

<p style="text-align: center;"><b>Lidocaine 2% w/v solution for injection</b> <b>Summary of Product Characteristics</b></p>
---

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

Lidocaine 2% w/v solution for injection

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

Each 1 ml of solution for injection contains 20 mg lidocaine hydrochloride.

Each 5 ml of solution contains 100 mg lidocaine hydrochloride.

For a full list of excipients, see section 6.1.

## **3. PHARMACEUTICAL FORM**

Solution for injection.

Clear, colourless solution

## **4. CLINICAL PARTICULARS**

### **4.1 Therapeutic indications**

Lidocaine is a local anaesthetic of the amide group. Lidocaine solution for injection is indicated 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 dosage varies depending on the area to be anaesthetised, vascularity of the tissues, number of neuronal segments to be blocked, individual tolerance and the anaesthetic technique. The lowest dosage needed to provide anaesthesia should be administered.

Unnecessarily high doses of local anaesthetics are to be avoided. In general, surgical anaesthesia (e.g. epidural administration) requires the use of higher concentrations and doses. When blocking smaller nerves, or when a less intense block is required, the use of a lower concentration is indicated. The volume of drug used will affect the extent and spread of anaesthesia. The maximum dose for healthy adults should not exceed 200 mg.

Care should be taken to prevent acute toxic reactions by avoiding intravascular injection. Careful aspiration before and during the injection is recommended. When a large dose is

to be injected, e.g. in epidural block, a test dose of 3 – 5 ml of lidocaine containing adrenaline (epinephrine) is recommended. An accidental intravascular injection may be recognised by a temporary increase in heart rate. The main dose should be injected slowly while keeping in constant verbal contact with the patient. If toxic symptoms occur, the injection should be stopped immediately.

Children: The dosage should be calculated on a weight basis and should not exceed 5 mg/kg.

Standard textbooks should be consulted for factors affecting specific block techniques and for individual patient requirements.

### **4.3 Contra-indications**

Known hypersensitivity to anaesthetics of the amide type or to any of the excipients in the injection.

### **4.4 Special warnings and precautions for use**

As with other local anaesthetics, lidocaine should be used with caution in patients with epilepsy, impaired cardiac conduction, congestive cardiac failure, bradycardia or impaired respiratory function, if the dose or site of administration is likely to produce high blood levels. Lidocaine is metabolised in the liver and it should be used with caution in patients with impaired hepatic function.

Facilities for resuscitation should be available when administering local anaesthetics.

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

Solutions containing adrenaline should be used with caution in patients with hypertension, cardiac disease, cerebrovascular insufficiency, thyrotoxicosis, in patients taking tricyclic antidepressants, MAOI's or receiving potent anaesthetic agents.

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

- 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.
- 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 muscle 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 the local anaesthetic. For this reason, as with all local anaesthetics, the lowest effective concentration and dose of local anaesthetic should be used.

- Injections in the head and neck regions may be made inadvertently into an artery, causing cerebral symptoms even at low doses.
- Paracervical block can sometimes cause foetal bradycardia/tachycardia, and careful monitoring of the foetal heart rate is necessary.

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 with e.g. ephedrine 5-10 mg intravenously and repeated as necessary.

Each 5 ml of Lidocaine 2% w/v solution for injection contains approximately 9.44 mg (0.41 mmol) sodium.

#### **4.5 Interactions with other medicinal products and other forms of interaction**

The speed of onset and duration of action of lidocaine are increased by the addition of a vasoconstrictor such as adrenaline and absorption from the site of injection is reduced.

Dopamine and 5-hydroxytryptamine depletion both reduce the convulsant threshold of lidocaine, and the concomitant use of pethidine increases the incidence of lidocaine-induced convulsions in animals.

Cimetidine and propranolol depress microsomal enzyme activity, thus enhancing lidocaine toxicity during anti-arrhythmic infusions if concomitantly administered with these drugs.

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

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

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

#### **4.6 Pregnancy and lactation**

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

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.

CNS reactions may be excitatory and/or depressant and may manifest as nervousness, tremor, blurred vision, nausea and vomiting, followed by drowsiness, coma and possibly respiratory arrest. The excitatory reactions may be brief or may not occur at all, so that the first signs of toxicity may be drowsiness, followed by coma and respiratory failure. Cardiovascular reactions are depressant and may manifest as hypotension, bradycardia, myocardial depression and possibly cardiac arrest.

Allergic reactions are rare. They may be characterised by cutaneous lesions, urticaria, oedema or anaphylactoid reactions. Skin testing for allergy to lidocaine is not considered to be reliable.

Localised nerve damage at the site of injection (very rare).

Prolonged neural blockade following epidural may be due to delayed spread. Permanent neural blockade may be more likely associated with hypotension and cord ischaemia.

Following regional blockade as when lidocaine is injected intrathecally or extradurally, hypotension, hypoventilation, Horner's Syndrome and hypoglycaemia may be seen. The degree of these effects will depend on the dose and the height of the block. Urinary retention may occur following sacral or lumbar epidural block. It should not outlast the duration of the block. Apnoea and coma followed by aphasia and hemiparesis may occur following stellate ganglion block. The probable cause is a direct injection of lidocaine into the vertebral or carotid arteries.

Profound lethargy and death have been reported following the injection of only

10 – 32 mg of lidocaine for dental blocks.

Diplopia and temporary blindness has been reported following lidocaine for maxillary block, also respiratory arrest following retrobulbar block.

The major adverse effects on the CNS and CVS are primarily due to the absorption of lidocaine into the systemic circulation. Lidocaine may also produce methaemoglobinaemia.

The initial CNS toxic effects are demonstrated by a gradual onset of drowsiness or inebriation similar to alcoholic intoxication. Balance is disturbed, circumoral pins and needles, numb tongue, roaring in the ears, visual disturbances, restlessness and twitching may occur. Severe intoxication of rapid onset may immediately lead to convulsions followed by circulatory depression. Major overdosage may depress all systems simultaneously. Psychotic reactions have been reported following infusion for the control of arrhythmia.

Profound hypotension may be associated with B blockade, widespread sympathetic block from spinal or epidural block, intercostal nerve block administration or supine hypotension in pregnancy.

Ventricular fibrillation occurs less frequently than that seen with bupivacaine.

#### **4.9 Overdose**

The effects of overdosage involve the CNS, where reactions may be excitatory and/or depressant, and the CVS where the effects are depressant. In the event of an overdose, immediate steps should be taken to maintain the circulation and respiration and to control convulsions.

A patent airway should be established and oxygen should be administered, together with assisted ventilation 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. Convulsions 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. If cardiac arrest should occur, standard cardiopulmonary resuscitation procedures should be instituted.

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

### **5. PHARMACOLOGICAL PROPERTIES**

#### **5.1 Pharmacodynamic properties**

ATC Code:N01BB02

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 Preclinical 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 solution for injection should not be mixed with other preparations unless compatibility is known.

### **6.3 Shelf life**

Unopened: 2 years.

#### **6.4 Special precautions for storage**

Do not store above 25°C.

#### **6.5 Nature and contents of container**

5 ml translucent polypropylene ampoules  
Pack size: 20 x 5 ml

#### **6.6 Special precautions for disposal or handling**

Use as directed by the physician.  
Keep out of the reach and sight of children.  
For single use only.  
Use immediately after opening.  
If only part of an ampoule is used, discard the remaining solution.  
The injection should not be used if particles are present.

#### **7. MARKETING AUTHORISATION HOLDER**

Taro Pharmaceuticals Ireland Ltd.,  
Lourdes Road,  
Roscrea,  
County Tipperary,  
Ireland.

#### **8. MARKETING AUTHORISATION NUMBER**

PL 20910/0012

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

15/08/2007

#### **10. DATE OF (PARTIAL) REVISION OF THE TEXT**

15/08/2007

#### **Legal Status**

POM

