

LOCAL ANAESTHETICS

Bupivacaine

Used for local and regional anaesthesia (infiltration anaesthesia, peripheral and sympathetic nerve blocks, dental anaesthesia, spinal, epidural and caudal anaesthesia).

Bupivacaine Inj 0.25%, 0.5% in vial for spinal anaesthesia, Inj. 0.5% in 4 ml ampoule mixed with 7.5% or 8.25% glucose (hyperbaric solution).	The maximum cumulative safe dose for adults and children of a 0.25% solution of bupivacaine is 2 mg/kg Unsuitable for intravenous regional anaesthesia
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Anaesthetic procedure	Concentration	Average dose in ml	Average dose in mg
Local infiltration	0.25%	Up to 60 ml	Up to 150 mg (not to exceed 2 mg/kg)
Peripheral nerve block	0.25-0.5%	Up to 30 ml	Up to 150 mg (not to exceed 2 mg/kg)
Dental anaesthesia	0.5%	1.8-3.6 ml	9.0-18.0 mg
Spinal anaesthesia	0.5% (with 7.5% or 8.25% glucose; preservative free)	1.5-3 ml	7.5-15 mg
Epidural anaesthesia	0.5%	Bolus 10-20 ml	50-100 mg
Epidural analgesia (labour and postoperative pain)	0.0625-0.25%	As per requirement	As per requirement
Caudal anaesthesia	0.25-0.5%	15-30 ml (adults) 0.5-1 ml/kg (children)	37.5-150 mg (adults) up to 2 mg/kg (children)

Precautions

- The smallest effective dose should be administered.
- Not recommended for obstetrical paracervical block and intravenous regional anaesthesia.
- Concentrations above 0.5% are associated with toxic reactions and refractory cardiac arrest.
- Intravenous access is essential during major regional block.
- Use with caution in patients with hypovolaemia, shock, severe congestive heart failure, and all forms of heart block.

- Toxic plasma levels (from accidental intravascular injection) may cause cardiopulmonary collapse and seizures.
- Epidural, caudal, or intrathecal injection should be avoided in patients with hypovolaemic shock, septicaemia, and infection at the injection site or coagulopathy.

Principal adverse effects

- Cardiovascular: Hypotension, arrhythmias, cardiac arrest
- Pulmonary: Respiratory impairment and arrest
- CNS: Seizures, tinnitus, blurred vision
- Allergic: Urticaria, angioneurotic oedema, anaphylactoid reaction
- Epidural/caudal/spinal anaesthesia: Hypotension, urinary retention, lower extremity weakness and paralysis, loss of sphincter control, headache, backache, cranial nerve palsies, slowing of labour.

Lidocaine (Lignocaine)

Used for surface anaesthesia of mucous membranes, infiltration anaesthesia, peripheral and sympathetic nerve blocks, intravenous regional anaesthesia, dental anaesthesia, spinal epidural and caudal anaesthesia, attenuation of pressor response to intubation and treatment of ventricular arrhythmias.

Lidocaine injection, 1%, 2% in vial	The smallest effective dose should be administered.
injection 1%, 2% in vial + Adrenaline 1: 200,000	The maximum safe doses for adults and children are:
Spinal anaesthesia, 5% in 2 ml ampoule to be mixed with 7.5% glucose solution	Plain lidocaine 4 mg/kg
Topical forms, 4% solution, 2% jelly, 5% ointment and 10% spray; dental cartridge, 2% + Adrenaline 1:80,000 in vial	Lidocaine + Adrenaline 5 mcg/ml (1:200,000)—7 mg/kg

Anaesthetic procedure	Concentration	Adrenaline	Dose	Dose (mg)
Local infiltration and peripheral nerve block	0.5%	Not for ring block of digits and penis	<50 ml	<250 mg
Pharynx, larynx,	1%	Yes	<40 ml	<400 mg
Trachea	4%	No	1-5 ml	40-200 mg
Urethra	2% jelly	No	Up to 10 ml	Up to 200 mg
Dental anaesthesia	2%	Yes	1-5 ml	20-100 mg
Epidural anaesthesia	1% - 2%	Yes	Bolus 10-20 ml	Up to 7 mg/kg

Attenuation of pressor response: Lidocaine 2% (preservative free) 1-1.5 mg/kg intravenous

Treatment of ventricular arrhythmias: Lidocaine 2% (preservative free) 1-1.5 mg/kg intravenous followed by infusion @ 1-4 mg/min.

Intravenous regional anaesthesia

Upper extremities 200-250 mg (40-50 ml of 0.5% solution)

Lower extremities 250-300 mg (100-120 ml of 0.25% solution)

Tetracaine

A short acting local anaesthetic for the cornea and conjunctiva. It is effective after topical application to the eye and anaesthesia persists for at least 15 minutes.

Solution (eyedrops), 0.5% one or 2 drops of 0.5% solution should be instilled into the conjunctiva sac.

Adrenaline (Epinephrine)

Used with local anaesthetics to retard absorption of infiltrated local anaesthetics. Inj 1mg/ml in 1 ml ampoule (1:1000).

Local surgery 5 mcg/ml (1:200,000) as a vasoconstrictor with local anaesthetic solutions.

Dental surgery 12.5 mcg/ml (1:80,000) are commonly used.

Note: Adrenaline should not be used in ring block of digits or the penis or other situations where there is a danger of local ischaemia.

Reference

1. Anaesthesia at the District Hospital. World Health Organization in collaboration with the Federation of Societies of Anesthesiologists, Second edition, 2000.