Brainstem anaesthesia following intranasal packing with lignocaine and adrenaline

Sir,

Brainstem anaesthesia (BSA) following retrobulbar blocks in ophthalmic surgeries is a rare but well-documented complication. So far, no case of BSA following intranasal packing with lignocaine and adrenaline has been reported.

A 19-year-old American Society of Anesthesiologists physical status 1 male with deviated nasal septum and left inferior turbinate hypertrophy was posted for elective septoplasty. A day before surgery pre-anaesthetic evaluation was done. Preoperatively, intranasal packing was done with lignocaine and

adrenaline-soaked wicks in the preparation room. Three millilitres of 1:1000 adrenaline (3 mg) was added in a 30 ml vial of 4% lignocaine and the wicks were soaked in 5 ml of solution from this vial. The ear, nose and throat consultant did this by inserting the soaked wicks with a forceps one after the other in the anterior nasal cavity. 45 minutes later, the pack was removed and the patient walked unassisted to the operation room. He was then made to lie supine on the operation table. Intravenous Ringer's lactate was started; monitors were connected. Vital parameters were recorded and found to be normal. Suddenly, he became aphasic, appeared unconscious and stopped breathing. We called out to him and pinched him but there was no response. Immediately positive pressure mask ventilation with 100% oxygen was started; he had bilateral pupillary dilatation, blood pressure (BP) slightly raised (systolic BP between 140 and 150 and diastolic between 90 and 100 mmHg) and increased pulse rate (between 100 and 136 beats/minute) during this period. Ventilation was continued for 35 min after which he started breathing. The BP and pulse rate also came down. He could recollect us calling out to him, pinching him and placing the mask on his face. He was shifted to the Intensive Care Unit for observation and then discharged.

Our differential diagnosis included BSA, local anaesthetic (LA)/vasoconstrictor toxicity, naso-pulmonary apnoeic reflex and inadvertent muscle relaxant administration. Nasopulmonary reflex occurs immediately after nasal mucosa stimulation especially after posterior nasal packing and is accompanied by bradycardia unlike our case wherein the manifestations occurred late with no evidence of bradycardia.

The most common mechanisms of LA toxicity are intravascular injection and exceeding recommended toxic dosage limits. Central nervous system (CNS) toxic responses include tinnitus, numbness and seizures and these occur at lower blood levels of lignocaine than the cardiovascular toxic responses. The maximum recommended single dose for a 70 kg patient is 500 mg of lignocaine with epinephrine.[1] In our patient, the LA had not reached the toxic dose, he had no seizures and there was no intravascular injection. Hence, the possibility of LA toxicity was ruled out.

A case of lignocaine toxicity after anterior nasal packing has been reported;[2] however, this patient had active bleeding epistaxis wherein the absorption of lignocaine from nasal mucosa will be high. Furthermore, the patient manifested with symptoms within 1 min after application[2] unlike our case.

Inadvertent intravascular administration, high volumes or high concentrations used or injections into inflamed tissues may potentiate the systemic uptake of vasoconstrictors along with local anaesthetics and produce toxic manifestations such as hypertension, tachycardia, tremors, headache, perspiration, palpitations and ventricular arrhythmias.[3] True epinephrine overdosage is of very short duration because of the short half-life of epinephrine (1–3 min).[1] Our patient had manifestations for 35 min, and there was no intravascular injection. Furthermore, we used a low total dose of adrenaline (0.45 mg) for packing. Adrenaline-soaked wicks in a low concentration of 1 mg in 20 ml saline up to high concentrations of 4 mg in 20 ml saline have been safely used in endoscopic nasal surgeries.[4] Thus, vasoconstrictor toxicity was unlikely.

BSA occurs in 1 in 350–500 cases of retrobulbar blocks with CNS involvement in 0.27% and apnoea in 0.79% cases. BSA manifests clinically as a wide range of symptoms including aphasia, apnoea, bradycardia, tachycardia, cyanosis, impaired hearing, cardiac arrest, confusion, diaphoresis, dilatation of the contralateral pupil, drowsiness, dysphagia, facial paralysis, gaze palsy, hypertension, loss of consciousness, nausea and vomiting, seizures and shivering.[5] Our patient had several of these manifestations.

Intranasal delivery has been shown to non-invasively deliver drugs from the nose to the brainstem beginning at the entry through the pons and then through the rest of the hindbrain in minutes along the olfactory and trigeminal nerve pathways, by an extracellular route bypassing the blood–brain barrier.[6] The exact mechanism of BSA following intranasal packing with lignocaine and adrenaline is not known. The haemodynamic and respiratory manifestations of brain stem anaesthesia are thought to be due to blockade of the cranial nerves by caudal flow, specifically the vagus and the glossopharyngeal. The parasympathetic blockade of the vagus nerve leads to a period of tachycardia and hypertension that is prolonged by abolition of the regulation of the carotid sinus reflex caused by the blockade of the glossopharyngeal nerve. Severe apnoea results, when blunting of diaphragmatic respiration occurs.[7]

We suggest that, for intranasal packing with LA, the risk of potential BSA should be kept in mind and it should be strictly done under close surveillance with monitoring

of all vital signs and ready availability of resuscitation facilities. If such a complication does arise, prompt diagnosis and intervention can save the patient's life.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

Madhuri S Kurdi, Sushma K Sannaboraiah, Raghavendra B Bhosale, Vinod D Gasti

Department of Anaesthesiology, Karnataka Institute of Medical Sciences, Hubballi, Karnataka, India

Address for correspondence:
Dr. Madhuri S Kurdi,
Department of Anaesthesiology, Karnataka Institute of Medical Sciences, Hubballi, Karnataka, India.
E-mail: drmadhuri_kurdi@yahoo.com

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