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Surgical complications, part 1: Acute and sub-acute complications of cutaneous surgery

By Rachit Gupta, MD, and Kelly Park, MD, MSL, FAAD

Complication and timing	Clinical appearance	Description	Treatment and/or resolution	Prevention
Motor nerve injury Intraoperatively	Inability to move certain facial muscles or make certain facial expressions	- Temporary: Diffusion effect of local anesthetic - Permanent: Transections proximal to facial nerve cause more significant motor deficits - High-risk nerves include the danger zones of the face: temporal, zygomatic, mandibular branch of the facial nerve, spinal accessory nerve	- Temporary: Time - Permanent: If a motor nerve is transected, options include: nerve graft, surgical reapproximation, physical therapy, neurotoxins (if temporal nerve deficit), and muscle stimulation.	- Evaluate for pre-existing motor deficits of facial muscles - Know crucial anatomy of the site of the procedure - Stay above the superficial musculoaponeurotic system (SMAS) during surgery - May need to consult neurology, radiation oncology, and/or neurosurgery
Sensory nerve injury Intraoperatively, but difficult to evaluate until few weeks after	Sensory deficits in focal areas of the face	Areas of skin that most commonly experience sensory deficits are the forehead, scalp, and fingers.	Sensory nerves do regenerate, but very slowly. It may take months for sensory deficits to improve.	When making incisions, be conscious of not cutting through multiple sensory nerve branches.
Anesthetic overdose Intraoperatively	- Variable neurologic findings: Perioral numbness, abnormal taste, twitching, and seizures. -Bradycardia or hypotension	- Risk factors include very young or elderly patients, pregnant patients, and patients with cardiac, renal, or severe hepatic disease - Bupivacaine is the agent with highest risk of cardiac toxicity	- Stop injecting, manage airway, transfer patient to higher-acuity setting - Manage complications: Seizures, arrhythmias, and cardiac arrest - Amiodarone is first-line for arrhythmia - Reduce epinephrine dose - Lipid rescue for severe cases of toxicity	- Keep track of total dose of local anesthetic (adults: 5mg/kg limit if no epinephrine and 7 mg/kg limit if epinephrine) - Alter or reduce dose if being used in very young, elderly, or pregnant patients
Interference with implantable devices (implantable cardioverter-defibrillator, pacemaker, deep brain stimulator) Intraoperatively	Theoretically, a disturbed ICD/pacemaker could cause a range of cardiac issues from arrhythmia to potential cardiac arrest	- ICDs are more sensitive to interference than pacemakers, but both should be unaffected by external signals if manufactured after 1980s - Electrosection is associated with the highest risk of interference	- Urgent cardiology or electrophysiology consultation - ACLS (advanced cardiovascular life support) algorithm utilizing a fully stocked crash cart as appropriate	- Pre-operative evaluation - Use electrocautery, or electrosurgery with biterminal forceps - Avoid using within 3-5 cm of device - Use in short <5 second spurts with lowest possible settings - Direct away from implanted device - Consider bipolar cautery or handheld heat cautery. If within 3 inches of the device or components, consult deep brain stimulator surgeon

Rachit Gupta, MD, is a PGY-3 dermatology resident at Loyola University Medical Center.

Kelly Park, MD, MSL, FAAD, is a board-certified Mohs micrographic surgeon at Park Dermatology, PLLC, and Edward Hines Jr. VA Hospital. She is also an adjunct assistant professor in the Department of Medicine at Northeast Ohio Medical University, as well as affiliate faculty at the Stritch School of Medicine at Loyola University of Chicago.

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Flap ischemia and necrosis 4 hours or less if flaps experience venous congestion 12-14 hours for flaps with arterial insufficiency	- The first sign is pale appearance of the skin - Venous congestion: blue-purple discoloration of skin, and pinprick test will show dark purple blood - Arterial insufficiency: pinprick test will result in no bleeding, and skin may be cool to touch	Risk can be increased by patient factors, including smoking or nicotine use, or procedural factors, including significant undermining, suture knots that are too tight, postprocedural swelling, or significant bleeding due to inappropriate electrocoagulation	- Sutures can be fully removed or rethrown to decrease tension on the flap - Elevation helps reduce swelling - Mild heat can improve local circulation - In severe cases, hyperbaric oxygen may be needed - Necrotic tissue should not be debrided	- Intraoperative bleeding should be adequately controlled with electrocoagulation - Sutures should not be placed too tightly - Ensure flap is well-vascularized when planning repair
Bleeding Highest risk is within 6-48 hours after procedure	Mild spotting on pressure dressing is normal, but bleeding should raise caution if blood is soaking through dressings	- Can increase risk of infection, tension, and lead to hematoma or dehiscence of wound - Risk factors include medications (aspirin, clopidogrel, ticagrelor, warfarin, rivaroxaban, etc.), hereditary bleeding disorders, large procedures, and supplements (vitamin E, fish oil, ginkgo, alcohol, etc.)	- Firm uninterrupted pressure for 20 minutes should be applied. If this does not work, this should be re-attempted for 20 more minutes - If bleeding is still occurring, the surgeon should explore the wound and stop any visible sources of blood loss with cautery and/or various suture techniques - For severe cases, drain placement may be necessary	- A strong pressure dressing should be placed postoperatively, that should be left on for 1-2 days - If not related to stroke or myocardial infarction, aspirin can be held before and after surgery - INR (international normalized ratio) should be <3 for patients on warfarin - Limit undermining - Linear closure > flaps/grafts
Contact dermatitis 1 day to 3 weeks	Eczematous dermatitis in area of procedure, occasionally with vesicles	- Bacitracin, neomycin are common culprits - Most reactions to dressings and bandages tend to be irritation, but allergy can also exist	- Discontinue likely culprit - Topical corticosteroids - Patch testing once acute episode is resolved	Obtain thorough allergy history (rubber, acrylate, resins, etc.)
Hematoma - Early hematomas form within 2 days - Organized hematomas form in ≥1 week - After two weeks, organized hematomas liquefy	- Red/purple discoloration - Small: Feeling of pressure - Large: Pulsatile pain - Early hematomas are soft and fluctuant, and organized hematomas are thick, firm, and immobile.	- Hematomas can increase risk of necrosis, dehiscence, and infection. - Worsening hematomas around the eyes or in the neck is a medical emergency.	- Small hematomas can be monitored closely, but warm compresses can be helpful. - Large worsening hematomas must be removed, irrigated, and bleeding controlled - If hematoma is early or has liquefied, it can be aspirated (16/18-gauge needle) - Bromelain helps speed up resorption of hematomas	Excellent hemostasis should be obtained during the procedure to reduce risk of hematoma.

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Infection 4-8 days after procedure	- Erythema, purulent drainage, warmth, swelling, or pain - In severe cases, fevers and chills may be present - Rule out mimickers of infection (contact dermatitis, suture reaction, dermatophyte infection)	- Most dermatologic surgery wounds are classified as clean with low rates of infection (1-3%) - Associated with improper technique during surgery, inadequate wound care - Most often caused by *S. aureus*, but high suspicion should be present for *P. aeruginosa* infection (common on the ear). Rates of infection from MRSA are increasing.	- Wound culture - MSSA (methicillin-sensitive *S. aureus*): dicloxacillin or cephalexin can be used (clindamycin if penicillin allergy) - MRSA (methicillin-resistant *S. aureus*): TMP-SMX, doxycycline, clindamycin - Pseudomonas: fluoroquinolone - Abscess: drain and allow to heal by secondary intention	- Clean, sterile technique should be used during dermatologic surgery and for post-operative wound care - Antibiotic prophylaxis may be needed depending on site of procedure and if patient is high-risk for infective endocarditis or infection of a joint replacement
Chondritis 7 days	Swelling, erythema, and pain of the ear	- Associated with surgery involving the cartilage of the ear - Most often due to *P. aeruginosa*	- NSAIDs (non-steroidal anti-inflammatory drug) and warm compresses - If infection suspected: fluoroquinolone	Can start warm compresses after procedure to reduce risk
Dehiscence 7-14 days (highest risk is when sutures are removed)	Wound edges appear separated	Dehiscence can happen due to infection, hematoma, necrosis, or high wound tension	- Treat the underlying cause - If within 24 hours of surgery, resuture wound - If >24 hours after surgery, allow for wound to heal on its own	- Avoid exercise, heavy lifting, bending, and stretching for several weeks after surgery - Sutures can be removed in multiple stages if needed, or adhesive strips can be used after suture removal for 1-2 days

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