Providing anesthesia in a remote location for radiation oncology in an adult - Problems and solutions

Sir,

With the increasing role for anesthesiologists outside operating room locations, we are asked to provide services in unknown areas with limited resources. There is a significant mortality and morbidity associated with providing anesthesia in these locations.[1] We describe a patient successfully anesthetized in such a location (radiotherapy suite) on a daily basis for around 6 weeks.

A 30-year-male (ASA III, weighing 90 kg) presented for radiation (photon beam) therapy, to treat invasive squamous cell carcinoma of the mastoid. Mild mental retardation due to cerebral palsy necessitated anesthesia to maintain immobility throughout the procedure. Although, the patient was able to understand verbal commands, he was unable to stay still for the duration of the procedure. His speech and language skills were fairly developed and communication skills were acceptable. Airway examination showed a Malampatti class 3 with adequate mouth opening and neck extension. The aims of anesthesia were to maintain spontaneous ventilation and immobility [Figure 1] without requiring significant airway intervention for the duration of the procedure. It was also important to ensure quick recovery facilitating early discharge as the procedure was planned only on an out-patient basis. After connecting to routine monitors and obtaining baseline

readings, anesthesia was induced using 40-60 mg propofol and maintained with an infusion of propofol pre-mixed with remifentanil (5 μg of remifentanil/ml of propofol), infused at 60-80 μg/kg/min of propofol (at this rate remifentanil infusion is likely to be 0.03-0.05 μg/kg/min [Figure 2]). This technique allowed spontaneous ventilation and no airway intervention was required for the entire duration of the procedure during any of about 20 sittings of radiotherapy. The procedures lasted 12-15 min and the patient woke up consistently within 2-3 min after cessation of the infusion. Oxygen was administered through a nasal cannula and CO_2 monitoring was achieved with sampling tubing that was integrated part of the nasal cannula. "Remote video monitoring" was maintained during the radiation treatment [Figure 3]. Full resuscitation equipment, mobile cart with all the necessary airway equipment and a Mapelson C breathing system were kept at standby for the need during any emergency.

Use of low dose remifentanil with propofol mixture is a useful technique for short procedures. It allows to reduce propofol infusion dose without risking apnea. In addition, it maintains spontaneous ventilation, simultaneously allowing quick awakening. The mixture is stable for up to 30 min[2] outlasting the procedure duration as radiation sessions are likely to last shorter than this. The differences in the context sensitive half-times of individual components of the mixture (propofol vs. remifentanyl) are unlikely to be of any clinical significance due to short duration of these infusions. The need to vary the dose of individual components (one of the drawback of mixing the drugs) does not arise as radiation therapy is not painful and only requires patients to remain still with adequate spontaneous breathing activity.

Remote monitoring is another key element of providing anesthesia in a linear accelerator vault (photon therapy unit). In many ways, it is similar to magnetic resonance imaging or computed tomography units, except the patients usually present for treatment on a daily basis that can last for many weeks. We did not observe any tolerance to the bolus or infusion rates,[3-5] as dose requirements of drugs did not increase with an increasing number of treatment shifts. Anxiety and tiredness of the patient's caregivers (in this case parent's) has to be borne in mind. Any adverse effects as a result of treatment (pharyngeal edema in our case) should be carefully looked for. It is useful to schedule them first, to avoid unexpected delays and to provide adequate post-procedure observation time. Emergency resuscitation equipment should be kept at hand at all times. Due to the remote location, expert help (in the form of an experienced anesthesiologist or an intensivist) may not be readily available. The presence of an anesthesiologist with expertise in monitored anesthesia care and intravenous

Figure 1: Patient made immobile with a custom made mask

Figure 2: Anesthesia and monitoring set-up

Figure 3: Remote monitoring from outside the unit

anesthesia (preferably to have the same anesthesiologist or from a small pool) will add additional safety of the patient care. Our experience of providing anesthesia to this patient over 6 consecutive weeks suggests that tolerance to propofol did not occur over the course of treatment.

Thus, we conclude total intravenous anesthesia using premixed solution of propofol and remifentanil can be safely used

without developing tolerance in patients undergoing recurrent radiation therapy.

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