

## **SUMMARY OF PRODUCT CHARACTERISTICS**

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

Buspirone Hydrochloride 15 mg Tablets

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

Each tablet contains 15 mg buspirone hydrochloride.

Excipient with known effect:

Each tablet contains 123.09 mg anhydrous lactose.

For the full list of excipients, see section 6.1.

### **3 PHARMACEUTICAL FORM**

Tablet

White to off-white, flat faced, capsule shaped tablet, scored and debossed with 5/5/5 on one side and 1/00 on other side. The tablet can be divided into equal halves

### **4 CLINICAL PARTICULARS**

#### **4.1 Therapeutic indications**

Buspirone is indicated for the treatment of short-term management of anxiety disorders and the relief of symptoms of anxiety with or without accompanying symptoms of depression.

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

*Posology*

The dosage should be individualised for each patient.

*Adults (including the elderly):* the usual starting dosage is 5mg given two to three times per day. The dosage may be increased every 2-3 days. The usual therapeutic dosage is 15 to 30 mg daily in divided doses. The maximum recommended dose should not exceed 60 mg per day.

Food increases the bioavailability of buspirone. Buspirone should be taken at the same time each day and consistently with or without food. If buspirone is administered with a potent CYP3A4 inhibitor, the initial dose should be lowered and only increased gradually after medical evaluation (see section 4.5).

Grapefruit juice increases the plasma concentrations of buspirone. Patients taking buspirone should avoid consuming large quantities of grapefruit juice.

#### *Renal impairment*

After a single administration to patients with mild to moderate renal insufficiency (creatinine clearance 20-49 ml/min/1.72 m<sup>2</sup>) a slight increase in the buspirone blood levels was seen, without increase of the half-life time. In these patients buspirone should be administered with caution and a low dosage, two-times daily, is advised. The response and the symptoms of the patients should be evaluated carefully, before an eventual increase of the dosage is made. A single administration to anuric patients causes an increase in the blood levels of the metabolite 1-pyrimidine/piperazine (1-PP), in which dialysis did not prove to have any influence on the buspirone levels, neither on the 1-PP levels. Buspirone should not be administered to patients with a creatinine clearance < 20 ml/min/1.72 m<sup>2</sup>), especially not to anuric patients, because of the fact that increased and untreated levels of buspirone and its metabolites may occur.

#### *Hepatic impairment*

As may be expected agents as buspirone used in patients with a reduced liver function show a reduced “first pass effect”. After a single administration to patients with liver cirrhosis, higher maximum concentrations of unchanged buspirone are seen, with an increase in the half life time. In these patients buspirone should be used with caution and individual dosages should be titrated with care to reduce the chance of central undesirable effects, which may occur because of high maximum concentrations of buspirone. Increased dosages should be considered carefully and only after 4-5 days experience with the prior dosage.

#### Elderly Patients

Current data do not support a change in dosage regimen based on age or sex of the patient.

#### *Paediatric population:*

Placebo-controlled trials, in which 334 patients were treated with buspirone for up to six weeks, have not shown buspirone at doses recommended for adults to be an effective treatment for generalised anxiety disorder in patients less than 18 years.

Plasma concentrations of buspirone and its active metabolite were higher in paediatric patients, compared to adults given equivalent doses. (see 5.2, Pharmacokinetic Properties.)

#### *Method of administration*

For oral administration.

### **4.3 Contraindications**

Buspirone is contraindicated in the following groups of patients.

- patients with known hypersensitivity to the active substance or to any of the excipients listed in section 6.1.
- patients with severe renal (defined as a creatinine clearance less than 20ml/min/1.72 m<sup>2</sup> or a plasma creatinine above 200micromoles/litre) or severe hepatic insufficiency.
- acute intoxication with alcohol, hypnotics, analgesics, or antipsychotic drugs.
- patients with epilepsy.

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

The administration of buspirone to a patient taking a monoamine oxidase inhibitor (MAOI) may pose a hazard. There have been reports of the occurrence of elevated blood pressure when buspirone has been added to a regimen including a MAOI. Therefore, it is recommended that buspirone not be used concomitantly with a MAOI.

Buspirone should be used with caution in patients with:

- acute narrow-angle glaucoma.
- myasthenia gravis.
- drug dependence.
- a history of renal or hepatic impairment.
- alcohol use should be avoided, although buspirone has not been reported to potentiate the psychomotor impairment produced by alcohol. No data are available on concomitant use of alcohol and single doses of buspirone greater than 20mg.
- buspirone does not exhibit cross-tolerance with benzodiazepines and other common sedative/hypnotic agents. It will not block the withdrawal syndrome often seen with cessation of therapy with these agents. Patients should be gradually withdrawn from these agents before initiating buspirone treatment.

Buspirone should not be used alone to treat depression and may potentially mask the clinical signs of depression.

#### *Paediatric population*

The long-term safety and effectiveness of buspirone have not been determined in individuals below 18 years of age. Buspirone is not recommended in children and adolescents (see section 4.2).

#### *Drug abuse and dependence*

Buspirone is not a controlled substance.

Buspirone has shown no potential for drug abuse and dependence based on human and animal studies.

#### *Potential for withdrawal reactions in sedative/hypnotic/anxiolytic drug-dependent patients*

Because buspirone does not exhibit cross-tolerance with benzodiazepines and other common sedative/hypnotic drugs, it will not block the withdrawal syndrome often seen with cessation of therapy with these drugs. Therefore, before starting therapy with buspirone, it is advisable to withdraw these drugs gradually, especially in patients who have been using a CNS-depressant drug chronically.

#### *Long-term toxicity*

Because its mechanism of action is not fully elucidated, long-term toxicity in the CNS or other organ systems cannot be predicted.

#### *Lactose*

Patients with rare hereditary problems of galactose intolerance, total lactase deficiency or glucose-galactose malabsorption should not take this medicine.

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

The concomitant use of buspirone with other CNS-active drugs should be approached with caution.

#### **Effect of other drugs on buspirone**

*Association not recommended:*

*MAO inhibitors:* Co-administration of MAO inhibitors may cause increases in blood pressure. Co-administration of MAO inhibitors and buspirone is therefore not recommended (see section 4.4).

*Erythromycin:* Concomitant administration of buspirone (10 mg as single dose) and erythromycin (1.5 g once daily for four days) in healthy volunteers increased the plasma concentrations of buspirone (C<sub>max</sub> increased 5-fold and AUC 6-fold). If buspirone and erythromycin are to be used in combination, a low dose of buspirone (e.g., 2.5 mg twice daily) is recommended. Subsequent dose adjustments of either drug should be based on clinical response.

*Itraconazole:* Concomitant administration of buspirone (10 mg as single dose) and itraconazole (200 mg once daily for four days) in healthy volunteers increased the plasma concentrations of buspirone (C<sub>max</sub> increased 13-fold and AUC 19-fold). If buspirone and itraconazole are to be used in combination, a low dose of buspirone (e.g., 2.5 mg once daily) is recommended. Subsequent dose adjustments of either drug should be based on clinical response.

*Association with precautions of use:*

*Diltiazem:* Concomitant administration of buspirone (10 mg as single dose) and diltiazem (60 mg three times daily) in healthy volunteers increased the plasma concentrations of buspirone (C<sub>max</sub> increased 5.3-fold and AUC 4-fold). Enhanced effects and increased toxicity of buspirone may be possible when buspirone is administered with diltiazem. Subsequent dose adjustments of either drug should be based on clinical response.

*Verapamil:* Concomitant administration of buspirone (10 mg as single dose) and verapamil (80 mg three times daily) in healthy volunteers increased the plasma concentrations of buspirone (C<sub>max</sub> and AUC increased 3.4-fold). Enhanced effects and increased toxicity of buspirone may be possible when buspirone is administered with verapamil. Subsequent dose adjustments of either drug should be based on clinical response.

*Rifampicin:* Rifampicin induces the metabolism of buspirone via CYP3A4. Therefore, concomitant administration of buspirone (30 mg as single dose) and rifampicin (600 mg once daily for 5 days) in healthy volunteers decreased the plasma concentrations (C<sub>max</sub> decreased 84 % and AUC decreased 90 %) and the pharmacodynamic effect of buspirone.

- Antidepressants - the occurrence of elevated blood pressure in patients receiving buspirone and monoamine oxidase inhibitors (phenelzine and tranylcypromine) has been reported. Buspirone should not be used concomitantly with a MAOI. In healthy volunteers no interaction with the tricyclic antidepressant amitriptyline was seen.
- Baclofen, lofexidine, nabilone, antihistamines may enhance any sedative effect.

*Association to be taken into account:*

**SSRI:** The combination of buspirone and selective serotonin reuptake inhibitors (SSRI) was tested in a number of clinical trials on more than 300,000 patients. Although no severe toxicities were observed, there were rare cases of seizures in patients that took SSRI and buspirone concomitantly.

Separate cases of seizures in patients administered combination therapy with buspirone and SSRIs have been reported from regular clinical use.

Buspirone should be used with caution in combination with serotonergic drugs (including MAOIs, L-tryptophan, triptans, tramadol, linezolid, SSRIs, lithium and St. John's Wort) as there are isolated reports of serotonin syndrome occurring in patients on concomitant SSRI therapy. If this condition is suspected, treatment with buspirone should be immediately discontinued and supportive symptomatic treatment should be initiated.

**Protein Binding:** *In vitro* buspirone may displace less firmly protein-bound drugs like digoxin. The clinical significance of this property is unknown.

**Nefazodone:** The coadministration of buspirone (2.5 or 5 mg twice daily) and nefazodone (250 mg twice daily) to healthy volunteers resulted in marked increases in plasma buspirone concentrations (increases up to 20-fold in C<sub>max</sub> and up to 50-fold in AUC) and statistically significant decreases (about 50%) in plasma concentrations of buspirone metabolite, 1-pyrimidinylpiperazine. With 5-mg twice daily doses of buspirone, slight increases in AUC were observed for nefazodone (23%) and its metabolites hydroxynefazodone (HO-NEF) (17%) and mCPP (9%). Slight increases in C<sub>max</sub> were observed for nefazodone (8%) and its metabolite HO-NEF (11%).

The side effect profile for subjects receiving buspirone 2.5 mg twice daily and nefazodone 250 mg twice daily was similar to that for subjects receiving either drug alone. Subjects receiving buspirone 5 mg twice daily and nefazodone 250 mg twice daily experienced side effects such as light headedness, asthenia, dizziness, and somnolence. It is recommended that the dose of buspirone be lowered when administered with nefazodone. Subsequent dose adjustments of either drug should be based on clinical response.

**Grapefruit juice:** Concomitant administration of buspirone 10 mg and grapefruit juice (double strength 200 ml for 2 days) in healthy volunteers increased the plasma concentrations of buspirone (C<sub>max</sub> increased 4.3-fold and AUC 9.2-fold).

**Other Inhibitors and Inducers of CYP3A4:** *In vitro* studies have shown that buspirone is metabolised by cytochrome P450 3A4 (CYP3A4). When administered with a potent inhibitor of CYP3A4, a low dose of buspirone such as 2.5 mg twice daily, should be used cautiously. When used in combination with a potent inducer of CYP3A4, e.g., phenobarbital, phenytoin, carbamazepine, St. John's wort, an

adjustment of the dosage of buspirone may be necessary to maintain buspirone's anxiolytic effect.

*Fluvoxamine:* In short-term treatment with fluvoxamine and buspirone doubled buspirone plasma concentrations are observed compared to mono-therapy with buspirone.

*Trazodone:* Concomitant administration of trazodone showed a 3-6 fold increase of ALT in some patients.

*Cimetidine:* The concomitant use of buspirone and cimetidine has shown a slight increase in the 1-(2-pyrimidinyl)-piperazine metabolite of Buspirone. Because of the high protein binding of Buspirone (around 95%) caution is advised when drugs with a high protein binding are given concomitantly.

*In vitro* studies have shown that buspirone does not displace warfarin, digoxin, phenytoin, or propranolol from plasma proteins.

Baclofen, lofexidine, nabilone, antihistamines may enhance any sedative effect.

### **Effect of buspirone on other drugs**

*Diazepam:* After addition of buspirone to the diazepam dose regimen, no statistically significant differences in the steady-state pharmacokinetic parameters (C<sub>max</sub>, AUC, and C<sub>min</sub>) were observed for diazepam, but increases of about 15% were seen for nordiazepam, and minor adverse clinical effects (dizziness, headache, and nausea) were observed.

*Haloperidol:* Concomitant administration of haloperidol and buspirone can increase haloperidol serum levels.

*Digoxin:* In humans, approximately 95% of buspirone is plasma protein bound. In vitro, buspirone does not displace tightly bound drugs (i.e. warfarin) from serum proteins. However, *in vitro*, buspirone may displace less firmly protein-bound drugs like digoxin. The clinical significance of this property is unknown.

There are reports on increases in the prothrombin time after the addition of buspirone to a treatment regimen containing warfarin.

## **4.6 Fertility, pregnancy and lactation**

### Pregnancy

There are no or limited amount of data from the use of buspirone in pregnant women.

As a precautionary measure, it is preferable to avoid the use of buspirone during pregnancy.

The effect of buspirone on labour and delivery is unknown.

#### Fertility

Animal studies do not indicate direct or indirect harmful effects with respect to reproductive toxicity (see section 5.3).

#### Breast-Feeding

It is unknown whether buspirone or its metabolite/metabolites are excreted in human milk.

A decision must be made whether to discontinue breast-feeding or to discontinue/abstain from buspirone therapy taking into account the benefit of breast feeding for the child and the benefit of therapy for the woman.

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

Buspirone has moderate influence on the ability to drive and use machines. Attention is drawn to the risks associated with drowsiness or dizziness induced by this drug (see section 4.8).

This medicine can impair cognitive function and can affect a patient's ability to drive safely. This class of medicine is in the list of drugs included in regulations under 5a of the Road Traffic Act 1988. When prescribing this medicine, patients should be told:

- The medicine is likely to affect your ability to drive.
- Do not drive until you know how the medicine affects you.
- It is an offence to drive while under the influence of this medicine.
- However, you would not be committing an offence (called 'statutory defence') if:
  - The medicine has been prescribed to treat a medical or dental problem and
  - You have taken it according to the instructions given by the prescriber and in the information provided with the medicine and

It was not affecting your ability to drive safely.

### **4.8 Undesirable effects**

Side effects of buspirone, if they occur, are generally observed at the beginning of drug therapy and usually subside with use of the medication and/or decreased dosage.



### Clinical experience

When patients receiving buspirone were compared with patients receiving placebo, dizziness, headache, nervousness, lightheadedness, nausea, excitement, and sweating/clamminess were the only side effects occurring with significantly greater frequency ( $p < 0.10$ ) in the buspirone group than in the placebo group.

The list of undesirable effects shown below is presented by system organ class, MedDRA preferred term, and frequency using the following frequency categories: very common ( $\geq 1/10$ ), common ( $\geq 1/100$  to  $< 1/10$ ), rare ( $\geq 1/10,000$  to  $< 1/1,000$ ) and very rare ( $< 1/10,000$ ).

### ADVERSE DRUG EVENTS REPORTED DURING CLINICAL EXPERIENCE

System Organ Class	Frequency	MedDRA Terms
<i>Psychiatric Disorders</i>	common	nervousness, insomnia, disturbance in attention, depression, confusional state, sleep disorder, anger, excitement
	very rare	psychotic disorder, hallucination, depersonalization, affect lability
<i>Nervous System Disorders</i>	very common	dizziness*, headache, somnolence
	common	paraesthesia, coordination abnormal, tremor
	very rare	serotonin syndrome, convulsion, extrapyramidal disorder, cogwheel rigidity, dyskinesia, dystonia, syncope, amnesia, ataxias, Parkinsonism, akathisia, restless leg syndrome, restlessness
<i>Eye disorders</i>	common	vision blurred
	very rare	tunnel vision
<i>Ear and labyrinth disorders</i>	common	tinnitus
<i>Cardiac Disorders</i>	common	tachycardia, chest pain
<i>Respiratory, Thoracic and Mediastinal Disorders</i>	common	nasal congestion, pharyngolaryngeal pain
<i>Gastrointestinal Disorders</i>	common	nausea, abdominal pain, dry mouth, diarrhoea, constipation, vomiting
<i>Skin and Subcutaneous Tissue Disorders</i>	common	cold sweat, rash
	rare	angioneurotic oedema, ecchymosis, urticaria
<i>Musculoskeletal and Connective Tissue Disorders</i>	common	musculoskeletal pain
<i>Renal and Urinary Disorders</i>	very rare	urinary retention

<i>Reproductive System and Breast Disorders</i>	very rare	galactorrhoea
<i>General Disorders and Administration Site Conditions</i>	common	fatigue

\* Dizziness includes light-headedness.

#### 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. Healthcare professionals are asked to report any suspected adverse reactions via Yellow Card Scheme

Website: [www.mhra.gov.uk/yellowcard](http://www.mhra.gov.uk/yellowcard) or search for MHRA Yellow Card in the Google Play or Apple App Store.

## **4.9 Overdose**

#### Recommended overdose treatment

In normal volunteers, the maximum tolerated dose of buspirone was 375 mg/day. As the maximum dose levels were approached, the most commonly observed symptoms were nausea, vomiting, headache, dizziness, drowsiness, tinnitus, restlessness, miosis, and gastric distress. Mild bradycardia and hypotension have been reported. Extrapyramidal symptoms have been reported after therapeutic doses. Rarely convulsions may occur.

No specific antidote exists. Buspirone hydrochloride is not removed by haemodialysis. The stomach should be emptied as quickly as possible.

#### Management

Treatment should be symptomatic and supportive. The ingestion of multiple agents should be suspected. The benefit of gastric decontamination is uncertain. Consider activated charcoal if the patient presents within 1 hour of ingestion of more than 5mg/kg provided they are not too drowsy.

## **5 PHARMACOLOGICAL PROPERTIES**

### **5.1 Pharmacodynamic properties**

Pharmacotherapeutic group: Anxiolytics, azaspirodecanedione derivatives, ATC code N05B E01

Buspirone is a member of the azapirone class of drugs. It has anxiolytic activity, but is largely lacking in sedative and muscle relaxant effects and anticonvulsant activity.

Its mechanism of action has yet to be fully explained. Evidence to date suggests that its activity is based on its effects on serotonin (5-HT) receptors. It acts as an agonist of presynaptic and partial agonist of post-synaptic 5-HT<sub>1A</sub> subtype receptors. It is thought this initiates long-term changes in central 5-HT neurotransmission, producing the efficacy seen in the treatment of anxiety. Buspirone is thought to have antagonist activity at D<sub>2</sub> receptors at the doses stipulated for anxious disorders, though it is unclear if this is linked to its anxiolytic activity.

Buspirone's effects on GABAergic mechanisms are unclear. It does not directly interact with either the benzodiazepine-GABA receptor complex or GABA receptors. However, there is indirect evidence for buspirone having a GABA antagonist-like action.

There has been no evidence of pharmacodependence in studies performed in animals and on humans.

## **5.2 Pharmacokinetic properties**

### Absorption

Buspirone hydrochloride is rapidly absorbed from the gastrointestinal tract reaching peak plasma concentrations within 40 to 90 minutes after administration by mouth. Systemic bioavailability is low because of extensive first-pass metabolism.

### Distribution

Equilibration of plasma levels is reached after 2 days of repeated dosing, with around 95% bound to plasma proteins.

### Biotransformation

Buspirone hydrochloride is extensively metabolised to two main metabolites; 1-(2-pyrimidinyl)-piperazine, and 5-hydroxybuspirone. 1-(2-pyrimidinyl)-piperazine is pharmacologically active, with approximately 20% of the potency of buspirone, though it is unclear if it has any effect on buspirone's overall anxiolytic action. The latter is present as both free and glucuroconjugated forms.

### Elimination

The apparent plasma half-life for the elimination of buspirone hydrochloride is 2 to 11 hours, with the elimination of the metabolites 1-(2-pyrimidinyl)-piperazine and 5-hydroxybuspirone and its glucuronide taking a little longer. Elimination occurs mainly in the urine (29 to 63% of the dose) and bile (18 to 38% of the dose).

Elimination occurs mainly as metabolites and takes place largely in the first 24 hours following administration.

#### Paediatric population

At steady state, the following doses of buspirone in children aged 6–12 years resulted in increases in  $C_{\max}$  (maximum concentration) and AUC (area under the curve), compared with adults, as shown in the table:

<u>Dosage</u>	<u><math>C_{\max}</math></u>	<u>AUC</u>
7.5mg b.i.d	2.9 - fold	1.8 - fold
15mg b.i.d	2.1 - fold	1.5 - fold

Across the dose range studied, the  $C_{\max}$  and AUC of 1-PP (the active metabolite of buspirone, 1-pyrimidinylpiperazine) in children were approximately double those in adults.

### **5.3 Preclinical safety data**

Toxicity studies in several animal species have shown little evidence of undesirable effects, with toxic effects occurring only at levels well in excess of those recommended for clinical use.

No adverse effects have been described when buspirone hydrochloride has been tested *in vitro* and *in vivo* for carcinogenicity, mutagenicity and teratogenicity.

## **6 PHARMACEUTICAL PARTICULARS**

### **6.1 List of excipients**

Lactose

Microcrystalline Cellulose

Sodium Starch glycolate (Type B)

Magnesium stearate

Silica colloidal anhydrous

### **6.2 Incompatibilities**

None

**6.3 Shelf life**

24 months

**6.4 Special precautions for storage**

This medicinal product does not require any special storage condition

**6.5 Nature and contents of container**

Alu-Alu Film/Aluminium (OPA-Al-PVC) blister pack.

Tablets are packed in blisters containing 21, 30, 56, 60, 84 & 90 tablets.

Not all pack sizes may be marketed.

**6.6 Special precautions for disposal**

Any unused medicinal product or waste material should be disposed of in accordance with local requirements.

**7 MARKETING AUTHORISATION HOLDER**

Wave Pharma Limited.,  
Ground Floor, Cavendish House,  
369 Burnt Oak, Broadway,  
Edgware, HA8 5AW,  
United Kingdom

**8 MARKETING AUTHORISATION NUMBER(S)**

PL 42289/0019

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

28/07/2021

**10 DATE OF REVISION OF THE TEXT**

08/08/2023