

CASE WESTERN RESERVE UNIVERSITY
SCHOOL OF DENTISTRY
DEPARTMENT OF ORAL AND MAXILLOFACIAL SURGERY

Midterm Examination
Local Anesthesia and Pain Control
Friday March 19, 2004

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Course #252

Choose the *best* answer.

1. The tensor veli palatini muscles receive their motor fibers from the:
 - a. maxillary nerve.
 - b. auriculotemporal nerve.
 - c. buccal nerve.
 - d. medial pterygoid nerve.
 - e. palatal nerve.

2. The local anesthetic in a dental anesthetic cartridge is:
 - a. acid
 - b. salt
 - c. "free-base"
 - d. antigen-antibody complex

- in tissue = free base

3. What form of local anesthetic is responsible for diffusion through the nerve sheath?
 - a. acid form
 - b. salt form
 - c. "free-base" form
 - d. acidified form

4. Injecting into infected tissues is **not** indicated because:
 - a. of the possible spread of bacteria.
 - b. infected tissues are relatively acidic and decrease the potential of the local anesthetic solution.
 - c. the infection may be spread from one patient to another within the clinic.
 - d. all of the above.
 - e. more than one but not all of the above.

5. The most constant anatomic feature in the relationship for the location of the greater palatine foramen is the:

- a. lingual aspect of the second molar.
- b. midline of the palate.
- c. pterygoid hamulus.
- d. maxillary central incisors.
- e. posterior border of the soft palate.

6. The application of a topical antiseptic is considered a mandatory step in tissue preparation prior to intraoral injection.

- a. True
- b. False

7. Mepivacaine:

- 1. provides a longer duration of anesthesia than most other local anesthetics when the drug is administered without a vasoconstrictor.
- 2. in a 3% solution without a vasoconstrictor is recommended for use with patients in whom a vasoconstrictor is not indicated.
- 3. is **not** indicated for use without a vasoconstrictor in pediatric patients.
- 4. does **not** have any documented evidence of producing an allergic reaction in patients.
- 5. is commercially available with or without a vasoconstrictor added to the anesthetic solution.

- a. 1, 2 and 5
- b. 2 and 4
- c. 1, 2, 3 and 5
- d. 1, 2, 4 and 5
- e. 1, 2, 3, 4 and 5

8. Ten cartridges of 1% lidocaine contain approximately _____ mg of lidocaine.

- a. 18
- b. 180
- c. 360
- d. 3600
- e. 18000

$$\frac{1\text{ gm}}{100\text{ ml}} = \frac{1000\text{ mg}}{100\text{ ml}} = \frac{10\text{ mg}}{1\text{ ml}} \times 1.8\text{ ml} = 18\text{ mg} \times 10\text{ cart.}$$

$$\frac{1\text{ gm}}{100\text{ ml}} = \frac{1000\text{ mg}}{100\text{ ml}} = \frac{10\text{ mg}}{1\text{ ml}} \times 1.8\text{ ml} \times 10 = 180\text{ mg}$$

180 mg

180 mg

9. The mucosal tissues associated with the maxillary first molar are innervated by the:

1. nasopalatine nerve.
2. greater palatine nerve.
3. lesser palatine nerve.
4. posterior superior alveolar (PSA) nerve.
5. middle superior alveolar (MSA) nerve.

- 7
- ~~a.~~ 3, 4 and 5
 - ~~b.~~ 2 and 4
 - ~~c.~~ 2, 3 and 4
 - d. 2, 4 and 5
 - ~~e.~~ 1, 4 and 5

10. The ideal injectable local anesthetic agent for clinical use provides:

- a. potent anesthesia.
- b. reversible sensory and motor loss of sensation.
- c. loss of sensation without loss of consciousness.
- d. a satisfactory duration of action.
- e. All of the above

b 11. Which of the following ingredients are **NOT** contained in a local anesthetic cartridge that **DOES NOT** contain a vasoconstrictor:

- ~~a.~~ sodium chloride
- b. sodium bisulfite
- ~~c.~~ mepivacaine
- ~~d.~~ distilled water
- e. all of the above would be present in a local anesthetic cartridge that does not contain a vasoconstrictor.

12. What is the maximum concentration of epinephrine that you should give to a healthy patient:

- a. 0.2 mg
- b. 2 mg
- c. 0.04 mg
- d. 0.4 mg
- e. 0.004 mg

0.04 mg - recommended
don't exceed.

13. Which of the following local anesthetic agent(s) are(is) considered a long acting drug(s):

1. bupivacaine
2. lidocaine
3. etidocaine
4. mepivacaine

- a. 1,2,3
 b. 1,3
c. 2,4
d. 1,2,3,4
e. 4 only

14. What is the maximum concentration of epinephrine that you can give to a patient who is epinephrine sensitive:

- b. 0.2 mg → healthy
b. 2 mg
 c. 0.04 mg → unhealthy
d. 0.4 mg

15. Methemoglobinemia is a potential side effect of which of the following local anesthetic drugs:

1. lidocaine
2. prilocaine ✓
3. mepivacaine
4. articaine

- a. 1,2,3
b. 1,3
 c. 2,4
d. 1,2,3,4
e. 4 only

16. Which of the following local anesthetics is a ESTER type drug?

- a. mepivacaine
- b. lidocaine
- c. prilocaine
- d. procaine
- e. None of the above.

17. Which following statement is **FALSE** regarding lidocaine.

- a. Lidocaine is an amide type local anesthetic
- b. Lidocaine is metabolized in the liver
- c. Lidocaine is excreted in the kidneys
- d. Lidocaine can be used effectively without a vasoconstrictor since it has no vasodilating properties.

18. Which is the most common needle size used in the clinic:

- a. 16 gauge
- b. 30 gauge
- c. 27 gauge
- d. 5 gauge
- e. 40 gauge

19. Which of the following statement(s) concerning procaine is(are) **FALSE**:

- 1. Procaine is hydrolyzed by plasma pseudocholinesterase.
 - 2. Procaine is excreted in the urine.
 - 3. Procaine is associated with high incidences of allergies.
 - 4. Procaine has a fast onset of action and long duration of pulpal anesthesia.
- a. 1, 2, 3
 - b. 1, 3
 - c. 2, 4
 - d. 1, 2, 3, 4
 - e. 4 only

20. Which of the following factors affects the duration of action of a local anesthetic:

- 1. Concentration of the agent used.
 - 2. Presence or absence of a vasoconstrictor
 - 3. Health of the tissues at the site of drug injection (vascularity, pH)
 - 4. Anatomical variations within patients.
- a. 1, 2, 3
 - b. 1, 3
 - c. 2, 4
 - d. 1, 2, 3, 4
 - e. 4 only

21. The volume of a local anesthetic cartridge is:

- a. 3.8 ml
- b. 2.8 ml
- c. 1.8 ml
- d. 0.8 ml
- e. The volume of local anesthetic in a typical cartridge is variable.

22. A vasoconstrictor is added to a local anesthetic cartridge to:

- 1. counteract the vasodilating properties of a local anesthetic agent.
- 2. help reduce local and systemic toxicity.
- 3. increase the duration of action of the local anesthetic agent
- 4. increase blood flow to the site of injection

- a. 1, 2, 3
- b. 1, 3
- c. 2, 4
- d. 1, 2, 3, 4
- e. 4 only

23. Epinephrine is in local anesthetic solutions to:

- a. reduce toxicity.
- b. prolong shelf life.
- c. enhance the permeability of the local anesthetic.
- d. all of the above.
- e. more than one but not all of the above.

24. Which of the following statements are **TRUE** regarding **topical** local anesthetics.

- 1. All topical anesthetics contain a vasoconstrictor.
- 2. Topical anesthetics have the same concentration as the injectable agents.
- 3. Topical anesthetics can produce effective pulpal anesthesia.
- 4. Topical anesthetics are only effective on surface tissues.

- a. 1, 2, 3
- b. 1, 3
- c. 2, 4
- d. 1, 2, 3, 4
- e. 4 only

25. You give a 60 lb. child five cartridges of 3% mepivacaine which would contain a total of how many milligrams of mepivacaine?

a. 54
 b. 157
 c. 264
 d. 270
 e. 300

$$\frac{3\%}{100\text{ mL}} = \frac{30\text{ mg}}{100\text{ mL}}$$

$$\frac{30\text{ mg}}{100\text{ mL}} \times 1.8\text{ mL} = 0.54\text{ mg}$$

$$0.54\text{ mg} \times 5 = 2.70\text{ mg}$$

26. If you give a successful posterior superior alveolar injection and a greater palatine injection, you would anticipate being able to complete which of the following procedures painlessly?

- a. removal of the upper 2nd molar
 b. do a MODL on the upper 1st molar
 c. removal of the upper first molar
 d. all of the above
 e. more than one but not all of the above

27. If you had a carpule of 5% lidocaine and injected $\frac{1}{2}$ capsule of the solution, you would be injecting _____ mg of lidocaine.

a. 36
 b. 90
 c. 18
 d. 180
 e. 45

$$\frac{5\%}{100\text{ mL}} = \frac{50\text{ mg}}{100\text{ mL}}$$

$$\frac{50\text{ mg}}{100\text{ mL}} \times 1.8\text{ mL} = 0.9\text{ mg}$$

$$0.9\text{ mg} \times 50 = 45\text{ mg}$$

28. The average duration of analgesia for a mandibular block with 3% mepivacaine is:

- a. 20 minutes.
 b. 40 minutes.
 c. 60 minutes.
 d. 2 hours.
 e. 3% mepivacaine is not available without a vasoconstrictor.

29. Allergy to amide-type anesthetics is a common complication that is seen with their use

- a. true
 b. false

35. Vasoconstrictors commonly used in the United States in local anesthetic cartridges include:

1. epinephrine
2. norepinephrine
3. dopamine
4. felypressin
5. levonordefrin
6. ephedrine
7. isoproterenol

- a. 1,2,5
 b. 1,2,4,6
 c. 1,2,3,5,7
 d. 1,4,5,6
 e. all of the above

36. The mandibular branch provides motor function to:

1. the salivatory glands.
2. masseter muscle.
3. anterior belly of the digastric muscle
4. anterior 2/3 of the tongue.
5. buccinator muscle.
6. tensor veli palatini.
7. mentalis muscle.

- a. 1,2,3,4,6
 b. 2,3,4,6,7
 c. 1,2,5
 d. 2,3,6
 e. 2,3,4

37. The sensory roots of trigeminal nerve:

- a. provide cutaneous sensation to the face and scalp.
- b. provides general sensation to the mucous membranes of the nose and oral cavity, teeth and meninges of the brain.
- c. carries parasympathetic fibers to the teeth and gingiva.
- d. a and b
- e. all of the above

38. The maxillary branch of the trigeminal nerve exits the skull base through the:

- a. foramen ovale
- b. foramen rotundum
- c. foramen spinosum
- d. mandibular foramen
- e. maxillary foramen

39. The posterior superior alveolar (PSA) nerve:

- a. supplies sensation to the posterior maxillary buccal mucosa.
- b. supplies sensation to the posterior maxillary palatal mucosa.
- c. supplies motor function to the tensor veli palatini muscle.
- d. a and b
- e. all of the above

40. What is the maximum manufacturer's recommended dose in cartridges of 2% lidocaine with 100,000 epinephrine for a 150 pound (70 kg) man.

- a. 8
 - b. 10
 - c. 12
 - d. 14
 - e. Epinephrine cannot be combined with lidocaine in a cartridge.
- Handwritten calculations:*
 $\frac{2 \text{ gm}}{100 \text{ ml}} = \frac{2.000 \text{ mg}}{100 \text{ ml}}$
 $\frac{0.02 \text{ mg}}{1 \text{ ml}}$
 $\frac{0.518 \text{ mg}}{\text{ml}}$
 $4.4 \text{ mg/kg} \quad 4.4 \cdot 70 = \frac{308 \text{ mg}}{36}$

41. Epinephrine, norepinephrine and levonordefrin are sympathomimetic amines that:

- ~~a. do not affect either alpha or beta receptors when used with local anesthetic solutions.~~
 - ~~b. act by releasing norepinephrine from stores in the adrenergic nerve terminals.~~
 - ~~c. are affected by tachyphylaxis.~~
 - d. exert their action directly on the adrenergic receptors.
 - e. more than one of the above.
- Handwritten:* p 38839

42. The maxillary nerve enters the orbit through the:

- a. superior orbital groove
- b. inferior orbital fissure
- c. infraorbital foramen
- d. infraorbital groove
- e. greater palatine foramen

Handwritten: 1.8 300mg

43. Prilocaine administration is relatively contraindicated in patients:

- 1. taking acetaminophen.
- 2. taking aspirin.
- 3. suffering with sickle cell anemia.
- 4. with respiratory failure with hypoxia.
- 5. who are very sensitive to epinephrine.

- a. 1, 3 and 4
- b. 1 and 3
- c. 2, 3 and 5
- d. 1, 3, 4, and 5
- e. 1, 2, 3, 4 and 5

P. 120
Anemia
sickle cell do not
important administration of LA

44. How many cartridges of 2% lidocaine with 1:100,000 epinephrine can you safely administer to a healthy 80 kg patient to reach the maximum allowable dosage of lidocaine?

- a. 4
- b. 8
- c. 16
- d. 22

$$\frac{2 \text{ gm}}{100,000 \text{ mL}} = \frac{2000}{100,000 \text{ mL}} = .02 \text{ mg/mL} \times 1.8 = .036$$

$\frac{3.5 \text{ mg}}{1 \text{ kg}} \times 80 \text{ kg} =$

e. There is no limit to amount of lidocaine a healthy adult can safely tolerate.

45. For hemostasis in procedures in which significant bleeding may be potentially a problem, an anesthetic solution of 2% lidocaine with _____ epinephrine is recommended.

- a. 1 : 1000
- b. 1 : 50,000
- c. 1 : 100,000
- d. 1 : 200,000
- e. Lidocaine should be combined with thrombin not epinephrine in the anesthetic cartridge.

P. 58

46. The greater palatine nerve supplies sensation to the:

- a. maxillary posterior lingual gingiva.
- b. soft palate.
- c. maxillary molars.
- d. nasal mucosa.
- e. more than one of the above.

47. The middle superior alveolar (MSA) nerve supplies sensation to the:

- a. maxillary posterior palatal gingiva.
- b. soft palate.
- c. mesial buccal root of the maxillary first molar.
- d. maxillary sinus mucosa.
- e. more than one of the above.

48. The lingual nerve:

- a. supplies sensory fibers to the anterior 2/3 of the tongue.
- b. conducts postganglionic fibers to the sublingual salivary gland.
- c. supplies motor function to the anterior 2/3 of the tongue.
- d. communicates anteriorly with the terminal branches of the mental nerve.
- e. more than one of the above.

49. The mandibular branch of the trigeminal nerve exits the skull base through the:

- a. foramen ovale
- b. foramen rotundum
- c. foramen spinosum
- d. mandibular foramen
- e. maxillary foramen

50. The motor branch of the mandibular nerve joins with the sensory branch of the mandibular nerve:

- a. before the nerve exits the skull base.
- b. after the nerve exits the skull base.
- c. at the lingula of the mandible.
- d. in the Gasserian ganglion.
- e. rarely.

END OF EXAMINATION

Make sure your name and social security number are both on the grading sheet and this copy of the examination. You must return both to Ms. Nancy Turner, the Department of Oral and Maxillofacial Surgery administrative assistant, by noon, Monday March 22, 2004. Examinations accepted after the deadline will be assessed a 10 point penalty. No exceptions. You may turn in the examination to Ms. Turner at anytime before the deadline. Thank you.