PRODUCT MONOGRAPH

Lidocaine Hydrochloride Injection USP
20 mg/mL

Sterile Solution

Antiarrhythmic Agent
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20 mg/mL

Sterile Solution
Antiarrhythmic Agent

ACTION
The mode of action of the antiarrhythmic effect of lidocaine appears to be similar to that of procaine, procainamide and quinidine. Ventricular excitability is depressed and the stimulation threshold of the ventricle is increased during diastole. The sinoatrial node is, however, unaffected. Lidocaine in recommended doses does not produce a significant decrease in arterial pressure nor in cardiac contractile force. In large doses, lidocaine hydrochloride may produce circulatory depression but the magnitude of the changes is less than that found with comparable doses of procainamide. Neither drug appreciably affects the duration of the absolute refractory period.

The onset of action following a single intravenous injection varies from 45 to 90 seconds and duration of action is 10 to 20 minutes. Lidocaine plasma levels have been correlated with clinical effectiveness. The therapeutic range is 1.2 to 6 mcg/mL. Plasma drug concentration higher than 5 to 6 mcg/mL increases the risk of toxicity.

INDICATIONS AND CLINICAL USES
Intravenous administration of lidocaine hydrochloride is indicated in the treatment of ventricular tachycardia and premature ventricular beats of life-threatening nature, which may occur during acute myocardial infarction, digitalis toxicity or other cardiac diseases.

Lidocaine Hydrochloride Injections USP is designed for use only as direct intravenous injection.

Constant electrocardiographic and blood pressure monitoring are essential.

CONTRAINdications
Lidocaine is contraindicated in patients with:
1. hypersensitivity to local anesthetic of the amide type;
2. Stokes-Adams’ Syndrome or severe degrees of sinoatrial, atrio-ventricular or intraventricular block;
3. advanced hepatic disease.
NOTE: The safety of lidocaine hydrochloride intravenous injection in children has not been established.

WARNINGS

1. Constant ECG monitoring is essential for the proper administration of lidocaine intravenously. Signs of excessive depression of cardiac conductivity, such as prolongation of PR interval and QRS complex, and the appearance of aggravation of arrhythmias, should be followed by prompt cessation of the intravenous injection. Lidocaine hydrochloride Injection must be used in the treatment of cardiac arrhythmias under the constant supervision of a physician, with meticulous regulation of the rate of injection.

2. It is mandatory to have emergency resuscitative equipment and drugs immediately available to manage possible adverse reactions involving the cardiovascular, respiratory, or central nervous systems.

3. Usage in Pregnancy: Safety of lidocaine with respect to the development of the human fetus has not been adequately established. Therefore, the risk of benefit ratio should be determined when the use of lidocaine in early pregnancy is considered.

PRECAUTIONS

a) In patients with heart-block and bradycardia, severe digitalis intoxication and severe myocardial disease, any cardiac depressant should be used with caution (see CONTRAINDICATIONS and WARNINGS).

b) Patients with congestive heart failure, shock, liver disease and patients over 70 years of age require smaller doses of lidocaine since the drug may accumulate in these patients and result in toxic manifestations.

c) In unconscious patients, circulatory collapse should be watched for, since CNS effects may not be apparent as an initial manifestation of toxicity.

d) The intravenous administration of lidocaine hydrochloride may sometimes be accompanied by a hypotensive response and, in overdosage, this could be precipitous. For this reason, the intravenous dose should not exceed 100 mg in a single injection, and no more than 200 to 300 mg should be given during a one-hour period (see DOSAGE AND ADMINISTRATION).

e) Clinical evaluation and periodic laboratory determinations are necessary to monitor changes in fluid balance, electrolyte concentrations and acid-base balance during prolonged parenteral therapy or whenever the condition of the patient warrants such evaluation.
f) Do not administer unless solution is clear and container is undamaged. Discard unused portion.

**DRUG INTERACTIONS**

Lidocaine hydrochloride should be used with caution in patients with digitalis toxicity accompanied by atrioventricular block. Concomitant use of beta-blocking agents (i.e., propanolol) or cimetidine may reduce hepatic blood flow and thereby reduce lidocaine hydrochloride clearance. The concomitant use of these two agents may cause an increased incidence of adverse reactions.

When lidocaine hydrochloride is administered with other antiarrhythmic drugs such as phenytoin, procainamide, propanolol or quinidine, the cardiac effects may be additive or antagonistic and toxic effects may be additive. Phenytoin may stimulate the hepatic metabolism of lidocaine, but the clinical significance of this effect is not known.

**ADVERSE REACTIONS**

Systemic reactions of the following types have been reported:

**Central Nervous System**

Nervousness, lightheadedness, dizziness, blurred or double vision, tinnitus, twitching or tremors, drowsiness, nausea and vomiting, sensation of heat, cold or numbness, convulsions, unconsciousness and respiratory depression or arrest.

**Cardiovascular System**

Myocardial depression, hypotension, bradycardia and cardiac arrest. There have been reports of A-V block in patients with diffuse intraventricular conduction disturbances, as well as reports of acceleration of conduction in the presence of atrial flutter, leading to a large increase in ventricular rate.

**Allergic Reactions**

Cutaneous lesions of delayed onset, urticaria, edema and other manifestations of allergy. The detection of sensitivity by skin testing is of doubtful value.

Adverse reactions were found to be dose-related. Toxic effects have been observed at concentrations over 6 mcg/mL. However, idiosyncratic reactions have been reported at low doses in some patients.

Cross-sensitivity between lidocaine and procainamide or lidocaine and quinidine has not been reported.
SYMPTOMS AND TREATMENT OF OVERDOSAGE

The symptoms of overdosage or idiosyncratic reactions are as described under ADVERSE REACTIONS.

Use of the drug should be discontinued if severe reactions occur. In the event of circulatory collapse, emergency resuscitative measures, such as oxygen, vasopressor drugs or cardiac massage, should be instituted. Cardiac pacemaker and defibrillator should be readily available. For severe convulsions, small doses of an ultra-short-acting barbiturate, or a short-acting muscle relaxant (if the patient is under anesthesia) may be used.

DOSAGE AND ADMINISTRATION

NO MORE THAN 200 TO 300 MG OF LIDOCAINE HYDROCHLORIDE SHOULD BE ADMINISTERED DURING A ONE-HOUR PERIOD.

CAUTION: In shock, heart failure, hepatocellular liver disease and in those over 70 years of age, reduce the dose recommended above for single injection by one half and measure serum concentrations frequently (see PRECAUTIONS).

For direct intravenous injection, the usual dose of lidocaine hydrochloride is 50 to 100 mg administered at an approximate rate of 25 to 50 mg/min. Sufficient time should be allowed to enable a slow circulation to carry the drug to the site of action. If the initial injection of 50 to 100 mg does not produce the desired response, a second dose may be repeated after five to ten minutes.

**Instructions on how to use the syringe**

**Ansyr™ Syringe:**

**USE ASEPTIC TECHNIQUE**

1. Remove luer cover

2. Hold plunger and push barrel forward to relieve any resistance that may be present

3. Pull the barrel down until air is expelled from syringe
LifeShield® Abboject® Syringe:

CAUTION: Liquid in glass vial. Handle with care. Inspect vial for damage prior to assembly. USE ASEPTIC TECHNIQUE. Do not assemble until ready to use.

1. Remove caps from vial and injector.

2. Insert vial into injector **without exerting excessive force**. Ensure that vial and injector are properly aligned. **Gently** rotate vial clockwise (about 3 turns) until medication enters needle. **If resistance is encountered, remove vial and repeat procedure.**

3. To access green **male luer lock adapter**, push yellow hood in and then twist **counterclockwise**.

   Or,
   
   To access **needle**, twist and pull yellow hood **clockwise** to remove hood and green adapter.

4. Apply gentle downward pressure on vial to initiate liquid flow. **DO NOT APPLY EXCESSIVE FORCE TO VIAL.**
PHARMACEUTICAL INFORMATION

Drug Substance

Proper Name  Lidocaine Hydrochloride USP

Chemical Name  2-(Diethylamino)-N-(2,6-dimethylphenyl)-acetamide monohydrochloride monohydrate

Structural Formula

\[
\text{CH}_3 \\
\text{NHCOC}_2\text{H}_5\text{N}(\text{C}_2\text{H}_5)_2 \cdot \text{HCl} \cdot \text{H}_2\text{O}
\]

Molecular Formula  C\text{14}H\text{22}N\text{2}0\cdot\text{HCl}.\text{H}_2\text{O}

Molecular Weight  288.82

Description

Lidocaine hydrochloride USP is a white, odourless, crystalline powder which has a slightly bitter taste. It is very soluble in water and in alcohol, soluble in chloroform, and insoluble in ether. Melting point 77°C to 78°C, pKa 7.86. The pH range of a 0.5% solution of lidocaine hydrochloride in water is 4.0 to 5.5.

Composition

2% single-use syringes contain lidocaine hydrochloride (expressed as the hydrochloride salt) and sodium chloride sufficient to render the solution isotonic (6 mg/mL). They may contain sodium hydroxide and/or hydrochloric acid for pH adjustment. The pH range is 5.0 to 7.0.

STABILITY AND STORAGE RECOMMENDATION

Store between 20°C and 25°C. Protect from freezing. Avoid excessive heat.

Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration, whenever solution and container permit.

Do not use unless the solution is clear and container or seal intact. Discard if it contains a precipitate.
For single-use, discard unused portion.

**AVAILABILITY OF DOSAGE FORMS**

Lidocaine Hydrochloride Injection USP for single intravenous injection is supplied in 5 mL LifeShield® Abboject® syringe¹ and 5 mL Ansyr™ syringe².

1: **LifeShield® Abboject® Syringe**: Flexible and reliable, the ready-to-use LifeShield® Abboject® syringe minimizes errors and protects caregivers and patients alike. It can be used for needle-free or shrouded needle access. The design features two pieces - a calibrated glass drug vial and a matching plastic syringe barrel with integral injector needle. Medication, fluid path, and needle are sterile and nonpyrogenic if caps and needle cover are undisturbed and package is intact.

2: **Ansyr™ Syringe**: The Ansyr™ syringe is a proprietary delivery option offering one-piece, polypropylene plastic construction with a needle-free luer lock adapter. Ansyr syringes are available prefilled with a wide range of emergency medications. Graduated markings on the syringe barrel conform to ISO standards and clearly show any drug remaining. Medication and fluid path are sterile and nonpyrogenic if luer cover is undisturbed and package is intact.

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