/a	n/a	n/a	n/a	Provides guidance for care and clearing of instruments.	IVA
98	Tixier F, Garçon M, Rochefort F, Corvaisier S. Insulation failure in electrosurgery instrumentation: a prospective evaluation. Surg Endosc. 2016;30(11):4995-5001.	Nonexperimental	489 instruments	n/a	n/a	Insulation failure	24.1% of the instruments failed by visual inspection and 37.2% failed with the use of an active electrode insulation integrity tester. The failure in 50.4% of the laparoscopic instruments was median and the failure was distal in 40.4% of non-laparoscopic instruments	IIIA
99	Espada M, Munoz R, Noble BN, Magrina JF. Insulation failure in robotic and laparoscopic instrumentation: a prospective evaluation. Am J Obstet Gynecol. 2011;205(2):121.e1-121.e5.	Nonexperimental	744 Robotic and laparoscopic instruments	n/a	n/a	Insulation failure	There is a high incidence of insulation failure in robotic and laparoscopic instruments. Routine testing should be performed.	IIIB

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100	Zhang Y, Zhang Y, Wang Y, Yang L, Hu R. The packaging and clean method contribute to insulation failure of electrosurgical instruments. Medicine (Baltimore). 2021;100(42):e27492.	Organizational Experience	n/a	n/a	n/a	n/a	Identified insulation failure of reusable electrosurgical instruments as a common problem. Suggested that changing the cleaning procedures and packaging methods reduced damage to instrument insulation.	VB
101	Common Misconceptions about Electrosurgery Can Lead to Serious Burns. Emergency Care Research Institute (ECRI); 2023.	Expert Opinion	n/a	n/a	n/a	n/a	Addresses common misconceptions about electrosurgery that can lead to burns. Misconceptions include the belief that simultaneous use of multiple electrosurgical units does not increase risk, that the active electrode should be activated before contacting tissue, and that return electrodes cannot safely be placed over orthopedic metal implants, tattoos, or metal piercings.	VB
102	Guzman C, Forrester JA, Fuchshuber PR, Eakin JL. Estimating the Incidence of Stray Energy Burns during Laparoscopic Surgery based on Two Statewide Databases and Retrospective Rates: An Opportunity to Improve Patient Safety. Surg Technol Int. 2019;34:30–34.	Nonexperimental	192,794 records of patients having laparoscopic abdominal procedures.	n/a	n/a	Presence of an accidental puncture or laceration.	694 patients had an accidental puncture or laceration of internal structures or organs during laparoscopic procedures. Recommend education and use of active electrode monitoring to reduce stray energy burns.	IIIA
103	Martin KE, Moore CM, Tucker R, Fuchshuber P, Robinson T. Quantifying inadvertent thermal bowel injury from the monopolar instrument. Surg Endosc. 2016;30(11):4776-4784.	Nonexperimental	Porcine tissue	n/a	n/a	Amount of energy passed by capacitive coupling and the number of burns from insulation breaks.	The use of an active electrode monitoring system decreased the number of burns to the porcine tissue model and the amount of energy passed by capacitive coupling.	IIIB
104	Odell RC. Surgical complications specific to monopolar electrosurgical energy: engineering changes that have made electrosurgery safer. J Minim Invasive Gynecol. 2013;20(3):288-298.	Expert Opinion	n/a	n/a	n/a	n/a	Supports the use of contact quality monitoring and active electrode monitoring.	VB
105	Evaluation Background: Active Laparoscopic Electrode Shielding SystemsHealth Devices. 2020. https://members.ecri.org/guidance/evaluation-background-active-laparoscopic-electrode-shielding-systems	Expert Opinion	n/a	n/a	n/a	n/a	ECRI's overview of an active electrode shielding system.	VB
106	Increased Burn Risk with Single-Foil Electrosurgical Return Electrodes. Emergency Care Research Institute (ECRI); 2024.	Expert Opinion	n/a	n/a	n/a	n/a	Avoid using single-foil conductive return electrodes in adult patients and when dual-foil alternatives are available for pediatric patients due to reports of burns associated with single-foil return electrode.	VB
107	Borgmeier PR, Ricketts CD, Clymer JW, Gangoli G, Tommaselli GA. A review of capacitive return electrodes in electrosurgery. J Surg. 2021;9(1):31-35. doi:10.11648/j.js.20210901.16	Literature Review	n/a	n/a	n/a	n/a	Describes the technology behind the Mega Soft pad, reviews relevant literature, and provides guidance for clinical practice.	VB

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108	Return-Electrode-Site Burns: When the Risks Are Greatest. Emergency Care Research Institute (ECRI); 2016.	Expert Opinion	n/a	n/a	n/a	n/a	Recommendations to avoid burns associated with the return electrode during the use of electrosurgery.	VB
109	Sanders A, Andras L, Lehman A, Bridges N, Skaggs DL. Dermal discolorations and burns at neuromonitoring electrodes in pediatric spine surgery. Spine (Phila PA 1976). 2017;42(1):20-24.	Organizational Experience	201 patients having spinal surgery.	n/a	n/a	n/a	Identified patients with dermal discolorations and burns associated with neuromonitoring during spine surgery. Suggests placing the return electrode close to the surgical site, on a well-perfused area away from bony prominences. Avoid locating electrode wires near the active and return electrodes. Use return electrodes with a large surface area.	VA
110	Electrosurgical Safety: Managing Burn Risks at the Return-Electrode Site during High-Current Procedures. Emergency Care Research Institute (ECRI); 2005.	Expert Opinion	n/a	n/a	n/a	n/a	Practice recommendations to prevent burn injuries associated with return electrodes.	VB
111	Suchanek S, Grega T, Zavoral M. The role of equipment in endoscopic complications. Best Pract Res Clin Gastroenterol. 2016;30(5):667-678.	Literature Review	n/a	n/a	n/a	n/a	Describes how electrosurgery works and interventions to prevent burns.	VB
112	Fonseca AZ, Santin S, Gomes LG, Waisberg J, Ribeiro MA Jr. Complications of radiofrequency ablation of hepatic tumors: frequency and risk factors. World J Hepatol. 2014;6(3):107-113.	Literature Review	n/a	n/a	n/a	n/a	Recommendations for dispersive electrode placement.	VB
113	Ertuğrul İ, Karagöz T, Aykan HH. A rare complication of radiofrequency ablation: skin burn. Cardiol Young. 2015;25(7):1385-1386.	Case Report	n/a	n/a	n/a	n/a	Report of a 10 year old female who experienced a burn under the return electrode during catheter radiofrequency ablation for ventricular tachycardia.	VC
114	Roth M, Rakers L. Intraoperative Neuromonitoring: Principles and Considerations for Perioperative Nurses. AORN J. 2019;110(1):11-26.	Expert Opinion	n/a	n/a	n/a	n/a	Describes different methods of intraoperative neuromonitoring and perioperative nursing considerations.	VA
115	Stuhlinger M, Burri H, Vernooy K, et al. EHRA consensus on prevention and management of interference due to medical procedures in patients with cardiac implantable electronic devices. Europace. 2022;24(9):1512–1537.	Consensus	n/a	n/a	n/a	n/a	International consensus document on preventing and managing electrical interference during medical procedures in patients with cardiac implantable electronic devices.	IVB
116	Thomas H, Plummer C, Wright IJ, Foley P, Turley AJ. Guidelines for the peri-operative management of people with cardiac implantable electronic devices. Anaesthesia. 2022;77(7):808–817. doi:10.1111/anae.15728.	Guideline	n/a	n/a	n/a	n/a	Guideline for the management of patients with cardiac implantable electronic devices undergoing surgical interventions. These devices include pacemakers, implantable defibrillators and cardiac resynchronization devices. Recommendations for preoperative assessment, general measures to reduce risk of electromagnetic interference during surgery, and more specific guidance based on device type, patient dependence on the device, and procedure type.	IVB

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117	Skin Injuries Caused By DC Current May Occur at Subdermal Electrodes Used during Intraoperative Neural Monitoring Emergency Care Research Institute (ECRI) Web site. https://alerts.ecri.org/alerts-search/view/details/1633376. Updated 2018	Expert Opinion	n/a	n/a	n/a	n/a	Recommendations for procedures involving neuromonitoring needles based on investigation of direct current skin injuries.	VB
118	deKay K. Guideline for Preoperative Patient Skin Antisepsis. In: Kyle E, ed. Guidelines for Perioperative PracticeAORN, Inc; 2025	Guideline	n/a	n/a	n/a	n/a	Provides guidance for preoperative patient skin antisepsis.	IVA
119	Safe Use of Megadyne Mega 2000 and Mega Soft Patient Return Electrodes: Letter to Health Care ProvidersU.S. Food & Drug Administration (FDA) Web site. https://www.fda.gov/medical-devices/letters-health-care-providers/safe-use-megadyne-mega-2000-and-mega-soft-patient-return-electrodes-letter-health-care-providers. Updated 2025	Expert Opinion	n/a	n/a	n/a	n/a	FDA recommendation to avoid using Mega Soft Patient Return Electrodes on patients younger than 12 years.	VA
120	Schulman PM, Treggiari MM, Yanez ND, et al. Electromagnetic Interference with Protocolized Electrosurgery Dispersive Electrode Positioning in Patients with Implantable Cardioverter Defibrillators. Anesthesiology. 2019;130(4):530–540.	Nonexperimental	144 patients with implanted cardioverter defibrillators who underwent elective surgery	n/a	n/a	Electromagnetic interference and clinically meaningful electromagnetic interference	Electromagnetic interference (EMI) risk remains high during monopolar electrosurgery above the umbilicus, even with protocolized placement of the return electrode. Published recommendations to suspend antitachycardia therapy for electrosurgery procedures above the umbilicus should be followed, but might be unnecessary for surgeries below the umbilicus where EMI risk is negligible.	IIIB
121	Morano JM, Uejima JL, Tung A, Rosenow JM. Management strategies for patients with neurologic stimulators during nonneurologic surgery: an update and review. *Curr Opin Anaesthesiol* . 2023;36(5):461-467. doi:10.1097/ACO.0000000000001296	Literature Review	n/a	n/a	n/a	n/a	Reviews literature on perioperative management of patients with non-cardiac implanted electronic devices in non-neurosurgical procedures from the perspective of the anesthesia professional.	VA
122	Dhillon PS, Gonna H, Li A, Wong T, Ward DE. Skin burns associated with radiofrequency catheter ablation of cardiac arrhythmias. Pacing Clin Electrophysiol. 2013;36(6):764-767.	Case Report	n/a	n/a	n/a	n/a	Case report of return electrode burns.	VC
123	Hwang S, Wook-Seo J, Hoon-Lee B, Hyun-Bae S, Kyung-Lee Y. Percutaneous radiofrequency ablation for hepatic tumors: factors affecting baseline impedance. Diagn Interv Radiol. 2021;27(3):386–393.	Nonexperimental	51 patients undergoing radiofrequency ablation for hepatic tumors	n/a	n/a	Baseline impedance	Baseline impedance was significantly different depending on location of the return electrode pad and active electrode tip size. Placing return electrode pads on the back and larger active electrode tip size resulted in reduced total ablation time.	IIIB

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124	Voutsalath MA, Bichakjian CK, Pelosi F, Blum D, Johnson TM, Farrehi PM. Electrosurgery and implantable electronic devices: review and implications for office-based procedures. Dermatol Surg. 2011;37(7):889-899.	Expert Opinion	n/a	n/a	n/a	n/a	Provides recommendations for the care of patients who have IEDs when electrosurgery is used.	VA
125	Practice advisory for the perioperative management of patients with cardiac implantable electronic devices: pacemakers and implantable cardioverter–defibrillators 2020: an updated report by the American Society of Anesthesiologists Task Force on Perioperative Management of Patients with Cardiac Implantable Electronic Devices. Anesthesiology. 2020;132(2):225-252.	Consensus	n/a	n/a	n/a	n/a	Provides guidance for decision-making in the management of patients with CIEDs.	IVA
126	Crossley GH, Poole JE, Rozner MA, et al. The Heart Rhythm Society (HRS)/American Society of Anesthesiologists (ASA) Expert Consensus Statement on the perioperative management of patients with implantable defibrillators, pacemakers and arrhythmia monitors: facilities and patient management. Heart Rhythm. 2011;8(7):1114-1154.	Consensus	n/a	n/a	n/a	n/a	Provides guidance for the management of patients with CIEDs.	IVA
127	Healey JS, Merchant R, Simpson C, et al. Society Position Statement: Canadian Cardiovascular Society/Canadian Anesthesiologists' Society/Canadian Heart Rhythm Society joint position statement on the perioperative management of patients with implanted pacemakers, defibrillators, and neurostimulating devices. Can J Anesth. 2012;59(4):394-407.	Position Statement	n/a	n/a	n/a	n/a	Provides guidance for care of patients with implanted cardiac and neurostimulating devices.	IVB
128	Truong W, Matsumoto H, Brooks J, et al. Development of Consensus-Based Best Practice Guidelines for the Perioperative and Postoperative Care of Pediatric Patients With Spinal Deformity and Programmable Implanted Devices. Spine. 2024;49(23):1636–1644.	Consensus	n/a	n/a	n/a	n/a	Best practices for perioperative care of pediatric patients undergoing surgery for spinal deformity who have implantable programmable devices.	IVA
129	Ubee SS, Selvan M, Chandrashekar R, Cooke P. Safety considerations for performing robotic surgery in the presence of a permanent pacemaker. J Perioper Pract. 2019;29(7-8):242–246.	Case Report	n/a	n/a	n/a	n/a	Describes the preoperative planning and intraoperative management for two patients with permanent pacemakers who underwent robotic prostatectomy and robotic cystectomy. Emphasizes the importance of preoperative planning, briefings, and checklists.	VB

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130	Special Precautions Must Be Taken When Using Electrosurgery on Patients with Implantable Cardiac DevicesEmergency Care Research Institute (ECRI) Web site. https://alerts.ecri.org/alerts-search/view/details/1660354 Updated 2025	Expert Opinion	n/a	n/a	n/a	n/a	Guidance from ECRI for using electrosurgery on patients with cardiac IEDs.	VB
131	Traczyk C, Rice AN, Thompson A, Thompson J, Muckler VC. Implementation of a Postoperative Electronic Health Record Alert for Cardiac Implantable Electronic Device Patients. J Perianesth Nurs. 2021;36(4):345–350.e1	Organizational Experience	404 patients with cardiac implantable electronic devices undergoing surgical procedures with anesthesia	Active alert reminder	No active alert reminder	Documentation of CIED interventions, length of stay, device suspension time	Describes one facility's process of implementing alerts in the electronic health record to track preoperative device reprogramming and notify anesthesia providers. This project led to improved documentation of cardiac implantable electronic devices and reduced length of stay	VA
132	Tom J. Management of patients with cardiovascular implantable electronic devices in dental, oral, and maxillofacial surgery. Anesth Prog. 2016;63(2):95-104.	Literature Review	n/a	n/a	n/a	n/a	Recommendations for caring for patient with a pacemaker during dental and maxillofacial surgery	VB
133	Messenger D, Carter F, Francis N. Electrosurgery and energized dissection. Surgery (Oxford). 2014;32(3):126-130.	Expert Opinion	n/a	n/a	n/a	n/a	Describes precautions to take when using ESU in the patient with and without a CIED.	VB
134	Robinson TN, Varosy PD, Guillaume G, et al. Effect of radiofrequency energy emitted from monopolar "Bovie" instruments on cardiac implantable electronic devices. J Am Coll Surg. 2014;219(3):399-406.	Nonexperimental	Pig hearts	n/a	n/a	Amount of EMI received by the CIED	The lowest effective power setting should be used, the active electrode cord should be placed at the greatest distance possible from the CIED generator, and the CIED generator should not be in pathway of the current from the active electrode to the return electrode.	IIIB
135	Tauber J, Tingley J, Barmettler A. Implantable Electronic Cardiovascular Device Complications Related to Electrocautery During Ophthalmology Surgery: A Systematic Review. Ophthal Plast Reconstr Surg. 2023;39(2):108–116.	Systematic Review	12 studies (RCT and non-RCTs)	n/a	n/a	n/a	There were no reports of implantable electronic cardiovascular device-related complications from bipolar or thermocautery use in ophthalmic or oculoplastic surgeries. Monopolar devices have been associated with electromagnetic interference, but additional preoperative and perioperative measures can be taken to mitigate this risk.	IIIB
136	Elzayat S, Elsherif H, Nada I, Youssef R. The safety of bipolar mode radiofrequency (BMRF) on cochlear implant integrity test; a clinical prospective study. Am J Otolaryngol. 2020;41(5):102584.	Nonexperimental	15 pediatric patients with cochlear implants who underwent bipolar mode radiofrequency tonsillectomy	n/a	n/a	Postoperative integrity of internal device	Bipolar mode radiofrequency appears safe for tonsillectomy in children with cochlear implants and was not associated with negative changes to the internal device.	IIIB
137	Feldman JB, Stone ME. Anesthesia teams managing pacemakers and ICDs for the perioperative period: enhanced patient safety and improved workflows. Curr Opin Anaesthesiol. 2020;33(3):441–447.	Literature Review	n/a	n/a	n/a	n/a	Summarizes current practice recommendations for perioperative management of patients with cardiac implantable electronic devices.	VA

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138	Wong T, Abu Bakar J, MBBS MM, et al. Posterior Spinal Fusion in a Scoliotic Patient With Congenital Heart Block Treated With Pacemaker: An Intraoperative Technical Difficulty. Spine. 2019;44(4):E252–E257.	Case Report	n/a	n/a	n/a	n/a	Describes case of performing posterior spinal fusion for scoliosis on a 17-year old male with a permanent pacemaker.	VB
139	Lin Y, Melby DP, Krishnan B, Adabag S, Tholakanahalli V, Li JM. Frequency of pacemaker malfunction associated with monopolar electrosurgery during pulse generator replacement or upgrade surgery. J Interv Card Electrophysiol. 2017;49(2):205-209.	Nonexperimental	1398 patients with pacemakers and a review of the MAUDE database	n/a	n/a	Pacemaker malfunction	Various adverse events including loss of pacing, reversion to backup pacing, inappropriate low pacing rate, and ventricular fibrillation occurred because of electromagnetic interference.	IIIB
140	Friedman H, Higgins JV, Ryan JD, Konecny T, Asirvatham SJ, Cha YM. Predictors of intraoperative electrosurgery-induced implantable cardioverter defibrillator (ICD) detection. J Interv Card Electrophysiol. 2017;48(1):21-26.	Nonexperimental	103 patient records	n/a	n/a	Presence of electromagnetic interference in a cardioverter-defibrillator.	EMI does not occur when bipolar technology is used or when the surgical site and the dispersive site is below the hip joint.	IIIB
141	Kim M, Kwon CH. Perioperative management of patients with cardiac implantable electronic devices. Korean J Anesthesiol. 2024;77(3):306–315. doi:10.4097/kja.23826.	Literature Review	n/a	n/a	n/a	n/a	Review discussing perioperative management of patients with cardiac implantable electronic devices and responses to magnet application by device manufacturer, type, and programming.	VA
142	Page JC, Chapel AC, Silva RC, Sullivan JC, Sweeney AD. Monopolar Cautery Use in Pediatric Cochlear Implant Users. Otolaryngol Head Neck Surg. 2023;168(3):478–483.	Nonexperimental	15 patients who underwent 17 surgical procedures with monopolar cautery after cochlear implantation	n/a	n/a	Cochlear implant (CI) failure or decline in performance	Monopolar cautery use does not impair CI functionality, and the study findings challenge the risk-averse strategy of avoiding monopolar cautery when planning surgery for a patient with a CI. Recommend informing patients about theoretical risk of damage to the CI, including discussion of CI during the preoperative time out, and prompt evaluation of CI functionality after surgery.	IIIB
143	Behan J, Higgins S, Wysong A. Safety of cochlear implants in electrosurgery: a systematic review of the literature. Dermatol Surg. 2017;43(6):775-783.	Literature Review	n/a	n/a	n/a	n/a	Use bipolar electrosurgery above the clavicles when a cochlear implant is present. Monopolar electrosurgery maybe used below the clavicles.	VA
144	Jeyakumar A, Wilson M, Sorrel JE, et al. Monopolar cautery and adverse effects on cochlear implants. JAMA Otolaryngol Head Neck Surg. 2013;139(7):694-697.	Nonexperimental	Laboratory study	n/a	n/a	Increase in temperature or damage to cochlear implant	No cochlear implant damage or temperature increase observed but further study needed.	IIIB
145	Sankaranarayanan G, Resapu RR, Jones DB, Schwaitzberg S, De S. Common uses and cited complications of energy in surgery. Surg Endosc. 2013;27(9):3056-3072.	Literature Review	n/a	n/a	n/a	n/a	Describes precautions to take with argon beam coagulation.	VA

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146	Sachdeva A, Pickering EM, Lee HJ. From electrocautery, balloon dilatation, neodymium-doped:yttrium-aluminum-garnet (Nd:YAG) laser to argon plasma coagulation and cryotherapy. J Thorac Dis. 2015;7(Suppl 4):S363-S379.	Expert Opinion	n/a	n/a	n/a	n/a	Provides guidance on argon gas flow rates.	VB
147	Mendelson BJ, Feldman JM, Addante RA. Argon embolus from argon beam coagulator. J Clin Anesth. 2017;42:86-87.	Case Report	n/a	n/a	n/a	n/a	Describes a case in which a gas embolism developed during the use of argon plasma coagulation use.	VB
148	Shaw Y, Yoneda KY, Chan AL. Cerebral gas embolism from bronchoscopic argon plasma coagulation: a case report. Respiration. 2012;83(3):267-270.	Case Report	n/a	n/a	n/a	n/a	Case report of a patient who expired from cerebral systemic gas embolization during bronchoscopic argon plasma coagulation device use.	VA
149	Malik A, Khan R, Khan R, et al. Lack of awareness among surgeons regarding safe use of electrosurgery. A cross sectional survey of surgeons in Pakistan. Ann Med Surg (Lond). 2020;50:24–27.	Qualitative	52 surgeons from two hospitals in Pakistan	n/a	n/a	Level of understanding of electrosurgical devices.	A majority of surveyed surgeons lacked an understanding of safe use of electrosurgical devices. Increased awareness and education on the safe use of these devices among surgeons in Pakistan is needed.	IIIB
150	Homma T. Advances and safe use of energy devices in lung cancer surgery. Gen Thorac Cardiovasc Surg. 2022;70(3):207–218.	Literature Review	n/a	n/a	n/a	n/a	Describes the literature on energy devices and their application in lung cancer surgery to guide appropriate selection.	VA
151	Marin-Gabriel J, Romito R, Guarner-Argente C, Santiago-Garcia J, Rodriguez-Sanchez J, Toyonaga T. Use of electrosurgical units in the endoscopic resection of gastrointestinal tumors. Gastroenterol Hepatol. 2019;42(8):512–523.	Literature Review	n/a	n/a	n/a	n/a	Reviews literature on principles of electrosurgery, safe practices, and power settings used in endoscopy.	VB
152	General Risks and Protective Measures during Laparoscopic Monopolar Electrosurgery. Emergency Care Research Institute (ECRI); 2005.	Expert Opinion	n/a	n/a	n/a	n/a	Background information on the use of monopolar electrosurgery in laparoscopy and recommendations for practice.	VB
153	Senaratne DNS, Serpell M. Electricity and the operating theatre: hazards and uses. Anaesthesia & Intensive Care Medicine. 2022;23(10):575–582.	Expert Opinion	n/a	n/a	n/a	n/a	Describes principles of electrosurgery relevant to anesthetic practice, mechanisms of injury, and concepts of surgical diathermy and defibrillators.	VC
154	Frampton SJ, Ismail-Koch H, Mitchell TE. How safe is diathermy in patients with cochlear implants? Ann R Coll Surg Engl. 2012;94(8):585-587.	Qualitative	35 surgeons from otolaryngology, oral and maxillofacial surgery, dermatology, plastic surgery, and pediatric surgery departments	n/a	n/a	Amount of knowledge on the interaction of cochlear implant and electrosurgery	There is a significant deficit in the knowledge of safe operating practices for patients with cochlear implants and awareness of published safety guidelines among surgeons who operate in the head and neck region.	IIIB

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155	Feldman LS, Fuchshuber P, Jones DB, Mischna J, Schwaitzberg SD; FUSE (Fundamental Use of Surgical EnergyTM) Task Force. Surgeons don't know what they don't know about the safe use of energy in surgery. Surg Endosc. 2012;26(10):2735-2739.	Qualitative	48 surgeons and 27 residents	n/a	n/a	Correct answers on test regarding electrosurgery and associated complications.	Surgeons have a knowledge gap regarding the safe use of electrosurgery devices and education is needed.	IIIB
156	Ahrens PM, Siddiqui NA, Rakhit RD. Pacemaker placement and shoulder surgery: is there a risk? Ann R Coll Surg Engl. 2012;94(1):39-42.	Qualitative	17 surgeons, 8 residents	n/a	n/a	Use of electrosurgery in the presence of a pacemaker	Education is needed on risks associated with shoulder surgery in patients with a pacemaker.	IIIC
157	Kondo A, Nishihara Y, Sato M, Bilgic E, Watanabe Y. Impact of the fundamental use of surgical energy certification on surgeons' behavior and awareness of safe use of energy devices: a cross-sectional survey research. Surg Endosc. 2023 Jan;37(1):241-247. doi: 10.1007/s00464-022-09468-4. Epub 2022 Aug 3.	Qualitative	57 FUSE-certified surgeons in Japan	n/a	n/a	Behavior and safety awareness on safe use of surgical energy devices	Surgeons' knowledge and awareness of surgical energy safety increased and surgical technique improved after FUSE certification.	IIIB
158	Surve R, Madhusudan S, Sriganesh K. Electrocautery interference with intraoperative capnography during neurosurgery. J Clin Monit Comput. 2014;28(4):429-430.	Case Report	n/a	n/a	n/a	n/a	Education on electrosurgery-induced artifact will help prevent diagnostic confusion and unnecessary treatments.	VB
159	Sutton C, Abbott J. History of power sources in endoscopic surgery. J Minim Invasive Gynecol. 2013;20(3):271-278.	Expert Opinion	n/a	n/a	n/a	n/a	Historical perspective on energy devices for the OR.	VC
160	Frampton SJ, Mitchell TE. Surgical safety issues relating to the use of diathermy in patients with cochlear implants: the patient's perspective. Cochlear Implants Int. 2014;15(1):48-52.	Qualitative	50 adults and the parents of 50 children with cochlear implants	n/a	n/a	Amount of knowledge on the interaction of cochlear implant and electrosurgery	Patients and surgeons need education on the use of electrosurgery when the patient has a cochlear implant.	IIIB
161	21 CFR 803: Medical Device Reporting. Code of Federal Regulations. Accessed June 30, 2025. https://www.ecfr.gov/current/title-21/chapter-I/subchapter-H/part-803	Regulatory	n/a	n/a	n/a	n/a	Requirements for medical device reporting.	n/a
162	State Operations Manual Appendix A: Survey Protocol, Regulations and Interpretive Guidelines for HospitalsRev. 220; 04-19-24 ed. Centers for Medicare & Medicaid Services (CMS); 2024.	Regulatory	n/a	n/a	n/a	n/a	CMS conditions of participation for hospitals.	n/a
163	State Operations Manual Appendix L: Guidance for Surveyors: Ambulatory Surgical CentersRev. 215, 07-21-23 ed. Centers for Medicare & Medicaid Services (CMS); 2023.	Regulatory	n/a	n/a	n/a	n/a	CMS conditions of coverage for ambulatory centers.	n/a

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164	Top 10 Health Technology Hazards for 2023: Expert Insights from ECRI's Device Evaluation Program. ECRI; 2023. Accessed October June 30, 2025. https://www.ecri.org/components/HDJournal/Documents/ECRI_2023_Top_10_Hazards_Full_Report.pdf	Expert Opinion	n/a	n/a	n/a	n/a	ECRI recommends removing barriers to reporting device-related issues to reduce the chance of recurrence.	VB
165	Medical Device Reporting (MDR): How to report medical device problems. US Food and Drug Administration. https://www.fda.gov/medical-devices/medical-device-safety/medical-device-reporting-mdr-how-report-medical-device-problems. Updated July 8, 2019. Accessed March 30, 2020.	Regulatory	n/a	n/a	n/a	n/a	Provides recommendations regarding mandatory reporting of equipment failures to the FDA.	n/a