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Anaesthesia for awake craniotomy

To the Editor:

Assessment of consciousness and motor function is important in many neurosurgical procedures. We report a case where general anaesthesia without tracheal intubation was induced for craniotomy, the patient was awakened, minimal changes in speech and vision were ascertained, and the patient was then re-anaesthetized for skull closure.

This patient is a 28-yr-old 60 kg woman referred for resection ependymoma of the motor and speech cortex. Cortical mapping was planned to identify areas at risk and to preserve as much normal tissue as possible, requiring the patient to be awake and alert with discriminatory functions intact.

At the preoperative, the patient understood the value of being awake for cerebral protection but was hesitant to being conscious for the opening of her skull, but she agreed to the following procedure.

After ascertaining a therapeutic dilantin level ($22.6 \text{ mg} \cdot \text{ml}^{-1}$), she received midazolam 1.5 mg *iv*. Anaesthesia was induced with sufentanil, 20 μg and propofol 100 mg bolus, after lidocaine 25 mg. The lungs were easily ventilated by mask. An 8.0 mm nasal airway was shortened to 22 cm, placed in the right naris, and connected to the breathing circuit by a #7 endotracheal tube connector. With this arrangement, we were able to ventilate the lungs

by closing the mouth and applying 20 mmHg to the bag. After spontaneous respiration resumed, a propofol infusion was titrated at $7 \text{ mg} \cdot \text{kg}^{-1} \cdot \text{hr}^{-1}$ and supplemented with 60% $\text{N}_2\text{O}/\text{O}_2$. Bupivacaine was injected in the skull prior to tongs placement and skin incision. Ability to ventilate was checked again after she was placed in Mayfield tongs with her head in the semi-lateral position. Spontaneous respiration was maintained with SpO_2 of 100% and $\text{PETCO}_2 < 55 \text{ mmHg}$.

The case proceeded without incident for four hours. At the surgeon's request, the propofol infusion and nitrous oxide were discontinued. The patient awoke seven minutes later and answered questions appropriately. She identified areas of cortical stimulation, changes in conjugate eye motion, and was aware of mild degrees of dysarthria which resolved with the cessation of stimuli. Very small incremental doses of sufentanil 20 μg and midazolam 1.0 mg were used to increase her comfort during the four hours that she remained awake.

The only unexpected event was a three-minute episode of non-thermogenic shivering upon awakening which resolved without treatment. Focal seizures occurred several times with cortical stimulation and resolved with discontinuation of the stimulation. Following tumour removal, she was re-anaesthetized at her request for skull closure using propofol, N_2O , O_2 , and sufentanil. The total duration of the case was 11 hr.

We were pleased with the ease of providing an effective anaesthetic for a difficult problem. Potential difficulties considered included vomiting, grand mal seizures, or a psychotic episode. Fortunately, this young woman did well and was discharged with no residual effects after seven days. She remains symptom free.

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Endotracheal tube fires

To the Editor:

Numerous protocols for the management of endotracheal tube fires have recommended stopping ventilation and disconnecting the endotracheal tube at the Y connector.^{1–3} Based on my own experience, and that of others gained during demonstrations of laser-induced endotracheal tube fires, I feel that these goals can best be met when using a circle system by disconnecting the anaesthesia circuit at both the inspiratory and expiratory valves. This one