

## **SUMMARY OF PRODUCT CHARACTERISTICS**

### **1. NAME OF THE MEDICINAL PRODUCT**

Lidocaine Hydrochloride Injection BP 1% w/v, 2ml, 5ml, 10ml & 20ml plastic ampoules.

### **2. QUALITATIVE AND QUANTITATIVE COMPOSITION**

Each 1ml of solution contains 1% w/v of Lidocaine Hydrochloride BP

### **3. PHARMACEUTICAL FORM**

Clear, colourless, sterile solution intended for parenteral administration to human beings.

### **4. CLINICAL PARTICULARS**

#### **4.1. Therapeutic Indications**

Lidocaine is a local anaesthetic of the amide group. Lidocaine Hydrochloride Injection BP is for use in infiltration anaesthesia, intravenous regional anaesthesia and nerve blocks.

#### **4.2. Posology and Method of Administration**

The method of administration of lidocaine varies according to the procedure (infiltration anaesthesia, intravenous regional anaesthesia or nerve block).

The dosage should be adjusted according to the response of the patient and the site of administration. The lowest concentration and smallest dose producing the required effect should be given.

The following table is intended as a guide to the concentrations, volumes and doses of Lidocaine Hydrochloride Injection BP for various types of anaesthetic procedure in healthy adults. Elderly or debilitated patients require smaller doses commensurate with age and physical status. For dosage information in other regional local anaesthetic techniques, standard textbooks should be consulted.

Type of block	Conc. mg/ml	Dose (plain) ml	Dose (plain) mg	Dose [with adrenaline ( <i>epinephrine</i> ) ] ml	Dose [with adrenaline ( <i>epinephrine</i> )] mg
Local infiltration	5 10	1 – 60 0.5 - 30	5 - 300 5 - 300		
Peripheral nerves (upper limb)	10	1 – 10	10 - 100		
Brachial plexus	10	30	300	50	500
Sciatic	10 - 15	15 - 20			
3 in 1	10 - 15	30			
Saphenous nerve	10 - 15	10			
Inguinal Field Block	5			30	150
Intravenous regional anaesthesia	5	10 - 40	50 - 200		

Children: A 1% or 2% solution may be used and the maximum dose should not exceed 5mg/kg (plain) or 7mg/kg [with adrenaline (*epinephrine*)].

### 4.3 Contraindications

Known hypersensitivity to anaesthetics of the amide type.

- Complete heart block
- Hypovolaemia

Solutions containing adrenaline (*epinephrine*) should not be used in areas of the body supplied by end arteries or otherwise having a compromised blood supply such as digits, nose, ear or penis. Solutions containing adrenaline (*epinephrine*) should not be given intravenously.

### 4.4. Special Warnings and Special Precautions for Use

Lidocaine should only be used by people with skills in resuscitation. Facilities and equipment for resuscitation should be available when administering local anaesthetics.

As with other local anaesthetics, lidocaine should be used with caution in patients with epilepsy, myasthenia gravis, congestive cardiac failure, bradycardia or respiratory depression, including where agents are known to interact with Lidocaine either to increase its availability or additive effects e.g. phenytoin or prolong its elimination e.g. hepatic or end renal insufficiency where the metabolites of Lidocaine may accumulate.

The effect of local anaesthetics may be reduced if the injection is made into an inflamed or infected area.

Intramuscular Lidocaine may increase creatinine phosphokinase concentrations which can interfere with the diagnosis of acute myocardial infarction. Lidocaine has been shown to be porphyrinogenic in animals and should be avoided in persons suffering from porphyria.

Hypokalaemia, hypoxia and disorder of acid-base balance should be corrected before treatment with intravenous lidocaine begins.

Certain local anaesthetic procedures may be associated with serious adverse reactions, regardless of local anaesthetic drug used.

Central nerve blocks may cause cardiovascular depression, especially in the presence of hypovolaemia, and therefore epidural anaesthesia should be used with caution in patients with impaired cardiovascular function.

Epidural anaesthesia may lead to hypotension and bradycardia. This risk can be reduced by preloading the circulation with crystalloidal or colloidal solutions. Hypotension should be treated promptly.

Paracervical block can sometimes cause foetal bradycardia or tachycardia and careful monitoring of foetal heart rate is necessary (see section 4.6).

Injections in the head and neck region may be made inadvertently into an artery causing cerebral symptoms even at low doses.

Retrobulbar injections may rarely reach the cranial subarachnoid space, causing serious/severe reactions including cardiovascular collapse, apnoea, convulsions and temporary blindness.

Retro- and peribulbar injections of local anaesthetics carry a low risk of persistent ocular motor dysfunction. The primary causes include trauma and/or local toxic effects on muscles and/or nerves.

The severity of such tissue reactions is related to the degree of trauma, the concentration of the local anaesthetic and the duration of exposure of the tissue to local anaesthetic. For this reason, as with all local anaesthetic, the lowest effective concentration and dose of local anaesthetic should be used. Lidocaine Injection is not recommended for use in neonates. The optimum serum concentration of lidocaine required to avoid toxicity, such as convulsions and cardiac arrhythmias, in this age group is not known.

#### **4.5. Interaction with other Medicinal Products and other Forms of Interaction**

While adrenaline when used in conjunction with Lidocaine might decrease vascular absorption, it greatly increases the danger of ventricular tachycardia and fibrillation if accidentally injected intravenously.

Dopamine and 5 hydroxytryptamine reduce the convulsant threshold to Lidocaine.

Narcotics are probably proconvulsants and this would support the evidence that Lidocaine reduces the seizure threshold to fentanyl in man.

Opioid-antiemetic combination sometimes used for sedation in children could reduce the convulsant threshold to Lidocaine and increase the CNS depressant effect.

Cimetidine and propranolol depress microsomal enzyme activity, thus enhancing lidocaine toxicity if concomitantly administered with these drugs, requiring a reduction in the dosage of Lidocaine. Ranitidine produces a small reduction in renal clearance. Increase in serum levels of Lidocaine may also occur with anti-viral agents (e.g. amprenavir, atazanavir, darunavir, lopinavir).

Hypokalaemia caused by diuretics may antagonize the action of lidocaine if administered concomitantly (see section 4.4).

Cardiovascular collapse has been reported following the use of bupivacaine in patients on treatment with verapamil and timolol; Lidocaine is closely related to bupivacaine.

Lidocaine should be used with caution in patients receiving other local anaesthetics or agents related structurally to amide-type local anaesthetics (e.g. anti-arrhythmics, such as mexiletine), since the systemic toxic effects are additive. Specific interaction studies with lidocaine and class III anti-arrhythmic drugs (e.g. amiodarone) have not been performed, but caution is advised.

There may be an increased risk of ventricular arrhythmia in patients treated concurrently with antipsychotics which prolong or may prolong the QT interval (e.g. pimozide, sertindole, olanzapine, quetiapine, zotepine), prenylamine, adrenaline (if accidentally injected intravenously) or 5HT<sub>3</sub> antagonists (e.g. tropisetron, dolasetron).

Concomitant use of quinupristin/dalfopristin may increase lidocaine levels with a subsequent increased risk of ventricular arrhythmias and therefore should be avoided.

There may be an increased risk of enhanced and prolonged neuromuscular blockade in patients treated concurrently with muscle relaxants (e.g. suxamethonium).

#### **4.6. Pregnancy and Lactation**

Pregnancy:

Although animal studies have revealed no evidence of harm to the foetus, lidocaine crosses the placenta and should not be administered during early pregnancy unless the benefits are considered to outweigh the risks.

Lidocaine readily crosses the placental barrier after epidural or intravenous administration to the mother. The ratio of umbilical to maternal venous concentration is 0.5 to 0.6. The foetus appears to be capable of metabolising Lidocaine at term. The elimination half life in the newborn of the drug received in utero is about three hours, compared with 100 minutes in the adult. Elevated lidocaine levels may persist in the newborn for at least 48 hours after delivery. Foetal bradycardia or tachycardia (see section 4.4), neonatal bradycardia, hypotonia or respiratory depression may occur.

Lactation:

Small amounts of lidocaine are secreted into breast milk and the possibility of an allergic reaction in the infant, albeit remote, should be borne in mind when using lidocaine in nursing mothers.

#### **4.7. Effects on Ability to Drive and Use Machines**

Where outpatient anaesthesia affects areas of the body involved in driving or operating machinery, patients should be advised to avoid these activities until normal function is fully restored.

#### **4.8 Undesirable effects**

In common with other local anaesthetics, adverse reactions to lidocaine are rare and are usually the result of raised plasma concentrations due to accidental intravascular injection, excessive dosage or rapid absorption from highly vascular areas, or may result from a hypersensitivity, idiosyncrasy or diminished tolerance on the part of the patient. Systemic toxicity mainly involves the central nervous system and/or the cardiovascular system (see also section 4.9 overdose).

Immune system disorders:

Hypersensitivity reactions (allergic or anaphylactoid reactions, anaphylactic shock) see also Skin & subcutaneous tissue disorders.

Skin testing for allergy to Lidocaine is not considered to be reliable.

Nervous & Psychiatric disorders:

Neurological signs of systemic toxicity include dizziness or light-headedness, nervousness, tremor, circumoral paraesthesia, tongue numbness, drowsiness, convulsions, coma.

Nervous system reactions may be excitatory and or depressant. Signs of CNS stimulation may be brief, or may not occur at all, so that the first signs of toxicity may be confusion and drowsiness, followed by coma and respiratory failure.

Neurological complications of spinal anaesthesia include transient neurological symptoms such as pain of the lower back, buttock and legs.

These symptoms usually develop within twenty-four hours of anaesthesia and resolve within a few days. Isolated cases of arachnoiditis or cauda equina syndrome, with persistent paraesthesia, bowel and urinary dysfunction, or lower limb paralysis have been reported following spinal anaesthesia with lidocaine and other similar agents. The majority of cases have been associated with hyperbaric concentrations of lidocaine or prolonged spinal infusion.

Eye disorders:

Blurred vision, diplopia and transient amaurosis may be signs of lidocaine toxicity.

Bilateral amaurosis may also be a consequence of accidental injection of the optic nerve sheath during ocular procedures. Orbital inflammation and diplopia have been reported following retro- or peribulbar anaesthesia (see section 4.4 Special warnings and precautions for use).

Ear and labyrinth disorders:

Tinnitus, hyperacusis.

Cardiac and vascular disorders:

Cardiovascular reactions are depressant and may manifest as hypotension, bradycardia, myocardial depression, cardiac arrhythmias and possibly cardiac arrest or circulatory collapse.

Hypotension may accompany spinal and epidural anaesthesia. Isolated cases of bradycardia and cardiac arrest have also been reported.

Respiratory, thoracic or mediastinal disorders:

Dyspnoea, bronchospasm, respiratory depression, respiratory arrest.

Gastrointestinal:

Nausea, vomiting.

Skin & subcutaneous tissue disorders:

Rash, urticaria, angioedema, face oedema.

## **4.9 Overdose**

Symptoms of acute systemic toxicity:

Central nervous system toxicity presents with symptoms of increasing severity. Patients may present initially with circumoral paraesthesia, numbness of the tongue, light-headedness, hyperacusis and tinnitus. Visual disturbances and muscular tremors or muscle twitching are more serious and precede the onset of generalised convulsions. These signs must not be mistaken for neurotic behaviour. Unconsciousness and grand mal convulsions may usually follow, which may last from a few second to several minutes. Hypoxia and hypercapnia occur rapidly following convulsions due to increase muscular activity, together with the interference with normal respiration and loss of the airway. In severe cases, apnoea may occur. Acidosis increases the toxic effects of local anaesthetics.

Effects on the cardiovascular system may be seen in severe cases. Hypotension, bradycardia, arrhythmia and cardiac arrest may occur as a result of high systemic concentrations, with potentially fatal outcome.

Recovery occurs as a consequence of redistribution of the local anaesthetic drug from the central nervous system and metabolism and may be rapid unless large amounts of the drug have been injected.

Treatment of acute toxicity

If signs of acute systemic toxicity appear, injection of the anaesthetic should be stopped immediately.

Treatment will be required if convulsions and CNS depression occurs. The objectives of treatment are to maintain oxygenation, stop the convulsions and support the circulation. A patent airway should be established and oxygen should be administered, together with assisted ventilation (mask and bag) if necessary. The circulation should be maintained with infusions of plasma or intravenous fluids. Where further supportive treatment of circulatory depression is required, use of a vasopressor agent may be considered although this involves a risk of CNS excitation. If the convulsions do not stop spontaneously in 15-20 seconds, they may be controlled by the intravenous administration of Diazepam or Thiopentone Sodium, bearing in mind that anti-convulsant drugs may also depress respiration and the circulation. Prolonged convulsions may jeopardize the patient's ventilation and oxygenation and early endotracheal intubation should be considered. If cardiac arrest should occur, standard cardiopulmonary resuscitation procedures should be instituted. Continual optimal oxygenation and ventilation and circulatory support as well as treatment of acidosis are of vital importance.

Dialysis is of negligible value in the treatment of acute overdosage with lidocaine.

## **5. PHARMACOLOGICAL PROPERTIES**

### **5.1 Pharmacodynamic Properties**

Lidocaine is a local anaesthetic of the amide type. It is used to provide local anaesthesia at various sites in the body and it acts by inhibiting the ionic reflexes required for the initiation and conduction of impulses, thereby stabilising the neuronal membrane. In addition to blocking conduction in nerve axons in the peripheral nervous system, lidocaine has important effects on the central nervous system and cardiovascular system. After absorption, lidocaine may cause stimulation of the CNS followed by depression and in the cardiovascular system, it acts primarily on the myocardium where it may produce decreases in electrical excitability, conduction rate and force of contraction.

## **5.2 Pharmacokinetic Properties**

Lidocaine is absorbed from injection sites including muscle and its rate of absorption is determined by factors such as the site of administration and the tissue vascularity. Except for intravascular administration, the highest blood levels occur following intercostal nerve block and the lowest after subcutaneous administration. Lidocaine is bound to plasma proteins, including alpha-1-acid-glycoprotein. The drug crosses the blood-brain and placental barriers.

Lidocaine is metabolised in the liver and about 90% of a given dose undergoes N-dealkylation to form monoethylglycinexylidide and glycinexylidide, both of which may contribute to the therapeutic and toxic effects of lidocaine. Further metabolism occurs and metabolites are excreted in the urine with less than 10% as unchanged lidocaine. The elimination half-life of lidocaine following an intravenous bolus injection is one to two hours, but this may be prolonged in patients with hepatic dysfunction.

## **5.3 Pre-clinical Safety Data**

No further relevant information other than that which is included in other sections of the Summary of Product Characteristics.

## **6. PHARMACEUTICAL PARTICULARS**

### **6.1 List of Excipients**

Sodium Chloride  
Sodium Hydroxide  
Hydrochloric Acid  
Water for Injections

### **6.2 Incompatibilities**

Lidocaine caused precipitation of amphotericin, methohexital sodium and sulfadiazine sodium in glucose injection. It is recommended that admixtures of lidocaine and glyceryltrinitrate should be avoided.

### **6.3 Shelf-Life**

3 years.  
If only part used, discard the remaining solution.

### **6.4 Special Precautions for Storage**

Do not store above 25°C.

**6.5 Nature and Contents of Container**

2ml, 5ml, 10ml & 20ml translucent plastic ampoules, polypropylene Ph. Eur.,  
packed in cardboard cartons to contain 10, 20, 50 and 100 ampoules.

**6.6 Instructions for Use, Handling and Disposal**

Use as directed by the physician.  
Keep out of reach of children.

**7. MARKETING AUTHORISATION HOLDER**

Antigen International Ltd.  
Roscrea  
Co. Tipperary  
Ireland

**8. MARKETING AUTHORISATION NUMBER(S)**

PL 02848/0155.

**9. DATE OF FIRST AUTHORISATION / RENEWAL OF THE  
AUTHORISATION**

26<sup>th</sup> November 1991 / 29<sup>th</sup> July 1997

**10 DATE OF REVISION OF THE TEXT**

09/09/2010