

## SUMMARY OF PRODUCT CHARACTERISTICS

### 1. NAME OF THE MEDICINAL PRODUCT

Ropivacaine BioAvenir 2 mg/ml solution for infusion

Ropivacaine BioAvenir 2 mg/ml solution for injection

Ropivacaine BioAvenir 7.5 mg/ml solution for injection

Ropivacaine BioAvenir 10 mg/ml solution for injection

### 2. QUALITATIVE AND QUANTITATIVE COMPOSITION

#### Ropivacaine BioAvenir 2 mg/ml solution for infusion:

1 ml solution for infusion contains ropivacaine hydrochloride 2 mg.

1 bag of 100 ml contains ropivacaine hydrochloride 200 mg.

1 bag of 200 ml contains ropivacaine hydrochloride 400 mg.

#### Ropivacaine BioAvenir 2 mg/ml solution for injection:

1 ml solution for injection contains ropivacaine hydrochloride 2 mg.

1 ampoule of 10 ml contains ropivacaine hydrochloride 20 mg.

1 ampoule of 20 ml contains ropivacaine hydrochloride 40 mg.

#### Ropivacaine BioAvenir 7.5 mg/ml solution for injection:

1 ml solution for injection contains ropivacaine hydrochloride 7.5 mg.

1 ampoule of 10 ml contains ropivacaine hydrochloride 75 mg.

1 ampoule of 20 ml contains ropivacaine hydrochloride 150 mg.

#### Ropivacaine BioAvenir 10 mg/ml solution for injection:

1 ml solution for injection contains ropivacaine hydrochloride 10 mg.

1 ampoule of 10 ml contains ropivacaine hydrochloride 100 mg.

1 ampoule of 20 ml contains ropivacaine hydrochloride 200 mg.

Excipients: 1 ml contains 3 mg sodium.

For a full list of excipients, see section 6.1

### 3. PHARMACEUTICAL FORM

Ropivacaine BioAvenir 2 mg/ml solution for infusion

Ropivacaine Bioavenir 2 mg/ml, 7.5 mg/ml, 10 mg/ml solution for injection for epidural and perineural administration

Solution for injection - Sterile, clear, colourless, isotonic, aqueous solution with pH between 4.0-6.0.

## **4. CLINICAL PARTICULARS**

### **4.1 Therapeutic indications**

Ropivacaine BioAvenir 2mg/ml solution for injection is indicated for acute pain management:

In adults and adolescents above 12 years of age for:

Continuous epidural infusion or intermittent bolus administration during post operative or labour pain.

Field blocks.

Peripheral nerve block via continuous infusion or intermittent bolus injections, e.g: postoperative pain management.

Ropivacaine BioAvenir 2mg/ml solution for infusion is indicated for

In adults and adolescents above 12 years of age for:

Continuous epidural infusion or intermittent bolus administration during post operative or labour pain.

Field blocks.

Peripheral nerve block via continuous infusion or intermittent bolus injections, e.g: postoperative pain management

Ropivacaine 7.5 mg/ml solution for injection is indicated in adults and adolescents above 12 years of age for:

surgical anaesthesia:

- Epidural blocks for surgery, including Caesarean section.
- Major nerve blocks
- Field blocks.

Ropivacaine BioAvenir 10mg/ml solution for injection is indicated in adults and adolescents above 12 years of age for:

Surgical anaesthesia: lumbar epidural administration for surgery.

### **4.2 Posology and method of administration**

For epidural and perineural use.

Ropivacaine Hydrochloride should only be used by, or under the supervision of, clinicians experienced in regional anaesthesia.

## ADULTS AND ADOLESCENT ABOVE 12 YEARS OF AGE

### Posology

The following table is a guide to dosage for the more commonly used blocks. The smallest dose required to produce an effective block should be used. The clinician's experience and knowledge of the patient's physical status are of importance when deciding the dose.

### Dosage recommendations for Ropivacaine BioAvenir in adults and adolescents above 12 years if age.

	Conc. mg/ml	Volume ml	Dose (§) mg	Onset minutes	Duration hours
<b>SURGICAL ANAESTHESIA</b>					
<b>Lumbar Epidural Administration</b>					
Surgery	7.5	15-25	113-188	10-20	3-5
	10	15-20	150-200	10-20	4-6
Caesarean section	7.5	15-20	113-150 <sup>(1)</sup>	10-20	3-5
<b>Thoracic Epidural Administration</b>					
To establish block for post-operative pain relief	7.5	5-15 (dependent on the level of injection)	38-113	10-20	n/a <sup>(2)</sup>
<b>Major Nerve Block*</b>					
Brachial plexus block	7.5	30-40	225-300 <sup>(3)</sup>	10-25	6-10
<b>Field Block</b> (e.g. minor nerve blocks and infiltration)					
	7.5	1-30	7.5-225	1-15	2-6
<b>ACUTE PAIN MANAGEMENT</b>					
<b>Lumbar epidural administration</b>					
Bolus	2	10-20	20-40	10-15	0.5-1.5
Intermittent injections (top-up) (e.g. labour pain management)	2	10-15 (minimum interval 30 minutes)	20-30		
Continuous infusion e.g. labour pain	2	6-10 ml/h	12-20 mg/h	n/a	n/a
Postoperative pain management	2	6-14 ml/h	12-28 mg/h	n/a	n/a
<b>Thoracic epidural administration</b>					
Continuous infusion (postoperative pain management)	2	6-14 ml/h	12-28 mg/h	n/a	n/a
<b>Field Block</b> (e.g. minor nerve blocks and infiltration)					
	2	1-100	2.0-200	1-5	2-6
<b>Peripheral nerve block</b> <b>(femoral or interscalene block)</b>					
Continuous infusion or intermittent injections (e.g. postoperative pain management)	2	5-10 ml/h	10-20 mg/h	n/a	n/a

(§) The doses in the table refers to ropivacaine hydrochloride and are those considered to be necessary to produce a successful block and should be regarded as guidelines for use in adults. Individual variations in onset and duration occur. The figures in the column

'Dose' reflect the expected average dose range of ropivacaine hydrochloride needed. Standard textbooks should be consulted for both factors affecting specific block techniques and individual patient requirements.

- \* With regard to major nerve block, only for brachial plexus block a dose recommendation can be given. For other major nerve blocks lower doses may be required. However, there is presently no experience of specific dose recommendations for other blocks.
- (1) Incremental dosing should be applied, the starting dose about 100 mg (97.5 mg = 13 ml; 105 mg = 14 ml) to be given over 3-5 minutes. Two extra doses , in total an additional 50mg, may be administered as needed.
- (2) n/a = not applicable
- (3) The dose for a major nerve block must be adjusted according to site of administration and patient status. Interscalene and supraclavicular brachial plexus blocks may be associated with a higher frequency of serious adverse reactions, regardless of the local anaesthetic used, (See section 4.4.).

In general, surgical anaesthesia (e.g. epidural administration) requires the use of the higher concentrations and doses. Ropivacaine Hydrochloride 10 mg/ml solution for injection is recommended for epidural anesthesia in which a complete motor block is essential for the surgery. For analgesia (e.g. epidural administration for acute pain management) the lower concentrations and doses are recommended.

### **Method of administration**

Careful aspiration before and during injection is recommended to prevent intravascular injection. When a large dose is to be injected, a test dose of 3-5 ml lidocaine (Xylocaine 1-2%) with adrenaline is recommended. An inadvertent intravascular injection may be recognised by a temporary increase in heart rate and an accidental intrathecal injection by signs of a spinal block.

Aspiration should be performed prior to and during administration of the main dose, which should be injected slowly or in incremental doses, at a rate of 25-50 mg/min, while closely observing the patient's vital functions and maintaining verbal contact. If toxic symptoms occur, the injection should be stopped immediately.

In epidural block for surgery, single doses of up to 250 mg ropivacaine hydrochloride have been used and well tolerated.

In brachial plexus block a single dose of 300 mg has been used in a limited number of patients and was well tolerated.

When prolonged blocks are used, either through continuous infusion or through repeated bolus administration, the risks of reaching a toxic plasma concentration or inducing local neural injury must be considered. Cumulative doses up to 675 mg ropivacaine for surgery and postoperative analgesia administered over 24 hours were well tolerated in adults, as were postoperative continuous epidural infusions at rates up to 28 mg/hour for 72 hours. In a limited number of patients higher doses of up to 800 mg/day have been administered with relatively few adverse reactions.

For treatment of postoperative pain, the following technique can be recommended: Unless preoperatively instituted, an epidural block with Ropivacaine Hydrochloride 7.5 mg/ml is induced via an epidural catheter. Analgesia is maintained with Ropivacaine Hydrochloride 2 mg/ml infusion. Infusion rates of 6-14 ml (12-28 mg), per hour provide adequate analgesia with only slight and non-progressive motor block in most cases of moderate to severe postoperative pain. The maximum duration of epidural block is 3 days. However, close monitoring of analgesic effect should be performed in order to remove the catheter as soon as the pain condition allows it. With this technique

a significant reduction in the need for opioids has been observed.

In clinical studies an epidural infusion of Ropivacaine Hydrochloride 2 mg/ml alone or mixed with fentanyl 1-4 µg/ml has been given for postoperative pain management for up to 72 hours. The combination of Ropivacaine Hydrochloride and fentanyl provided improved pain relief but caused opioid side effects. The combination of Ropivacaine Hydrochloride and fentanyl has been investigated only for Ropivacaine Hydrochloride 2 mg/ml.

When prolonged peripheral nerve blocks are applied, either through continuous infusion or through repeated injections, the risks of reaching a toxic plasma concentration or inducing local neural injury must be considered. In clinical studies, femoral nerve block was established with 300 mg Ropivacaine Hydrochloride 7.5 mg/ml and interscalene block with 225 mg Ropivacaine Hydrochloride 7.5 mg/ml, respectively, before surgery. Analgesia was then maintained with Ropivacaine Hydrochloride 2 mg/ml. Infusion rates or intermittent injections of 10-20 mg per hour for 48 hours provided adequate analgesia and were well tolerated.

Concentrations above 7.5 mg/ml Ropivacaine Hydrochloride have not been documented for Caesarean section.

Until further experience has been gained, Ropivacaine Hydrochloride can not be recommended for use in children below the age of 12 years.

### **4.3 Contra-indications**

- Hypersensitivity to the active substance or to any of the excipients listed in section 6.1 or to other local anaesthetics of the amide type.
- General contra-indications related to epidural anesthesia, regardless of the local anaesthetic used, should be taken into account.
- Intravenous regional anaesthesia.
- Obstetric paracervical anaesthesia.
- Hypovolaemia.

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

Regional anaesthetic procedures should always be performed in a properly equipped and staffed area. Equipment and drugs necessary for monitoring and emergency resuscitation should be immediately available. Patients receiving major blocks should be in an optimal condition and have an intravenous line inserted before the blocking procedure. The clinician responsible should take the necessary precautions to avoid intravascular injection and be appropriately trained and familiar with diagnosis and treatment of side effects, systemic toxicity and other complications (See sections 4.8 Undesirable effects and 4.9 Overdose) such as inadvertent subarachnoid injection which may produce a high spinal block with apnoea and hypotension. Convulsions have occurred most often after brachial plexus block and epidural block. This is likely to be the result of either accidental intravascular injection or rapid absorption from the injection site.

Caution is required to prevent injections in inflamed areas.

### **Cardiovascular**

Epidural and intrathecal anaesthesia may lead to hypotension and bradycardia. Hypotension should be treated promptly with a vasopressor intravenously, and with an adequate vascular filling.

Patients treated with anti-arrhythmic drugs class III (e.g., amiodarone) should be under close surveillance and ECG monitoring considered, since cardiac effects may be additive.

There have been rare reports of cardiac arrest during the use of Ropivacaine for epidural anaesthesia or peripheral nerve blockade, especially after unintentional accidental intravascular administration in elderly patients and in patients with concomitant heart disease. In some instances, resuscitation has been difficult. Should cardiac arrest occur, prolonged resuscitative efforts may be required to improve the possibility of a successful outcome.

### **Head and neck blocks**

Certain local anaesthetic procedures, such as injections in the head and neck regions, may be associated with a higher frequency of serious adverse reactions, regardless of the local anaesthetic used.

### **Major peripheral nerve blocks**

Major peripheral nerve blocks may imply the administration of a large volume of local anaesthetic in highly vascularized areas, often close to large vessels where there is an increased risk of intravascular injection and/or rapid systemic absorption, which can lead to high plasma concentrations.

### **Hypersensitivity**

A possible cross-hypersensitivity with other amide-type local anaesthetics should be taken into account.

### **Hypovolaemia**

Patients with hypovolaemia due to any cause can develop sudden and severe hypotension during epidural anaesthesia, regardless of the local anaesthetic used.

### **Patients in poor general health**

Patients in poor general condition due to ageing or other compromising factors such as partial or complete heart conduction block, advanced liver disease or severe renal dysfunction require special attention, although regional anaesthesia is frequently indicated in these patients.

### **Patient with hepatic and renal impairment**

Ropivacaine is metabolised in the liver and should therefore be used with caution in patients with severe liver disease; repeated doses may need to be reduced due to delayed elimination. Normally there is no need to modify the dose in patients with impaired renal function when used for single dose or short term treatment. Acidosis and reduced plasma protein concentration, frequently seen in patients with chronic renal failure, may increase the risk of systemic toxicity.

### **Acute porphyria**

Ropivacaine solution for injection and infusion is possibly porphyrinogenic and should only be prescribed to patients with acute porphyria when no safer alternative is available. Appropriate precautions should be taken in the case of vulnerable patients, according to standard textbooks and/or in consultation with disease area experts.

## **Chondrolysis**

There have been post-marketing reports of chondrolysis in patients receiving post-operative intra-articular continuous infusion of local anaesthetics, including ropivacaine. The majority of reported cases of chondrolysis have involved the shoulder joint. Intra-articular continuous infusion is not an approved indication for Ropivacaine BioAvenir. Intra-articular continuous infusion with Ropivacaine BioAvenir should be avoided, as the efficacy and safety has not been established.

## **Excipients with recognised action/effect**

This medicinal product contains 3 mg sodium per ml. To be taken into consideration by patients on a controlled sodium diet.

## **Prolonged administration**

Prolonged administration of ropivacaine should be avoided in patients concomitantly treated with strong CYP1A2 inhibitors, such as fluvoxamine and enoxacin, (See section 4.5).

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

Ropivacaine should be used with caution in patients receiving other local anaesthetics or agents structurally related to amide-type local anaesthetics, e.g. certain antiarrhythmics, such as lidocaine and mexiletine, since the systemic toxic effects are additive. Simultaneous use of Ropivacaine with general anaesthetics or opioids may potentiate each others (adverse) effects. Specific interaction studies with ropivacaine and anti-arrhythmic drugs class III (e.g., amiodarone) have not been performed, but caution is advised (See also section 4.4).

Cytochrome P450 (CYP) 1A2 is involved in the formation of 3-hydroxy ropivacaine, the major metabolite. *In vivo* the plasma clearance of ropivacaine was reduced by up to 77% during coadministration of fluvoxamine, a selective and potent CYP1A2 inhibitor. Thus strong inhibitors of CYP1A2, such as fluvoxamine and enoxacin, given concomitantly during prolonged administration of Ropivacaine, can interact with Ropivacaine. Prolonged administration of ropivacaine should be avoided in patients concomitantly treated with strong CYP1A2 inhibitors. (See also section 4.4).

*In vivo* the plasma clearance of ropivacaine was reduced by 15 % during coadministration of ketoconazole, a selective and potent inhibitor of CYP3A4. However the inhibition of this isozyme is not likely to have clinical relevance.

*In vitro* ropivacaine is a competitive inhibitor of CYP2D6 but does not seem to inhibit this isozyme at clinically attained plasma concentrations.

## **4.6 Pregnancy and lactation**

### Pregnancy

Apart from epidural administration for obstetrical use, there are no adequate data on the use of ropivacaine in human pregnancy. Experimental animal studies do not indicate direct or indirect harmful effects with respect to pregnancy, embryonal/fœtal development, parturition or postnatal development (See section 5.3).

### Lactation

There are no data available concerning the excretion of ropivacaine into human milk.

## **4.7 Effects on ability to drive and use machines**

No data are available. Depending on the dose, local anaesthetics may have a minor influence on

mental function and coordination even in the absence of overt CNS toxicity and may temporarily impair locomotion and alertness.

#### **4.8 Undesirable effects**

##### General

The adverse reaction profile for Ropivacaine is similar to those for other long acting local anaesthetics of the amide type. Adverse reactions should be distinguished from the physiological effects of the nerve block itself e.g. Hypotension (a decrease in blood pressure), bradycardia during spinal/ epidural block.

##### Table of adverse reactions

The following frequencies are used for the description of the occurrence of adverse reactions: very common ( $\geq 1/10$ ), common ( $\geq 1/100$  to  $< 1/10$ ), uncommon ( $\geq 1/1,000$  to  $< 1/100$ ), rare ( $\geq 1/10,000$  to  $< 1/1,000$ ), very rare ( $< 1/10,000$ ) and not known (cannot be estimated from the available data).



<b>System organ class</b>	<b>Frequency</b>	<b>Undesirable effects</b>
Immune system disorders	Rare	Allergic reactions (anaphylactic reactions, angioneurotic oedema and urticaria)
Psychiatric Disorders	Uncommon	Anxiety
Nervous System Disorders	Common	Paraesthesia, dizziness, headache
	Uncommon	Symptoms of CNS toxicity (convulsions, grand mal convulsions, seizures, light headedness, circumoral paraesthesia, numbness of the tongue, hyperacusis, tinnitus, visual disturbances, dysarthria, muscular twitching, tremor)*, hypoaesthesia
	Not known	Dyskinesia
Cardiac Disorders	Common	Bradycardia, tachycardia
	Rare	Cardiac arrest, cardiac arrhythmias
Vascular Disorders	Very common	Hypotension
	Common	Hypertension
	Uncommon	Syncope
Respiratory, Thoracic and Mediastinal Disorders	Uncommon	Dyspnoea
Gastrointestinal Disorders	Very common	Nausea
	Common	Vomiting
Musculoskeletal and connective tissue disorders	Common	back pain
Renal and Urinary Disorders	Common	Urinary retention
General Disorders and Administration Site Conditions	Common	Temperature elevation, Chills
	Uncommon	Hypothermia

\* These symptoms usually occur because of inadvertent intravascular injection, overdose or rapid absorption, see section 4.9.

## **Class-related adverse drug reactions**

### ***Neurological complications***

Neuropathy and spinal cord dysfunction (e.g. anterior spinal artery syndrome, arachnoiditis, cauda equina), which may result in rare cases of permanent sequelae, have been associated with regional anaesthesia, regardless of the local anaesthetic used.

### ***Total spinal block***

Total spinal block may occur if an epidural dose is inadvertently administered intrathecally.

### ***Acute systemic toxicity***

Systemic toxic reactions primarily involve the central nervous system (CNS) and the cardiovascular system (CVS). Such reactions are caused by high blood concentration of a local anaesthetic, which may appear due to (accidental) intravascular injection, overdose or exceptionally rapid absorption from highly vascularized areas, see also section 4.4. CNS reactions are similar for all amide local anaesthetics, while cardiac reactions are more dependent on the drugs, both quantitatively and qualitatively.

### ***Central nervous system toxicity***

Central nervous system toxicity is a graded response with symptoms and signs of escalating severity. Initially symptoms such as visual or hearing disturbances, perioral numbness, dizziness, light-headedness, tingling and paraesthesia are seen. Dysarthria, muscular rigidity and muscular twitching are more serious and may precede the onset of generalised convulsions. These signs must not be mistaken for neurotic behaviour. Unconsciousness and grand mal convulsions may follow, which may last from a few seconds to several minutes. Hypoxia and hypercarbia occur rapidly during convulsions due to the increased muscular activity, together with the interference with respiration. In severe cases even apnoea may occur. The respiratory and metabolic acidosis increases and extends the toxic effects of local anaesthetics.

Recovery follows the redistribution of the local anaesthetic drug from the central nervous system and subsequent metabolism and excretion. Recovery may be rapid unless large amounts of the drug have been injected.

### ***Cardiovascular system toxicity***

*Cardiovascular toxicity* indicates a more severe situation. Hypotension, bradycardia, arrhythmia and even cardiac arrest may occur as a result of high systemic concentrations of local anaesthetics. In volunteers the intravenous infusion of ropivacaine resulted in signs of depression of conductivity and contractility.

Cardiovascular toxic effects are generally preceded by signs of toxicity in the central nervous system, unless the patient is receiving a general anaesthetic or is heavily sedated with drugs such as benzodiazepines or barbiturates.

### **Treatment of acute systemic toxicity**

(See section 4.9)

### **Reporting of suspected adverse reactions**

Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Any suspected adverse event should be reported to the Ministry of Health according to the National Regulation by using an online form <https://sideeffects.health.gov.il/>

## **4.9 Overdose**

### Symptoms

Accidental intravascular injections of local anaesthetics may cause immediate (within seconds to a few minutes) systemic toxic reactions. In the event of overdose, peak plasma concentrations may not be reached for one to two hours, depending on the site of the injection, and signs of toxicity may thus be delayed. (See section 4.8).

### **Treatment**

If signs of acute systemic toxicity appear, injection of the local anaesthetic should be stopped immediately and CNS symptoms (convulsions, CNS depression) must promptly be treated with appropriate airway/respiratory support and the administration of anticonvulsant drugs.

If circulatory arrest should occur, immediate cardiopulmonary resuscitation should be instituted. Optimal oxygenation and ventilation and circulatory support as well as treatment of acidosis are of vital importance.

If cardiovascular depression occurs (hypotension, bradycardia), appropriate treatment with intravenous fluids, vasopressor, and or inotropic agents should be considered. Children should be given doses commensurate with age and weight.

Should cardiac arrest occur, a successful outcome may require prolonged resuscitative efforts.

## **5. PHARMACOLOGICAL PROPERTIES**

### **5.1 Pharmacodynamic properties**

Pharmacotherapeutic group: Anaesthetics, local, Amides

ATC code: N01B B09

Ropivacaine is a long-acting amide-type local anaesthetic with both anaesthetic and analgesic effects. At high doses Ropivacaine produces surgical anaesthesia, while at lower doses it produces sensory block with limited and non-progressive motor block.

The mechanism is a reversible reduction of the membrane permeability of the nerve fibre to sodium ions. Consequently the depolarisation velocity is decreased and the excitable threshold increased, resulting in a local blockade of nerve impulses.

The most characteristic property of ropivacaine is the long duration of action. Onset and duration of the local anaesthetic efficacy are dependent upon the administration site and dose, but are not influenced by the presence of a vasoconstrictor (e.g. adrenaline (epinephrine)). For details concerning the onset and duration of action of Ropivacaine, see table under posology and method of administration.

Healthy volunteers exposed to intravenous infusions tolerated ropivacaine well at low doses and with expected CNS symptoms at the maximum tolerated dose. The clinical experience with this drug indicates a good margin of safety when adequately used in recommended doses.

## 5.2 Pharmacokinetic properties

### Absorption

Ropivacaine has a chiral centre and is available as the pure S-(-)- enantiomer.

It is highly lipid soluble. All metabolites have a local anaesthetic effect but of considerably lower potency and shorter duration than that of ropivacaine.

There is no evidence of in vivo racemisation of ropivacaine.

The plasma concentration of ropivacaine depends upon the dose, the route of administration and the vascularity of the injection site. Ropivacaine follows linear pharmacokinetics and the  $C_{\max}$  is proportional to the dose.

Ropivacaine shows complete and biphasic absorption from the epidural space, with half-lives of the two phases of the order of 14 min and 4 h in adults. The slow absorption is the rate-limiting factor in the elimination of ropivacaine, which explains why the apparent elimination half-life is longer after epidural than after intravenous administration.

### Distribution

Ropivacaine has a mean total plasma clearance in the order of 440 ml/min, a renal clearance of 1 ml/min, a volume of distribution at steady state of 47 liters and a terminal half-life of 1.8 h after i.v. administration. Ropivacaine has an intermediate hepatic extraction ratio of about 0.4. It is mainly bound to  $\alpha_1$ -acid glycoprotein in plasma with an unbound fraction of about 6%.

An increase in total plasma concentrations during continuous epidural and interscalene infusion has been observed, related to a postoperative increase of  $\alpha_1$ -acid glycoprotein. Variations in unbound, i.e. pharmacologically active, concentration have been much less than in total plasma concentration.

### Elimination

Since ropivacaine has an intermediate to low hepatic extraction ratio, its rate of elimination should depend on the unbound plasma concentration. A postoperative increase in AAG will decrease the unbound fraction due to increased protein binding, which will decrease the total clearance and result in an increase in total plasma concentrations, as seen in the paediatric and adult studies. The unbound clearance of ropivacaine remains unchanged as illustrated by the stable unbound concentrations during postoperative infusion. It is the unbound plasma concentration that is related to systemic pharmacodynamic effects and toxicity.

Ropivacaine readily crosses the placenta and equilibrium in regard to unbound concentration will be rapidly reached. The degree of plasma protein binding in the foetus is less than in the mother, which results in lower total plasma concentrations in the foetus than in the mother.

Ropivacaine is extensively metabolised, predominantly by aromatic hydroxylation. In total, 86% of the dose is excreted in the urine after intravenous administration, of which only about 1% relates to unchanged drug. The major metabolite is 3-hydroxy-ropivacaine, about 37% of which is excreted in

the urine mainly conjugated. Urinary excretion of 4-hydroxy-ropivacaine the N-dealkylated metabolite (PPX) and the 4-hydroxy-dealkylated metabolite accounts for 1-3%. Conjugated and unconjugated 3-hydroxy-ropivacaine shows only detectable concentrations in plasma.

Impaired renal function has little or no influence on ropivacaine pharmacokinetics. The renal clearance of PPX is significantly correlated with creatinine clearance. A lack of correlation between total exposure, expressed as AUC, with creatinine clearance indicates that the total clearance of PPX includes a non-renal elimination in addition to renal excretion. Some patients with impaired renal function may show an increased exposure to PPX resulting from a low non-renal clearance. Due to the reduced CNS toxicity of PPX as compared to ropivacaine the clinical consequences are considered negligible in short-term treatment. Patients with end-stage renal disease undergoing dialysis have not been studied.

### **5.3 Preclinical Safety Data**

Based on conventional studies of safety pharmacology, single and repeated dose toxicity, reproduction toxicity, mutagenic potential and local toxicity, no hazards for humans were identified other than those which can be expected on the basis of the pharmacodynamic action of high doses of ropivacaine (e.g. CNS signs, including convulsions, and cardiotoxicity).

## **6. PHARMACEUTICAL PARTICULARS**

### **6.1 List of excipients**

Sodium chloride  
Hydrochloric acid 3.6% w/v (E507)  
Sodium hydroxide (E524) (for pH-adjustment)  
Water for injection

### **6.2 Incompatibilities**

Studies carried out on alkaline solutions, showed that ropivacaine has poor solubility at pH > 6.0 and therefore precipitation may occur.

### **6.3 Shelf-life**

The expiry date of the product is indicated on the packaging materials

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

Do not store above 25°C. Do not refrigerate or freeze.

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

#### **Ropivacaine BioAvenir 2 mg/ml solution for infusion:**

- 100 ml transparent polypropylene bags in sterile plastic cover, pack of 5
- 200 ml transparent polypropylene bags in sterile plastic cover, pack of 5

**Ropivacaine Bioavenir 2 mg/ml solution for injection:**

- 10 ml transparent polypropylene ampoules in sterile plastic cover, pack of 5
- 20 ml transparent polypropylene ampoules in sterile plastic cover, pack of 5

**Ropivacaine Bioavenir 7.5 mg/ml solution for injection:**

- 10 ml transparent polypropylene ampoules in sterile plastic cover, pack of 5
- 20 ml transparent polypropylene ampoules in sterile plastic cover, pack of 5

**Ropivacaine Bioavenir 10 mg/ml solution for injection:**

- 10 ml transparent polypropylene ampoules in sterile plastic cover, pack of 5
- 20 ml transparent polypropylene ampoules in sterile plastic cover, pack of 5

Not all pack-sizes may be marketed.

**6.6 Special precautions for disposal and other handling****Ropivacaine Bioavenir 2 mg/ml; 7.5 mg/ml; 10 mg/ml solution for injection**

The solution for injection is preservative free and is intended for single use only. Discard any unused solution.

The medicinal product is to be visually inspected prior to use: only clear solutions practically free from particles should be used.

Do not re-autoclaved the container: when a sterile outside is required, the intact covered container should be used.

The polypropylene ampoules are especially designed to fit Luer Lock and Luer fit syringes.

**Ropivacaine BioAvenir 2 mg/ml solution for infusion**

The solution for infusion is preservative free and is intended for single use only. Discard any unused solution.

Physical and chemical stability of the solution after opening was demonstrated for 24 hours at 2-8<sup>0</sup> C. From microbiological point of view the product should be used immediately.

The medicinal product is to be visually inspected prior to use. only clear solutions practically free from particles should be used.

On the bag there are the insertion port for the infusion device and the injection port to inject other pharmaceutical products into the solution.

**7. LICENSES' REGISTRATION NUMBERS**

2mg/ml infusion bags - 153-67-33924-00, 153-67-33924-01, 153-67-33924-02

2mg/ml ampoules - 153-22-33926-00, 153-22-33926-01

7.5mg/ml ampoules - 153-23-33927-00, 153-23-33927-01

10mg/ml ampoules - 153-24-33928-00, 153-24-33928-01

**8. MANUFACTURER**

L. Molteni & C. dei F.lli Alitti Società di Esercizio S.p.A.

Strada Statale 67 Frazione Granatieri

50018 Scandicci (Firenze)

Italy

**9. LICENSE HOLDER AND IMPORTER**  
BioAvenir Ltd.  
1 David Hamelech St. Herzelia Pituach 4666101

**Revised in 11/2021**

Ropi-2mg,7.5mg,10mg, 11/21-01