

Transient sinus arrest during continuous infusion of landiolol in an elderly patient

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To the editor: We report a case of cardiac arrest during continuous infusion of landiolol. An 87-year-old female patient (136 cm, 40 kg) was scheduled to undergo split thickness skin grafting for a defect due to femoral tumorectomy. Preoperative electrocardiography revealed sinus bradycardia (49 beats·min⁻¹). Before the induction of general anesthesia, her heart rate was 72 beats·min⁻¹ in normal sinus rhythm, and blood pressure was 148/70 mmHg. General anesthesia was induced with propofol 80 mg, and tracheal intubation was facilitated with vecuronium 4 mg. Maintenance of anesthesia was conducted with sevoflurane 1%–2% and nitrous oxide 67% in oxygen. After the tracheal intubation, the patient developed atrial fibrillation and had a heart rate of 125–130 beats·min⁻¹, and blood pressure of 90/40 mmHg. Then continuous IV infusion of landiolol was initiated at the rate of 0.01 mg·kg⁻¹·min⁻¹. The heart rate decreased slightly, to 110 beats·min⁻¹. Fifteen minutes after the start of the landiolol infusion, the patient developed cardiac arrest that lasted for 10 seconds and from which she recovered spontaneously. Then, 4 min after this episode, cardiac arrest recurred and the landiolol was stopped. The cardiac arrest changed to atrial fibrillation, 7s afterwards with a heart rate of 60 beats·min⁻¹, and atropine 0.5 mg and ephedrine 5 mg were administered simultaneously. During these episodes, nitrous oxide and sevoflurane were continued. The operation was performed and heart rhythm showed atrial fibrillation at 80 beats·min⁻¹. Soon after the completion of the operation, the heart rate gradually increased to 140–160 beats·min⁻¹, when nitrous oxide and sevoflurane had not yet been stopped. Digoxin 0.1 mg was administered intravenously, but the patient's heart rhythm still showed atrial fibrillation with tachycardia (140–160 beats·min⁻¹). Sinus rhythm, at 50 beats·min⁻¹, was restored 5 h after the operation, with no treatment. Sick sinus syndrome was ruled out after the operation.

Although landiolol has been reported to cause neither excessive hypotension nor cardiac decompensation, and the drug is thought to be useful for treating tachycardiac atrial fibrillation [1–3], cardiac arrest developed in the present patient. The operative procedure had not started during

the period of the cardiac arrest, and the cardiac arrest did not recur after the discontinuation of landiolol. Therefore, the cardiac arrest was likely due to a hemodynamic response to landiolol.

In this patient, we selected a 0.01 mg·kg⁻¹·min⁻¹ dose of landiolol infusion without a loading dose. Landiolol is rapidly hydrolyzed in the blood and liver [4]. In patients with hepatic impairment, the maximum blood concentration of landiolol is increased [5]. Because elderly patients have reduced physiological functions, the concentration of landiolol in our patient may have been elevated even though a loading dose was not employed. A landiolol dose of 0.01 mg·kg⁻¹·min⁻¹ may not be low, especially in elderly patients.

For treating cardiac arrest after esmolol administration, ephedrine, epinephrine, and atropine were not effective [6]. Glucagon is the drug of choice for cardiovascular depression resulting from beta-blocker overdose [7]. In the present patient, the first cardiac arrest was restored with no therapy, and the second cardiac arrest could have recovered spontaneously. In addition, cardiac arrest did not recur after landiolol was stopped. Discontinuation of landiolol could be the most effective treatment for cardiac arrest caused by landiolol.

Our patient's atrial fibrillation recovered spontaneously and digoxin was not effective. In this patient, tachycardiac atrial fibrillation could have led to low cardiac output, and beta-blockers may have caused cardiac arrest. We should have considered employing calcium channel blockers such as verapamil and diltiazem.

In conclusion, although landiolol has been administered safely in patients with tachycardiac atrial fibrillation, we should note that landiolol can cause cardiac arrest in elderly patients.

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Received: March 6, 2009 / Accepted: June 29, 2009