

Background

- Epidural placement requires confirmation of correct catheter positioning.
- A common safety check involves administering lidocaine with epinephrine to detect intravascular or intrathecal placement.
- Expected response to intravascular injection¹:
 - **Heart rate increase:** ≥20 bpm
 - **Systolic blood pressure increase:** ≥15 mmHg
- Various factors can alter expected responses.
- This case highlights a **false negative** test dose in a patient using **timolol eye drops** for glaucoma.

Methods

- Patient consent obtained for case reporting.
- Comprehensive review of anesthetic and medical records.
- Literature review conducted to explore systemic effects of ophthalmic beta blockers.
- Institutional Review Board (IRB) review not required per **Colorado Multiple Institutional Review Board** guidelines and no identifiable patient data is presented.

Case Presentation

- **Patient:** 71-year-old female with **hypertension, glaucoma, and duodenal adenocarcinoma** scheduled for a **Whipple procedure**.
- **Epidural Placement:**
 - Thoracic epidural placed without complications.
 - **Test dose:** 3 mL 1.5% lidocaine with epinephrine (1:200,000) administered.
 - **No significant change** in heart rate or blood pressure.
- **Findings:**
 - Blood aspirated from the catheter in the **operating room** before infusion.
 - Retesting showed transient **blood pressure increase on arterial line** within next 30 seconds
 - **No heart rate change.**
 - Review of patient's medications revealed **timolol eye drops** use.
- **Intervention:**
 - Epidural removed and replaced postoperatively without complications.
 - **Postoperative pain control was uneventful,** catheter removed on POD 5.

Discussion

- **Ophthalmic beta blockers**, such as **timolol**, are often prescribed to patients with glaucoma.²
- They can cause systemic effects due to absorption through multiple routes:
 - Conjunctival epithelium
 - Lacrimal channels
 - Nasal mucosa
 - GI tract
- These medications may lead to **blunted heart rate responses** while maintaining blood pressure via compensatory vasoconstriction.³
- **Clinical implications:**
 - A 2012 study showed **patients on systemic beta blockers often fail to reach the 20 bpm increase** expected after intravascular epinephrine administration.⁴
 - Epidural placement safety checks may be **less reliable** in these patients.
- **Institutional Practice Considerations:**
 - Blood pressure cycling every **5 minutes** may miss transient responses.
 - **More frequent blood pressure monitoring** could improve detection of **false negative test doses** in patients on beta blockers.
 - Reinforces the importance of multiple safety measures in epidural placement.

Resources

1. Guinard JP, Mulroy MF, Carpenter RL, Knopes KD. Test doses: optimal epinephrine content with and without acute beta-adrenergic blockade. Anesthesiology. 1990;73(3):386-392.

2. Radcliffe NM. The impact of timolol maleate on the ocular tolerability of fixed-combination glaucoma therapies. Clin Ophthalmol. 2014;8:2541-2549. Published 2014 Dec 12. doi:10.2147/OPTH.S76053

3. Nieminen T, Lehtimäki T, Mäenpää J, Ropo A, Uusitalo H, Kähönen M. Ophthalmic timolol: plasma concentration and systemic cardiopulmonary effects. Scand J Clin Lab Invest. 2007;67(2):237-245. doi:10.1080/00365510601034736

4. Pong RP, Bernards CM, Hejlskov MR, Slee AE, Batra MS. Effect of chronic β -blockade on the utility of an epinephrine-containing test dose to detect intravascular injection in nonsedated patients. Reg Anesth Pain Med. 2013;38(5):403-408. doi:10.1097/AAP.0b013e31829bb9fa