DPSF | DENTAL PATIENT SAFETY FOUNDATION

Patient Safety Listed PSO Organization

P0198

Shared Learning

from the Dental Patient Safety Foundation Reporting Tool

"What gets measured gets managed" is the DPSF philosophy to encourage reporting. All received information about patient safety events (unsafe conditions, near misses or adverse events) are de-identified contextually (confidentiality is fully protected under federal law), aggregated, analyzed and abstracted by selected experts from our DPSF committees. Reports are generated and disseminated as the only means to learn from our errors. The information in these peer-reviewed reports is provided for its educational value only, and does not purport to establish any legally binding standard of care. Feedback is encouraged.

Case 2019.2: Epinephrine and β blockers – Watch Out!

Situation: A 55 y/o 65kg female presented for extraction of two carious mandibular molars (#18 and 31) under intravenous moderate sedation and local anesthesia. She reported a history of hypertension which was well managed with **carvedilol (Coreg™)**. Preoperative vital signs included HR 74/min, BP 122/82, SpO_2 98 on room air. Sedation was initiated with 40% nitrous oxide and oxygen and 3mg midazolam IV. A bite block was inserted and 1.8cc 2% lidocaine with 1:100,000 epinephrine (36mg lidocaine/18µg epinephrine) was injected to block the left mandible.

Three minutes after injection and before the right mandible was anesthetized, a vital sign check revealed HR 50/min, BP 188/105, SpO_2 99. The patient denied any symptoms and responded appropriately to verbal command. The blood pressure returned to baseline 5 minutes later and the first tooth (#18) was extracted without complication. Following extraction of the first tooth, the mandibular right side was anesthetized using 0.9cc 2% lidocaine with 1:100,000 epinephrine (18mg lidocaine/0.9µg epinephrine) and 1.8cc 3% mepivacaine plain (54mg) without a rise in blood pressure. The second procedure was completed without incident.

122/82 mmHg
HR 74/min

→ 2% lido with epi →

188/105 mmHg
HR 50/min

What we learned: This case demonstrates the profound dose-related drug interaction that can occur with epinephrine and non-selective β blockers. While it is common practice to check blood pressure every 5 minutes during moderate sedation, pressures are rarely rechecked when sedation is not administered – and in such a case, this potentially life-threatening interaction would be undiscovered and ignored. Furthermore, as it is common practice to anesthetize all areas of the mouth to be treated at the beginning of the procedure, this dose-related interaction could have been much more severe, had it not been noticed.

Non-selective β blockers block both β2 vasodilation and β1 mediated increase in heart rate. Epinephrine stimulates vasoconstriction (α1), heart rate (β1), and vasodilation (β2). In the presence of non-specific β blockers, epinephrine triggers unopposed vasoconstriction (α1); while compensatory vasodilation and heart rate increase are blocked. The resulting hypertension triggers reflex bradycardia leading to the classic hypertension and bradycardia characteristic of this drug interaction.

Recommendations: Continued monitoring of vital signs of patients who are receiving local anesthetics and taking non-selective beta blockers is essential and unrelated to the use of sedation or general anesthesia. Use of non-epinephrine containing local anesthetics or local anesthetics with reduced concentrations of epinephrine should be considered.

Non-cardioselective Beta (β) blockers	
Labetolol	Trandate™, Normodyne™
Carvedilol	Coreg™
Propranolol	Inderal™
Nadolol	Corgard™
Timolol	Blocadren™
Pindolol	Viskin™
Sotalol	Betapace™

The DPSF encourages frequent reporting of unsafe conditions, near misses and adverse events as the only means to close the gap between knowing how to prevent these occurrences and taking the necessary action to do so. Please visit our website.

Additional reading:

Hersh EV and Giannakopoulos H. Beta-adrenergic blocking agents and dental vasoconstrictors. Dent Clin North Am 2010;54:687-696.

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