successful rescue ventilation of an infant with a laryngeal mask airway (LMA) after accidental extubation in the prone position during open calvarial reconstruction of a craniostenosis

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Introduction
The accidental extubation of a patient in the prone position constitutes a crisis in emergency airway management, particularly when returning the patient to the supine position to facilitate re-intubation poses an unacceptable risk to the patient. While there is limited literature available to guide clinical decision making, we would like to include our example with the small number of case reports that demonstrate laryngeal mask airway (LMA) insertion in the prone position as a successful rescue technique.

Case Presentation
The patient was an 11 month old 9.8 kg male with a clover leaf deformity of his right posterior skull. Pertinent history included hydrocephalus, status post placement of a right ventriculoperitoneal shunt. This surgery was a complex open calvarial reconstruction, first of three stages, with posterior calvaria expansion utilizing a bicoronal approach. After general anesthesia induction, the patient was intubated with a cuffed 4.0 endotracheal tube (ETT), which was secured to the patient’s face with silk tape. The patient was then turned prone in a horsehoe head rest. The breathing circuit was additionally secured to the OR table with a rubber tourniquet.

The ETT position was checked several times during surgery. Three hours and forty minutes after turning prone, the breathing circuit developed a large leak, with subsequent ventilation difficulty. During auscultation, distant breath sounds were heard. The silk tape securing the ETT was noted to be saturated with bloody irrigation fluid from the surgical field, and pulling away from the face.

During spontaneous breathing, the ETT was presumed dislodged, and was replaced with a 1.5 LMA Unique restoring ventilation with no interval desaturation.

Reconstruction of loose ETT and soaked tape
Surgery was concluded within an hour with the LMA in place, whereupon the patient was returned to supine, and the LMA removed with patient awake and spontaneously breathing.

Discussion
Accidental ETT dislodgement in a prone patient is a matter of urgency, particularly in the context of an infant with limited physiologic reserve, and where surgical context prevents expeditious return to supine. LMA placement while prone, either as a temporizing measure or as a substitute airway for the duration of the case, may be life-saving.

In the prone position, gravity displaces the jaw and tongue anteriorly to facilitate LMA passage into the posterior oropharynx. If an adequate seal can be achieved, ventilation can be successful.1

By design, most investigations of LMA placement in the prone patient, although demonstrating consistent success, have been performed in elective rather than emergent cases.2

Three reports demonstrate success with an LMA as rescue airway: Taxak and Gopinath successfully rescued a neonate with size 1 LMA approximately 20 minutes into a meningoencephalcele repair after the ETT slipped out.3 Dingeman et al. successfully placed an LMA in a prone 5 year old female during a decompressive craniectomy, after the ETT was dislodged 127 minutes into the case.4 Raphael et al. successfully placed an LMA in a 12 year old female during spinal fusion for scoliosis when her ETT was accidentally removed after an unreported amount of surgical time.5

Contrasting with these successes is another case of prone extubation reported by Thiel et al.6 They report extubation in a 62 year old male late in a multiple level cervical fusion case. Although an LMA provided good ventilation in the beginning of the case, air exchange with the LMA rescue attempt was minimal.

Difficulty placing an LMA and attaining an adequate seal in the prone position is likely secondary to mucosal edema in the oropharynx after a prolonged surgical course in the prone position and excessive administration of IV fluids.7

Although the evidence is insufficient to make a definitive statement, review of our case and others suggests that an LMA inserted while prone may be a useful contingency plan during a window of opportunity in a brief surgical course.

References