Use of the ProSeal™ laryngeal mask airway in a pregnant patient with a difficult airway during electroconvulsive therapy

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We describe a patient at 20–22 weeks gestation, with a known difficult airway, who underwent eight sessions of electroconvulsive therapy using the ProSeal™ laryngeal mask airway and controlled ventilation. The airway management options for brief periods of general anaesthesia in patients with increased gastric volume are discussed.

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Electroconvulsive therapy (ECT) is an established treatment modality for various mood disorders. It requires a brief period of general anaesthesia and controlled ventilation during which an electrical stimulus is applied to the patient’s head, inducing a grand mal seizure. The American Psychiatric Association (APA) practice guidelines endorse the safety and efficacy of ECT for major depressive and bipolar disorders, and suggest ECT as a ‘primary treatment for these disorders during pregnancy’.¹ The APA Task Force Report on ECT also acknowledges the
safety of ECT during all three trimesters of pregnancy. We present a case of a pregnant patient (20–22 weeks) with a difficult airway who underwent a series of ECT using a ProSeal laryngeal mask airway (PLMA).

Case report
A 37-yr-old gravida 2, para 1 patient at 20 weeks gestation (63 kg, 160 cm), ASA physical status III, with psychotic depression, presented for ECT. Airway evaluation demonstrated a Mallampati class II airway, intact dentition, a small mandible, a high arched and narrow palate, anterior overriding of the maxillary teeth, and a thyromental distance of 5 cm. The patient denied any symptoms of gastroesophageal reflux disease.

The patient was fasted overnight and sodium citrate (30 ml) was administered. She was positioned with left uterine displacement, and pre-oxygenated. Rapid sequence induction of anaesthesia was effected with thiopental 3 mg kg⁻¹ and succinylcholine 1.6 mg kg⁻¹. Laryngoscopy with a Macintosh 3 blade provided a Cormack grade III view. While maintaining cricoid pressure (Sellick manoeuvre), a 6.0 mm endotracheal tube was placed by an experienced anaesthetist, but with great difficulty.

As this patient was to undergo a series of such treatments, and had been a problematic intubation, an alternative means of controlling the airway was sought. The ProSeal LMA (PLMA) was chosen for airway management during the subsequent ECT sessions. Patient preparation and anaesthetic management remained the same except that a size 4 PLMA was inserted with the introducer after rapid sequence induction. Cricoid pressure was maintained until delivery. In a retrospective review of 11 910 patients, the incidence of aspiration with the LMA was 0.84/10 000. The PLMA was chosen in this scenario because it has design modifications that allow a better seal than the classic LMA, decreasing the likelihood of gastric insufflation during positive pressure ventilation.

The PLMA design includes a modified cuff to isolate the glottis from the oesophagus, and a drainage tube alongside the airway tube, allowing fluid from the stomach and oesophagus to bypass the pharynx and mouth or to be suctioned; the connection also equilibrates the stomach and atmospheric pressures, reducing gastric insufflation. The PLMA has several modifications that may protect against aspiration of regurgitated fluid. If properly placed, the drainage tube should be aligned with the oesophageal opening, and the distal cuff should be sealed against the hypopharynx. An accessory vent under the drainage tube in the bowl of the PLMA prevents pooling of secretions. Finally, the PLMA has a built-in bite block that proved to be effective in our patient during the induced grand mal seizure.

In cadavers, even with a clamped drainage tube, the airway was protected from retrograde injection of fluid from the oesophagus until pressures of 68–73 cm H₂O were reached inside the bowl of the PLMA. In a study of 1067 patients preferring general anaesthesia, but cricoid pressure was maintained until delivery. In a retrospective review of 11 910 patients, the incidence of aspiration with the LMA was 0.84/10 000. The PLMA was chosen in this scenario because it has design modifications that allow a better seal than the classic LMA, decreasing the likelihood of gastric insufflation during positive pressure ventilation.

In this patient, airway management options included tracheal intubation, mask ventilation with constant cricoid pressure, the classic laryngeal mask airway (LMA), or the ProSeal LMA. A rapid sequence induction and intubation is the most definitive means of airway protection at this stage of pregnancy. However, as the initial intubation was problematic, quick and atraumatic placement of a tracheal tube at each session could not be assured. Mask ventilation with cricoid pressure does not prevent gastric insufflation. Proper mask fit may be difficult to attain, as a bite block also has to be placed during the grand mal seizure. In a study comparing the LMA with the facemask, oxygen desaturation occurred in 13 and 52% of patients, respectively. The classic LMA has been used during elective Caesarean section in 1067 patients preferring general anaesthesia, but cricoid pressure was maintained until delivery. In a retrospective review of 11 910 patients, the incidence of aspiration with the LMA was 0.84/10 000. The PLMA was chosen in this scenario because it has design modifications that allow a better seal than the classic LMA, decreasing the likelihood of gastric insufflation during positive pressure ventilation.

Discussion
Pregnant women are more prone to aspiration than non-pregnant patients for several reasons. First, the enlarged uterus increases intrabdominal and thus intragastric pressures. Secondly, gastric volume and the acidity of the gastric contents are increased by gastrin, which is produced by the placenta. Lower oesophageal sphincter tone may be reduced and complete gastric emptying is thought to be delayed; however, this continues to be controversial. Finally, aspiration in pregnant patients is more likely during a difficult intubation.

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ECT is a treatment that requires efficient and reliable control of the airway for short periods. If a prolonged
intubation time or difficulty in securing the airway is encountered, the patient may waken as the drug effects subside. Repeated bolus doses of the induction agent is not an option, as this will interfere with the seizure threshold and preclude completion of the procedure.

The PLMA was used effectively in a pregnant patient deemed to be at increased risk of aspiration. Rapid sequence induction and insertion of the PLMA allowed immediate control of ventilation. The PLMA may be considered in circumstances where rapid but brief control of the airway is required in pregnant patients.

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