PHC721 - CLINICAL PROBLEM SET # 8

Patient

Male, 54 years old

Chief Complaint

"I'm here to have my filling done. Last time, my jaw was numb for many hours afterwards and I could not talk with anyone. I have a job interview this afternoon and really want that job. So, I hope you have a trick, Doc, for the numbness to go away quickly."

Background and/or Patient History

Ventricular Tachyarrhythmia, the onset coincided with Myocardial Infarction 5 years ago;
Congestive Heart Failure
Gastric Ulcerations
Glaucoma (Narrow Angle)
Epilepsy;
Abuses alcohol (> 10 years);
Smokes tobacco (30 pack-years)

Medications:

- Acetazolamide (Diamox®, eye drops)
- Cimetidine (Tagamet®)
- Phenytoin (Dilantin®)
- Hydrochlorothiazide
- Propranolol
- Quinidine

Current Findings

Carious tooth #3, restorable.

Temp: 98.5 F

BP: 115/65 mmHg
HR: 72 bpm
For local anesthesia, the patient received one cartridge of 2% Lidocaine with 1:200,000 Epinephrine. The procedure was completed in 30 minutes. To shorten the duration of anesthesia in consideration of the patient's needs, he received one cartridge of Oraverse® (Phentolamine, 0.4 mg). Within a minute, the patient reported chest pain, feeling dizzy and shortness of breath. The EKG revealed a 2nd degree atrioventricular block (prolonged P-R intervals and selected P waves not followed by QRS complexes - 'skipped beats') and the heart rate of 55 bpm.

1. What are the expected <u>systemic</u> effects of Lidocaine, Epinephrine and Phentolamine?

2. What was the most likely mechanism of the 2nd degree heart block and bradycardia in this patient's case?

3. What is a potential link between the dental treatment this patient received and the dizziness, chest pain and shortness of breath that he is experiencing? Please explain the underlying mechanism.

4. What factors and/or drugs have likely informed the decision to lower the concentration of Epinephrine?

5. Could any of the patient's other medications have evoked, or contributed to, the incident? If so, please indicate which medication and explain the underlying mechanism of interaction.

6. How would a physical exercise (e.g., ten push-ups) affect the duration of local anesthesia in a healthy individual? What is the underlying mechanism?

7. Which of the patient's medications are expected to affect the local anesthetic pharmacokinetics and/or pharmacodynamics? For each medication, please explain:

A) the specific changes to pharmacokinetics and/or pharmacodynamics of the local anesthetic;
B) the underlying mechanism; and
C) consequences for the effectiveness of local anesthesia.