

What to Do When the Lights Go Out, Anesthesia in Power Failure

Devin Shenkman DO and Daniel Perez MD

Department of Anesthesiology, Perioperative Medicine and Pain Management
University of Miami Miller School of Medicine/Jackson Health System, Miami, Florida

Abstract

A 45 year old male with multiple comorbidities and history of esophageal cancer was brought back to the OR emergently by ENT, for massive arterial bleeding into the neck, on POD9 status post resection of oral cavity cancer with creation of a pectoralis major pedicled flap. Patient was transported to the OR with tracheal tube in place, while manual pressure was applied by the surgical team in an attempt to control rapid exsanguination. Surgery proceeded without complication for approximately one hour before an abrupt loss of power caused complete surgical instrument failure, ENT was using a surgical microscope and had to halt operation for approximately 30 minutes while power was restored. The anesthesia machine automatically switched to battery operation and the anesthesia provider switched to manual ventilation to conserve battery life. This case report looks at the various anesthetic safety considerations for the provision of anesthesia in the event of power failure during emergent surgery.

Background

- Electrical power is ubiquitous and essential in the practice of anesthesia
- Understanding how to continue the support of vital functions and delivery of anesthesia in the event of power failure is vital to providing safe care
- Most common source of preoperative power failure is failure of emergency generators to function during widespread power failure
- Regional disasters, extreme weather events, and hospital renovations that unmask internal electrical system faults, are all possible sources of interruption to operating room power supply.
- Interruption of power supply, even for seconds, can alter the calibration and functionality of sensitive electrical instruments (fluoroscopy machine, Da Vinci robot, transesophageal probes)

Case Presentation

- 45-year-old male with cystic carcinoma of the tongue status post total glossectomy, total laryngectomy, composite anterior segmental mandibulectomy, bilateral neck dissections, was brought back to the operating room on POD9 for neck exploration and control of arterial extravasation by ligation of inferior thyroid artery, pec flap, and redo arterial anastomosis.
- Preoperative exam was significant for active large volume blood loss from pharyngeal defect despite application of pressure by surgical team, hypotension with MAPs in the high 50s, tachycardia to the 110s and size 6.5 cuffed tracheal tube in place in larengectomy stoma.



Case Presentation (cont.)

- Patient was emergently brought back to the operating room and induced via inhalation of sevoflourane via preexisting secure airway.
- Invasive blood pressure monitoring was established and hemodynamic resuscitation was initiated with four units of packed red blood cells.
- Surgical incision was made at 7:47am, at 8:57 there was an abrupt power failure, with the surgical lights, microscope and power instruments all ceasing to function.
- The anesthesia machine continued to operate on battery power, and the patient monitor continued to record vitals. Immediately, contingency planning for continued loss of electrical power went into effect.
- After verification of continued function of the bellows and wall gas pressure, the emergency oxygen cylinder was opened in the event that wall pressure was lost. Manual ventilation was begun to conserve battery life on the machine. Alternate light source was obtained so that continued clinical examination could take place. Paper anesthesia charts were located in the event that the computer failed or that the monitor ceased to transmit vitals. Simultaneously engineering was contacted to locate the root cause of the power outage.
- 9:12 power restored, the regional circuit had been overloaded, we suspect by the bair hugger, and after transfer of electrical devices to an alternate circuit the power remained on for the duration of the case.

Discussion

- Data is lacking on official incidence and duration of power outages in the operating room, but anecdotal evidence suggests it is more prevalent than commonly believed.
- No official guidelines exist for anesthetic management, preparation and prevention of operating room power failure.

Management

- Be prepared, know where back up equipment is located (flashlight, manual bag mask ventilation device, emergency oxygen cylinder).
- Be familiar with anesthesia machine function in the event of power failure and length of battery life.
- Suspend the surgery, assess ABCs, call for assistance.
- Establish adequate ventilation and oxygenation, with manual bag mask and emergency O2 cylinder if necessary.
- Switch to battery powered transport monitor in the event OR monitor fails.
- Ensure adequate plane of anesthesia, consider switching to total intravenous anesthesia if inhaled volatile anesthetic delivery is in question.
- Agree with surgical team on plan to either abort or continue surgery

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