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CASE REPORT

Severe Bradycardia During Sevoflurane Induction with Fentanyl: A Case Report

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ABSTRACT

Several cases of severe bradycardia or even asystole have been reported in randomized clinical studies using fentanyl during sevoflurane induction. We wish to present a clinical case of severe bradycardia during sevoflurane induction associated with fentanyl. We report a case of a bradycardia induced by sevoflurane with opioid in a healthy adult (43 years old). Induction of anesthesia, in emergency for an intra-esophageal foreign body, was performed using a single breathing technique of a mixture of sevoflurane 8% with an oxygen flow of 6 L min-1. After loss of consciousness, a dose of fentanyl (2.5 µg kg–1) was administered. Two minutes later, the heart rate dropped to 28 beats per minute. The patient responded to atropine 0.5 mg IV. Intraoperative monitoring and immediate postoperative follow-up were favorable. The combination of morphine, even at low doses, during single-breath sevoflurane induction can be dangerous due to a possibility of bradycardia and even asystole.

Keywords: induction, sevoflurane, opioid, bradycardia

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1. INTRODUCTION

The practice of induction by inhalation with halogens associated with the administration of morphine is an anesthetic technique that ensures, in addition to hemodynamic stability, very good conditions of intubation without curare (1). We present the case of a patient who presented a significant bradycardia (less than 45 beats/min) during a vital capacity induction to sevoflurane.

2. CASE PRESENTATION

The reported patient was admitted to the ENT block in emergency for an intra-esophageal foreign body (piece of meat). He was 43 years old, with a BMI of 26.3 (weight 95kg/ 1.90 m) and a medical history of high blood pressure under Diet Half Salt. The preanesthetic examination finds a calm patient well oriented good skin-mucous coloration and a good state of hydration; the rest of the physical examination is without particularity (apart from a hypersalivation in relation to the intraesophageal foreign body). The biological test was correct, and the ECG was without abnormalities. His radiology telethorax without abnormalities, and a thoracic CT showed an intraesophageal foreign body (meat). This patient was classified as ASA IIu, Mallampati II. He was fasting and had not received

premedication. Vital signs before induction showed a heart rate of 75 beats/min and a blood pressure of 111/70 mm Hg, with a regular sinus rhythm.

The inhalation anaesthetic protocol was as follows: the venous route was installed before the induction into a semi-closed circuit saturated with sevoflurane at 8% with a flow rate of 6 L min-1 of O2. After two minutes of prexygenation, the patient exhaled at residual volume and then inhaled the contents of the circuit at vital capacity. After five breaths, the concentration of sevoflurane was decreased to 6. The expired concentration of sevoflurane was not recorded during this procedure.

Five minutes elapsed between initial sevoflurane respiration and intravenous fentanyl injection 2.5 µg.kg-1 (200 µg). Two minutes after the injection, the heart rate decreased significantly from 79 to 42 and then to 28 beats. min-1, while the TA (PANI) is 90/50 mm Hg and sp02 at 100% with a scoped heart rate that shows sinus bradycardia descending to 28 beat. min, the capnography monitoring was without anomalies with a PETCO2 at 43 mmhg. The injection of 0.5 mg atropine allowed to return to a normal heart rate. Intraoperative monitoring and immediate postoperative follow-up were favorable, with a wake on table. The patient was transferred to the recovery room for a survillance, electrocardiogram made before his discharge (24 hours after returning) was without anomalies, and a cardiology opinion was sought.

3. DISCUSSION

The combination of sevoflurane and fentanyl has a particularly bradycardic effect during induction of anesthesia, as shown in this observation (1). Sevoflurane was initially given at a high concentration. The dose of fentanyl does not appear to be excessive, according to the usual recommendations (up to 3 µg.kg-1). In this observation, the patient was not taking any medication that could cause bradycardia and syncope, nor did bradycardia occur outside of vagal stimulation of laryngoscopy.

At the consultation of anesthesia, the detection of a conduction disorder, of a previous bradycardic treatment, or of a notion of severe cardiac disorder occurred during a previous anesthesia, should make the combination of sevoflurane with morphinics more cautious and may need to be directed towards another induction protocol.

Marked inhibition of the atrial sinus node activity may be observed in the presence of sevoflurane with a decrease in heart rate. Atrial-ventricular conduction disorders have been reported in children (2) (3). A brief observation indicates that an atrioventricular block (AVB) with progressive elongation of the PR space until a blocking of the P wave, which responded well to atropine(3,4)(5), occurred in a 4-year-old child. An atrioventricular block (AVB) with progressive elongation of the PR space until a blocking of the P wave, which responded well to atropine(4)(5).

Direct stimulation of the nerve nucleus of the pneumogastric by morphinomimetics will have a slowing effect on heart rate; in this specific situation, combine sevoflurane and fentanyl, lowering the heart rate through synergy. It should also be noted that sufentanil has bradycardising effects in combination with sevoflurane. Myocardial depression can be caused by sevoflurane by depressing Ca2+ influx through cardiac membranes, and it can also prolong action potentials due to their effects on K+ currents(5) (6).

Risk factors of bradycardia during induction by sevoflurane and opioids include: the rapid injection rate of morphinomimetic drugs may also explain these effects (3), bradyarythmy or conduction disorders. Use of drugs that slow the heart (beta-blockers, calcium channel blockers)(7) hypovolemia, increased vaginal predisposition and Advanced age.(8)

The maximum recommended dose of fentanyl should always be observed; caution during sevoflurane induction, with monitoring of its fraction delivered and exhaled through a gas analyzer, as well as for the reduction of morphine dosage, slow injection, and the control electrocardioscope is the rule. Resolvable bradycardia with atropine should lead to finding underlying asymptomatic cardiomyopathy.(7,9)

4. CONCLUSION

During anesthesia, any bradycardia requires prompt medical attention. We would like to report this case of severe bradycardia during sevoflurane inhalation anesthesia associated with opioids at anesthetic concentrations in an adult subject. This adverse reaction (bradycardia) +/- resolvable with atropine does not pose a diagnostic or prognostic problem but should lead to finding underlying asymptomatic cardiomyopathy.

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