Case Report

Post-Retrobulbar Apnea Syndrome

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Abstract: This case describes two episodes of apnea following retrobulbar anesthesia in the same patient, even though the second block did not contain bupivacaine and was performed on the contralateral eye. [Key words: Ophthalmologic anesthesia, retrobulbar block, apnea, lidocaine HC1, bupivacaine HC1.] Reg Anesth 1989;14:203-205.

RETROBULBAR ADMINISTRATION of local anesthetics is an effective method of achieving regional anesthesia and akinesia for many types of eye surgery. Ocular complications are unusual but include retrobulbar hemorrhage, central retinal artery occlusion, and perforation of the globe or optic nerve. Retrobulbar injection of bupivacaine HC1 with or without lidocaine HC1 has also been associated with episodes of brain stem anesthesia characterized by an insidious onset of bradycardia, hypotension, and apnea, on occasion progressing to cardiac arrest. Bupivacaine HC1, but not lidocaine HC1, has been incriminated as the causative agent. This communication describes two episodes of respiratory arrest in the same patient on consecutive days. The second occurrence followed the retrobulbar injection of lidocaine HC1 alone into the contralateral eye, clearly demonstrating the bupivacaine is not the sole causative agent.

Case Report

A 63-year-old, 70-kg woman with bilateral glaucoma was scheduled for trabeculectomy (OD) under retrobulbar nerve block anesthesia. The patient had a 20-year history of hypertension treated with propranolol 30 mg every day. Her other routine medications were timolol maleate, 0.5% left eye twice a day; pilocarpine HC1, 4% left eye four times a day; epinephrine HC1, 1% left eye twice a day; acetazolamide sequel, 500 mg BID, and docusate sodium, 2 capsules q am.

The patient had a history of allergies to penicillin, dust, grass, pollen, and boric acid. Past anesthetics were uneventful and included general anesthesia for a uterine dilatation and curettage and an unknown anesthetic for dental surgery.

Results of preoperative laboratory studies (complete blood count, urinalysis, electrolytes, glucose, blood urea nitrogen, electrocardiogram, chest x-ray) were within normal limits.

At 8 AM on the day of surgery, the patient was premedicated with meperidine, 50 mg, and hydroxyzine, 30 mg, intramuscularly. Before surgery, at 11:15 AM, an additional intramuscular injection of meperidine, 50 mg, and hydroxyzine, 15 mg, was given. Ten minutes later, a modified Van Lint right facial nerve block (4 ml of 50/50 mixture of 2% lidocaine and 0.75% bupivacaine injected periortically and subcutaneously) was administered without immediate difficulty.

A special-grind (blunt-tip) 23-gauge 1 1/2-inch needle was placed in the retrobulbar space without difficulty, and no blood was aspirated. During initial injection, resistance was noted, and the needle was withdrawn slightly and a negative aspiration test repeated. After injection of 3 ml of the 50/50 mixture of 2% lidocaine
and 0.75% bupivacaine, there was rapid onset of akinesia of the eye. Within 5 minutes, the patient was taken to the operating room and was noted to be overly talkative and anxious. The patient was left in the operating room with the circulating nurse while the surgeon scrubbed. Upon re-entering the operating room 5 minutes later, the surgeon noted the EKG displayed a heart rate of 40 bpm with frequent premature beats. The patient appeared slightly cyanotic.

An anesthesiologist was immediately summoned. The patient was found to be apneic with an irregular heart rate of 26. She was ventilated with 100% O₂ by face mask, and atropine sulfate, 0.4 mg, was administered intravenously. Heart rate and skin color improved, but she made no respiratory efforts and was totally unresponsive to verbal or painful stimuli. Narcan, 0.2 mg, was given intravenously without effect. Blood samples for drug levels were drawn at this time. These later revealed the patient’s meperidine level was 0.69 mcg/ml; bupivacaine, 2.6 mcg/ml; and lidocaine, 3.6 mcg/ml. After 15 minutes of positive pressure ventilation, the patient began to initiate adequate spontaneous respirations, and, over the subsequent 2 hours, gradually awoke. The eye was well anesthetized; the lid, ptotic. No long-lasting sequelae were apparent, but surgery was postponed until the following day.

The next morning, the patient returned to the operating room for trabeculectomy of the contralateral eye. At 10:05 AM, meperidine, 50 mg, and hydroxyzine, 35 mg, were administered intramuscularly. Anesthesia monitoring with intravenous sedation was requested. One hour after the premedication, incremental doses of diazepam (total dose, 3 mg) were administered intravenously over a 10-minute period. The patient was minimally sedated. Van Lint and retrobulbar block were performed using 4 ml and 3 ml, respectively, of 2% lidocaine. Again, aspiration tests were negative. Three to four minutes after the block, the patient complained of dizziness and weakness. Atropine sulfate, 0.4 mg, intravenously and 100% oxygen were empirically administered. The patient was disoriented and less responsive but continued to take spontaneous breaths on command. Within the next 3 minutes, she became totally unresponsive and her ventilation had to be controlled. The patient’s blood pressure fell from 120/80 to 90/60, but her heart rate remained at 80 to 90 beats per minute. Blood samples at this time revealed bupivacaine 0.14 µg/ml, lidocaine 7.0 µg/ml, meperidine 0.63 µg/ml. The patient gradually awoke and regained normal mental status 1 hour after the retrobulbar block was given. The patient was discharged the next day but was readmitted one week later and underwent uneventful general anesthesia for trabeculectomy (OD).

Discussion

The cause of respiratory arrest after retrobulbar injection of local anesthetics remains unknown. Possible explanations include oversedation, intravascular injection (intravenous or retrograde arterial) of local anesthetics, subdural injection, or an idiosyncratic drug reaction.

The dose of premedicant, the blood level of meperidine (0.69 mcg/ml), and the temporal relationship between premedication and the respiratory arrest do not seem consistent with narcotic overdose. Intravascular injections of local anesthetics in quantities sufficient to cause cardiac or pulmonary arrest are usually associated with seizures. Although grand mal seizures have been reported following retrobulbar block, presumably from ophthalmic artery injection, no seizure activity was noted in the patient presented in this case report.

Facial nerve blocks (Nabath, Van Lint, O’Brien) are often performed immediately before or after retrobulbar blocks, yet their possible contribution to respiratory arrest has been largely ignored because retrobulbar injection alone has resulted in respiratory arrest. The trigeminal nerve is an extension of the brain and is invested with all the dural coverings. It has been radiographically demonstrated that a retrobulbar injection deep to the dural sheath of the optic nerve has resulted in diffusion of contrast material into the subdural space surrounding the pons and midbrain. If local anesthetics were similarly injected, they could bathe the respiratory centers, resulting in brainstem anesthesia and subsequent apnea. A peribulbar technique should avoid this complication of retrobulbar blockade.

The repeated occurrence of the same patient with a rare complication indicates either a bilateral anatomic anomaly allowing easier intravascular or subdural injection, or an idiosyncratic drug reaction. In either case, it appears prudent to avoid repeat retrobulbar injection, even in the contralateral eye, in patients who have previously experienced postretrobulbar respiratory arrest. Patients should be adequately monitored after retrobulbar block with any local anesthetic, and operating room personnel with resuscitation experience must be immediately available.

References