

ANNEX I
SUMMARY OF PRODUCT CHARACTERISTICS

1. NAME OF THE MEDICINAL PRODUCT

Bondronat 2 mg concentrate for solution for infusion.

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

One vial with 2 ml concentrate for solution for infusion contains 2 mg ibandronic acid (as sodium monohydrate).

For the full list of excipients, see section 6.1.

3. PHARMACEUTICAL FORM

Concentrate for solution for infusion.
Clear, colourless solution.

4. CLINICAL PARTICULARS

4.1 Therapeutic indications

Bondronat is indicated in adults for

- Prevention of skeletal events (pathological fractures, bone complications requiring radiotherapy or surgery) in patients with breast cancer and bone metastases
- Treatment of tumour-induced hypercalcaemia with or without metastases

4.2 Posology and method of administration

Patients treated with Bondronat should be given the package leaflet and the patient reminder card.

Bondronat therapy should only be initiated by physicians experienced in the treatment of cancer.

Posology

Prevention of skeletal events in patients with breast cancer and bone metastases

The recommended dose for prevention of skeletal events in patients with breast cancer and bone metastases is 6 mg intravenous injection given every 3-4 weeks. The dose should be infused over at least 15 minutes.

A shorter (i.e. 15 min) infusion time should only be used for patients with normal renal function or mild renal impairment. There are no data available characterising the use of a shorter infusion time in patients with creatinine clearance below 50 ml/min. Prescribers should consult the section *Patients with Renal Impairment* (see section 4.2) for recommendations on dosing and administration in this patient group.

Treatment of tumour-induced hypercalcaemia

Prior to treatment with Bondronat the patient should be adequately rehydrated with 9 mg/ml (0.9%) sodium chloride solution. Consideration should be given to the severity of the hypercalcaemia as well as the tumour type. In general patients with osteolytic bone metastases require lower doses than patients with the humoral type of hypercalcaemia. In most patients with severe hypercalcaemia (albumin-corrected serum calcium* ≥ 3 mmol/l or ≥ 12 mg/dl) 4 mg is an adequate single dose. In patients with moderate hypercalcaemia (albumin-corrected serum calcium < 3 mmol/l or < 12 mg/dl)

2 mg is an effective dose. The highest dose used in clinical trials was 6 mg but this dose does not add any further benefit in terms of efficacy.

* Note albumin-corrected serum calcium concentrations are calculated as follows:

$$\text{Albumin-corrected serum calcium (mmol/l)} = \text{serum calcium (mmol/l)} - [0.02 \times \text{albumin (g/l)}] + 0.8$$

Or

$$\text{Albumin-corrected serum calcium (mg/dl)} = \text{serum calcium (mg/dl)} + 0.8 \times [4 - \text{albumin (g/dl)}]$$

To convert the albumin-corrected serum calcium in mmol/l value to mg/dl, multiply by 4.

In most cases a raised serum calcium level can be reduced to the normal range within 7 days. The median time to relapse (return of albumin-corrected serum calcium to levels above 3 mmol/l) was 18 - 19 days for the 2 mg and 4 mg doses. The median time to relapse was 26 days with a dose of 6 mg.

A limited number of patients (50 patients) have received a second infusion for hypercalcaemia. Repeated treatment may be considered in case of recurrent hypercalcaemia or insufficient efficacy.

Bondronat concentrate for solution for infusion should be administered as an intravenous infusion over 2 hours.

Special populations

Patients with hepatic impairment

No dose adjustment is required (see section 5.2).

Patients with renal impairment

For patients with mild renal impairment (CLCr ≥ 50 and < 80 mL/min) no dose adjustment is necessary. For patients with moderate renal impairment (CLCr ≥ 30 and < 50 mL/min) or severe renal impairment (CLCr < 30 mL/min) being treated for the prevention of skeletal events in patients with breast cancer and metastatic bone disease the following dosing recommendations should be followed (see section 5.2):

Creatinine Clearance (ml/min)	Dosage	Infusion Volume ¹ and Time ²
≥ 50 CLCr < 80	6 mg (6 ml of concentrate for solution for infusion)	100 ml over 15 minutes
≥ 30 CLCr < 50	4 mg (4 ml of concentrate for solution for infusion)	500 ml over 1 hour
< 30	2 mg (2 ml of concentrate for solution for infusion)	500 ml over 1 hour

¹ 0.9% sodium chloride solution or 5% glucose solution

² Administration every 3 to 4 week

A 15 minute infusion time has not been studied in cancer patients with CLCr < 50 mL/min.

Elderly population (> 65 years)

No dose adjustment is required. (see section 5.2).

Paediatric population

The safety and efficacy of Bondronat in children and adolescents below the age of 18 years have not been established. No data are available. (see section 5.1 and section 5.2).

Method of administration

For intravenous administration.

The content of the vial is to be used as follows:

- Prevention of Skeletal Events - added to 100 ml isotonic sodium chloride solution or 100 ml 5% dextrose solution and infused over at least 15 minutes. See also dose section above for patients with renal impairment
- Treatment of tumour-induced hypercalcaemia - added to 500 ml isotonic sodium chloride solution or 500 ml 5% dextrose solution and infused over 2 hours

For single use only. Only clear solution without particles should be used.

Bondronat concentrate for solution for infusion should be administered as an intravenous infusion.

Care must be taken not to administer Bondronat concentrate for solution for infusion via intra-arterial or paravenous administration, as this could lead to tissue damage.

4.3 Contraindications

- Hypersensitivity to the active substance or to any of the excipients listed in section 6.1
- Hypocalcaemia

4.4 Special warnings and precautions for use

Patients with disturbances of bone and mineral metabolism

Hypocalcaemia and other disturbances of bone and mineral metabolism should be effectively treated before starting Bondronat therapy for metastatic bone disease.

Adequate intake of calcium and vitamin D is important in all patients. Patients should receive supplemental calcium and/or vitamin D if dietary intake is inadequate.

Anaphylactic reaction/shock

Cases of anaphylactic reaction/shock, including fatal events, have been reported in patients treated with intravenous ibandronic acid.

Appropriate medical support and monitoring measures should be readily available when Bondronat intravenous injection is administered. If anaphylactic or other severe hypersensitivity/allergic reactions occur, immediately discontinue the injection and initiate appropriate treatment.

Osteonecrosis of the jaw

Osteonecrosis of the jaw (ONJ) has been reported very rarely in the post marketing setting in patients receiving Bondronat for oncology indications (see section 4.8).

The start of treatment or of a new course of treatment should be delayed in patients with unhealed open soft tissue lesions in the mouth.

A dental examination with preventive dentistry and an individual benefit-risk assessment is recommended prior to treatment with Bondronat in patients with concomitant risk factors.

The following risk factors should be considered when evaluating a patient's risk of developing ONJ:

- Potency of the medicinal product that inhibit bone resorption (higher risk for highly potent compounds), route of administration (higher risk for parenteral administration) and cumulative dose of bone resorption therapy
- Cancer, co-morbid conditions (e.g. anaemia, coagulopathies, infection), smoking
- Concomitant therapies: corticosteroids, chemotherapy, angiogenesis inhibitors, radiotherapy to head and neck
- Poor oral hygiene, periodontal disease, poorly fitting dentures, history of dental disease, invasive dental procedures e.g. tooth extractions

All patients should be encouraged to maintain good oral hygiene, undergo routine dental check-ups, and immediately report any oral symptoms such as dental mobility, pain or swelling, or non-healing of sores or discharge during treatment with Bondronat. While on treatment, invasive dental procedures should be performed only after careful consideration and be avoided in close proximity to Bondronat administration.

The management plan of the patients who develop ONJ should be set up in close collaboration between the treating physician and a dentist or oral surgeon with expertise in ONJ. Temporary interruption of Bondronat treatment should be considered until the condition resolves and contributing risk factors are mitigated where possible.

Osteonecrosis of the external auditory canal

Osteonecrosis of the external auditory canal has been reported with bisphosphonates, mainly in association with long-term therapy. Possible risk factors for osteonecrosis of the external auditory canal include steroid use and chemotherapy and/or local risk factors such as infection or trauma. The possibility of osteonecrosis of the external auditory canal should be considered in patients receiving bisphosphonates who present with ear symptoms including chronic ear infections.

Atypical fractures of the femur

Atypical subtrochanteric and diaphyseal femoral fractures have been reported with bisphosphonate therapy, primarily in patients receiving long-term treatment for osteoporosis. These transverse or short oblique fractures can occur anywhere along the femur from just below the lesser trochanter to just above the supracondylar flare. These fractures occur after minimal or no trauma and some patients experience thigh or groin pain, often associated with imaging features of stress fractures, weeks to months before presenting with a completed femoral fracture. Fractures are often bilateral; therefore the contralateral femur should be examined in bisphosphonate-treated patients who have sustained a femoral shaft fracture. Poor healing of these fractures has also been reported.

Discontinuation of bisphosphonate therapy in patients suspected to have an atypical femur fracture should be considered pending evaluation of the patient, based on an individual benefit risk assessment.

During bisphosphonate treatment patients should be advised to report any thigh, hip or groin pain and any patient presenting with such symptoms should be evaluated for an incomplete femur fracture.

Patients with renal impairment

Clinical studies have not shown any evidence of deterioration in renal function with long term Bondronat therapy. Nevertheless, according to clinical assessment of the individual patient, it is recommended that renal function, serum calcium, phosphate and magnesium should be monitored in patients treated with Bondronat (see section 4.2).

Patients with hepatic impairment

As no clinical data are available, dose recommendations cannot be given for patients with severe hepatic insufficiency (see section 4.2).

Patients with cardiac impairment

Overhydration should be avoided in patients at risk of cardiac failure.

Patients with known hypersensitivity to other bisphosphonates

Caution is to be taken in patients with known hypersensitivity to other bisphosphonates.

Excipients with known effect

Bondronat is essentially sodium free.

4.5 Interaction with other medicinal products and other forms of interaction

Metabolic interactions are not considered likely, since ibandronic acid does not inhibit the major human hepatic P450 isoenzymes and has been shown not to induce the hepatic cytochrome P450

system in rats (see section 5.2). Ibandronic acid is eliminated by renal excretion only and does not undergo any biotransformation.

Caution is advised when bisphosphonates are administered with aminoglycosides, since both substances can lower serum calcium levels for prolonged periods. Attention should also be paid to the possible existence of simultaneous hypomagnesaemia.

4.6 Fertility, pregnancy and lactation

Pregnancy

There are no adequate data from the use of ibandronic acid in pregnant women. Studies in rats have shown reproductive toxicity (see section 5.3). The potential risk for humans is unknown. Therefore, Bondronat should not be used during pregnancy.

Breast-feeding

It is not known whether ibandronic acid is excreted in human milk. Studies in lactating rats have demonstrated the presence of low levels of ibandronic acid in the milk following intravenous administration. Bondronat should not be used during breast-feeding.

Fertility

There are no data on the effects of ibandronic acid in humans. In reproductive studies in rats by the oral route, ibandronic acid decreased fertility. In studies in rats using the intravenous route, ibandronic acid decreased fertility at high daily doses (see section 5.3).

4.7 Effects on ability to drive and use machines

On the basis of the pharmacodynamic and pharmacokinetic profile and reported adverse reactions, it is expected that Bondronat has no or negligible influence on the ability to drive and use machines.

4.8 Undesirable effects

Summary of the safety profile

The most serious reported adverse reactions are anaphylactic reaction/shock, atypical fractures of the femur, osteonecrosis for the jaw, and ocular inflammation (see paragraph “description of selected adverse reactions” and section 4.4).

Treatment of tumour induced hypercalcaemia is most frequently associated with a rise in body temperature. Less frequently, a decrease in serum calcium below normal range (hypocalcaemia) is reported. In most cases no specific treatment is required and the symptoms subside after a couple of hours/days.

In the prevention of skeletal events in patients with breast cancer and bone metastases, treatment is most frequently associated with asthenia followed by rise in body temperature and headache.

Tabulated list of adverse reactions

Table 1 lists adverse drug reactions from the pivotal phase III studies (Treatment of tumour induced hypercalcaemia: 311 patients treated with Bondronat 2 mg or 4 mg; Prevention of skeletal events in patients with breast cancer and bone metastases: 152 patients treated with Bondronat 6 mg), and from post-marketing experience.

Adverse reactions are listed according to MedDRA system organ class and frequency category. Frequency categories are defined using the following convention: 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 ($< 1/10,000$), not known (cannot be estimated from the available data). Within each frequency grouping, adverse reactions are presented in order of decreasing seriousness.

Table 1 Adverse Reactions Reported for Intravenous Administration of Bondronat

System Organ Class	Common	Uncommon	Rare	Very rare	Not known
Infections and infestations	Infection	Cystitis, vaginitis, oral candidiasis			
Neoplasms benign, malignant and unspecified		Benign skin neoplasm			
Blood and lymphatic system disorders		Anaemia, blood dyscrasia			
Immune system disorders				Hypersensitivity†, bronchospasm†, angioedema†, anaphylactic reaction/shock† **	Asthma exacerbation
Endocrine disorders	Parathyroid disorder				
Metabolism and nutrition disorders	Hypocalcaemia **	Hypophosphataemia			
Psychiatric disorders		Sleep disorder, anxiety, affectation lability			
Nervous system disorders	Headache, dizziness, dysgeusia (taste perversion)	Cerebrovascular disorder, nerve root lesion, amnesia, migraine, neuralgia, hypertonia, hyperaesthesia, paraesthesia circumoral, parosmia			
Eye disorders	Cataract		Ocular inflammation†**		
Ear and labyrinth disorders		Deafness			
Cardiac disorders	Bundle branch block	Myocardial ischaemia, cardiovascular disorder, palpitations			
Respiratory, thoracic, and mediastinal disorders	Pharyngitis	Lung oedema, stridor			
Gastrointestinal disorders	Diarrhoea, vomiting, dyspepsia, gastrointestinal pain, tooth disorder	Gastroenteritis, gastritis, mouth ulceration, dysphagia, cheilitis			

System Organ Class	Common	Uncommon	Rare	Very rare	Not known
Hepatobiliary disorders		Cholelithiasis			
Skin and subcutaneous tissue disorders	Skin disorder, ecchymosis	Rash, alopecia		Stevens-Johnson Syndrome†, Erythema Multiforme†, Dermatitis Bullous†	
Musculoskeletal and connective tissue disorders	Osteoarthritis, myalgia, arthralgia, joint disorder, bone pain		Atypical subtrochanteric and diaphyseal femoral fractures†	Osteonecrosis of jaw†**, Osteonecrosis of the external auditory canal (bisphosphonate class adverse reaction)†	
Renal and urinary disorders		Urinary retention, renal cyst			
Reproductive system and breast disorders		Pelvic pain			
General disorders and administration site conditions	Pyrexia, influenza-like illness**, oedema peripheral, asthenia, thirst	Hypothermia			
Investigations	Gamma-GT increased, creatinine increased	Blood alkaline phosphatase increase, weight decrease			
Injury, poisoning and procedural complications		Injury, injection site pain			

** See further information below

† Identified in post-marketing experience.

Description of selected adverse reactions

Hypocalcaemia

Decreased renal calcium excretion may be accompanied by a fall in serum phosphate levels not requiring therapeutic measures. The serum calcium level may fall to hypocalcaemic values.

Influenza-like illness

A flu-like syndrome consisting of fever, chills, bone and/or muscle ache-like pain has occurred. In most cases no specific treatment was required and the symptoms subsided after a couple of hours/days.

Osteonecrosis of jaw

Cases of osteonecrosis of the jaw have been reported, predominantly in cancer patients treated with medicinal products that inhibit bone resorption, such as ibandronic acid (see section 4.4.) Cases of ONJ have been reported in the post marketing setting for ibandronic acid.

Ocular inflammation

Ocular inflammation events such as uveitis, episcleritis and scleritis have been reported with ibandronic acid. In some cases, these events did not resolve until the ibandronic acid was discontinued.

Anaphylactic reaction/shock

Cases of anaphylactic reaction/shock, including fatal events, have been reported in patients treated with intravenous ibandronic acid.

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 the national reporting system listed in [Appendix V](#).

4.9 Overdose

Up to now there is no experience of acute poisoning with Bondronat concentrate for solution for infusion. Since both the kidney and the liver were found to be target organs for toxicity in preclinical studies with high doses, kidney and liver function should be monitored. Clinically relevant hypocalcaemia should be corrected by intravenous administration of calcium gluconate.

5. PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmaco-therapeutic group: Medicinal products for treatment of bone diseases, bisphosphonate, ATC Code: M05BA06.

Ibandronic acid belongs to the bisphosphonate group of compounds which act specifically on bone. Their selective action on bone tissue is based on the high affinity of bisphosphonates for bone mineral. Bisphosphonates act by inhibiting osteoclast activity, although the precise mechanism is still not clear.

In vivo, ibandronic acid prevents experimentally-induced bone destruction caused by cessation of gonadal function, retinoids, tumours or tumour extracts. The inhibition of endogenous bone resorption has also been documented by ⁴⁵Ca kinetic studies and by the release of radioactive tetracycline previously incorporated into the skeleton.

At doses that were considerably higher than the pharmacologically effective doses, ibandronic acid did not have any effect on bone mineralisation.

Bone resorption due to malignant disease is characterised by excessive bone resorption that is not balanced with appropriate bone formation. Ibandronic acid selectively inhibits osteoclast activity, reducing bone resorption and thereby reducing skeletal complications of the malignant disease.

Clinical studies in the treatment of tumour-induced hypercalcaemia

Clinical studies in hypercalcaemia of malignancy demonstrated that the inhibitory effect of ibandronic acid on tumour-induced osteolysis, and specifically on tumour-induced hypercalcaemia, is characterised by a decrease in serum calcium and urinary calcium excretion.

In the dose range recommended for treatment, the following response rates with the respective confidence intervals have been shown in clinical trials for patients with baseline albumin-corrected serum calcium ≥ 3.0 mmol/l after adequate rehydration.

Ibandronic acid dose	% of Patients with Response	90% Confidence Interval
2 mg	54	44-63
4 mg	76	62-86
6 mg	78	64-88

For these patients and dosages, the median time to achieve normocalcaemia was 4 to 7 days. The median time to relapse (return of albumin-corrected serum calcium above 3.0 mmol/l) was 18 to 26 days.

Clinical studies in the prevention of skeletal events in patients with breast cancer and bone metastases

Clinical studies in patients with breast cancer and bone metastases have shown that there is a dose dependent inhibitory effect on bone osteolysis, expressed by markers of bone resorption, and a dose dependent effect on skeletal events.

Prevention of skeletal events in patients with breast cancer and bone metastases with Bondronat 6 mg administered intravenously was assessed in one randomized placebo controlled phase III trial with duration of 96 weeks. Female patients with breast cancer and radiologically confirmed bone metastases were randomised to receive placebo (158 patients) or 6 mg Bondronat (154 patients). The results from this trial are summarised below.

Primary efficacy endpoints

The primary endpoint of the trial was the skeletal morbidity period rate (SMPR). This was a composite endpoint which had the following skeletal related events (SREs) as sub-components:

- radiotherapy to bone for treatment of fractures/impending fractures
- surgery to bone for treatment of fractures
- vertebral fractures
- non-vertebral fractures

The analysis of the SMPR was time-adjusted and considered that one or more events occurring in a single 12 week period could be potentially related. Multiple events were therefore counted only once for the purposes of the analysis. Data from this study demonstrated a significant advantage for intravenous Bondronat 6 mg over placebo in the reduction in SREs measured by the time-adjusted SMPR ($p=0.004$). The number of SREs was also significantly reduced with Bondronat 6 mg and there was a 40% reduction in the risk of a SRE over placebo (relative risk 0.6, $p = 0.003$). Efficacy results are summarised in Table 2.

Table 2 Efficacy Results (Breast Cancer Patients with Metastatic Bone Disease)

	All Skeletal Related Events (SREs)		
	Placebo n=158	Bondronat 6 mg n=154	p-value
SMPR (per patient year)	1.48	1.19	p=0.004
Number of events (per patient)	3.64	2.65	p=0.025
SRE relative risk	-	0.60	p=0.003

Secondary efficacy endpoints

A statistically significant improvement in bone pain score was shown for intravenous Bondronat 6 mg compared to placebo. The pain reduction was consistently below baseline throughout the entire study and accompanied by a significantly reduced use of analgesics. The deterioration in Quality of Life was significantly less in Bondronat treated patients compared with placebo. A tabular summary of these secondary efficacy results is presented in Table 3.

Table 3 Secondary Efficacy Results (Breast cancer Patients with Metastatic Bone Disease)

	Placebo n=158	Bondronat 6 mg n=154	p-value
Bone pain *	0.21	-0.28	p<0.001
Analgesic use *	0.90	0.51	p=0.083
Quality of Life *	-45.4	-10.3	p=0.004

* Mean change from baseline to last assessment.

There was a marked depression of urinary markers of bone resorption (pyridinoline and deoxypyridinoline) in patients treated with Bondronat that was statistically significant compared to placebo.

In a study in 130 patients with metastatic breast cancer the safety of Bondronat infused over 1 hour or 15 minutes was compared. No difference was observed in the indicators of renal function. The overall adverse event profile of ibandronic acid following the 15 minute infusion was consistent with the known safety profile over longer infusion times and no new safety concerns were identified relating to the use of a 15 minute infusion time.

A 15 minute infusion time has not been studied in cancer patients with a creatinine clearance of <50ml/min.

Paediatric population (see section 4.2 and section 5.2)

The safety and efficacy of Bondronat in children and adolescents below the age of 18 years have not been established. No data are available.

5.2 Pharmacokinetic properties

After a 2 hour infusion of 2, 4 and 6 mg ibandronic acid pharmacokinetic parameters are dose proportional.

Distribution

After initial systemic exposure, ibandronic acid rapidly binds to bone or is excreted into urine. In humans, the apparent terminal volume of distribution is at least 90 l and the amount of dose reaching the bone is estimated to be 40-50% of the circulating dose. Protein binding in human plasma is approximately 87% at therapeutic concentrations, and thus interaction with other medicinal products, due to displacement is unlikely.

Biotransformation

There is no evidence that ibandronic acid is metabolized in animals or humans.

Elimination

The range of observed apparent half-lives is broad and dependent on dose and assay sensitivity, but the apparent terminal half-life is generally in the range of 10-60 hours. However, early plasma levels fall quickly, reaching 10% of peak values within 3 and 8 hours after intravenous or oral administration respectively. No systemic accumulation was observed when ibandronic acid was administered intravenously once every 4 weeks for 48 weeks to patients with metastatic bone disease.

Total clearance of ibandronic acid is low with average values in the range 84-160 ml/min. Renal clearance (about 60 ml/min in healthy postmenopausal females) accounts for 50-60% of total clearance and is related to creatinine clearance. The difference between the apparent total and renal clearances is considered to reflect the uptake by bone.

The secretory pathway of renal elimination does not appear to include known acidic or basic transport systems involved in the excretion of other active substances. In addition, ibandronic acid does not inhibit the major human hepatic P450 isoenzymes and does not induce the hepatic cytochrome P450 system in rats.

Pharmacokinetics in special populations

Gender

Bioavailability and pharmacokinetics of ibandronic acid are similar in both men and women.

Race

There is no evidence for clinically relevant interethnic differences between Asians and Caucasians in ibandronic acid disposition. There are only very few data available on patients with African origin.

Patients with renal impairment

Exposure to ibandronic acid in patients with various degrees of renal impairment is related to creatinine clearance (CL_{Cr}). In subjects with severe renal impairment (mean estimated CL_{Cr} = 21.2 mL/min), dose-adjusted mean AUC_{0-24h} was increased by 110% compared to healthy volunteers. In clinical pharmacology trial WP18551, after a single dose intravenous administration of 6 mg (15 minutes infusion), mean AUC₀₋₂₄ increased by 14% and 86%, respectively, in subjects with mild (mean estimated CL_{Cr}=68.1 mL/min) and moderate (mean estimated CL_{Cr}=41.2 mL/min) renal impairment compared to healthy volunteers (mean estimated CL_{Cr}=120 mL/min). Mean C_{max} was not increased in patients with mild renal impairment and increased by 12% in patients with moderate renal impairment. For patients with mild renal impairment (CL_{Cr} ≥50 and <80 mL/min) no dosage adjustment is necessary. For patients with moderate renal impairment (CL_{Cr} ≥30 and <50 mL/min) or severe renal impairment (CL_{Cr} <30 mL/min) being treated for the prevention of skeletal events in patients with breast cancer and metastatic bone disease an adjustment in the dose is recommended (see section 4.2).

Patients with hepatic impairment (see section 4.2)

There are no pharmacokinetic data for ibandronic acid in patients who have hepatic impairment. The liver has no significant role in the clearance of ibandronic acid since it is not metabolized but is cleared by renal excretion and by uptake into bone. Therefore dosage adjustment is not necessary in patients with hepatic impairment. Further, as protein binding of ibandronic acid is approximately 87%

at therapeutic concentrations, hypoproteinaemia in severe liver disease is unlikely to lead to clinically significant increases in free plasma concentration.

Elderly (see section 4.2)

In a multivariate analysis, age was not found to be an independent factor of any of the pharmacokinetic parameters studied. As renal function decreases with age, this is the only factor that should be considered (see renal impairment section).

Paediatric population (see section 4.2 and section 5.1)

There are no data on the use of Bondronat in patients less than 18 years old.

5.3 Preclinical safety data

Effects in non-clinical studies were observed only at exposures sufficiently in excess of the maximum human exposure indicating little relevance to clinical use. As with other bisphosphonates, the kidney was identified to be the primary target organ of systemic toxicity.

Mutagenicity/Carcinogenicity:

No indication of carcinogenic potential was observed. Tests for genotoxicity revealed no evidence of effects on genetic activity for ibandronic acid.

Reproductive toxicity:

No evidence of direct foetal toxicity or teratogenic effects were observed for ibandronic acid in intravenously treated rats and rabbits. In reproductive studies in rats by the oral route, effects on fertility consisted of increased preimplantation losses at dose levels of 1 mg/kg/day and higher. In reproductive studies in rats by the intravenous route, ibandronic acid decreased sperm counts at doses of 0.3 and 1 mg/kg/day and decreased fertility in males at 1 mg/kg/day and in females at 1.2 mg/kg/day. Adverse effects of ibandronic acid in reproductive toxicity studies in the rat were those expected for this class of medicinal products (bisphosphonates). They include a decreased number of implantation sites, interference with natural delivery (dystocia), an increase in visceral variations (renal pelvis ureter syndrome) and teeth abnormalities in F1 offspring in rats.

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Sodium chloride
Acetic acid (99%)
Sodium acetate
Water for injections

6.2 Incompatibilities

To avoid potential incompatibilities Bondronat concentrate for solution for infusion should only be diluted with isotonic sodium chloride solution or 5% glucose solution.

Bondronat should not be mixed with calcium containing solutions.

6.3 Shelf life

5 years
After reconstitution: 24 hours.

6.4 Special precautions for storage

This medicinal product does not require any special storage conditions prior to reconstitution.

After reconstitution: Store at 2°C – 8°C (in a refrigerator).

From a microbiological point of view, the product should be used immediately. If not used immediately, in-use storage times and conditions prior to use are the responsibility of the user and would normally not be longer than 24 hours at 2 to 8°C, unless reconstitution has taken place in controlled and validated aseptic conditions.

6.5 Nature and contents of container

Bondronat is supplied as packs containing 1 vial (2 ml type I glass vial with a bromobutyl rubber stopper).

6.6 Special precautions for disposal

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

The release of pharmaceuticals in the environment should be minimized.

7. MARKETING AUTHORISATION HOLDER

Atnahs Pharma Netherlands B.V.
Copenhagen Towers,
Ørestads Boulevard 108, 5.tv
DK-2300 København S,
Denmark

8. MARKETING AUTHORISATION NUMBER(S)

EU/1/96/012/004

9. DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION

Date of first authorisation: 25 June 1996

Date of latest renewal: 25 June 2006

10. DATE OF REVISION OF THE TEXT

Detailed information on this medicinal product is available on the website of the European Medicines Agency <http://www.ema.europa.eu>.

1. NAME OF THE MEDICINAL PRODUCT

Bondronat 50 mg film-coated tablets.

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Each film-coated tablet contains 50 mg of ibandronic acid (as sodium monohydrate).

Excipients with known effect:

Contains 88.1 mg lactose (as lactose monohydrate).

For the full list of excipients, see section 6.1.

3. PHARMACEUTICAL FORM

Film-coated tablets.

White to off-white film-coated tablets, of oblong shape engraved "L2" on one side and "IT" on the other side.

4. CLINICAL PARTICULARS

4.1 Therapeutic indications

Bondronat is indicated in adults for the prevention of skeletal events (pathological fractures, bone complications requiring radiotherapy or surgery) in patients with breast cancer and bone metastases.

4.2 Posology and method of administration

Bondronat therapy should only be initiated by physicians experienced in the treatment of cancer.

Posology

The recommended dose is one 50 mg film-coated tablet daily.

Special populations

Patients with hepatic impairment

No dose adjustment is required (see section 5.2).

Patients with renal impairment

No dose adjustment is necessary for patients with mild renal impairment ($CL_{Cr} \geq 50$ and < 80 mL/min).

For patients with moderate renal impairment ($CL_{Cr} \geq 30$ and < 50 mL/min) a dosage adjustment to one 50 mg film-coated tablet every second day is recommended (see section 5.2).

For patients with severe renal impairment ($CL_{Cr} < 30$ mL/min) the recommended dose is one 50 mg film-coated tablet once weekly. See dosing instructions, above.

Elderly population (> 65 years)

No dose adjustment is necessary (see section 5.2).

Paediatric population

The safety and efficacy of Bondronat in children and adolescents below the age of 18 years have not been established. No data are available. (see section 5.1 and 5.2).

Method of administration

For oral use.

Bondronat tablets should be taken after an overnight fast (at least 6 hours) and before the first food or drink of the day. Medicinal products and supplements (including calcium) should similarly be avoided prior to taking Bondronat tablets. Fasting should be continued for at least 30 minutes after taking the tablet. Water may be taken at any time during the course of Bondronat treatment (see section 4.5). Water with a high concentration of calcium should not be used. If there is concern regarding potentially high levels of calcium in the tap water (hard water), it is advised to use bottled water with a low mineral content.

- The tablets should be swallowed whole with a full glass of water (180 to 240 ml) while the patient is standing or sitting in an upright position.
- Patients should not lie down for 60 minutes after taking Bondronat.
- Patients should not chew, suck or crush the tablet because of a potential for oropharyngeal ulceration.
- Water is the only drink that should be taken with Bondronat.

4.3 Contraindications

- Hypersensitivity to ibandronic acid or to any of the excipients listed in section 6.1.
- Hypocalcaemia
- Abnormalities of the oesophagus which delay oesophageal emptying such as stricture or achalasia
- Inability to stand or sit upright for at least 60 minutes

4.4 Special warnings and precautions for use

Patients with disturbances of bone and mineral metabolism

Hypocalcaemia and other disturbances of bone and mineral metabolism should be effectively treated before starting Bondronat therapy. Adequate intake of calcium and vitamin D is important in all patients. Patients should receive supplemental calcium and/or vitamin D if dietary intake is inadequate.

Gastrointestinal irritation

Orally administered bisphosphonates may cause local irritation of the upper gastrointestinal mucosa. Because of these possible irritant effects and a potential for worsening of the underlying disease, caution should be used when Bondronat is given to patients with active upper gastrointestinal problems (e.g. known Barrett's oesophagus, dysphagia, other oesophageal diseases, gastritis, duodenitis or ulcers).

Adverse experiences such as oesophagitis, oesophageal ulcers and oesophageal erosions, in some cases severe and requiring hospitalization, rarely with bleeding or followed by oesophageal stricture or perforation, have been reported in patients receiving treatment with oral bisphosphonates. The risk of severe oesophageal adverse experiences appears to be greater in patients who do not comply with the dosing instruction and/or who continue to take oral bisphosphonates after developing symptoms suggestive of oesophageal irritation. Patients should pay particular attention and be able to comply with the dosing instructions (see section 4.2).

Physicians should be alert to any signs or symptoms signaling a possible oesophageal reaction and patients should be instructed to discontinue Bondronat and seek medical attention if they develop dysphagia, odynophagia, retrosternal pain or new or worsening heartburn.

While no increased risk was observed in controlled clinical trials there have been post-marketing reports of gastric and duodenal ulcers with oral bisphosphonate use, some severe and with complications.

Acetylsalicylic acid and NSAIDs

Since Acetylsalicylic acid, Nonsteroidal Anti-Inflammatory medicinal products (NSAIDs) and bisphosphonates are associated with gastrointestinal irritation, caution should be taken during concomitant administration.

Osteonecrosis of the jaw

Osteonecrosis of the jaw (ONJ) has been reported very rarely in the post marketing setting in patients receiving Bondronat for oncology indications (see section 4.8).

The start of treatment or of a new course of treatment should be delayed in patients with unhealed open soft tissue lesions in the mouth.

A dental examination with preventive dentistry and an individual benefit-risk assessment is recommended prior to treatment with Bondronat in patients with concomitant risk factors.

The following risk factors should be considered when evaluating a patient's risk of developing ONJ:

- Potency of the medicinal product that inhibit bone resorption (higher risk for highly potent compounds), route of administration (higher risk for parenteral administration) and cumulative dose of bone resorption therapy
- Cancer, co-morbid conditions (e.g. anaemia, coagulopathies, infection), smoking
- Concomitant therapies: corticosteroids, chemotherapy, angiogenesis inhibitors, radiotherapy to head and neck
- Poor oral hygiene, periodontal disease, poorly fitting dentures, history of dental disease, invasive dental procedures e.g. tooth extractions

All patients should be encouraged to maintain good oral hygiene, undergo routine dental check-ups, and immediately report any oral symptoms such as dental mobility, pain or swelling, or non-healing of sores or discharge during treatment with Bondronat. While on treatment, invasive dental procedures should be performed only after careful consideration and be avoided in close proximity to Bondronat administration.

The management plan of the patients who develop ONJ should be set up in close collaboration between the treating physician and a dentist or oral surgeon with expertise in ONJ. Temporary interruption of Bondronat treatment should be considered until the condition resolves and contributing risk factors are mitigated where possible.

Osteonecrosis of the external auditory canal

Osteonecrosis of the external auditory canal has been reported with bisphosphonates, mainly in association with long-term therapy. Possible risk factors for osteonecrosis of the external auditory canal include steroid use and chemotherapy and/or local risk factors such as infection or trauma. The possibility of osteonecrosis of the external auditory canal should be considered in patients receiving bisphosphonates who present with ear symptoms including chronic ear infections.

Atypical fractures of the femur

Atypical subtrochanteric and diaphyseal femoral fractures have been reported with bisphosphonate therapy, primarily in patients receiving long-term treatment for osteoporosis. These transverse or short oblique fractures can occur anywhere along the femur from just below the lesser trochanter to just above the supracondylar flare. These fractures occur after minimal or no trauma and some patients experience thigh or groin pain, often associated with imaging features of stress fractures, weeks to months before presenting with a completed femoral fracture. Fractures are often bilateral; therefore the contralateral femur should be examined in bisphosphonate-treated patients who have sustained a femoral shaft fracture. Poor healing of these fractures has also been reported.

Discontinuation of bisphosphonate therapy in patients suspected to have an atypical femur fracture should be considered pending evaluation of the patient, based on an individual benefit risk assessment.

During bisphosphonate treatment patients should be advised to report any thigh, hip or groin pain and any patient presenting with such symptoms should be evaluated for an incomplete femur fracture.

Renal function

Clinical studies have not shown any evidence of deterioration in renal function with long term Bondronat therapy. Nevertheless, according to clinical assessment of the individual patient, it is recommended that renal function, serum calcium, phosphate and magnesium should be monitored in patients treated with Bondronat.

Rare hereditary problems

Bondronat tablets contain lactose and should not be administered to patients with rare hereditary problems of galactose intolerance, Lapp lactase deficiency or glucose-galactose malabsorption.

Patients with known hypersensitivity to other bisphosphonates

Caution is to be taken in patients with known hypersensitivity to other bisphosphonates.

4.5 Interaction with other medicinal products and other forms of interaction

Medicinal product -Food Interactions

Products containing calcium and other multivalent cations (such as aluminium, magnesium, iron), including milk and food, are likely to interfere with absorption of Bondronat tablets. Therefore, with such products, including food, intake must be delayed at least 30 minutes following oral administration.

Bioavailability was reduced by approximately 75% when Bondronat tablets were administered 2 hours after a standard meal. Therefore, it is recommended that the tablets should be taken after an overnight fast (at least 6 hours) and fasting should continue for at least 30 minutes after the dose has been taken (see section 4.2).

Interactions with other medicinal products

Metabolic interactions are not considered likely, since ibandronic acid does not inhibit the major human hepatic P450 isoenzymes and has been shown not to induce the hepatic cytochrome P450 system in rats (see section 5.2). Ibandronic acid is eliminated by renal excretion only and does not undergo any biotransformation.

H₂-antagonists or other medicinal products that increase gastric pH.

In healthy male volunteers and postmenopausal women, intravenous ranitidine caused an increase in ibandronic acid bioavailability of about 20% (which is within the normal variability of the bioavailability of ibandronic acid), probably as a result of reduced gastric acidity. However, no dosage adjustment is required when Bondronat is administered with H₂-antagonists or medicinal products that increase gastric pH.

Acetylsalicylic acid and NSAIDs

Since Acetylsalicylic acid, Nonsteroidal Anti-Inflammatory medicinal products (NSAIDs) and bisphosphonates are associated with gastrointestinal irritation, caution should be taken during concomitant administration (see section 4.4).

Aminoglycosides

Caution is advised when bisphosphonates are administered with aminoglycosides, since both substances can lower serum calcium levels for prolonged periods. Attention should also be paid to the possible existence of simultaneous hypomagnesaemia.

4.6 Fertility, pregnancy and lactation

Pregnancy

There are no adequate data from the use of ibandronic acid in pregnant women. Studies in rats have shown reproductive toxicity (see section 5.3). The potential risk for humans is unknown. Therefore, Bondronat should not be used during pregnancy.

Breast-feeding

It is not known whether ibandronic acid is excreted in human milk. Studies in lactating rats have demonstrated the presence of low levels of ibandronic acid in the milk following intravenous administration. Bondronat should not be used during lactation.

Fertility

There are no data on the effects of ibandronic acid in humans. In reproductive studies in rats by the oral route, ibandronic acid decreased fertility. In studies in rats using the intravenous route, ibandronic acid decreased fertility at high daily doses (see section 5.3).

4.7 Effects on ability to drive and use machines

On the basis of the pharmacodynamic and pharmacokinetic profile and reported adverse reactions, it is expected that Bondronat has no or negligible influence on the ability to drive and use machines.

4.8 Undesirable effects

Summary of the safety profile

The most serious reported adverse reactions are anaphylactic reaction/shock, atypical fractures of the femur, osteonecrosis of the jaw, gastrointestinal irritation, and ocular inflammation (see paragraph "Description of selected adverse reactions" and section 4.4). Treatment was most frequently associated with a decrease in serum calcium to below normal range (hypocalcaemia), followed by dyspepsia.

Tabulated list of adverse reactions

Table 1 lists adverse reactions from 2 pivotal phase III studies (Prevention of skeletal events in patients with breast cancer and bone metastases: 286 patients treated with Bondronat 50 mg administered orally), and from post-marketing experience.

Adverse reactions are listed according to MedDRA system organ class and frequency category. Frequency categories are defined using the following convention: 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 ($< 1/10,000$), not known (cannot be estimated from the available data). Within each frequency grouping, adverse reactions are presented in order of decreasing seriousness.

Table 1 Adverse Drug Reactions Reported for Oral Administration of Bondronat

System Organ Class	Common	Uncommon	Rare	Very rare	Not known
Blood and lymphatic system disorders		Anaemia			
Immune system disorders				Hypersensitivity†, bronchospasm†, angioedema†, Anaphylactic reaction/shock†**	Asthma exacerbation
Metabolism and nutrition disorders	Hypocalcaemia**				
Nervous system disorders		Paraesthesia, dysgeusia (taste perversion)			
Eye disorders			Ocular inflammation†**		
Gastrointestinal disorders	Oesophagitis, abdominal pain, dyspepsia, nausea	Haemorrhage, duodenal ulcer, gastritis, dysphagia, dry mouth			
Skin and subcutaneous tissue disorders		Pruritus		Stevens-Johnson Syndrome†, Erythema Multiforme†, Dermatitis Bullous†	
Musculoskeletal and connective tissue disorders			Atypical subtrochanteric and diaphyseal femoral fractures†	Osteonecrosis of jaw†** Osteonecrosis of the external auditory canal (bisphosphonate class adverse reaction)†	
Renal and urinary disorders		Azotaemia (uraemia)			
General disorders and administration site conditions	Asthenia	Chest pain, influenza-like illness, malaise, pain			
Investigations		Blood parathyroid hormone increased			

**See further information below

†Identified in post-marketing experience.

Description of selected adverse reactions

Hypocalcaemia

Decreased renal calcium excretion may be accompanied by a fall in serum phosphate levels not requiring therapeutic measures. The serum calcium level may fall to hypocalcaemic values.

Osteonecrosis of jaw

Cases of osteonecrosis of the jaw have been reported, predominantly in cancer patients treated with medicinal products that inhibit bone resorption, such as ibandronic acid (see section 4.4.) Cases of ONJ have been reported in the post marketing setting for ibandronic acid.

Ocular inflammation

Ocular inflammation events such as uveitis, episcleritis and scleritis have been reported with ibandronic acid. In some cases, these events did not resolve until the ibandronic acid was discontinued.

Anaphylactic reaction/shock

Cases of anaphylactic reaction/shock, including fatal events, have been reported in patients treated with intravenous ibandronic acid.

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 **the national reporting system listed in [Appendix V](#)**.

4.9 Overdose

No specific information is available on the treatment of overdosage with Bondronat. However, oral overdosage may result in upper gastrointestinal events, such as upset stomach, heartburn, oesophagitis, gastritis or ulcer. Milk or antacids should be given to bind Bondronat. Due to the risk of oesophageal irritation, vomiting should not be induced and the patient should remain fully upright.

5. PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmaco-therapeutic group: Medicinal products for treatment of bone diseases, bisphosphonate, ATC Code: M05BA06.

Ibandronic acid belongs to the bisphosphonate group of compounds which act specifically on bone. Their selective action on bone tissue is based on the high affinity of bisphosphonates for bone mineral. Bisphosphonates act by inhibiting osteoclast activity, although the precise mechanism is still not clear.

In vivo, ibandronic acid prevents experimentally-induced bone destruction caused by cessation of gonadal function, retinoids, tumours or tumour extracts. The inhibition of endogenous bone resorption has also been documented by ⁴⁵Ca kinetic studies and by the release of radioactive tetracycline previously incorporated into the skeleton.

At doses that were considerably higher than the pharmacologically effective doses, ibandronic acid did not have any effect on bone mineralisation.

Bone resorption due to malignant disease is characterized by excessive bone resorption that is not balanced with appropriate bone formation. Ibandronic acid selectively inhibits osteoclast activity, reducing bone resorption and thereby reducing skeletal complications of the malignant disease.

Clinical studies in patients with breast cancer and bone metastases have shown that there is a dose dependent inhibitory effect on bone osteolysis, expressed by markers of bone resorption, and a dose dependent effect on skeletal events.

Prevention of skeletal events in patients with breast cancer and bone metastases with Bondronat 50 mg tablets was assessed in two randomized placebo controlled phase III trials with a duration of 96 weeks. Female patients with breast cancer and radiologically confirmed bone metastases were randomised to receive placebo (277 patients) or 50 mg Bondronat (287 patients). The results from these trials are summarised below.

Primary efficacy endpoints

The primary endpoint of the trials was the skeletal morbidity period rate (SMPR). This was a composite endpoint which had the following skeletal related events (SREs) as sub-components:

- radiotherapy to bone for treatment of fractures/impending fractures
- surgery to bone for treatment of fractures
- vertebral fractures
- non-vertebral fractures

The analysis of the SMPR was time-adjusted and considered that one or more events occurring in a single 12 week period could be potentially related. Multiple events were therefore, counted only once in any given 12 week period for the purposes of the analysis. Pooled data from these studies demonstrated a significant advantage for Bondronat 50 mg p.o. over placebo in the reduction in SREs measured by the SMPR (p=0.041). There was also a 38% reduction in the risk of developing an SRE for Bondronat treated patients when compared with placebo (relative risk 0.62, p=0.003). Efficacy results are summarised in Table 2.

Table 2 Efficacy Results (Breast Cancer Patients with Metastatic Bone Disease)

	All Skeletal Related Events (SREs)		
	Placebo n=277	Bondronat 50 mg n=287	p-value
SMPR (per patient year)	1.15	0.99	p=0.041
SRE relative risk	-	0.62	p=0.003

Secondary efficacy endpoints

A statistically significant improvement in bone pain score was shown for Bondronat 50 mg compared to placebo. The pain reduction was consistently below baseline throughout the entire study and accompanied by a significantly reduced use of analgesics compared to placebo. The deterioration in Quality of Life and WHO performance status was significantly less in Bondronat treated patients compared with placebo. Urinary concentrations of the bone resorption marker CTx (C-terminal telopeptide released from Type I collagen) were significantly reduced in the Bondronat group compared to placebo. This reduction in urinary CTx levels was significantly correlated with the primary efficacy endpoint SMPR (Kendall-tau-b (p<0.001)). A tabular summary of the secondary efficacy results is presented in Table 3.

Table 3 Secondary Efficacy Results (Breast Cancer Patients with Metastatic Bone Disease)

	Placebo n=277	Bondronat 50 mg n=287	p-value
Bone pain *	0.20	-0.10	p=0.001
Analgesic use *	0.85	0.60	p=0.019
Quality of Life *	-26.8	-8.3	p=0.032
WHO performance score *	0.54	0.33	p=0.008
Urinary CTx **	10.95	-77.32	p=0.001

* Mean change from baseline to last assessment.

** Median change from baseline to last assessment

Paediatric population (see section 4.2 and section 5.2)

The safety and efficacy of Bondronat in children and adolescents below the age of 18 years have not been established. No data are available.

5.2 Pharmacokinetic properties

Absorption

The absorption of ibandronic acid in the upper gastrointestinal tract is rapid after oral administration. Maximum observed plasma concentrations were reached within 0.5 to 2 hours (median 1 hour) in the fasted state and absolute bioavailability was about 0.6%. The extent of absorption is impaired when taken together with food or beverages (other than water). Bioavailability is reduced by about 90% when ibandronic acid is administered with a standard breakfast in comparison with bioavailability seen in fasted subjects. When taken 30 minutes before a meal, the reduction in bioavailability is approximately 30%. There is no meaningful reduction in bioavailability provided ibandronic acid is taken 60 minutes before a meal.

Bioavailability was reduced by approximately 75% when Bondronat tablets were administered 2 hours after a standard meal. Therefore, it is recommended that the tablets should be taken after an overnight fast (minimum 6 hours) and fasting should continue for at least 30 minutes after the dose has been taken (see section 4.2).

Distribution

After initial systemic exposure, ibandronic acid rapidly binds to bone or is excreted into urine. In humans, the apparent terminal volume of distribution is at least 90 l and the amount of dose reaching the bone is estimated to be 40-50% of the circulating dose. Protein binding in human plasma is approximately 87% at therapeutic concentrations, and thus interaction with other medicinal products, due to displacement is unlikely.

Biotransformation

There is no evidence that ibandronic acid is metabolized in animals or humans.

Elimination

The absorbed fraction of ibandronic acid is removed from the circulation via bone absorption (estimated to be 40-50%) and the remainder is eliminated unchanged by the kidney. The unabsorbed fraction of ibandronic acid is eliminated unchanged in the faeces.

The range of observed apparent half-lives is broad and dependent on dose and assay sensitivity, but the apparent terminal half-life is generally in the range of 10-60 hours. However, early plasma levels

fall quickly, reaching 10% of peak values within 3 and 8 hours after intravenous or oral administration respectively.

Total clearance of ibandronic acid is low with average values in the range 84-160 ml/min. Renal clearance (about 60 ml/min in healthy postmenopausal females) accounts for 50-60% of total clearance and is related to creatinine clearance. The difference between the apparent total and renal clearances is considered to reflect the uptake by bone.

The secretory pathway of renal elimination does not appear to include known acidic or basic transport systems involved in the excretion of other active substances. In addition, ibandronic acid does not inhibit the major human hepatic P450 isoenzymes and does not induce the hepatic cytochrome P450 system in rats.

Pharmacokinetics in special populations

Gender

Bioavailability and pharmacokinetics of ibandronic acid are similar in both men and women.

Race

There is no evidence for clinically relevant interethnic differences between Asians and Caucasians in ibandronic acid disposition. There are only very few data available on patients with African origin.

Patients with renal impairment

Exposure to ibandronic acid in patients with various degree of renal impairment is related to creatinine clearance (CL_{Cr}). Subjects with severe renal impairment (CL_{Cr} ≤ 30 mL/min) receiving oral administration of 10 mg ibandronic acid daily for 21 days, had 2-3 fold higher plasma concentrations than subjects with normal renal function (CL_{Cr} ≥ 80 mL/min). Total clearance of ibandronic acid was reduced to 44 ml/min in the subjects with severe renal impairment compared with 129 mL/min in subjects with normal renal function. No dosage adjustment is necessary for patients with mild renal impairment (CL_{Cr} ≥ 50 and < 80 mL/min). For patients with moderate renal impairment (CL_{Cr} ≥ 30 and < 50 mL/min) or severe renal impairment (CL_{Cr} < 30 mL/min) an adjustment in the dose is recommended (see section 4.2).

Patients with hepatic impairment (see section 4.2)

There are no pharmacokinetic data for ibandronic acid in patients who have hepatic impairment. The liver has no significant role in the clearance of ibandronic acid since it is not metabolized but is cleared by renal excretion and by uptake into bone. Therefore dosage adjustment is not necessary in patients with hepatic impairment. Further, as protein binding of ibandronic acid is approximately 87% at therapeutic concentrations, hypoproteinaemia in severe liver disease is unlikely to lead to clinically significant increases in free plasma concentration.

Elderly (see section 4.2)

In a multivariate analysis, age was not found to be an independent factor of any of the pharmacokinetic parameters studied. As renal function decreases with age, this is the only factor to take into consideration (see renal impairment section).

Paediatric population (see section 4.2 and section 5.1)

There are no data on the use of Bondronat in patients less than 18 years old.

5.3 Preclinical safety data

Effects in non-clinical studies were observed only at exposures sufficiently in excess of the maximum human exposure indicating little relevance to clinical use. As with other bisphosphonates, the kidney was identified to be the primary target organ of systemic toxicity.

Mutagenicity/Carcinogenicity:

No indication of carcinogenic potential was observed. Tests for genotoxicity revealed no evidence of genetic activity for ibandronic acid.

Reproductive toxicity:

No evidence of direct foetal toxicity or teratogenic effects was observed for ibandronic acid in intravenously or orally treated rats and rabbits. In reproductive studies in rats by the oral route effects on fertility consisted of increased preimplantation losses at dose levels of 1 mg/kg/day and higher. In reproductive studies in rats by the intravenous route, ibandronic acid decreased sperm counts at doses of 0.3 and 1 mg/kg/day and decreased fertility in males at 1 mg/kg/day and in females at 1.2 mg/kg/day. Adverse effects of ibandronic acid in reproductive toxicity studies in the rat were those expected for this class of medicinal products (bisphosphonates). They include a decreased number of implantation sites, interference with natural delivery (dystocia), an increase in visceral variations (renal pelvis ureter syndrome) and teeth abnormalities in F1 offspring in rats.

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Tablet core:

Lactose monohydrate
Povidone
Cellulose, microcrystalline
Crospovidone
Stearic acid
Silica, anhydrous colloidal

Tablet coat:

Hypromellose
Titanium dioxide (E 171)
Talc
Macrogol 6000

6.2 Incompatibilities

Not applicable.

6.3 Shelf life

5 years.

6.4 Special precautions for storage

Store in the original package in order to protect from moisture.

6.5 Nature and contents of container

Bondronat 50 mg film coated tablets are supplied in blisters (aluminium) containing 7 tablets, which are presented as packs containing 28 or 84 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. The release of pharmaceuticals in the environment should be minimized.

7. MARKETING AUTHORISATION HOLDER

Atnahs Pharma Netherlands B.V.
Copenhagen Towers,
Ørestads Boulevard 108, 5.tv
DK-2300 København S,
Denmark

8. MARKETING AUTHORISATION NUMBER(S)

EU/1/96/012/009
EU/1/96/012/010

9. DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION

Date of first authorisation: 25 June 1996

Date of latest renewal: 25 June 2006

10. DATE OF REVISION OF THE TEXT

Detailed information on this medicinal product is available on the website of the European Medicines Agency <http://www.ema.europa.eu>.

1. NAME OF THE MEDICINAL PRODUCT

Bondronat 6 mg concentrate for solution for infusion.

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

One vial with 6 ml concentrate for solution for infusion contains 6 mg ibandronic acid (as sodium monohydrate).

For the full list of excipients, see section 6.1.

3. PHARMACEUTICAL FORM

Concentrate for solution for infusion.
Clear, colourless solution.

4. CLINICAL PARTICULARS

4.1 Therapeutic indications

Bondronat is indicated in adults for

- Prevention of skeletal events (pathological fractures, bone complications requiring radiotherapy or surgery) in patients with breast cancer and bone metastases
- Treatment of tumour-induced hypercalcaemia with or without metastases

4.2 Posology and method of administration

Patients treated with Bondronat should be given the package leaflet and the patient reminder card.

Bondronat therapy should only be initiated by physicians experienced in the treatment of cancer.

Posology

Prevention of skeletal events in patients with breast cancer and bone metastases

The recommended dose for prevention of skeletal events in patients with breast cancer and bone metastases is 6 mg intravenous injection given every 3-4 weeks. The dose should be infused over at least 15 minutes.

A shorter (i.e. 15 min) infusion time should only be used for patients with normal renal function or mild renal impairment. There are no data available characterising the use of a shorter infusion time in patients with creatinine clearance below 50 ml/min. Prescribers should consult the section *Patients with Renal Impairment* (see section 4.2) for recommendations on dosing and administration in this patient group.

Treatment of tumour-induced hypercalcaemia

Prior to treatment with Bondronat the patient should be adequately rehydrated with 9 mg/ml (0.9%) sodium chloride solution. Consideration should be given to the severity of the hypercalcaemia as well as the tumour type. In general patients with osteolytic bone metastases require lower doses than patients with the humoral type of hypercalcaemia. In most patients with severe hypercalcaemia (albumin-corrected serum calcium* ≥ 3 mmol/l or ≥ 12 mg/dl) 4 mg is an adequate single dose. In patients with moderate hypercalcaemia (albumin-corrected serum calcium < 3 mmol/l or < 12 mg/dl)

2 mg is an effective dose. The highest dose used in clinical trials was 6 mg but this dose does not add any further benefit in terms of efficacy.

* Note albumin-corrected serum calcium concentrations are calculated as follows:

$$\text{Albumin-corrected serum calcium (mmol/l)} = \text{serum calcium (mmol/l)} - [0.02 \times \text{albumin (g/l)}] + 0.8$$

Or

$$\text{Albumin-corrected serum calcium (mg/dl)} = \text{serum calcium (mg/dl)} + 0.8 \times [4 - \text{albumin (g/dl)}]$$

To convert the albumin-corrected serum calcium in mmol/l value to mg/dl, multiply by 4.

In most cases a raised serum calcium level can be reduced to the normal range within 7 days. The median time to relapse (return of albumin-corrected serum calcium to levels above 3 mmol/l) was 18 - 19 days for the 2 mg and 4 mg doses. The median time to relapse was 26 days with a dose of 6 mg.

A limited number of patients (50 patients) have received a second infusion for hypercalcaemia. Repeated treatment may be considered in case of recurrent hypercalcaemia or insufficient efficacy.

Bondronat concentrate for solution for infusion should be administered as an intravenous infusion over 2 hours.

Special populations

Patients with hepatic impairment

No dose adjustment is required (see section 5.2).

Patients with renal impairment

For patients with mild renal impairment (CLCr \geq 50 and $<$ 80 mL/min) no doseadjustment is necessary. For patients with moderate renal impairment (CLCr \geq 30 and $<$ 50 mL/min) or severe renal impairment (CLCr $<$ 30 mL/min) being treated for the prevention of skeletal events in patients with breast cancer and metastatic bone disease the following dosing recommendations should be followed (see section 5.2):

Creatinine Clearance (ml/min)	Dosage	Infusion Volume ¹ and Time ²
\geq 50 CLCr $<$ 80	6 mg (6 ml of concentrate for solution for infusion)	100 ml over 15 minutes
\geq 30 CLCr $<$ 50	4 mg (4 ml of concentrate for solution for infusion)	500 ml over 1 hour
$<$ 30	2 mg (2 ml of concentrate for solution for infusion)	500 ml over 1 hour

¹ 0.9% sodium chloride solution or 5% glucose solution

² Administration every 3 to 4 week

A 15 minute infusion time has not been studied in cancer patients with CLCr $<$ 50 mL/min.

Elderly population (> 65 years)

No dose adjustment is required (see section 5.2).

Paediatric population

The safety and efficacy of Bondronat in children and adolescents below the age of 18 years have not been established. No data are available (see section 5.1 and section 5.2).

Method of administration

For intravenous administration.

The content of the vial is to be used as follows:

- Prevention of Skeletal Events - added to 100 ml isotonic sodium chloride solution or 100 ml 5% dextrose solution and infused over at least 15 minutes. See also dose section above for patients with renal impairment
- Treatment of tumour-induced hypercalcaemia - added to 500 ml isotonic sodium chloride solution or 500 ml 5% dextrose solution and infused over 2 hours

For single use only. Only clear solution without particles should be used.

Bondronat concentrate for solution for infusion should be administered as an intravenous infusion.

Care must be taken not to administer Bondronat concentrate for solution for infusion via intra-arterial or paravenous administration, as this could lead to tissue damage..

4.3 Contraindications

- Hypersensitivity to the active substance or to any of the excipients listed in section 6.1
- Hypocalcaemia

4.4 Special warnings and precautions for use

Patients with disturbances of bone and mineral metabolism

Hypocalcaemia and other disturbances of bone and mineral metabolism should be effectively treated before starting Bondronat therapy for metastatic bone disease.

Adequate intake of calcium and vitamin D is important in all patients. Patients should receive supplemental calcium and/or vitamin D if dietary intake is inadequate.

Anaphylactic reaction/shock

Cases of anaphylactic reaction/shock, including fatal events, have been reported in patients treated with IV ibandronic acid.

Appropriate medical support and monitoring measures should be readily available when Bondronat intravenous injection is administered. If anaphylactic or other severe hypersensitivity/allergic reactions occur, immediately discontinue the injection and initiate appropriate treatment.

Osteonecrosis of the jaw

Osteonecrosis of the jaw (ONJ) has been reported very rarely in the post marketing setting in patients receiving Bondronat for oncology indications (see section 4.8).

The start of treatment or of a new course of treatment should be delayed in patients with unhealed open soft tissue lesions in the mouth.

A dental examination with preventive dentistry and an individual benefit-risk assessment is recommended prior to treatment with Bondronat in patients with concomitant risk factors.

The following risk factors should be considered when evaluating a patient's risk of developing ONJ:

- Potency of the medicinal product that inhibit bone resorption (higher risk for highly potent compounds), route of administration (higher risk for parenteral administration) and cumulative dose of bone resorption therapy
- Cancer, co-morbid conditions (e.g. anaemia, coagulopathies, infection), smoking
- Concomitant therapies: corticosteroids, chemotherapy, angiogenesis inhibitors, radiotherapy to head and neck
- Poor oral hygiene, periodontal disease, poorly fitting dentures, history of dental disease, invasive dental procedures e.g. tooth extractions

All patients should be encouraged to maintain good oral hygiene, undergo routine dental check-ups, and immediately report any oral symptoms such as dental mobility, pain or swelling, or non-healing of sores or discharge during treatment with Bondronat. While on treatment, invasive dental procedures should be performed only after careful consideration and be avoided in close proximity to Bondronat administration.

The management plan of the patients who develop ONJ should be set up in close collaboration between the treating physician and a dentist or oral surgeon with expertise in ONJ. Temporary interruption of Bondronat treatment should be considered until the condition resolves and contributing risk factors are mitigated where possible.

Osteonecrosis of the external auditory canal

Osteonecrosis of the external auditory canal has been reported with bisphosphonates, mainly in association with long-term therapy. Possible risk factors for osteonecrosis of the external auditory canal include steroid use and chemotherapy and/or local risk factors such as infection or trauma. The possibility of osteonecrosis of the external auditory canal should be considered in patients receiving bisphosphonates who present with ear symptoms including chronic ear infections.

Atypical fractures of the femur

Atypical subtrochanteric and diaphyseal femoral fractures have been reported with bisphosphonate therapy, primarily in patients receiving long-term treatment for osteoporosis. These transverse or short oblique fractures can occur anywhere along the femur from just below the lesser trochanter to just above the supracondylar flare. These fractures occur after minimal or no trauma and some patients experience thigh or groin pain, often associated with imaging features of stress fractures, weeks to months before presenting with a completed femoral fracture. Fractures are often bilateral; therefore the contralateral femur should be examined in bisphosphonate-treated patients who have sustained a femoral shaft fracture. Poor healing of these fractures has also been reported.

Discontinuation of bisphosphonate therapy in patients suspected to have an atypical femur fracture should be considered pending evaluation of the patient, based on an individual benefit risk assessment.

During bisphosphonate treatment patients should be advised to report any thigh, hip or groin pain and any patient presenting with such symptoms should be evaluated for an incomplete femur fracture.

Patients with renal impairment

Clinical studies have not shown any evidence of deterioration in renal function with long term Bondronat therapy. Nevertheless, according to clinical assessment of the individual patient, it is recommended that renal function, serum calcium, phosphate and magnesium should be monitored in patients treated with Bondronat (see section 4.2).

Patients with hepatic impairment

As no clinical data are available, dose recommendations cannot be given for patients with severe hepatic insufficiency (see section 4.2).

Patients with cardiac impairment

Overhydration should be avoided in patients at risk of cardiac failure.

Patients with known hypersensitivity to other bisphosphonates

Caution is to be taken in patients with known hypersensitivity to other bisphosphonates.

Excipients with known effect

Bondronat is essentially sodium free.

4.5 Interaction with other medicinal products and other forms of interaction

Metabolic interactions are not considered likely, since ibandronic acid does not inhibit the major human hepatic P450 isoenzymes and has been shown not to induce the hepatic cytochrome P450

system in rats (see section 5.2). Ibandronic acid is eliminated by renal excretion only and does not undergo any biotransformation.

Caution is advised when bisphosphonates are administered with aminoglycosides, since both substances can lower serum calcium levels for prolonged periods. Attention should also be paid to the possible existence of simultaneous hypomagnesaemia.

4.6 Fertility, pregnancy and lactation

Pregnancy

There are no adequate data from the use of ibandronic acid in pregnant women. Studies in rats have shown reproductive toxicity (see section 5.3). The potential risk for humans is unknown. Therefore, Bondronat should not be used during pregnancy.

Breast-feeding

It is not known whether ibandronic acid is excreted in human milk. Studies in lactating rats have demonstrated the presence of low levels of ibandronic acid in the milk following intravenous administration. Bondronat should not be used during breast-feeding.

Fertility

There are no data on the effects of ibandronic acid in humans. In reproductive studies in rats by the oral route, ibandronic acid decreased fertility. In studies in rats using the intravenous route, ibandronic acid decreased fertility at high daily doses (see section 5.3).

4.7 Effects on ability to drive and use machines

On the basis of the pharmacodynamic and pharmacokinetic profile and reported adverse reactions, it is expected that Bondronat has no or negligible influence on the ability to drive and use machines.

4.8 Undesirable effects

Summary of the safety profile

The most serious reported adverse reactions are anaphylactic reaction/shock, atypical fractures of the femur, osteonecrosis for the jaw and ocular inflammation (see paragraph “description of selected adverse reactions” and section 4.4).

Treatment of tumour induced hypercalcaemia is most frequently associated with a rise in body temperature. Less frequently, a decrease in serum calcium below normal range (hypocalcaemia) is reported. In most cases no specific treatment was required and the symptoms subsided after a couple of hours/days.

In the prevention of skeletal events in patients with breast cancer and bone metastases, treatment is most frequently associated with asthenia followed by rise in body temperature and headache.

Tabulated list of adverse reactions

Table 1 lists adverse drug reactions from the pivotal phase III studies (Treatment of tumour induced hypercalcaemia: 311 patients treated with Bondronat 2 mg or 4 mg; Prevention of skeletal events in patients with breast cancer and bone metastases: 152 patients treated with Bondronat 6 mg), and from post-marketing experience.

Adverse reactions are listed according to MedDRA system organ class and frequency category. Frequency categories are defined using the following convention: 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 ($< 1/10,000$), not known (cannot be estimated from the available data). Within each frequency grouping, adverse reactions are presented in order of decreasing seriousness.

Table 1 Adverse Reactions Reported for Intravenous Administration of Bondronat

System Organ Class	Common	Uncommon	Rare	Very rare	Not known
Infections and infestations	Infection	Cystitis, vaginitis, oral candidiasis			
Neoplasms benign, malignant and unspecified		Benign skin neoplasm			
Blood and lymphatic system disorders		Anaemia, blood dyscrasia			
Immune system disorders				Hypersensitivity†, bronchospasm†, angioedema†, anaphylactic reaction/shock† **	Asthma exacerbation
Endocrine disorders	Parathyroid disorder				
Metabolism and nutrition disorders	Hypocalcaemia **	Hypophosphataemia			
Psychiatric disorders		Sleep disorder, anxiety, affectation lability			
Nervous system disorders	Headache, dizziness, dysgeusia (taste perversion)	Cerebrovascular disorder, nerve root lesion, amnesia, migraine, neuralgia, hypertonia, hyperaesthesia, paraesthesia circumoral, parosmia			
Eye disorders	Cataract		Ocular inflammation†**		
Ear and labyrinth disorders		Deafness			
Cardiac disorders	Bundle branch block	Myocardial ischaemia, cardiovascular disorder, palpitations			
Respiratory, thoracic, and mediastinal disorders	Pharyngitis	Lung oedema, stridor			
Gastrointestinal disorders	Diarrhoea, vomiting, dyspepsia, gastrointestinal pain, tooth disorder	Gastroenteritis, gastritis, mouth ulceration, dysphagia, cheilitis			

System Organ Class	Common	Uncommon	Rare	Very rare	Not known
Hepatobiliary disorders		Cholelithiasis			
Skin and subcutaneous tissue disorders	Skin disorder, ecchymosis	Rash, alopecia		Stevens-Johnson Syndrome†, Erythema Multiforme†, Dermatitis Bullous†	
Musculoskeletal and connective tissue disorders	Osteoarthritis, myalgia, arthralgia, joint disorder, bone pain		Atypical subtrochanteric and diaphyseal femoral fractures†	Osteonecrosis of jaw†**, Osteonecrosis of the external auditory canal (bisphosphonate class adverse reaction)†	
Renal and urinary disorders		Urinary retention, renal cyst			
Reproductive system and breast disorders		Pelvic pain			
General disorders and administration site conditions	Pyrexia, influenza-like illness**, oedema peripheral, asthenia, thirst	Hypothermia			
Investigations	Gamma-GT increased, creatinine increased	Blood alkaline phosphatase increase, weight decrease			
Injury, poisoning and procedural complications		Injury, injection site pain			

** See further information below

† Identified in post-marketing experience.

Description of selected adverse reactions

Hypocalcaemia

Decreased renal calcium excretion may be accompanied by a fall in serum phosphate levels not requiring therapeutic measures. The serum calcium level may fall to hypocalcaemic values.

Influenza-like illness

A flu-like syndrome consisting of fever, chills, bone and/or muscle ache-like pain has occurred. In most cases no specific treatment was required and the symptoms subsided after a couple of hours/days.

Osteonecrosis of jaw

Cases of osteonecrosis of the jaw have been reported, predominantly in cancer patients treated with medicinal products that inhibit bone resorption, such as ibandronic acid (see section 4.4.) Cases of ONJ have been reported in the post marketing setting for ibandronic acid.

Ocular inflammation

Ocular inflammation events such as uveitis, episcleritis and scleritis have been reported with ibandronic acid. In some cases, these events did not resolve until the ibandronic acid was discontinued.

Anaphylactic reaction/shock

Cases of anaphylactic reaction/shock, including fatal events, have been reported in patients treated with intravenous ibandronic acid.

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 the national reporting system listed in [Appendix V](#).

4.9 Overdose

Up to now there is no experience of acute poisoning with Bondronat concentrate for solution for infusion. Since both the kidney and the liver were found to be target organs for toxicity in preclinical studies with high doses, kidney and liver function should be monitored. Clinically relevant hypocalcaemia should be corrected by intravenous administration of calcium gluconate.

5. PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmaco-therapeutic group: Medicinal products for treatment of bone diseases, bisphosphonate, ATC Code: M05BA06.

Ibandronic acid belongs to the bisphosphonate group of compounds which act specifically on bone. Their selective action on bone tissue is based on the high affinity of bisphosphonates for bone mineral. Bisphosphonates act by inhibiting osteoclast activity, although the precise mechanism is still not clear.

In vivo, ibandronic acid prevents experimentally-induced bone destruction caused by cessation of gonadal function, retinoids, tumours or tumour extracts. The inhibition of endogenous bone resorption has also been documented by ⁴⁵Ca kinetic studies and by the release of radioactive tetracycline previously incorporated into the skeleton.

At doses that were considerably higher than the pharmacologically effective doses, ibandronic acid did not have any effect on bone mineralisation.

Bone resorption due to malignant disease is characterised by excessive bone resorption that is not balanced with appropriate bone formation. Ibandronic acid selectively inhibits osteoclast activity, reducing bone resorption and thereby reducing skeletal complications of the malignant disease.

Clinical studies in the treatment of tumour-induced hypercalcaemia

Clinical studies in hypercalcaemia of malignancy demonstrated that the inhibitory effect of ibandronic acid on tumour-induced osteolysis, and specifically on tumour-induced hypercalcaemia, is characterised by a decrease in serum calcium and urinary calcium excretion.

In the dose range recommended for treatment, the following response rates with the respective confidence intervals have been shown in clinical trials for patients with baseline albumin-corrected serum calcium ≥ 3.0 mmol/l after adequate rehydration.

Ibandronic acid dose	% of Patients with Response	90% Confidence Interval
2 mg	54	44-63
4 mg	76	62-86
6 mg	78	64-88

For these patients and dosages, the median time to achieve normocalcaemia was 4 to 7 days. The median time to relapse (return of albumin-corrected serum calcium above 3.0 mmol/l) was 18 to 26 days.

Clinical studies in the prevention of skeletal events in patients with breast cancer and bone metastases

Clinical studies in patients with breast cancer and bone metastases have shown that there is a dose dependent inhibitory effect on bone osteolysis, expressed by markers of bone resorption, and a dose dependent effect on skeletal events.

Prevention of skeletal events in patients with breast cancer and bone metastases with Bondronat 6 mg administered intravenously was assessed in one randomized placebo controlled phase III trial with a duration of 96 weeks. Female patients with breast cancer and radiologically confirmed bone metastases were randomised to receive placebo (158 patients) or 6 mg Bondronat (154 patients). The results from this trial are summarised below.

Primary efficacy endpoints

The primary endpoint of the trial was the skeletal morbidity period rate (SMPR). This was a composite endpoint which had the following skeletal related events (SREs) as sub-components:

- radiotherapy to bone for treatment of fractures/impending fractures
- surgery to bone for treatment of fractures
- vertebral fractures
- non-vertebral fractures

The analysis of the SMPR was time-adjusted and considered that one or more events occurring in a single 12 week period could be potentially related. Multiple events were therefore counted only once for the purposes of the analysis. Data from this study demonstrated a significant advantage for intravenous Bondronat 6 mg over placebo in the reduction in SREs measured by the time-adjusted SMPR ($p=0.004$). The number of SREs was also significantly reduced with Bondronat 6 mg and there was a 40% reduction in the risk of a SRE over placebo (relative risk 0.6, $p = 0.003$). Efficacy results are summarised in Table 2.

Table 2 Efficacy Results (Breast Cancer Patients with Metastatic Bone Disease)

	All Skeletal Related Events (SREs)		
	Placebo n=158	Bondronat 6 mg n=154	p-value
SMPR (per patient year)	1.48	1.19	p=0.004
Number of events (per patient)	3.64	2.65	p=0.025
SRE relative risk	-	0.60	p=0.003

Secondary efficacy endpoints

A statistically significant improvement in bone pain score was shown for intravenous Bondronat 6 mg compared to placebo. The pain reduction was consistently below baseline throughout the entire study and accompanied by a significantly reduced use of analgesics. The deterioration in Quality of Life was significantly less in Bondronat treated patients compared with placebo. A tabular summary of these secondary efficacy results is presented in Table 3.

Table 3 Secondary Efficacy Results (Breast cancer Patients with Metastatic Bone Disease)

	Placebo n=158	Bondronat 6 mg n=154	p-value
Bone pain *	0.21	-0.28	p<0.001
Analgesic use *	0.90	0.51	p=0.083
Quality of Life *	-45.4	-10.3	p=0.004

* Mean change from baseline to last assessment.

There was a marked depression of urinary markers of bone resorption (pyridinoline and deoxypyridinoline) in patients treated with Bondronat that was statistically significant compared to placebo.

In a study in 130 patients with metastatic breast cancer the safety of Bondronat infused over 1 hour or 15 minutes was compared. No difference was observed in the indicators of renal function. The overall adverse event profile of ibandronic acid following the 15 minute infusion was consistent with the known safety profile over longer infusion times and no new safety concerns were identified relating to the use of a 15 minute infusion time.

A 15 minute infusion time has not been studied in cancer patients with a creatinine clearance of <50ml/min.

Paediatric population (see section 4.2 and section 5.2)

The safety and efficacy of Bondronat in children and adolescents below the age of 18 years have not been established. No data are available.

5.2 Pharmacokinetic properties

After a 2 hour infusion of 2, 4 and 6 mg ibandronic acid pharmacokinetic parameters are dose proportional.

Distribution

After initial systemic exposure, ibandronic acid rapidly binds to bone or is excreted into urine. In humans, the apparent terminal volume of distribution is at least 90 l and the amount of dose reaching the bone is estimated to be 40-50% of the circulating dose. Protein binding in human plasma is approximately 87% at therapeutic concentrations, and thus interaction with other medicinal products, due to displacement is unlikely.

Biotransformation

There is no evidence that ibandronic acid is metabolized in animals or humans.

Elimination

The range of observed apparent half-lives is broad and dependent on dose and assay sensitivity, but the apparent terminal half-life is generally in the range of 10-60 hours. However, early plasma levels fall quickly, reaching 10% of peak values within 3 and 8 hours after intravenous or oral administration respectively. No systemic accumulation was observed when ibandronic acid was administered intravenously once every 4 weeks for 48 weeks to patients with metastatic bone disease.

Total clearance of ibandronic acid is low with average values in the range 84-160 ml/min. Renal clearance (about 60 ml/min in healthy postmenopausal females) accounts for 50-60% of total clearance and is related to creatinine clearance. The difference between the apparent total and renal clearances is considered to reflect the uptake by bone.

The secretory pathway of renal elimination does not appear to include known acidic or basic transport systems involved in the excretion of other active substances. In addition, ibandronic acid does not inhibit the major human hepatic P450 isoenzymes and does not induce the hepatic cytochrome P450 system in rats.

Pharmacokinetics in special populations

Gender

Bioavailability and pharmacokinetics of ibandronic acid are similar in both men and women.

Race

There is no evidence for clinically relevant interethnic differences between Asians and Caucasians in ibandronic acid disposition. There are only very few data available on patients with African origin.

Patients with renal impairment

Exposure to ibandronic acid in patients with various degrees of renal impairment is related to creatinine clearance (CL_{cr}). In subjects with severe renal impairment (mean estimated CL_{cr} = 21.2 mL/min), dose-adjusted mean AUC_{0-24h} was increased by 110% compared to healthy volunteers. In clinical pharmacology trial WP18551, after a single dose intravenous administration of 6 mg (15 minutes infusion), mean AUC₀₋₂₄ increased by 14% and 86%, respectively, in subjects with mild (mean estimated CL_{cr}=68.1 mL/min) and moderate (mean estimated CL_{cr}=41.2 mL/min) renal impairment compared to healthy volunteers (mean estimated CL_{cr}=120 mL/min). Mean C_{max} was not increased in patients with mild renal impairment and increased by 12% in patients with moderate renal impairment. For patients with mild renal impairment (CL_{cr} ≥50 and <80 mL/min) no dosage adjustment is necessary. For patients with moderate renal impairment (CL_{cr} ≥30 and <50 mL/min) or severe renal impairment (CL_{cr} <30 mL/min) being treated for the prevention of skeletal events in patients with breast cancer and metastatic bone disease an adjustment in the dose is recommended (see section 4.2).

Patients with hepatic impairment (see section 4.2)

There are no pharmacokinetic data for ibandronic acid in patients who have hepatic impairment. The liver has no significant role in the clearance of ibandronic acid since it is not metabolized but is cleared by renal excretion and by uptake into bone. Therefore dosage adjustment is not necessary in patients with hepatic impairment. Further, as protein binding of ibandronic acid is approximately 87%

at therapeutic concentrations, hypoproteinaemia in severe liver disease is unlikely to lead to clinically significant increases in free plasma concentration.

Elderly (see section 4.2)

In a multivariate analysis, age was not found to be an independent factor of any of the pharmacokinetic parameters studied. As renal function decreases with age, this is the only factor that should be considered (see renal impairment section).

Paediatric population (see section 4.2 and section 5.1)

There are no data on the use of Bondronat in patients less than 18 years old.

5.3 Preclinical safety data

Effects in non-clinical studies were observed only at exposures sufficiently in excess of the maximum human exposure indicating little relevance to clinical use. As with other bisphosphonates, the kidney was identified to be the primary target organ of systemic toxicity.

Mutagenicity/Carcinogenicity:

No indication of carcinogenic potential was observed. Tests for genotoxicity revealed no evidence of effects on genetic activity for ibandronic acid.

Reproductive toxicity:

No evidence of direct foetal toxicity or teratogenic effects were observed for ibandronic acid in intravenously treated rats and rabbits. In reproductive studies in rats by the oral route, effects on fertility consisted of increased preimplantation losses at dose levels of 1 mg/kg/day and higher. In reproductive studies in rats by the intravenous route, ibandronic acid decreased sperm counts at doses of 0.3 and 1 mg/kg/day and decreased fertility in males at 1 mg/kg/day and in females at 1.2 mg/kg/day. Adverse effects of ibandronic acid in reproductive toxicity studies in the rat were those expected for this class of medicinal products (bisphosphonates). They include a decreased number of implantation sites, interference with natural delivery (dystocia), an increase in visceral variations (renal pelvis ureter syndrome) and teeth abnormalities in F1 offspring in rats.

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Sodium chloride
Acetic acid (99%)
Sodium acetate
Water for injections

6.2 Incompatibilities

To avoid potential incompatibilities Bondronat concentrate for solution for infusion should only be diluted with isotonic sodium chloride solution or 5% glucose solution.

Bondronat should not be mixed with calcium containing solutions.

6.3 Shelf life

5 years
After reconstitution: 24 hours.

6.4 Special precautions for storage

This medicinal product does not require any special storage conditions prior to reconstitution.

After reconstitution: Store at 2 °C – 8 °C (in a refrigerator).

From a microbiological point of view, the product should be used immediately. If not used immediately, in-use storage times and conditions prior to use are the responsibility of the user and would normally not be longer than 24 hours at 2 to 8 °C, unless reconstitution has taken place in controlled and validated aseptic conditions.

6.5 Nature and contents of container

Bondronat is supplied as packs containing 1, 5 and 10 vials (6 ml type I glass vial with a bromobutyl rubber stopper). 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.

The release of pharmaceuticals in the environment should be minimized.

7. MARKETING AUTHORISATION HOLDER

Atnahs Pharma Netherlands B.V.
Copenhagen Towers,
Ørestads Boulevard 108, 5.tv
DK-2300 København S,
Denmark

8. MARKETING AUTHORISATION NUMBER(S)

EU/1/96/012/011
EU/1/96/012/012
EU/1/96/012/013

9. DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION

Date of first authorisation: 25 June 1996

Date of latest renewal: 25 June 2006

10. DATE OF REVISION OF THE TEXT

Detailed information on this medicinal product is available on the website of the European Medicines Agency <http://www.ema.europa.eu>.

ANNEX II

- A. MANUFACTURER(S) RESPONSIBLE FOR BATCH RELEASE**
- B. CONDITIONS OR RESTRICTIONS REGARDING SUPPLY AND USE**
- C. OTHER CONDITIONS AND REQUIREMENTS OF THE MARKETING AUTHORISATION**
- D. CONDITIONS OR RESTRICTIONS WITH REGARD TO THE SAFE AND EFFECTIVE USE OF THE MEDICINAL PRODUCT**

A. MANUFACTURER(S) RESPONSIBLE FOR BATCH RELEASE

Name and address of the manufacturers responsible for batch release

Concentrate for solution for infusion

Atnahs Pharma Denmark ApS
Copenhagen Towers,
Ørestads Boulevard 108, 5.tv
DK-2300 København S,
Denmark

Film-coated tablet

IL CSM Clinical Supplies Management GmbH
Marie-Curie-Strasse 8
Lörrach
Baden-Württemberg
79539, Germany

Atnahs Pharma Denmark ApS
Copenhagen Towers,
Ørestads Boulevard 108, 5.tv
DK-2300 København S,
Denmark

The printed package leaflet of the medicinal product must state the name and address of the manufacturer responsible for the release of the concerned batch.

B. CONDITIONS OR RESTRICTIONS REGARDING SUPPLY AND USE

Medicinal product subject to restricted medical prescription (see Annex I: Summary of Product Characteristics, section 4.2).

C. OTHER CONDITIONS AND REQUIREMENTS OF THE MARKETING AUTHORISATION

Periodic Safety Update Reports

The requirements for submission of periodic safety update reports for this medicinal product are set out in the list of Union reference dates (EURD list) provided for under Article 107c(7) of Directive 2001/83/EC and any subsequent updates published on the European medicines web-portal.

D. CONDITIONS OR RESTRICTIONS WITH REGARD TO THE SAFE AND EFFECTIVE USE OF THE MEDICINAL PRODUCT

Risk Management Plan (RMP)

The MAH shall perform the required pharmacovigilance activities and interventions detailed in the agreed RMP presented in Module 1.8.2 of the Marketing Authorisation and any agreed subsequent updates of the RMP.

An updated RMP should be submitted:

- At the request of the European Medicines Agency.

- Whenever the risk management system is modified, especially as the result of new information being received that may lead to a significant change to the benefit/risk profile or as the result of an important (pharmacovigilance or risk minimization) milestone being reached.

Additional risk minimisation measures

The MAH shall ensure that a patient reminder card regarding osteonecrosis of the jaw is implemented.

ANNEX III
LABELLING AND PACKAGE LEAFLET

A. LABELLING

PARTICULARS TO APPEAR ON THE OUTER PACKAGING

Outer Carton

1. NAME OF THE MEDICINAL PRODUCT

Bondronat 2 mg concentrate for solution for infusion
ibandronic acid

2. STATEMENT OF ACTIVE SUBSTANCE(S)

Each vial contains 2 mg of ibandronic acid (as sodium monohydrate).

3. LIST OF EXCIPIENTS

Sodium acetate, sodium chloride, acetic acid and water for injections. See the package leaflet for further information.

4. PHARMACEUTICAL FORM AND CONTENTS

Concentrate for solution for infusion
1 vial

5. METHOD AND ROUTE(S) OF ADMINISTRATION

Read the package leaflet before use
Intravenous use, for infusion after dilution

6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN

Keep out of the sight and reach of children

7. OTHER SPECIAL WARNING(S), IF NECESSARY

8. EXPIRY DATE

EXP

9. SPECIAL STORAGE CONDITIONS

This medicinal product does not require any special storage conditions prior to reconstitution. After dilution the infusion solution is stable for 24 hours at 2 °C - 8 °C (in a refrigerator)

10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE

11. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER

Atnahs Pharma Netherlands B.V.
Copenhagen Towers,
Ørestads Boulevard 108, 5.tv
DK-2300 København S,
Denmark

12. MARKETING AUTHORISATION NUMBER(S)

EU/1/96/012/004

13. BATCH NUMBER

Batch

14. GENERAL CLASSIFICATION FOR SUPPLY

Medicinal product subject to medical prescription

15. INSTRUCTIONS ON USE

16. INFORMATION IN BRAILLE

Justification for not including Braille accepted

17. UNIQUE IDENTIFIER – 2D BARCODE

2D barcode carrying the unique identifier included.

18. UNIQUE IDENTIFIER - HUMAN READABLE DATA

PC:
SN:
NN:

MINIMUM PARTICULARS TO APPEAR ON SMALL IMMEDIATE PACKAGING UNITS

Vial

1. NAME OF THE MEDICINAL PRODUCT AND ROUTE(S) OF ADMINISTRATION

Bondronat 2 mg concentrate for solution for infusion
ibandronic acid
I.V. use

2. METHOD OF ADMINISTRATION

Read the package leaflet before use

3. EXPIRY DATE

EXP

4. BATCH NUMBER

Batch

5. CONTENTS BY WEIGHT, BY VOLUME OR BY UNIT

2 ml

6. OTHER

PARTICULARS TO APPEAR ON THE OUTER PACKAGING

Outer Carton

1. NAME OF THE MEDICINAL PRODUCT

Bondronat 50 mg film-coated tablets
ibandronic acid

2. STATEMENT OF ACTIVE SUBSTANCE(S)

Each film-coated tablet contains 50 mg of ibandronic acid (as sodium monohydrate).

3. LIST OF EXCIPIENTS

The tablets also contain lactose monohydrate. See the package leaflet for further information.

4. PHARMACEUTICAL FORM AND CONTENTS

Film-coated tablets

28 film-coated tablets
84 film-coated tablets

5. METHOD AND ROUTE(S) OF ADMINISTRATION

Do not suck, chew or crush tablets
Read the package leaflet before use
Oral use

6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN

Keep out of the sight and reach of children

7. OTHER SPECIAL WARNING(S), IF NECESSARY

8. EXPIRY DATE

EXP

9. SPECIAL STORAGE CONDITIONS

Store in the original package in order to protect from moisture

10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE

11. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER

Atnahs Pharma Netherlands B.V.
Copenhagen Towers,
Ørestads Boulevard 108, 5.tv
DK-2300 København S,
Denmark

12. MARKETING AUTHORISATION NUMBER(S)

EU/1/96/012/009: 28film-coated tablets
EU/1/96/012/010: 84 film-coated tablets

13. BATCH NUMBER

Batch

14. GENERAL CLASSIFICATION FOR SUPPLY

Medicinal product subject to medical prescription

15. INSTRUCTIONS ON USE

16. INFORMATION IN BRAILLE

bondronat 50 mg

17. UNIQUE IDENTIFIER – 2D BARCODE

2D barcode carrying the unique identifier included.

18. UNIQUE IDENTIFIER - HUMAN READABLE DATA

PC:
SN:
NN:

MINIMUM PARTICULARS TO APPEAR ON BLISTERS OR STRIPS

Blister foil

1. NAME OF THE MEDICINAL PRODUCT

Bondronat 50 mg film-coated tablets
ibandronic acid

2. NAME OF THE MARKETING AUTHORISATION HOLDER

Atnahs Pharma Netherlands B.V.

3. EXPIRY DATE

EXP

4. BATCH NUMBER

Lot

5. OTHER

Mon
Tue
Wed
Thu
Fri
Sat
Sun

PARTICULARS TO APPEAR ON THE OUTER PACKAGING
Outer Carton

1. NAME OF THE MEDICINAL PRODUCT

Bondronat 6 mg concentrate for solution for infusion
ibandronic acid

2. STATEMENT OF ACTIVE SUBSTANCE(S)

Each vial contains 6 mg of ibandronic acid (as sodium monohydrate).

3. LIST OF EXCIPIENTS

Sodium acetate, sodium chloride, acetic acid and water for injections. See the package leaflet for further information.

4. PHARMACEUTICAL FORM AND CONTENTS

Concentrate for solution for infusion
1 vial
5 vials
10 vials

5. METHOD AND ROUTE(S) OF ADMINISTRATION

Read the package leaflet before use
Intravenous use, for infusion after dilution

6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN

Keep out of the sight and reach of children

7. OTHER SPECIAL WARNING(S), IF NECESSARY

8. EXPIRY DATE

EXP

9. SPECIAL STORAGE CONDITIONS

This medicinal product does not require any special storage conditions prior to reconstitution. After dilution the infusion solution is stable for 24 hours at 2 °C - 8 °C (in a refrigerator)

10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE

11. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER

Atnahs Pharma Netherlands B.V.
Copenhagen Towers,
Ørestads Boulevard 108, 5.tv
DK-2300 København S,
Denmark

12. MARKETING AUTHORISATION NUMBER(S)

EU/1/96/012/011: 1 vial
EU/1/96/012/012: 5 vials
EU/1/96/012/013: 10 vials

13. BATCH NUMBER

Batch

14. GENERAL CLASSIFICATION FOR SUPPLY

Medicinal product subject to medical prescription

15. INSTRUCTIONS ON USE

16. INFORMATION IN BRAILLE

Justification for not including Braille accepted

17. UNIQUE IDENTIFIER – 2D BARCODE

2D barcode carrying the unique identifier included.

18. UNIQUE IDENTIFIER - HUMAN READABLE DATA

PC:
SN:
NN:

MINIMUM PARTICULARS TO APPEAR ON SMALL IMMEDIATE PACKAGING UNITS

Vial

1. NAME OF THE MEDICINAL PRODUCT AND ROUTE(S) OF ADMINISTRATION

Bondronat 6 mg concentrate for solution for infusion
ibandronic acid
I.V. use

2. METHOD OF ADMINISTRATION

Read the package leaflet before use

3. EXPIRY DATE

EXP

4. BATCH NUMBER

Batch

5. CONTENTS BY WEIGHT, BY VOLUME OR BY UNIT

6 ml

6. OTHER

B. PACKAGE LEAFLET

Package leaflet: Information for the patient

Bondronat 2 mg concentrate for solution for infusion ibandronic acid

Read all of this leaflet carefully before you start using this medicine because it contains important information for you.

- Keep this leaflet. You may need to read it again
- If you have any further questions, ask your doctor, pharmacist or nurse
- If you get any side effects, talk to your doctor, pharmacist or nurse. This includes any possible side effects not listed in this leaflet. See section 4.

What is in this leaflet:

1. What Bondronat is and what it is used for
2. What you need to know before you receive Bondronat
3. How to receive Bondronat
4. Possible side effects
5. How to store Bondronat
6. Contents of the pack and other information

1. What Bondronat is and what it is used for

Bondronat contains the active substance ibandronic acid. This belongs to a group of medicines called bisphosphonates.

Bondronat is used in adults and prescribed to you if you have breast cancer that has spread to your bones (called 'bone metastases').

- It helps to prevent your bones from breaking (fractures)
- It helps to prevent other bone problems that may need surgery or radiotherapy.

Bondronat can also be prescribed if you have a raised calcium level in your blood due to a tumour.

Bondronat works by reducing the amount of calcium that is lost from your bones. This helps to stop your bones from getting weaker.

2. What you need to know before you receive Bondronat

Do not receive Bondronat:

- if you are allergic to ibandronic acid or any of the other ingredients of this medicine that are listed in section 6
- if you have, or have ever had low levels of calcium in your blood.

Do not receive this medicine if any of the above apply to you. If you are not sure, talk to your doctor or pharmacist before having Bondronat.

Warnings and precautions

A side effect called osteonecrosis of the jaw (ONJ) (bone damage in the jaw) has been reported very rarely in the post marketing setting in patients receiving Bondronat for cancer-related conditions. ONJ can also occur after stopping treatment.

It is important to try and prevent ONJ developing as it is a painful condition that can be difficult to treat. In order to reduce the risk of developing osteonecrosis of the jaw, there are some precautions you should take.

Before receiving treatment, tell your doctor/nurse (health care professional) if:

- you have any problems with your mouth or teeth such as poor dental health, gum disease, or a planned tooth extraction
- you don't receive routine dental care or have not had a dental check up for a long time
- you are a smoker (as this may increase the risk of dental problems)
- you have previously been treated with a bisphosphonate (used to treat or prevent bone disorders)
- you are taking medicines called corticosteroids (such as prednisolone or dexamethasone)
- you have cancer.

Your doctor may ask you to undergo a dental examination before starting treatment with Bondronat.

While being treated, you should maintain good oral hygiene (including regular teeth brushing) and receive routine dental check-ups. If you wear dentures you should make sure these fit properly. If you are under dental treatment or will undergo dental surgery (e.g. tooth extractions), inform your doctor about your dental treatment and tell your dentist that you are being treated with Bondronat.

Contact your doctor and dentist immediately if you experience any problems with your mouth or teeth such as loose teeth, pain or swelling, non-healing of sores or discharge, as these could be signs of osteonecrosis of the jaw.

Talk to your doctor, pharmacist or nurse before receiving Bondronat:

- if you are allergic to any other bisphosphonates
- if you have high or low levels of vitamin D, calcium or any other minerals
- if you have kidney problems
- if you have heart problems and the doctor recommended to limit your daily fluid intake.

Cases of serious, sometimes fatal allergic reaction have been reported in patients treated with intravenous ibandronic acid.

If you experience one of the following symptoms, such as shortness of breath/difficulty breathing, tight feeling in throat, swelling of tongue, dizziness, feeling of loss of consciousness, redness or swelling of face, body rash, nausea and vomiting, you should immediately alert your doctor or nurse (see section 4).

Children and adolescents

Bondronat should not be used in children and adolescents below the age of 18 years.

Other medicines and Bondronat

Tell your doctor or pharmacist if you are taking, have recently taken or might take any other medicines. This is because Bondronat can affect the way some other medicines work. Also, some other medicines can affect the way Bondronat works.

In particular, tell your doctor or pharmacist if you are receiving a type of antibiotic injection called 'aminoglycoside' such as gentamicin. This is because aminoglycosides and Bondronat can both lower the amount of calcium in your blood.

Pregnancy and breast-feeding

Do not receive Bondronat if you are pregnant, planning to get pregnant or if you are breast-feeding. Ask your doctor or pharmacist for advice before taking this medicine.

Driving and using machines

You can drive and use machines as it's expected that Bondronat has no or negligible effect on your ability to drive and use machines. Talk to your doctor first if you want to drive, use machines or tools.

Bondronat contains less than 1 mmol sodium (23 mg) per vial, i.e. 'essentially sodium free'.

3. How to receive Bondronat

Receiving this medicine

- Bondronat is normally given by a doctor or other medical staff who have experience with the treatment of cancer
- it is given as an infusion into your vein.

Your doctor may do regular blood tests while you are receiving Bondronat. This is to check that you are being given the right amount of this medicine.

How much to receive

Your doctor will work out how much Bondronat you will be given depending on your illness.

If you have breast cancer that has spread to your bones, then the recommended dose is 3 vials (6 mg) every 3-4 weeks, as an infusion in your vein over at least 15 minutes.

If you have a raised calcium level in your blood due to a tumour then the recommended dose is a single administration of 1 vial (2 mg) or 2 vials (4 mg), depending on the severity of your illness. The medicine should be administered as an infusion in your vein over two hours. A repeated dose may be considered in case of insufficient response or if your illness reappears.

Your doctor may adjust your dose and duration of intravenous infusion if you have kidney problems.

If you have any further questions on the use of this medicine, ask your doctor or pharmacist.

4. Possible side effects

Like all medicines, this medicine can cause side effects although not everybody gets them.

Talk to a nurse or a doctor straight away if you notice any of the following serious side effects you may need urgent medical treatment:

Rare (may affect up to 1 in 1,000 people)

- persistent eye pain and inflammation
- new pain, weakness or discomfort in your thigh, hip or groin. You may have early signs of a possible unusual fracture of the thigh bone.

Very rare (may affect up to 1 in 10,000 people)

- pain or sore in your mouth or jaw. You may have early signs of severe jaw problems (necrosis (dead bone tissue) in the jaw bone)
- Talk to your doctor if you have ear pain, discharge from the ear, and/or an ear infection. These could be signs of bone damage in the ear
- itching, swelling of your face, lips, tongue and throat, with difficulty breathing. You may be having a serious, potentially life threatening allergic reaction (see section 2)
- severe adverse skin reactions.

Not known (frequency cannot be estimated from the available data)

- asthma attack.

Other possible side effects

Common (may affect up to 1 in 10 people)

- flu-like symptoms, including fever, shaking and shivering, feeling of discomfort, fatigue, bone pain and aching muscles and joints. These symptoms usually disappear within a couple of hours or days. Talk to a nurse or doctor if any effects become troublesome or last more than a couple of days
- rise in body temperature
- stomach and tummy pain, indigestion, being sick, vomiting or having diarrhoea (loose bowels)
- low calcium or phosphate levels in your blood
- changes in blood test results such as Gamma GT or creatinine
- a heart rhythm problem called ‘bundle branch block’
- pain in your bone or muscles
- headache, feeling dizzy or feeling weak
- feeling thirsty, sore throat, changes in taste
- swollen legs or feet
- aching joints, arthritis, or other joint problems
- problems with your parathyroid gland
- bruising
- infections
- a problem with your eyes called ‘cataracts’
- skin problems
- tooth problems.

Uncommon (may affect less than 1 in 100 people)

- shaking or shivering
- your body temperature getting too low (‘hypothermia’)
- a condition affecting the blood vessels in your brain called ‘cerebrovascular disorder’ (stroke or brain bleeding)
- heart and circulatory problems (including palpitations, heart attack, hypertension (high blood pressure) and varicose veins)
- changes in your blood cells (‘anaemia’)
- a high level of alkaline phosphatase in your blood
- fluid build up and swelling (‘lymphoedema’)
- fluid in your lungs
- stomach problems such as ‘gastroenteritis’ or ‘gastritis’
- gallstones
- being unable to pass water (urine), cystitis (bladder inflammation)
- migraine
- pain in your nerves, damaged nerve root
- deafness
- increased sensitivity of sound, taste or touch or changes in smell
- difficulty swallowing
- mouth ulcers, swollen lips (‘cheilitis’), oral thrush
- itching or tingling skin around your mouth
- pelvic pain, discharge, itching or pain in the vagina
- a skin growth called a ‘benign skin neoplasm’
- memory loss
- sleep problems, feeling anxious, emotional instability, or mood swings
- skin rash
- hair loss
- injury or pain at the injection site
- weight loss
- kidney cyst (fluid-filled sac in the kidney).

Reporting of side effects

If you get any side effects, talk to your doctor, pharmacist or nurse. This includes any possible side effects not listed in this leaflet. You can also report side effects directly via [the national reporting system](#) listed in [Appendix V](#). By reporting side effects you can help provide more information on the safety of this medicine.

5. How to store Bondronat

- Keep this medicine out of the sight and reach of children
- Do not use this medicine after the expiry date which is stated on the folding box and on the label after EXP. The expiry date refers to the last day of that month
- After dilution the infusion solution is stable for 24 hours at 2-8°C (in a refrigerator)
- Do not use this medicine if you notice that the solution is not clear or contains particles.

6. Content of the pack and other information

What Bondronat contains

- The active substance is ibandronic acid. One vial with 2 ml of a concentrate for solution for infusion contains 2 mg ibandronic acid (as sodium monohydrate)
- The other ingredients are sodium chloride, acetic acid, sodium acetate and water for injections.

What Bondronat looks like and contents of the pack

Bondronat is a colourless, clear solution. Bondronat is supplied as packs containing 1 vial (2 ml type I glass vial with a bromobutyl rubber stopper).

Marketing Authorisation Holder and Manufacturer

Marketing Authorisation Holder

Atnahs Pharma Netherlands B.V.
Copenhagen Towers,
Ørestads Boulevard 108, 5.tv
DK-2300 København S,
Denmark

Manufacturer

Atnahs Pharma Denmark ApS
Copenhagen Towers,
Ørestads Boulevard 108, 5.tv
DK-2300 København S,
Denmark

This leaflet was last revised in {MM/YYYY}

Detailed information on this medicine is available on the European Medicines Agency web site:
<http://www.ema.europa.eu/>

The following information is intended for healthcare professionals only

Dosage: Prevention of Skeletal Events in Patients with Breast Cancer and Bone Metastases

The recommended dose for prevention of skeletal events in patients with breast cancer and bone metastases is 6 mg intravenously given every 3-4 weeks. The dose should be infused over at least 15 minutes.

Patients with renal impairment

For patients with mild renal impairment (CLCr \geq 50 and $<$ 80 mL/min) no dosage adjustment is necessary. For patients with moderate renal impairment (CLCr \geq 30 and $<$ 50 mL/min) or severe renal impairment (CLCr $<$ 30 mL/min) being treated for the prevention of skeletal events in patients with breast cancer and metastatic bone disease the following dosing recommendations should be followed:

Creatinine Clearance (ml/min)	Dosage	Infusion Volume ¹ and Time ²
\geq 50 CLCr $<$ 80	6 mg (6 ml of concentrate for solution for infusion)	100 ml over 15 minutes
\geq 30 CLCr $<$ 50	4 mg (4 ml of concentrate for solution for infusion)	500 ml over 1 hour
$<$ 30	2 mg (2 ml of concentrate for solution for infusion)	500 ml over 1 hour

¹ 0.9% sodium chloride solution or 5% glucose solution

² Administration every 3 to 4 week

A 15 minute infusion time has not been studied in cancer patients with CLCr $<$ 50 mL/min.

Dosage: Treatment of Tumour-induced Hypercalcaemia

Bondronat is usually administered in a hospital setting. The dose is determined by the doctor considering the following factors.

Prior to treatment with Bondronat the patient should be adequately rehydrated with 9 mg/ml (0.9%) sodium chloride. Consideration should be given to the severity of the hypercalcaemia as well as the tumour type. In most patients with severe hypercalcaemia (albumin-corrected serum calcium* \geq 3 mmol/l or \geq 12 mg/dl) 4 mg will be an adequate single dosage. In patients with moderate hypercalcaemia (albumin-corrected serum calcium $<$ 3 mmol/l or $<$ 12 mg/dl) 2 mg is an effective dose. The highest dose used in clinical trials was 6 mg but this dose does not add any further benefit in terms of efficacy.

* Note albumin-corrected serum calcium concentrations are calculated as follows:

$$\begin{array}{l} \text{Albumin-corrected} \\ \text{Serum calcium} \\ \text{(mmol/l)} \end{array} = \text{Serum calcium (mmol/l)} - [0.02 \times \text{albumin (g/l)}] + 0.8$$

or

$$\begin{array}{l} \text{Albumin-corrected} \\ \text{Serum calcium (mg/dl)} \end{array} = \text{Serum calcium (mg/dl)} + 0.8 \times [4 - \text{albumin (g/dl)}]$$

To convert the albumin-corrected serum calcium in mmol/l value to mg/dl, multiply by 4.

In most cases a raised serum calcium level can be reduced to the normal range within 7 days. The median time to relapse (re-increase of serum albumin corrected serum calcium above 3 mmol/l) was 18-19 days for the 2 mg and 4 mg doses. The median time to relapse was 26 days with a dose of 6 mg.

Method and route of administration

Bondronat concentrate for solution for infusion should be administered as an intravenous infusion.

For this purpose the contents of the vial are to be used as follows:

- Prevention of Skeletal Events in patients with breast cancer and bone metastases - added to 100 ml isotonic sodium chloride solution or 100 ml 5% dextrose solution and infused over at least 15 minutes. See also dosage section above for patients with renal impairment
- Treatment of tumour-induced hypercalcaemia - added to 500 ml isotonic sodium chloride solution or 500 ml 5% dextrose solution and infused over 2 hours.

Note:

In order to avoid potential incompatibilities, Bondronat concentrate for solution for infusion should only be mixed with isotonic sodium chloride solution or with 5% dextrose solution. Calcium containing solutions should not be mixed with Bondronat concentrate for solution for infusion.

Diluted solutions are for single use. Only clear solutions without particles should be used.

It is recommended that the product once diluted be used immediately (see point 5 of this leaflet “How to store Bondronat”).

Bondronat concentrate for solution for infusion should be administered as an intravenous infusion. Care must be taken not to administer Bondronat concentrate for solution for infusion via intra-arterial or paravenous administration, as this could lead to tissue damage.

Frequency of administration

For treatment of tumour induced hypercalcaemia, Bondronat concentrate for solution for infusion is generally given as a single infusion.

For the prevention of skeletal events in patients with breast cancer and bone metastases, the Bondronat infusion is repeated at 3-4 week intervals.

Duration of treatment

A limited number of patients (50 patients) have received a second infusion for hypercalcaemia. Repeated treatment may be considered in case of recurrent hypercalcaemia or insufficient efficacy.

For patients with breast cancer and bone metastases, Bondronat infusion should be administered every 3-4 weeks. In clinical trials, therapy has continued for up to 96 weeks.

Overdose

Up to now there is no experience of acute poisoning with Bondronat concentrate for solution for infusion. Since both the kidney and the liver were found to be target organs for toxicity in preclinical studies with high doses, kidney and liver function should be monitored.

Clinically relevant hypocalcaemia (very low serum calcium levels) should be corrected by intravenous administration of calcium gluconate.

Package leaflet: Information for the patient

Bondronat 50 mg film-coated tablets ibandronic acid

Read all of this leaflet carefully before you start taking this medicine because it contains important information for you.

- Keep this leaflet. You may need to read it again
- If you have any further questions, ask your doctor or pharmacist
- This medicine has been prescribed for you only. Do not pass it on to others. It may harm them, even if their signs of illness are the same as yours
- If you get any side effects, talk to your doctor or pharmacist. This includes any possible side effects not listed in this leaflet. See section 4.

What is in this leaflet:

1. What Bondronat is and what it is used for
2. What you need to know before you take Bondronat
3. How to take Bondronat
4. Possible side effects
5. How to store Bondronat
6. Contents of the pack and other information

1. What Bondronat is and what it is used for

Bondronat contains the active substance ibandronic acid. This belongs to a group of medicines called bisphosphonates.

Bondronat is used in adults and prescribed to you if you have breast cancer that has spread to your bones (called 'bone metastases').

- It helps to prevent your bones from breaking (fractures)
- It also helps to prevent other bone problems that may need surgery or radiotherapy.

Bondronat works by reducing the amount of calcium that is lost from your bones. This helps to stop your bones from getting weaker.

2. What you need to know before you take Bondronat

Do not take Bondronat:

- if you are allergic to ibandronic acid or any of the other ingredients of this medicine that are listed in section 6
- if you have problems with your food pipe/gullet (oesophagus) such as narrowing or difficulty swallowing
- if you cannot stand or sit upright for at least one hour (60 minutes) at a time
- if you have or ever had low calcium in your blood.

Do not take this medicine if any of the above apply to you. If you are not sure, talk to your doctor or pharmacist before taking Bondronat.

Warnings and precautions

A side effect called osteonecrosis of the jaw (ONJ) (bone damage in the jaw) has been reported very rarely in the post marketing setting in patients receiving Bondronat for cancer-related conditions. ONJ can also occur after stopping treatment.

It is important to try and prevent ONJ developing as it is a painful condition that can be difficult to treat. In order to reduce the risk of developing osteonecrosis of the jaw, there are some precautions you should take.

Before receiving treatment, tell your doctor/nurse (health care professional) if:

- you have any problems with your mouth or teeth such as poor dental health, gum disease, or a planned tooth extraction
- you don't receive routine dental care or have not had a dental check up for a long time
- you are a smoker (as this may increase the risk of dental problems)
- you have previously been treated with a bisphosphonate (used to treat or prevent bone disorders)
- you are taking medicines called corticosteroids (such as prednisolone or dexamethasone)
- you have cancer.

Your doctor may ask you to undergo a dental examination before starting treatment with Bondronat.

While being treated, you should maintain good oral hygiene (including regular teeth brushing) and receive routine dental check-ups. If you wear dentures you should make sure these fit properly. If you are under dental treatment or will undergo dental surgery (e.g. tooth extractions), inform your doctor about your dental treatment and tell your dentist that you are being treated with Bondronat.

Contact your doctor and dentist immediately if you experience any problems with your mouth or teeth such as loose teeth, pain or swelling, non-healing of sores or discharge, as these could be signs of osteonecrosis of the jaw.

Talk to your doctor or pharmacist before taking Bondronat:

- if you are allergic to any other bisphosphonates
- if you have any swallowing or digestion problems
- if you have high or low blood levels of vitamin D or any other minerals
- if you have kidney problems.

Irritation, inflammation or ulceration of the gullet/food pipe (oesophagus) often with symptoms of severe pain in the chest, severe pain after swallowing food and/or drink, severe nausea, or vomiting may occur, especially if you do not drink a full glass of water and/or if you lie down within an hour of taking Bondronat. If you develop these symptoms, stop taking Bondronat and tell your doctor straight away (see sections 3 and 4).

Children and adolescents

Bondronat should not be used in children and adolescents below the age of 18 years.

Other medicines and Bondronat

Tell your doctor or pharmacist if you are taking, have recently taken or might take any other medicines. This is because Bondronat can affect the way some other medicines work. Also some other medicines can affect the way Bondronat works.

In particular, tell your doctor or pharmacist if you are taking any of the following medicines:

- supplements containing calcium, magnesium, iron or aluminium
- acetylsalicylic acid and non-steroidal anti-inflammatory medicines called "NSAIDs", such as ibuprofen or naproxen. This is because NSAIDs, and Bondronat can both irritate your stomach and gut
- a type of antibiotic injection called "aminoglycoside" such as gentamicin. This is because aminoglycosides and Bondronat can both lower the amount of calcium in your blood.

Taking medicines that reduce stomach acid such as cimetidine and ranitidine, may slightly increase the effects of Bondronat.

Bondronat with food and drink

Do not take Bondronat with food or any other drinks except water as Bondronat is less effective if it is taken with food or drink (see section 3).

Take Bondronat at least 6 hours after you last had anything to eat, drink or any other medicines or supplements (e.g. products containing calcium (milk), aluminium, magnesium and iron) except water. After taking your tablet, wait at least 30 minutes. Then you can have your first food and drink, and take any medicines or supplements (see section 3).

Pregnancy and breast feeding

Do not take Bondronat if you are pregnant, planning to get pregnant or if you are breast-feeding. Ask your doctor or pharmacist for advice before taking this medicine.

Driving and using machines

You can drive and use machines as it's expected that Bondronat has no or negligible effect on your ability to drive and use machines. Talk to your doctor first if you want to drive, use machine or tools.

Bondronat contains lactose

If you have been told by your doctor that you cannot tolerate or digest some sugars (e.g. if you have a galactose intolerance, the Lapp lactase deficiency or have problems with glucose-galactose absorption), talk to your doctor before taking this medicine.

3. How to take Bondronat

Always take this medicine exactly as your doctor has told you. Check with your doctor or pharmacist if you are not sure.

Take your tablet at least 6 hours after you last had anything to eat, drink or any other medicines or supplements except water. Water with a high concentration of calcium should not be used. If there is concern regarding potentially high levels of calcium in the tap water (hard water), it is advised to use bottled water with a low mineral content.

Your doctor may do regular blood tests while you are taking Bondronat. This is to check that you are being given the right amount of medicine.

Taking this medicine

It is important that you take Bondronat at the right time and in the right way. This is because it can cause irritation, inflammation or ulcers in your food pipe/gullet (oesophagus).

You can help stop this happening by doing the following:

- Take your tablet as soon as you get up for the day before having your first food, drink, any medicine or supplements
- Take your tablet with a full glass of water only (about 200 mL). Do not take your tablet with any drink other than water
- Swallow the tablet whole. Do not chew, suck or crush the tablet. Do not let the tablet dissolve in your mouth
- After taking your tablet, wait at least 30 minutes. Then you can have your first food and drink, and take any medicines or supplements
- Stay upright (sitting or standing) while taking your tablet and for the next hour (60 minutes). Otherwise, some of the medicine could leak back into your food pipe/gullet (oesophagus).

How much to take

The usual dose of Bondronat is one tablet each day. If you have moderate kidney problems, your doctor may reduce your dose to one tablet every other day. If you have severe kidney problems, your doctor may reduce your dose to one tablet each week.

If you take more Bondronat than you should

If you take too many tablets talk to a doctor or go to hospital straight away. Drink a full glass of milk before you go. Do not make yourself sick. Do not lie down.

If you forget to take Bondronat

Do not take a double dose to make up for a forgotten dose. If you are taking a tablet each day, skip the missed dose completely. Then carry on as usual the next day. If you are taking a tablet every other day or once a week, ask your doctor or pharmacist for advice.

If you stop taking Bondronat

Keep taking Bondronat for as long as your doctor tells you. This is because the medicine will only work if it is taken all the time.

If you have any further questions on the use of this medicine, ask your doctor or pharmacist.

4. Possible side effects

Like all medicines, this medicine can cause side effects although not everybody gets them.

Talk to a nurse or a doctor straight away if you notice any of the following serious side effects, you may need urgent medical treatment:

Common (may affect up to 1 in 10 people):

- feeling sick, heartburn and discomfort in swallowing (inflammation of your gullet/food pipe).

Uncommon (may affect less than 1 in 100 people):

- severe stomach pain. This could be a sign of an ulcer of the first section of the bowel (duodenum) that is bleeding, or that your stomach is inflamed (gastritis).

Rare (may affect up to 1 in 1,000 people)

- persistent eye pain and inflammation
- new pain, weakness or discomfort in your thigh, hip or groin. You may have early signs of a possible unusual fracture of the thigh bone.

Very rare (may affect up to 1 in 10,000 people)

- pain or sore in your mouth or jaw. You may have early signs of severe jaw problems (necrosis (dead bone tissue) in the jaw bone)
- Talk to your doctor if you have ear pain, discharge from the ear, and/or an ear infection. These could be signs of bone damage in the ear
- itching, swelling of your face, lips, tongue and throat with difficulty breathing. You may be having a serious, potentially life threatening allergic reaction
- severe adverse skin reactions.

Not known (frequency cannot be estimated from the available data)

- asthma attack.

Other possible side effects

Common (may affect up to 1 in 10 people):

- tummy pain, indigestion
- low calcium levels in your blood
- weakness.

Uncommon (may affect less than 1 in 100 people):

- chest pain
- itching or tingling skin (paraesthesia)
- flu-like symptoms, feeling generally unwell or in pain
- dry mouth, strange taste in your mouth or difficulty swallowing
- anaemia (bloodlessness)
- high levels of urea or high levels of parathyroid hormone in your blood.

Reporting of side effects

If you get any side effects, talk to your doctor or pharmacist. This includes any possible side effects not listed in this leaflet. You can also report side effects directly via [the national reporting system listed in Appendix V](#). By reporting side effects you can help provide more information on the safety of this medicine.

5. How to store Bondronat

- Keep this medicine out of the sight and reach of children • Do not use this medicine after the expiry date which is stated on the blister and carton after EXP. The expiry date refers to the last day of that month
- Store in the original package in order to protect from moisture
- Do not throw away any medicines via wastewater or household waste. Ask your pharmacist how to throw away medicines you no longer use. These measures will help protect the environment.

6. Contents of the pack and other information

What Bondronat contains

- The active substance is ibandronic acid. Each film-coated tablet contains 50 mg of ibandronic acid (as sodium monohydrate).

The other ingredients are:

- tablet core: lactose monohydrate, povidone, microcrystalline cellulose, crospovidone, purified stearic acid, colloidal anhydrous silica
- tablet coat: hypromellose, titanium dioxide (E 171), talc, macrogol 6,000.

What Bondronat looks like and contents of the pack

The film-coated tablets are of oblong shape and white to off-white in colour, engraved L2/IT. They are available in packs of 28 and 84 tablets. Not all pack sizes may be marketed.

Marketing Authorisation Holder and Manufacturer

Marketing Authorisation Holder

Atnahs Pharma Netherlands B.V.
Copenhagen Towers,
Ørestads Boulevard 108, 5.tv
DK-2300 København S,
Denmark

Manufacturer

IL CSM Clinical Supplies Management GmbH
Marie-Curie-Strasse 8
Lörrach
Baden-Württemberg
79539, Germany

Atnahs Pharma Denmark ApS
Copenhagen Towers,
Ørestads Boulevard 108, 5.tv
DK-2300 København S,
Denmark

This leaflet was last revised in {MM/YYYY}

Detailed information on this medicine is available on the European Medicines Agency web site:
<http://www.ema.europa.eu>.

Package leaflet: Information for the patient

Bondronat 6 mg concentrate for solution for infusion ibandronic acid

Read all of this leaflet carefully before you start using this medicine because it contains important information for you.

- Keep this leaflet. You may need to read it again
- If you have any further questions, ask your doctor, pharmacist or nurse
- If you get any side effects, talk to your doctor, pharmacist or nurse. This includes any possible side effects not listed in this leaflet. See section 4.

What is in this leaflet:

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Bondronat contains the active substance ibandronic acid. This belongs to a group of medicines called bisphosphonates.

Bondronat is used in adults and prescribed to you if you have breast cancer that has spread to your bones (called 'bone metastases')

- It helps to prevent your bones from breaking (fractures)
- It helps to prevent other bone problems that may need surgery or radiotherapy.

Bondronat can also be prescribed if you have a raised calcium level in your blood due to a tumour.

Bondronat works by reducing the amount of calcium that is lost from your bones. This helps to stop your bones from getting weaker.

2. What you need to know before you receive Bondronat

Do not receive Bondronat:

- if you are allergic to ibandronic acid or any of the other ingredients of this medicine that are listed in section 6
- if you have, or have ever had low levels of calcium in your blood.

Do not receive this medicine if any of the above apply to you. If you are not sure, talk to your doctor or pharmacist before having Bondronat.

Warnings and precautions

A side effect called osteonecrosis of the jaw (ONJ) (bone damage in the jaw) has been reported very rarely in the post marketing setting in patients receiving Bondronat for cancer-related conditions. ONJ can also occur after stopping treatment.

It is important to try and prevent ONJ developing as it is a painful condition that can be difficult to treat. In order to reduce the risk of developing osteonecrosis of the jaw, there are some precautions you should take.

Before receiving treatment, tell your doctor/nurse (health care professional) if:

- you have any problems with your mouth or teeth such as poor dental health, gum disease, or a planned tooth extraction
- you don't receive routine dental care or have not had a dental check up for a long time
- you are a smoker (as this may increase the risk of dental problems)
- you have previously been treated with a bisphosphonate (used to treat or prevent bone disorders)
- you are taking medicines called corticosteroids (such as prednisolone or dexamethasone)
- you have cancer.

Your doctor may ask you to undergo a dental examination before starting treatment with Bondronat.

While being treated, you should maintain good oral hygiene (including regular teeth brushing) and receive routine dental check-ups. If you wear dentures you should make sure these fit properly. If you are under dental treatment or will undergo dental surgery (e.g. tooth extractions), inform your doctor about your dental treatment and tell your dentist that you are being treated with Bondronat.

Contact your doctor and dentist immediately if you experience any problems with your mouth or teeth such as loose teeth, pain or swelling, non-healing of sores or discharge, as these could be signs of osteonecrosis of the jaw.

Talk to your doctor, pharmacist or nurse before receiving Bondronat:

- if you are allergic to any other bisphosphonates
- if you have high or low levels of vitamin D, calcium or any other minerals
- if you have kidney problems
- If you have heart problems and the doctor recommended to limit your daily fluid intake.

Cases of serious, sometimes fatal allergic reaction have been reported in patients treated with intravenous ibandronic acid.

If you experience one of the following symptoms, such as shortness of breath/difficulty breathing, tight feeling in throat, swelling of tongue, dizziness, feeling of loss of consciousness, redness or swelling of face, body rash, nausea and vomiting, you should immediately alert your doctor or nurse (see section 4).

Children and adolescents

Bondronat should not be used in children and adolescents below the age of 18 years.

Other medicines and Bondronat

Tell your doctor or pharmacist if you are taking, have recently taken or might take any other medicines. This is because Bondronat can affect the way some other medicines work. Also, some other medicines can affect the way Bondronat works.

In particular, tell your doctor or pharmacist if you are receiving a type of antibiotic injection called 'aminoglycoside' such as gentamicin. This is because aminoglycosides and Bondronat can both lower the amount of calcium in your blood.

Pregnancy and breast-feeding

Do not receive Bondronat if you are pregnant, planning to get pregnant or if you are breast-feeding. Ask your doctor or pharmacist for advice before taking this medicine.

Driving and using machines

You can drive and use machines as it's expected that Bondronat has no or negligible effect on your ability to drive and use machines. Talk to your doctor first if you want to drive, use machines or tools.

Bondronat contains less than 1 mmol sodium (23 mg) per vial, i.e. 'essentially sodium free'.

3. How to receive Bondronat

Receiving this medicine

- Bondronat is normally given by a doctor or other medical staff who have experience with the treatment of cancer
- It is given as an infusion into your vein.

Your doctor may do regular blood tests while you are receiving Bondronat. This is to check that you are being given the right amount of this medicine.

How much to receive

Your doctor will work out how much Bondronat you will be given depending on your illness.

If you have breast cancer that has spread to your bones, then the recommended dose is 1 vial (6 mg) every 3-4 weeks, as an infusion in your vein over at least 15 minutes.

If you have a raised calcium level in your blood due to a tumour, then the recommended dose is a single administration of 2 mg or 4 mg depending on the severity of your illness. The medicine should be administered as an infusion in your vein over two hours. A repeated dose may be considered in case of insufficient response or if your illness reappears.

Your doctor may adjust your dose and duration of intravenous infusion if you have kidney problems.

If you have any further questions on the use of this medicine, ask your doctor or pharmacist.

4. Possible side effects

Like all medicines, this medicine can cause side effects although not everybody gets them.

Talk to a nurse or a doctor straight away if you notice any of the following serious side effects you may need urgent medical treatment:

Rare (may affect up to 1 in 1,000 people)

- persistent eye pain and inflammation
- new pain, weakness or discomfort in your thigh, hip or groin. You may have early signs of a possible unusual fracture of the thigh bone.

Very rare (may affect up to 1 in 10,000 people)

- pain or sore in your mouth or jaw. You may have early signs of severe jaw problems (necrosis (dead bone tissue) in the jaw bone)
- Talk to your doctor if you have ear pain, discharge from the ear, and/or an ear infection. These could be signs of bone damage in the ear
- itching, swelling of your face, lips, tongue and throat, with difficulty breathing. You may be having a serious, potentially life threatening allergic reaction (see section 2)
- severe adverse skin reactions.

Not known (frequency cannot be estimated from the available data)

- asthma attack.

Other possible side effects

Common (may affect up to 1 in 10 people)

- flu-like symptoms, including fever, shaking and shivering, feeling of discomfort, fatigue, bone pain and aching muscles and joints. These symptoms usually disappear within a couple of hours or days. Talk to a nurse or doctor if any effects become troublesome or last more than a couple of days
- rise in body temperature
- stomach and tummy pain, indigestion, being sick, vomiting or having diarrhoea (loose bowels)
- low calcium or phosphate levels in your blood
- changes in blood test results such as Gamma GT or creatinine
- a heart rhythm problem called ‘bundle branch block’
- pain in your bone or muscles
- headache, feeling dizzy or feeling weak
- feeling thirsty, sore throat, changes in taste
- swollen legs or feet
- aching joints, arthritis, or other joint problems
- problems with your parathyroid gland
- bruising
- infections
- a problem with your eyes called ‘cataracts’
- skin problems
- tooth problems.

Uncommon (may affect less than 1 in 100 people)

- shaking or shivering
- your body temperature getting too low (‘hypothermia’)
- a condition affecting the blood vessels in your brain called ‘cerebrovascular disorder’ (stroke or brain bleeding)
- heart and circulatory problems (including palpitations, heart attack, hypertension (high blood pressure) and varicose veins)
- changes in your blood cells (‘anaemia’)
- a high level of alkaline phosphatase in your blood
- fluid build up and swelling (‘lymphoedema’)
- fluid in your lungs
- stomach problems such as ‘gastroenteritis’ or ‘gastritis’
- gallstones
- being unable to pass water (urine), cystitis (bladder inflammation)
- migraine
- pain in your nerves, damaged nerve root
- deafness
- increased sensitivity of sound, taste or touch or changes in smell
- difficulty swallowing
- mouth ulcers, swollen lips (‘cheilitis’), oral thrush
- itching or tingling skin around your mouth
- pelvic pain, discharge, itching or pain in the vagina
- a skin growth called a ‘benign skin neoplasm’
- memory loss
- sleep problems, feeling anxious, emotional instability, or mood swings
- skin rash
- hair loss
- injury or pain at the injection site
- weight loss
- kidney cyst (fluid-filled sac in the kidney).

Reporting of side effects

If you get any side effects, talk to your doctor, pharmacist or nurse. This includes any possible side effects not listed in this leaflet. You can also report side effects directly via [the national reporting system](#) listed in [Appendix V](#). By reporting side effects you can help provide more information on the safety of this medicine.

5. How to store Bondronat

- Keep this medicine out of the sight and reach of children
- Do not use this medicine after the expiry date which is stated on the folding box and on the label after EXP. The expiry date refers to the last day of that month
- After dilution the infusion solution is stable for 24 hours at 2-8 °C (in a refrigerator)
- Do not use this medicine if you notice that the solution is not clear or contains particles.

6. Content of the pack and other information

What Bondronat contains

- The active substance is ibandronic acid. One vial with 6 ml of a concentrate for solution for infusion contains 6 mg ibandronic acid (as sodium monohydrate)
- The other ingredients are sodium chloride, acetic acid, sodium acetate and water for injections.

What Bondronat looks like and contents of the pack

Bondronat is a colourless, clear solution. Bondronat is supplied as packs containing 1, 5 and 10 vials (6 ml type I glass vial with a bromobutyl rubber stopper). Not all pack sizes may be marketed.

Marketing Authorisation Holder and Manufacturer

Marketing Authorisation Holder

Atnahs Pharma Netherlands B.V.
Copenhagen Towers,
Ørestads Boulevard 108, 5.tv
DK-2300 København S,
Denmark

Manufacturer

Atnahs Pharma Denmark ApS
Copenhagen Towers,
Ørestads Boulevard 108, 5.tv
DK-2300 København S,
Denmark

This leaflet was last revised in {MM/YYYY}

Detailed information on this medicine is available on the European Medicines Agency web site:
<http://www.ema.europa.eu/>

The following information is intended for healthcare professionals only

Dosage: Prevention of Skeletal Events in Patients with Breast Cancer and Bone Metastases

The recommended dose for prevention of skeletal events in patients with breast cancer and bone metastases is 6 mg intravenously given every 3-4 weeks. The dose should be infused over at least 15 minutes.

Patients with renal impairment

For patients with mild renal impairment (CLCr \geq 50 and $<$ 80 mL/min) no dosage adjustment is necessary. For patients with moderate renal impairment (CLCr \geq 30 and $<$ 50 mL/min) or severe renal impairment (CLCr $<$ 30 mL/min) being treated for the prevention of skeletal events in patients with breast cancer and metastatic bone disease the following dosing recommendations should be followed:

Creatinine Clearance (ml/min)	Dosage	Infusion Volume ¹ and Time ²
\geq 50 CLCr $<$ 80	6 mg (6 ml of concentrate for solution for infusion)	100 ml over 15 minutes
\geq 30 CLCr $<$ 50	4 mg (4 ml of concentrate for solution for infusion)	500 ml over 1 hour
$<$ 30	2 mg (2 ml of concentrate for solution for infusion)	500 ml over 1 hour

¹ 0.9% sodium chloride solution or 5% glucose solution

² Administration every 3 to 4 week

A 15 minute infusion time has not been studied in cancer patients with CLCr $<$ 50 mL/min.

Dosage: Treatment of Tumour-induced Hypercalcaemia

Bondronat is usually administered in a hospital setting. The dose is determined by the doctor considering the following factors.

Prior to treatment with Bondronat the patient should be adequately rehydrated with 9 mg/ml (0.9%) sodium chloride. Consideration should be given to the severity of the hypercalcaemia as well as the tumour type. In most patients with severe hypercalcaemia (albumin-corrected serum calcium* \geq 3 mmol/l or \geq 12 mg/dl) 4 mg will be an adequate single dosage. In patients with moderate hypercalcaemia (albumin-corrected serum calcium $<$ 3 mmol/l or $<$ 12 mg/dl) 2 mg is an effective dose. The highest dose used in clinical trials was 6 mg but this dose does not add any further benefit in terms of efficacy.

* Note albumin-corrected serum calcium concentrations are calculated as follows:

$$\begin{array}{l} \text{Albumin-corrected} \\ \text{Serum calcium} \\ \text{(mmol/l)} \end{array} = \text{Serum calcium (mmol/l)} - [0.02 \times \text{albumin (g/l)}] + 0.8$$

or

$$\begin{array}{l} \text{Albumin-corrected} \\ \text{Serum calcium (mg/dl)} \end{array} = \text{Serum calcium (mg/dl)} + 0.8 \times [4 - \text{albumin (g/dl)}]$$

To convert the albumin-corrected serum calcium in mmol/l value to mg/dl, multiply by 4.

In most cases a raised serum calcium level can be reduced to the normal range within 7 days. The median time to relapse (re-increase of serum albumin corrected serum calcium above 3 mmol/l) was 18-19 days for the 2 mg and 4 mg doses. The median time to relapse was 26 days with a dose of 6 mg.

Method and route of administration

Bondronat concentrate for solution for infusion should be administered as an intravenous infusion.

For this purpose the contents of the vial are to be used as follows:

- Prevention of Skeletal Events in patients with breast cancer and bone metastases - added to 100 ml isotonic sodium chloride solution or 100 ml 5% dextrose solution and infused over at least 15 minutes. See also dosage section above for patients with renal impairment
- Treatment of tumour-induced hypercalcaemia - added to 500 ml isotonic sodium chloride solution or 500 ml 5% dextrose solution and infused over 2 hours.

Note:

In order to avoid potential incompatibilities, Bondronat concentrate for solution for infusion should only be mixed with isotonic sodium chloride solution or with 5% dextrose solution. Calcium containing solutions should not be mixed with Bondronat concentrate for solution for infusion.

Diluted solutions are for single use. Only clear solutions without particles should be used.

It is recommended that the product once diluted be used immediately (see point 5 of this leaflet 'How to store Bondronat').

Bondronat concentrate for solution for infusion should be administered as an intravenous infusion. Care must be taken not to administer Bondronat concentrate for solution for infusion via intra-arterial or paravenous administration, as this could lead to tissue damage.

Frequency of administration

For treatment of tumour induced hypercalcaemia, Bondronat concentrate for solution for infusion is generally given as a single infusion.

For the prevention of skeletal events in patients with breast cancer and bone metastases, the Bondronat infusion is repeated at 3-4 week intervals.

Duration of treatment

A limited number of patients (50 patients) have received a second infusion for hypercalcaemia. Repeated treatment may be considered in case of recurrent hypercalcaemia or insufficient efficacy.

For patients with breast cancer and bone metastases, Bondronat infusion should be administered every 3-4 weeks. In clinical trials, therapy has continued for up to 96 weeks.

Overdose

Up to now there is no experience of acute poisoning with Bondronat concentrate for solution for infusion. Since both the kidney and the liver were found to be target organs for toxicity in preclinical studies with high doses, kidney and liver function should be monitored.

Clinically relevant hypocalcaemia (very low serum calcium levels) should be corrected by intravenous administration of calcium gluconate.