Part III

WHEN, WHY AND WHERE IN ORAL AND MAXILLOFACIAL SURGERY

111 Gold Coins and
1651 Questions with Answers



KC Gupta

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chapter

Local Anesthesia 4

1. Which is the first local anesthesia to be used clinically?

Ans. Cocaine in 1860 by Albert Niemann. In 1884, William Halstead used cocaine for dental nerve block.

2. Define local anesthetic agent, local anesthesia and general anesthesia?

Ans. *Local anesthetic agents:* These are the drugs which when applied directly to the peripheral nervous tissue, block nerve conduction and abolish all the sensations in the part supplied by the nerve. They are generally supplied by the somatic nerve and are capable of acting on axon, cell body, dendrites and synapses.

Local anesthesia: It is the local state of loss of sensation without the loss of consciousness in a circumscribed area of the body due to an inhibition of the conduction process in the peripheral nerves.

General anesthesia: It is a state which brings about the loss of all modalities of sensation, particularly pain along with a reversible loss of consciousness.

3. What are the contents of the anesthetic agent Lignocaine?

Ans.

i. HCl = 2% (20 mg/ml)
ii. Adrenaline hydrochloride-vasoconstrictor-1:80000 (0.012 mg)
iii. Sodium metabisulfite 0.5 mg (preservative/vasoconstrictor/reducing agent)
iv. Methyl paraben (preservative/bacteriostatic) or Capryl hydrocupreinotoxin which is included in xylotox = 0.1% (1 mg)

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v. Sodium chloride (isotonic solution) = 6 mg
vi. Sodium hydroxide = to adjust pH
vii. Thymol = fungicidal
viii. Ringer's solution = as vehicle to minimize discomfort during injection
ix. Distiled water for dilution.

4. What are the theories to explain the mode of action of local anesthesia (LA) and which theories are the most acceptable?

Ans.
i. Surface charge theory (Electric potential theory)
ii. Membrane expansion theory
iii. Specific receptor theory
iv. Acetylcholine theory
v. Reversible coagulation theory
vi. Calcium displacement theory
vii. Interference with nerve metabolism.

The most accepted theory is "Specific receptor theory".

5. What is the most accepted specific receptor theory?

Ans. It decreases the permeability of the nerve membrane to the sodium ions.

6. Which local anesthetic is used in a hemophilic patient?

Ans. Periodontal ligament/Intraligamentous technique.

7. What are the ideal requisites of a local anesthetic agent?

Ans.
i. It should not be irritating to the tissue.
ii. It should not cause any permanent damage to the nerve structure.
iii. Its systemic toxicity should be low.
iv. The time of onset of anesthesia should be as short as possible.
v. The duration of action must be long enough to permit the completion of procedure.
vi. It should be stable in solution.

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vii. It should be relatively free from producing allergic reaction.
viii. It should readily undergo biotransformation in the body.
ix. It should be capable of being sterilized by heat without deterioration.
x. Its action should be reversible.

8. Which content of local anesthesia (amide type) may cause allergic reaction most likely?

Ans. Allergic reaction caused by methylparaben used as germicidal or preservative.

9. Which is the alternative content in case a patient is allergic to methylparaben?

Ans. Capryl hydrocupreinotoxin, which is included in xylotox.

10. Local anesthetic injection results in the loss of function in which order?

Ans. Pain > Temperature > Touch > Proprioception > Motor sensation.

11. What are the other names of the following:
(i) Nasopalatine nerve block; (ii) Greater palatine nerve block; (iii) Posterosuperior alveolar nerve block; (iv) Inferior alveolar nerve block; and (v) Long buccal nerve block.

Ans.
i. *Nasopalatine nerve block:*
   a. Posterior palatine nerve block
   b. incisive canal injection
ii. *Greater palatine nerve block:* Anterior palatine nerve block
iii. *Posterosuperior alveolar nerve block:* Zygomatic block
iv. *Inferior alveolar nerve block:* Pterygomandibular block
v. *Long buccal nerve block:* Buccinator nerve block and buccal nerve block.

12. What is the maximum dose of local anesthesia in ml?

Ans.
i. Local anesthesia with adrenaline (1: 80000) = 20 ml
ii. Local anesthesia without adrenaline = 14 ml

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13. Which is the most effective local anesthetic agent as topical anesthesia?
Ans. Benzocaine.

14. Which of the following is not available as topical anesthesia?
Ans. Procaine is not available as topical anesthesia.

15. Majority of local anesthetic agent without adrenaline have pH?
Ans. pH = 5.5 acidic in nature (The normal tissue pH = 7.0 (approx).

16. Which local anesthetic agent is not affected by the effectiveness of tissue pH?
Ans. Benzocaine.

17. Why is lignocaine preferred as the local anesthetic agent in comparison of procaine?
Ans. Since it causes less allergic reaction.

18. Which local anesthetic agent causes vasoconstriction without a vasoconstrictor?
Ans. Cocaine.

19. What is the average duration of nerve anesthesia with 2% lignocaine with 1 : 200000 adrenaline?
Ans. More than 60 minutes.

20. Which is the longest acting LA?
Ans. Bupivacaine 0.5% (pharmacologically belongs to the amide group) and tetracaine = 175 minutes is the duration.

21. What is the first choice of drug in anaphylaxis?
Ans. Adrenaline 0.5 mg in 1:1000 I/M.

22. What is the exact cause of death due to local anesthetic toxicity?
Ans. It is due to medullary depression.

23. What is the rate of deposition of LA?
Ans. Local anesthetic should be deposited at the rate of 1 ml per minute.

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24. In severe liver disease, which local anesthetic drug can be used safely?

Ans. Procaine.

25. In case of allergy to procaine, which LA is contraindicated?

Ans. Topical spray of tetracaine.

26. How much lidocaine is present in dental cartridge (2 cc) containing 2% lidocaine (xylocaine)?

Ans. 1 ml contains 20 mg or 2 grams. So two cc cartridge contains 40 mg or 4 grams.

27. Pain sensation is conducted through which fibers?

Ans. A-delta fibers.

28. Where does the LA act and how?

Ans. LA acts on the nerve membrane, blocking the conduction of sodium from exterior to interior.

29. In general, what are the standard anesthetic cartridges available?

Ans. Cartridges with 1.8 ml and 2.0 ml of the required contents.

30. Where is the LA metabolized in our body?

Ans. Plasma, liver and lungs.

31. Which LA undergoes biotransformation in the kidney?

Ans. Prilocaine is biotransferred in the kidney.

32. Syncope, trismus, hematoma and facial paralysis—out of these which is the most common complication of the LA?

Ans. Syncope is the most common complication in dental clinic.

33. What complication can arise if LA is injected in LA hyperthyroid patient?

Ans.
i. Increased sensitivity
ii. Toxic crisis
iii. Tachycardia
iv. Fainting
v. Chest pain.

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34. Threshold of pain tolerance depends upon.

Ans.
i. Fear and anxiety
ii. Mental status of the patient
iii. Age of the patient
iv. Previous experience.

35. How can we prevent syncope during anesthetic injection?

Ans.
i. By administration of premedication
ii. By placing the patient in the reclined position
iii. Aspiration of syringe before the deposition of solution (negative aspiration).

36. In syncope, if the patient's condition deteriorates, what first step should be carried out?

Ans. Administration of 100% oxygen can improve the condition.

37. What is the role of inhalation of aromatic spirit of ammonia in the management of the syncope?

Ans. It acts as a respiratory stimulant.

38. How will you manage hyperventilation due to LA drug?

Ans. The patient is made to rebreathe in and out of a bag, such a waste-paper bag, until recovery occurs.

39. If hyperventilation is not treated, which complication may arise?

Ans. Tetany the complication characterized by extensive spasm of skeletal muscle causing Trismus.

40. In the cases of cardiac patients, how many cartridges can be given?

Ans. Only two cartridges, approximately 4 ml can be given.

41. Which is safest LA in children and why?

Ans. 2-chloroprocaine, due to short duration and less toxicity.

42. Which is the most toxic local anesthetic agent?

Ans. Propoxycaine.

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43. Why is anesthetic effect not obtained in the presence of inflammation or pus formation?

Ans. Because pH is decreased due to inflammation or pus formation meaning more acidic media. It results in the abundance of H^+ ions outside the nerve sheath and the equilibrium of reaction in the formation of lipophilic molecule [RH] is shifted to the left. Therefore, RH fails to enter the nerve and cannot block the conduction of impulse.

44. How the local anesthetic effect be increased?

Ans. Local anesthetic effect can be increased by addition of adrenaline. In small doses, it causes vasoconstriction.

45. What are the advantages of adrenaline in a local anesthetic agent?

Ans. Five advantages are:

i. It decreases the blood flow to the site of injection because of vasoconstriction.
ii. It decreases the rate of absorption of the local anesthetic agent into the cardiovascular system
iii. It lowers the plasma level of the local anesthetic agent, thereby decreasing the risk of the systematic toxicity of the local anesthetic agent
iv. Higher volumes of the local anesthetic agent remains around the nerve for a longer period, thereby increasing the duration of action
v. It decreases bleeding at the site of injection because of the decreased perfusion.

46. What does the systemic absorption of LA cause?

Ans.
i. Tonic clonic convulsion
ii. Decreased cardiac output
iii. Respiratory depression.

47. Accidental intravenous injection of LA, which contains a vasoconstrictor, may cause.

Ans.
i. Palpitation
ii. Convulsion—Most significant adverse consequence.

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iii. Unconsciousness
iv. Depressed respiration
v. Increased respiration.

48. What is the excess level of lignocaine can cause CVS collapse due to?

Ans. Myocardial depression.

49. What is the cause of syncope in the patients receiving LA (lignocaine-adrenaline 1:80,000) within 30 seconds of injecting it?

Ans. The most probable cause is cerebral hypoxia or due to temporary cerebral ischemia.

50. Why is lignocaine used most commonly in dentistry?

Ans. Because of the lesser incidence of allergy.

51. In reference to local anesthetic agent (Lignocaine):

Ans. i. Pharmacologically belongs to which group—Amide group
ii. Nature—Acidic salts and weak base.

52. What is the time of the onset action of LA?

Ans. 3-5 minutes is the time of the onset of LA.

53. A patient following local anesthesia manifests pallor and becomes unconscious. What is the reason?

Ans. Syncope is the probable reason, which is associated with bradycardia.

54. A patient who fainted during the extraction position should be given, what is the immediate treatment?

Ans. The patient's position should be Trendelenburg or head-down (10° to 15°).

55. Which is most alarming respiratory condition in the dental clinic?

Ans. Aponea or respiratory arrest is the most common cause of death due to overdoses of LA in the dental clinic.

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56. What is the maximum dose of adrenaline in a normal patient and a patient with cardiac problem?

Ans. In a normal patient, 0.2 mg is the safe dose. In a cardiac patient, 0.04 mg is the safe dose.

57. What are the symptoms of overdose of epinephrine following LA injection?

Ans.
i. Restlessness
ii. Apprehension
iii. Palpitation.

58. A cartridge with LA should not be soaked in alcohol. Why?

Ans. Alcohol can diffuse through rubber cap and cause contamination, neurolysis and even may result in paresthesia.

59. What is the drug of choice to control status epilepticus due to overdose of LA?

Ans. Diazepam is the drug of choice.

60. What are the clinical signs of toxic signs of LA?

Ans.
i. Convulsion
ii. Asystole
iii. Methemoglobinemia.

61. Due to overdose of LA, a patient will observe what hypotension or hypertension?

Ans. Hypotension due to the vasodilatation properties of LA

62. What is the role of sodium metabisulfite in local anesthetic agent?

Ans. Its role is to act as a reducing agent in local anesthetic to prevent the oxidation of vasoconstrictor (adrenaline). It competes with vasoconstrictor for the available oxygen and is oxidized to sodium bisulfate.

63. What are the common drugs used for anesthetic emergencies?

Ans.
i. Dexamethasone
ii. Epinephrine (Adrenaline)

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iii. Atropine
iv. Avil
v. Aminofilin.

64. What is EMLA?

Ans. EMLA consists of 5% cream containing 25 mg/gram lidocaine + 25 mg/gram prilocaine. It is used for skin anesthesia. It is contraindicated in the age-group below six months because of the possibility of prilocaine induced methemoglobinemia.

65. What are the gases present in LA cartridges and why?

Ans. The gases present in LA cartridges are:

i. Nitrogen
ii. Oxygen.

The purpose is to prevent the deterioration of vasoconstrictor.

66. Name the gas used in a LA cartridge?

Ans. Nitrogen gas is used in dental cartridges in the form of a small bubble about 1-2 mm in diameter. Nitrogen may not always be visible in the normal cartridge.

67. What is hyaluronidase?

Ans. Hyaluronidase is an enzyme that breaks down the intercellular content. It is added to LA to speed-up both the onset of the anesthesia and the area of anesthesia.

68. What do you understand by induction time?

Ans. Induction time is defined as the timeperiod from the deposition of the anesthetic solution to the complete conduction blockade.

69. Which type of nerve fibers require more concentration of the local anesthetic agent—motor fibers or sensory fibers?

Ans. Motor fibers require more concentration of the local anesthetic agent.

70. What is the role of LA on myocardium?

Ans. It produces the depressant effect.

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71. What does a local anesthetic agent initially affects—smaller nerve fibers or larger nerve fibers?

Ans. Anesthesia of smaller nerve fibers occurs prior to that of the larger nerve fibers.

72. What is basic difference between lignocaine and cocaine?

Ans.

Lignocaine	Cocaine
1. Action on vessel-vasodilatation 2. Synthetic local anesthetic agent 3. Produces vasoconstriction with adrenaline 4. Amide	1. Action on vessel-vasoconstriction 2. Natural local anesthetic agent 3. Produces vasoconstriction without adrenaline 4. Ester of benzoic acid.

73. Sensitivity of LA is greater in which type of fibers?

Ans. Type C fibers.

74. What is the onset time-period of lignocaine, xylocaine or lidocaine?

Ans. 3-5 minutes is the onset time-period.

75. Which route of sedation is reversed most rapidly?

Ans. Inhalation route is most rapidly reversed.

76. In which condition LA is not effective—local infection or edema?

Ans. LA is not effective in the local infection.

77. While giving inferior nerve block, if the bone is not contacted, then there are chances of what ailment?

Ans. Transient facial paralysis because the needle may pierce the parotid gland and main trunk of the facial nerve may get anesthetized causing facial paralysis.

78. After inferior nerve block, a patient has the difficulty in opening eyelid on the side of injection. What is the probable cause?

Ans. Anesthesia of facial nerve within the parotid gland.

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79. What is the cause of trismus resulting after the inferior nerve block?

Ans. Damage to the medial pterygoid muscle.

80. What are the structures passing through the inferior nerve block?

Ans. Mucous membrane → Buccinator muscle → Alveolar tissue.

81. Injury to the inferior alveolar nerve may result in what?

Ans. Temporary paresthesia of the lower lip.

82. What are the alternative techniques for the IAN block apart from the classical IAN block?

Ans.
i. Gow-Gates intraoral open mouth technique
ii. Akinosi intraoral closed mouth technique.

83. Which is the site of deposition of LA in:
(i) Classical inferior alveolar nerve block; and (ii) Gow-Gates technique.

Ans.
i. *Classical inferior alveolar nerve block:* Pterygomandibular space
ii. *Gow Gates technique:* At the anterior region of the condyle.

84. Why at a time is bilateral lingual nerve block contraindicated?

Ans. It may cause the loss of tongue movement and the tongue may fall back, causing airway obstruction. If necessary, tongue may be held with traction suture or it may be gently held.

85. Which facial space causes primary infection in case it is contaminated during inferior alveolar nerve block?

Ans. Pterygomandibular space is primarily involved because the solution is deposited in that space.

86. Sometimes swelling appears immediately after injecting inferior alveolar nerve block on the injecting side. Why?

Ans. It may be due to injury to blood vessel.

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KC Gupta MDS is an eminent teacher and clinician. Presently, he is a Postgraduate Teacher (since 2005) and Professor and Head, Department of Oral and Maxillofacial Surgery, Modern Dental College and Research Center, Indore, Madhya Pradesh, India.



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