94 x 140 mm

Lidocaine Hydrochloride Injection USP 2 %

For local Anaesthetic use.
Not for ophthalmic use.

Each ml contains:
Lidocaine Hydrochloride USP equivalent to anhydrous Lidocaine Hydrochloride 20mg
Methyl Paraben NF (As Preservative) 1 mg

Clinical Pharmacology

Mechanism of Action: Lidocaine stabilizes the neuronal membrane by inhibiting ionic fluxes required for initiation and conduction of impulses thereby effecting local anaesthetic action

Pharmacokinetics and Metabolism : Lidocaine is completely absorbed following parenteral administration, its rate of absorption depending upon various factors such as site of administration and the presence or absence of a vasoconstrictor agent. Except for intravascular administration, the highest blood levels are obtained following intercostal nerve block and the lowest after subcutaneous administration. The plasma binding of Lidocaine is dependant on drug concentration, and the fraction bound decreases with increasing concentration. At concentrations of 1 to 4 µg of free base per ml 60 to 80 percent of Lidocaine is protein bound. Binding is also dependant on the plasma concentration of the alpha 1-acid glycoprotein. Lidocaine crosses the blood-brain and placental barriers, presumably by passive diffusion.

Lidocaine is metabolized rapidly by the liver and metabolites and unchanged drug are excreted by the kidneys. Approximately 90% of Lidocaine administered is excreted in the form of various metabolites, and less than 10% is excreted unchanged . The primary metabolite in urine is a conjugate of 4-hydroxy 2,6-dimethylaniline.

The elimination half life of Lidocaine following an intravenous bolus injection is typically 1.5 to 2.0 hours. Because of the rapid rate at which Lidocaine is metabolized, any condition that affects liver function may alter Lidocaine kinetics. The half-life may be prolonged two-fold or more in patients with liver dysfunction. Renal dysfunction does not affect Lidocaine kinetics but may increase the accumulation of metabolites.

Factors such as acidosis and the use of CNS stimulants and depressants affect the CNS levels of Lidocaine required to produce over systemic effects. Objective adverse manifestations become increasingly apparent with increasing venous plasma levels above 6.0 µg free base per ml. In the rhesus monkey arterial blood levels of 18-21 µg /ml have been shown to be threshold for convulsive activity.

Indications and usage:

Lidocaine Injections are indicated for production of local or regional anaesthesia by infiltration techniques such as percutaneous injection, by peripheral nerve block techniques such as brachial plexus and intercostals blocks when the accepted procedures for theses techniques as described in standard textbooks are observed.

Contraindications:

Lidocaine is contraindicated in patients with a known history of hypersensitivity to local anaesthetics of the amide type.

Warnings

Lidocaine injections for infiltration and nerve block should be employed only by clinicians who are well versed in diagnosis and management of dose-related toxicity and other acute emergencies that might arise from the block to be employed and then only after ensuring the immediate availability of oxygen, other resuscitative drugs, cardiopulmonary equipment, and the personal needed for proper management of toxic reactions and related emergencies(see also adverse reactions and precautions). Delay in proper management of dose-related toxicity underventilation from any cause and/or altered sensitivity may lead to the development of acidosis, cardiac arrest and possibly death.

To avoid intravascular injection, aspiration should be performed before the local anaesthetic solution is injected. The needle must be repositioned until no return of blood can be elicited by aspiration. Note, however, that the absence of blood in the syringe does not guarantee that intravascular injection has avoided.

Lidocaine Injection solutions contain methylparaben as a preservative. Local anaesthetic solutions containing antimicrobial preservatives (eg methylparaben) should not be used for epidural or spinal anaesthesia because the safety of these agents has not been estabilished with regard to intrathecal injection, either intentional or accidental.

Lidocaine with adrenaline \ Epinephrine solutions contain sodium metabisulfite, a sulfite that may cause allergic type reactions including anaphylactic symptoms and life threatening or less severe asthmatic episodes in certain susceptible people. The overall prevalence of sulfite sensitivity in the general population is unknown and probably low. Sulfite sensitivity is seen more frequently in asthmatic than in non asthmatic people.

Precautions:

General: The safety and effectiveness of Lidocaine depend on proper dosage, correct technique, adequate precautions, and readiness for emergencies. Standard textbooks should be consulted for specific techniques and precautions for various regional anaesthetic procedures.

Resuscitative equipment, oxygen and other resuscitative drugs should be available for immediate use (See warnings and adverse reactions). The lowest dosage that results in effective anaesthesia should be used to avoid high plasma levels and serious adverse effects. Syringe aspirations should also be performed before and during each supplemental injection when using indwelling catheter techniques. When clinical conditions permit, consideration should be given to employing local anaesthetic solutions that contain adrenaline for the test dose because circulatory changes compatible with adrenaline may also serve as a warning sign of unintended intravascular injection. An intravascular injection is still possible even if aspirations for blood are negative. Repeated doses of Lidocaine may cause significant increases in blood levels with each repeated dose because of slow accumulation of the drug or its metabolites. Tolerance to elevated blood levels varies with the status of the patient. Debilitated elderly patients, acutely ill patients and children should be given reduced doses commensurate with their age and physical condition. Lidocaine should also be used with caution in patients with severe shock or heart block.

Local anaesthetic solutions containing a vasoconstrictor should be used cautiously and in carefully circumscribed quantities in areas of the body supplied by end arteries (fingers, toes, penis, nose) or having otherwise compromised blood supply. Patients with peripheral vascular disease and those with hypertensive vascular disease may exhibit exaggerated vasoconstrictor response. Ischemic injury or necrosis may result. Preparations containing a vasoconstrictor should be used with caution in patients during or following the administration of potent general anaesthetic agents, since cardiac arrhythmias may occur under such conditions.

Careful and constant monitoring of cardiovascular and respiratory (adequacy of ventilation) vital signs and the patient's state of consiousness should be accomplished after each local anaesthetic injection. It should be kept in mind at such times that restlessness, anxiety, tinnitus, dizziness, blurred vision, tremors, depression or drowsiness may be early warning signs of central nervous system toxicity.

Since amide-type local anaesthetics are metabolized by the liver, Lidocaine Injection should be used with caution in patients with hepatic disease. Patients with severe hepatic disease, because of their inability to metabolize local anaesthetics normally, are at greater risk of developing toxic plasma concentrations.

Lidocaine Injection should also be used with caution in patients with impaired cardiovascular function since they may be less able to compensate for functional changes associated with the prolongation of AV conduction produced by these drugs.

Lidocaine should be used with caution in persons with known drug sensitivities. Patients allergic to para-aminobenzoic acid derivetives(procaine, tetracaine, benzocaine etc) have not shown cross sensitivity to Lidocaine .

Use in the Head and Neck Area: Small doses of local anaesthetics injected into the head and neck area, including retrobulbar, dental and stellate ganglion blocks, may produce adverse reactions similar to systemic toxicity seen with unintentional intravascular injections of larger doses. Confusion, convulsions, respiratory depression and/or respiratory arrest, and cardiovascular stimulation or depression have been reported . These reactions may be due to intra-arterial injection of the local anaesthetic with retrograde flow to the cerebral circulation. Patients receiving these blocks should have their circulation and respiration monitored and be constantly observed. Resuscitative equipment and personal for treating adverse reactions should be immediately available. Dosage recommendations should not be exceeded (See DOSAGE AND ADMINISTRATION).

Clinically Significant Drug Interactions: The administration of local anaesthetic solutions containing adrenaline to patients receiving monoamine oxidase inhibitors or tricyclic antidepressants may produce severe prolonged hypertension. Phenothiazines and butyrophenones may reduce or reverse the pressor effect of adrenaline. Concurrent use of these agents should generally be avoided. In situations when concurrent therapy is necessary, careful patient monitoring is essential. Concurrent administration of vasopressor drugs (for the treatment of hypotension related to obstetric blocks) and ergot-type oxytocic drugs may cause severe, persistant hypertension or cerbrovascular accidents.

Labor and delivery : Local anaesthetics rapidly cross the placenta and when used for paracervical or pudental anaesthesia, can cause varying degrees of maternal, fetal and neonatal toxicity (See CLINICAL PHARMACOLOGY- Pharmacokinetics). The potential for toxicity depends upon the procecure performed, the type and amount of drug used and the technique of drug administration. Adverse reactions in the parturient, fetus and neonate involve alterations of the central nervous system, peripheral vascular tone and cardiac function.

Paracervical or pudendal anaesthesia may alter the forces at parturition through changes in unterine contractility or maternal expulsive efforts . In one study paracervical block anaesthesia was associated with a decrease in the man duration of fist stage labor and facilitation of cervical dilation. The use of obstetrical anaesthesia may increase the need for forceps assistance.

The use of some local anaesthetic drug products during labor and delivery may be followed by diminished muscle strength and tone for the first day or two life. The long term significance of these observations is unknown. Fetal bradycardia may occur in 20 to 30 percent of patients receiving paracervical block with the amide type local anaesthesia. The physician should weigh the possible advantages against risks when considering paracervical block in prematurity, toxemia of pregnancy and fetal distress. Careful adherence to recommended dosage is of the utmost importance in obstetrical paracervical block. Failure to achieve adequate analgesia with recommended dosage is of the utmost importance in obstetrical paracervical block. Failure to achieve adequate analgesia with recommended doses should arouse suspicion of intravascular or fetal intracranial injection. Cases compatible with unintended fetal intracranial injection of local anaesthetic solution have been reported following intended paracervical pudendal block or both. Babies so affected present with unexplained neonatal depression at birth, which correlates with high local anaesthetic serum levels, and often manifest seizures within six hours. Prompt use of supportive measures combined with forced urinary excretion of the local anaesthetic has been used successfully to manage this complication.

Case reports of maternal convulsions and cardiovascular collapse following use of some local anaesthetics for paracervical block in early pregnancy (as anaesthesia for elective abortion) suggest that systemic absorption under these circumstances may be rapid. The recommended maximum dose of each drug should not be exceeded. Injection should be made slowly and with frequent aspiration. Allow a 5-minute interval between sides.

Pediatric Use: Dosages in children should be reduced, commensurate with age, body weight and physical condition. See Dosage and administration

ADVERSE REACTIONS

Systemic : Adverse experiences following the administration of Lidocaine are similar in nature to those observed with other amide local anaesthetic agents. These adverse experiences are, in general, dose-related and may result from high plasma levels caused by excessive dosage, rapid absorption or inadvertent intravascular injection, or may result from a hypersensitivity, idiosyncrasy or diminished tolerance on the part of the patient. Serious adverse experiences are generally systemic in nature. The following types are those most commonly reported.

Central Nervous System: CNS manifestation are excitatory and/or depressant and may be characterized by light headedness, nervousness, apprehension, euphoria, confusion, dizziness, drowsiness, tinnitus, blurred or double vision, vomiting, sensations of heat, cold or numbness twitching, tremors, convulsions, unconsiousness, respiratory depression and arrest. The excitatory manifestations may be very brief or may not occur at all in which case the first manifestation of toxicity may be drowsiness, merging into unconsiousness and respiratory arrest.

Drowsiness following the administration of Lidocaine is usually an early sign of a high blood level of the drug and may occur as a consequence of rapid absorption.

Cardiovascular System: Cardiovascular manifestations are usually depressant and are characterized by bradycardia, hypotension and cardiovascular collapse, which may lead to cardiac arrest.

Allergic: Allergic reactions are characterized by cutaneous lesions, urticaria, edema or anaphylactoid reactions. Allergic reactions may occur as a result or sensitivity either to local anaesthesia agents or to the methylparaben used as preservative in multiple dose vials. Allergic reactions as a result of sensitivity to Lidocaine are extremely rare and, if they occur, should be managed by conventional means. Allergic reactions may occur despite a negative result in skin testing for sensitivity.

OVERDOSE:

Acute emergencies from local anaesthetics are generally related to high plasma levels encountered during therapeutic use of local anaesthetics (see ADVERSE REACTIONS, WARNINGS AND PRECAUTIONS)

Management of Local Anaesthetic Emergencies: The first consideration is prevention, best accomplished by careful and constant monitoring of cardiovascular and respiratory vital signs and the patient's state of consiousness after ech local anaesthetic injection. At the first sign of change, oxygen should be administered.

The first step in the management of convulsions consists of immediate attention to the maintenance of a patient airway and assisted or controlled ventilation with oxygen and a delivery system capable of permitting immediate positive airway pressure by masks. Immediately after the institution of these ventilatory measures, the adequacy of the circulation should be evaluated, keeping in mind that drugs used to treat convulsions sometimes depress the circulation when administered intravenously. Should convulsions persist despite adequate respiratory support, and if the status of the circulation permits, small increments of an ultra-short acting barbiturate (such as thiopental) or a benzodiazepine (such as diazepam) may be administered intravenously. The clinician should be familiar, prior to the use of local anaesthetics, with these anticonvulsant drugs. Supportive treatment of circulatory depression may require administration of intravenous fluids and, when appropriate, a vasopressor as directed by the clinical situation (e.g. ephedrine).

If not treated immediately, both convulsions and cardiovascular depression can result in hypoxia, acidosis, bradycardia, arrythmias and cardiac arrest. If cardiac arrest should occur standard cardiopulmonary resuscitative measures should be instituted.

Endotracheal intubation, employing drugs and techniques familiar to the clinician, may be indicated after initial administration of oxygen by masks, if difficulty is encountered in the maintenance of a patent airway or if prolonged ventilatory support (assisted or controlled) is indicated.

Dialysis is of negligible value in the treatment of acute overdose with Lidocaine

DOSAGE AND ADMINISTRATION

The dosage suggested in the Table (See below) are for normal healthy adults of 70 kg body weight and refer to the use of adrenaline-free solutions. When larger volumes are required only solutions containing adrenaline should be used, except in those cases where vasopressor drugs may be contraindicated.

These recommended doses serve only as a guide to the amount of anaesthetic required for most routine procedures. The actual volumes and concentrations to be used depend on a number of factors such as type and extent of surgical procedure, duration of anaesthesia required and the body weight and physical condition of the patient. In all cases the lowest concentration and smallest dose that will produce the desired result should be given. Dosages should be reduced for children, elderly and debilitated patients and patients with cardiac and/or liver disease.

The onset of anaesthesia, the duration of anaesthesia, and the degree of muscular relaxation are proportional to the volume and concentration (i.e. total dose) of local anaesthetic used. Thus an increase in volume and concentration of Lidocaine injection will decrease the onset time of anaesthesia and prolong the duration of anaesthesia. Although the incidence of side effects with Lidocaine is quite low, caution should be exercised when employing large volumes and concentrations, since the incidence of side effects with Lidocaine is quite low, caution should be exercised when employing large volumes and concentrations, since the incidence of side effects is directly proportional to the total dose of local anaesthetic agent injected.

MAXIMUM RECOMMENDED DOSAGES

Adults: For normal healthy adults, the individual maximum recommended dose of Lidocaine HCl with adrenaline (epinephrine) should not exceed 7 mg/kg (3.5mg/lb) of body weight, and in general it is recommended that the maximum total dose not exceed 500 mg in an adult of 70 kg body weight. When used without adrenaline, the maximum individual dose should not exceed 4.5mg / kg (2 mg per lb) of body weight and in general it is recommended that the maximum total dose does not exceed 200 mg(in an adult of 70 kg body weight).

The maximum recommended dose per 90 minute period of Lidocaine hydrochloride for paracervical block in obstetrical patients and non-obstetrical patients is 200 mg total. One half of the total dose is usually administered to each side. Inject slowly, five minutes between sides (See also discussion of paracervical block in PRECAUTIONS).

Children: It is difficult to recommend a maximum dose of any drug for children, since this varies as a function of age and weight. For children over 3 years of age who have a normal lean body mass and normal body development, the maximum dose is determined by the child's age and weight. For example, in a child of 5 years weighing 50lbs, the dose of Lidocaine HCl should not exceed 75-100 mg (1.5 – 2 mg/lb).

In order to guard against systemic toxicity, the lowest effective concentration and lowest effective dose should be used at all times. In some cases it may be necessary to dilute available concentrations with 0.9% sodium chloride injection in order to obtain the required final concentration.

FOR LOCAL ANAESTHESIA, NOT OPHTHALMIC USE,

* These recommendations are for healthy adults of body weight 70 kg and for Lidocaine Injection without adrenaline. For procedures requiring large doses, Lidocaine with adrenaline should be used.

Recommended Dosages *

Procedure (mg)	Lidocaine Injection Conc (%)	Lidocaine hydrochloride (Without adrenaline)	
		Vol (ml)	Total Dose (mg) for a 70 kg healthy adult.
Infiltration percutaneous	0.5 or 1	1 – 60	50 – 300
Peripheral Nerve Blocks eg.			
Brachial	1.5	15-20	225-300
Dental	2	1-5	20-100
Intercostal	1	3	30
Paravertebral	1	3-5	30-50
Pudendal (each side)	1	10	100
Paracervical Obstetrical analgesia (each side)	1	10	100
Sympathetic Nerve Blocks.eg.			
Cervical (stellate ganglion)	1	5	50
Lumbar	1	5-10	50-100

NOTE : Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration. The injection is not be used if its color is pinkish or darker than slightly yellow or if it contains a precipitate. Local anaesthetics react with certain metals and cause the release of their respective ions which if injected may cause a severe local reaction. Prolonged contact between Lidocaine solutions and metal surfaces (cannulae syringes with metal parts) should be avoided. Solutions containing adrenaline should be protected from light.

CAUTION : To be administered after a test dose with adequate precaution to cope with any adverse reactions.

Storage :
Store below 30°C. Protect from light.

Keep out of reach of children.

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Ciron Drugs
& Pharmaceuticals Pvt. Ltd.
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