

Chapter 19

PRACTICAL ANESTHESIA

Learning Objectives:

By the end of this lecture, participants are expected to know:

- Spectrum of sedation
- List pre-procedural patient assessments
- Understand common sedation complications and their management
- Drugs used for Sedation
- Post-procedural patient care
- Practical Local anesthesia

INTRODUCTION

Some minor surgical procedures can be done in the district hospital under local anesthesia whereas some cases might require some sedation or general anesthesia. Administration of any anesthetic drug requires full preparation for resuscitation.

Definition

A technique of administering of sedatives or dissociative agents with or without analgesia to induce a state that allows patient to tolerate unpleasant procedures while maintaining cardio-respiratory function.

Levels of Sedation:

- Level 0: No Sedation
- Level 1: Light/Minimal sedation (anxiolysis)
- Level II: Moderate sedation
- Level III: Deep sedation
- Level IV: General Anesthesia

Indication for sedation:

- To allay anxiety in anxious patients and uncooperative patients during:
 - Diagnostic procedure
 - Therapeutic procedures

Preparation:

- All patients should undergo a pre-anesthetic checkup to rule out any allergies, co-morbidities or difficulties in maintaining the airway.
- All patients should be adequately fasting unless delay is life threatening.
 - Fasting protocol:
 - Solids including cow milk – 6 hours
 - Mother's milk- 4 hours
 - Clear liquids- 2 hours
- All patients should ideally have an intravenous line in situ.
- A functioning suction should be ready.
- Means of delivering oxygen - oxygen mask/nasal prong, as well as a functioning self-inflating resuscitation bag (ambu bag) with mask should be ready to assist ventilation if required.
- Emergency resuscitation drugs should be ready.
- Laryngoscope and different sized endotracheal tubes and airways should be ready.
- Ideally a tilting table is preferred to facilitate head down tilt in case of regurgitation.
- Anesthetic agents should not be administered unless an assistant is available.
- All anesthetized patients should be monitored.

Potential Complications of sedation and management:

Usually related to medications/patient response

- Most common is respiratory depression or airway obstruction.
 - Patient stimulation often successful.
 - Consider use of emergency equipment such as bag-valve mask and oxygen.
- Aspiration.
 - Suction.

- May have silent aspiration. Monitor skin color and SpO₂.
- Hemodynamic instability.
 - Consider fluid bolus.
- Consider ACLS guidelines for any complication.
- If significant respiratory depression and/or hemodynamic instability occurs, consider use of reversal agents.

Drugs used in Sedation:

- Ketamine
- Propofol
- Diazepam
- Midazolam
- Fentanyl
- Morphine
- Haloperidol

Choosing the Appropriate Sedating Agent:

Agents should be chosen based on the **desired pharmacological response** (anxiolysis, analgesia, amnesia).

- **Adverse effects:** the potential side effects of any medication in a particular patient must be considered.
- **Pharmacokinetic considerations:**
 - Onset and duration
 - Elimination route
 - Accumulation
 - Drug interactions/potential
 - Cross-tolerance

Ketamine:

Ketamine is a commonly used agent for total intravenous anesthesia (TIVA) for many minor procedures like abscess drainage, fracture reductions and suction evacuations which do not require muscle relaxation. It may also be used to release a victim trapped at the accident site. It acts by causing dissociative anesthesia and has excellent analgesic and amnesic properties.

Dose and route: Onset of action is determined by unresponsiveness to stimuli.

- IV – 1-2 mg/kg. Onset- 1-2 minutes.
- IM – 3-5mg/kg. Onset- 3-5 minutes.
- Top up- ¼ the initial dose. Usually 5mg boluses IV for children and 10mg boluses IV for adults.
- Anesthetic effect typically lasts 5-15 minutes after IV and 45 minutes after IM, depending on intensity of stimulus.

Premedication: The common side effect of emergence hallucination seen with ketamine is reduced by premedication with midazolam. Give before ketamine. Not required for children less than 2 years.

Midazolam:

- IV-0.03-0.05mg/kg. Onset- 1-2 minutes.
- Children might need to be given a drying agent to counteract the increase in oral secretions caused by ketamine.

Atropine:

- IV-10-20mcg/kg.

Glycopyrrolate:

- IV-5-10mcg/kg.

Post sedation advice:

- Keep in lateral recovery position.
- Keep nil per oral for at least 2 hours.
- Reassure attendant regarding emergence of hallucination.

Caution:

- *Do not manipulate the airway as gag reflex is still intact – avoid unnecessary suction.*
- *Ketamine has sympathomimetic action – avoid in ischemic heart disease, uncontrolled hypertension, raised intra cranial pressure, uncontrolled seizure disorders.*
- *Do not administer any sedative drugs if you do not have means of artificial ventilation and resuscitation ready.*
- *Watch for apnea. Bag and mask ventilation with oxygen might be required.*

Ketamine is supplied in 50mg/ml vials. Dilute to 10mg/ml for IV administration (2 ml i.e., 100mg ketamine + 8 ml distilled water to make 10 ml).

Local anesthesia:

Most minor surgical procedures can be done under local anesthesia. It is essential to know the maximum doses of local anesthetic agents in order to avoid toxicity.

For most procedures, a concentration of 1% lignocaine and 0.25% bupivacaine gives adequate anesthesia (dilute with distilled water, if required).

Table 19.1 local anesthesia

Drug	Concentration available	Maximum dose (mg/kg)	Duration (hour)
Lignocaine plain	2%	4	0.75-2
Lignocaine with adrenaline	2%, adrenaline-1:200,000	7	1-3
Bupivacaine	0.5%, 0.25%	3	1.5-8

Contraindication:

- Unwilling patients.
- Allergy to local anesthetics.
- Infection at the intended site of injection.
- Patients with bleeding diathesis.
- When total volume of anesthetic required exceeds maximum dose.

Toxicity:

Lignocaine toxicity usually presents with CNS symptoms (peri-oral numbness, disorientation and convulsions). Bupivacaine toxicity presents with cardiac symptoms (arrhythmias, disorientation). Treatment is usually supportive.

Caution**Adverse effects Prevention**

Infection This should be very rare with use of an aseptic technique.

Hematoma	Avoid multiple needle insertions. Use 25-gauge needle (or smaller) and avoid puncturing superficial veins.
Vascular puncture	Intermittent aspiration should be performed to avoid intravascular injection.
Other	Instruct the patient on the care of the insensate finger.
Gangrene of the digit	Do not use adrenaline-containing solution for digital blocks. Limit the injection volume to 2mL on each side.
Nerve injury	Residual paresthesia is likely due to an inadvertent intraneuronal injection. Do not inject when the patient complains of pain or when high pressures on injection are met.

Practical tip: 2% of a drug = 2 gm in 100ml; 2gm = 2000mg i.e. 1ml = 2000/100 = 20mg.

Field blocks and Infiltration Anesthesia

In a field block, local anesthetic is infiltrated around the border of the surgical field, leaving the operative area undisturbed. In field blocks, epinephrine may be added to the anesthetic to enhance vasoconstriction and prolong the duration of anesthesia. Adrenaline should not be used in areas where the area has end arteries as blood supply to prevent ischemia. Examples: fingers, ear lobes, penis

Indications:

- Abscess drainage
- Foreign body removal.
- Excision of small mass/cyst.
- Suturing of lacerated wounds.

Technique:

Nerve blocks: In a nerve block, anesthetic is injected directly adjacent to the nerve supplying the surgical field. A review of regional anatomy and the location of nerves and other important structures is essential before administering the injection.

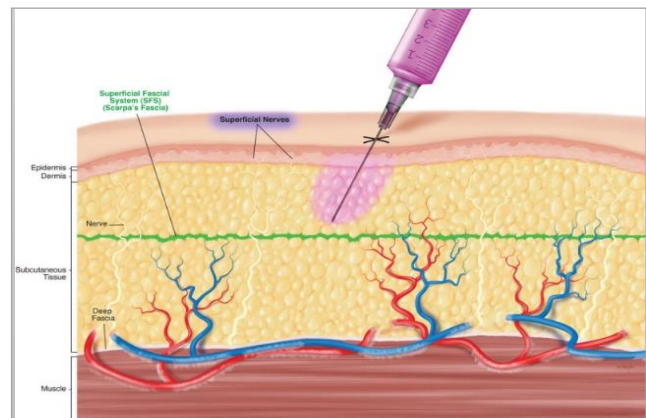


Figure 19.1 Technique of Local infiltration and anatomy of skin.

Digital nerve blocks

Indication:

Digital nerve blocks are easy to perform and are used for minor surgical procedures on the fingers.

Anatomy:

Sensory innervation of each finger is provided by four small digital nerves that enter each digit at its base in each of the four corners.

Technique:

- A 23-25-gauge 1½" needle is inserted at a point on the dorsolateral aspect of the base of the finger and a small skin wheal is raised.

- The needle is then directed anteriorly toward the base of the phalanx and advanced until it contacts the phalanx, taking care not to let it go through the palmar aspect.
- One ml of solution is injected as the needle is withdrawn 1 to 2 mm from the bone contact. An additional 1 ml is injected continuously as the needle is withdrawn back to the skin. The same procedure is repeated on each side of the base of the finger to achieve anesthesia of the entire finger. A total of 2-3ml of local anesthesia is injected on each side near the periosteum.
- The choice of the type and concentration of local anesthetic for a digital block is based on the desired duration of blockade.



Figure 19.2 Field block for ear.

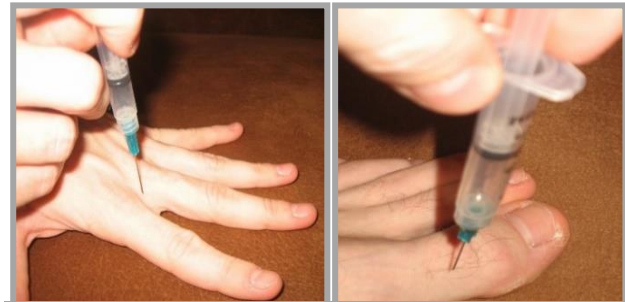


Figure 19.3 Digital nerve block finger and Digital nerve block toes.

Intercostal Nerve block

Intercostal block produces discrete bandlike segmental anesthesia in the chosen levels of intercostal space.

Indications:

- Rib Fractures with painful breathings
- Insertion of intercostal tube drainage

Technique:

After cleaning the skin with antiseptic solution, 1-2 ml of local anesthetic is infiltrated subcutaneously at each planned injection site. The fingers of the palpating hand should straddle the insertion site at the inferior border of the rib and fix the skin to avoid unwanted skin movement. A 1.5-inch, 22-gauge needle is attached to the syringe containing local anesthetic via extension tubing and advanced at an angle of approximately 20° cephalad to the skin. Contact with the rib should be made at within 1cm in most patients. While maintaining the same angle of insertion, the needle is walked off the inferior border of the rib as the skin is allowed to return to its initial position. Then the needle is advanced 3mm below the inferior margin of the rib, with the goal of placing the tip in the space containing the neuromuscular bundle (i.e., between the internal and innermost intercostal muscles). The end point for the advancement should be the predetermined distance (3mm). Following negative aspiration for blood or air, 3-5ml of local anesthetic is injected and needle withdrawn. The process is repeated for the remaining levels of blockade.

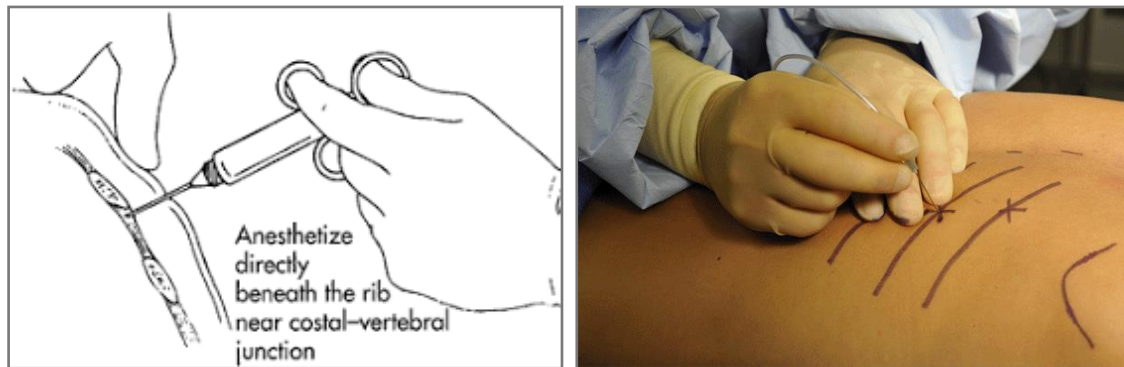


Figure 19.4 Patient position and needle insertion while doing intercostal nerve block.

Reference

1. Morgan's textbook of clinical anesthesiology, 4th edition.