

1. TRADE NAME OF THE MEDICINAL PRODUCT

Atosiban-Ferring 7.5 mg/ml

Solution for injection and concentrate for solution for injection.

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

One ml solution contains 7.5 mg atosiban free base in the form of atosiban acetate.

Concentrate: after dilution according to the instructions (see section "Pharmaceutical Particulars for instructions for use and handling"), the concentration of Atosiban-Ferring is 0.75 mg/ml.

For excipients see "list of excipients", see section 6.1.

3. PHARMACEUTICAL FORM

Solution for injection and concentrate for solution for infusion.

Solution: Each vial contains 6.75 mg atosiban.

Concentrate: Each vial contains 37.5 mg atosiban.

4. CLINICAL PARTICULARS

4.1 Therapeutic indications

Atosiban-Ferring is indicated to delay imminent pre-term birth in pregnant women with:

- regular uterine contractions of at least 30 seconds duration at a rate of ≥ 4 per 30 minutes
- a cervical dilation of 1 to 3 cm (0-3 for nulliparas) and effacement of $\geq 50\%$
- age ≥ 18 years
- a gestational age from 24 until 33 completed weeks
- a normal foetal heart rate

4.2 Posology and method of administration

Treatment with Atosiban-Ferring should be initiated and maintained by a physician experienced in the treatment of pre-term labour.

Atosiban-Ferring is administered intravenously in three successive stages: an initial bolus dose (6.75 mg), performed with Atosiban-Ferring 6.75 ml/0.9ml solution for injection, immediately followed by a continuous high dose infusion (loading infusion 300 $\mu\text{g}/\text{min}$) of Atosiban-Ferring 37.5 mg/5 ml concentrate for solution for infusion during three hours, followed by a lower dose of Atosiban-Ferring 37.5 mg/5 ml concentrate for solution for infusion (subsequent infusion 100 $\mu\text{g}/\text{min}$) up to 45 hours. The duration of the treatment should not exceed 48 hours. The total dose given during a full course of Atosiban-Ferring therapy should preferably not exceed 330 mg of the active substance.

Intravenous therapy using the initial bolus injection should be started as soon as possible after diagnosis of pre-term labour. Once the bolus has been injected, proceed with the infusion (See section "Pharmaceutical Particulars, instructions for use and handling"). In the case of persistence of uterine contractions during treatment with Atosiban-Ferring, alternative therapy should be considered.

The following table shows the full posology of the bolus injection followed by the infusion:

Step	Regimen	Injection/infusion rate	Atosiban-Ferring dose
1	0.9 ml intravenous bolus	Over 1 minute	6.75 mg
2	3 hours intravenous loading infusion	24 ml/hour	54 mg
3	Subsequent intravenous infusion	8 ml/hour	Up to 270 mg

Re-treatment

In case a re-treatment with Atosiban-Ferring is needed, it should also commence with a bolus injection of Atosiban-Ferring 6.75 mg/0.9 ml, solution for injection followed by infusion with Atosiban-Ferring 37.5 mg/5 ml, concentrate for solution for infusion.

Patients with renal or hepatic impairment

There is no experience with atosiban treatment in patients with impaired function of the liver or kidneys. Renal impairment is not likely to warrant a dose adjustment, since only a small extent of atosiban is excreted in the urine. In patients with impaired hepatic function, atosiban should be used with caution.

Paediatric population

The safety and efficacy of atosiban in pregnant women aged less than 18 years have not been established.

No data are available.

4.3 Contraindications

Atosiban-Ferring should not be used in the following conditions:

- Gestational age below 24 or over 33 completed weeks
- Premature rupture of the membranes >30 weeks of gestation
- Abnormal Foetal heart rate
- Antepartum uterine haemorrhage requiring immediate delivery
- Eclampsia and severe pre-eclampsia requiring delivery
- Intrauterine foetal death
- Suspected intrauterine infection
- Placenta praevia
- Abruptio placenta
- Any other conditions of the mother or foetus, in which continuation of pregnancy is hazardous
- Hypersensitivity to the active substance or any of the excipients listed in section 6.1.

4.4 Special warnings and special precautions for use

When Atosiban-Ferring is used in patients in whom premature rupture of membranes cannot be excluded, the benefits of delaying delivery should be balanced against the potential risk of chorioamnionitis.

There is no experience with Atosiban-Ferring treatment in patients with impaired function of the liver or kidneys. Renal impairment is not likely to warrant a dose adjustment, since only a small extent of atosiban is excreted in the urine. In patients with impaired hepatic function atosiban should be used with caution (see sections 4.2 and 5.2).

There is only limited clinical experience in the use of Atosiban-Ferring in multiple pregnancies or the gestational age group between 24 and 27 weeks, because of the small number of patients treated. The benefit of Atosiban-Ferring in these subgroups is therefore uncertain.

Re-treatment with Atosiban-Ferring is possible, but there is only limited clinical experience available with multiple re-treatments, up to 3 re-treatments (see section 4.2).

In case of intrauterine growth retardation, the decision to continue or reinstate the administration of Atosiban-Ferring depends on the assessment of foetal maturity.

Monitoring of uterine contractions and foetal heart rate during administration of Atosiban-Ferring and in case of persistent uterine contractions should be considered.

As an antagonist of oxytocin, atosiban may theoretically facilitate uterine relaxation and postpartum bleeding, therefore blood loss after delivery should be monitored. However, inadequate uterus contraction post partum was not observed during the clinical trials.

Multiple pregnancy and medicinal products with tocolytic activity like calcium channel blockers and beta-mimetics are known to be associated with increased risk of pulmonary oedema. Therefore, atosiban should be used with caution in case of multiple pregnancy and/or concomitant administration of other medicinal products with tocolytic activity (see section 4.8).

4.5 Interaction with other medicinal products and other forms of interaction

It is unlikely that atosiban is involved in cytochrome P₄₅₀ mediated drug-drug interactions as *in vitro* investigations have shown that atosiban is not a substrate for the cytochrome P₄₅₀ system, and does not inhibit the drug metabolizing cytochrome P₄₅₀ enzymes.

Interaction studies have been performed with labetalol and betamethasone in healthy, female volunteers. No clinically relevant interaction was found between atosiban and bethamethasone or labetalol.

4.6 Fertility, Pregnancy and lactation

Atosiban-Ferring should only be used when pre-term labour has been diagnosed between 24 and 33 completed weeks of gestation.

If during pregnancy the woman is already breast-feeding an earlier child, then breast-feeding should be discontinued during treatment with Atosiban-Ferring, since the release of oxytocin during breast-feeding may augment uterine contractility, and may counteract the effect of tocolytic therapy.

In Atosiban-Ferring clinical trials, no effects were observed on lactation. Small amounts of atosiban have been shown to pass from plasma into the breast milk of lactating women.

Embryo-fetal toxicity studies have not shown toxic effects of atosiban.

No studies were performed that covered fertility and early embryonic development (see section 5.3).

4.7 Effects on ability to drive and use machines

Not relevant.

4.8 Undesirable effects

Possible adverse reactions of atosiban were described for the mother during the use of Atosiban-Ferring in clinical trials. In total 48% of the patients treated with atosiban experienced adverse reactions during clinical trials. The observed adverse reactions were generally of a mild severity. The most commonly reported adverse reaction in the mother is nausea (14%).

For the newborn, the clinical trials did not reveal any specific undesirable effects of atosiban. The infant adverse reactions were in the range of normal variation and were comparable with both placebo and beta-mimetic group incidences.

The frequency of adverse reactions listed below is 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 $< 1/1,000$).

Within each frequency grouping, adverse reactions are presented in order of decreasing seriousness.

MedDRA System Organ Class (SOC)	Very common	Common	Uncommon	Rare
Immune system disorders				Allergic reaction
Metabolism and nutrition disorders		Hyperglycemia		
Psychiatric disorders			Insomnia	
Nervous system disorders		Headache Dizziness		
Cardiac disorders		Tachycardia		
Vascular disorders		Hypotension Hot flush		
Gastrointestinal disorders	Nausea	Vomiting		
Skin and subcutaneous tissue disorders			Pruritis Rash	
Reproductive system and breast cancer disorder				Uterine haemorrhage, Uterine atony
General disorders and administration site conditions		Injection site reaction	pyrexia	

Post-marketing experience

Respiratory events like dyspnoea and pulmonary oedema, particularly in association with concomitant administration of other medicinal products with tocolytic activity, like calcium antagonists and beta-mimetics, and/or in women with multiple pregnancy, have been reported post-marketing.

Reporting of suspected adverse reactions:

Reporting suspected adverse reactions after authorization of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product.

Any suspected adverse events should be reported to the Ministry of Health according to the National Regulation by using an online form <https://sideeffects.health.gov.il/>

4.9 Overdose

Few cases of Atosiban-Ferring overdosing were reported, they occurred without any specific signs or symptoms. There is no known specific treatment in case of an overdose.

5 PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: Other gynecologicals, ATC code: G02CX01

Atosiban-Ferring contains atosiban (INN), a synthetic peptide ([Mpa¹,D-Tyr(Et)²,Thr⁴,Orn⁸]-oxytocin) which is a competitive antagonist of human oxytocin at receptor level. In rats and guinea pigs, atosiban was shown to bind to oxytocin receptors, to decrease the frequency of contractions and the tone of the uterine musculature, resulting in a suppression of uterine contractions. Atosiban was also shown to bind to the vasopressin receptor, thus inhibiting the effect of vasopressin. In animals, atosiban did not exhibit cardiovascular effects.

In human pre-term labour, atosiban at the recommended dosage antagonises uterine contractions and induces uterine quiescence. The onset of uterus relaxation following atosiban is rapid, uterine contractions being significantly reduced within 10 minutes to achieve stable uterine quiescence (≤ 4 contractions/hour) for 12 hours.

Phase III clinical trials (CAP-001 studies) include data from 742 women who were diagnosed with pre-term labour at 23–33 weeks of gestation and were randomised to receive either Atosiban-Ferring (according to this labelling) or β -agonist (dose-titrated).

Primary endpoint:

The primary efficacy outcome was the proportion of women remaining undelivered and not requiring alternative tocolysis within 7 days of treatment initiation. The data show that 59.6% (n=201) and 47.7% (n=163) of atosiban- and β -agonist-treated women ($p=0.0004$), respectively, were undelivered and did not require alternative tocolysis within 7 days of starting treatment. Most of the treatment failures in CAP-001 were caused by poor tolerability. Treatment failures caused by insufficient efficacy were significantly ($p=0.0003$) more frequent in atosiban (n=48, 14.2%) than in the β -agonist-treated women (n=20, 5.8%).

In the CAP-001 studies the probability of remaining undelivered and not requiring alternative tocolytics within 7 days of treatment initiation was similar for atosiban and beta-mimetics treated women at gestational age of 24-28 weeks. However, this finding is based on a very small sample (n=129 patients).

Secondary endpoints:

Secondary efficacy parameters included the proportion of women remaining undelivered within 48 h of treatment initiation. There was no difference between the atosiban and beta-mimetic groups with regard to this parameter.

Mean (SD) gestational age at delivery was the same in the two groups: 35.6 (3.9) and 35.3 (4.2) weeks for the atosiban and β -agonist groups, respectively ($p=0.37$). Admission to a neonatal intensive care unit (NICU) was similar for both treatment groups (approximately 30%), as was length of stay and ventilation therapy. Mean (SD) birth weight was 2491 (813) g in the atosiban group and 2461 (831) g in the β -agonist group ($p=0.58$).

Foetal and maternal outcome did apparently not differ between the atosiban and the β -agonist group, but the clinical studies were not powered enough to rule out a possible difference.

Of the 361 women who received Atosiban-Ferring treatment in the phase III studies, 73 received at least one re-treatment, 8 received at least 2 re-treatments and 2 received 3 re-treatments (see section 4.4).

As the safety and efficacy of atosiban in women with a gestational age of less than 24 completed weeks has not been established in controlled randomized studies, the treatment of this patient group with atosiban is not recommended (see section "Contraindications").

In a placebo-controlled study, fetal/infant deaths were 5/295 (1.7%) in the placebo group and 15/288 (5.2%) in the atosiban group, at which 2 occurred at five and eight months of age. Eleven out of the 15 deaths in the atosiban group occurred in pregnancies with a gestational age of 20 to 24 weeks, although in this subgroup patient distribution was unequal (19 women on atosiban, 4 on placebo). For women with a gestational age greater than 24 weeks there was no difference in mortality rate (1.7% in the placebo group, 1.5% in the atosiban group).

5.2 Pharmacokinetic properties

In healthy non-pregnant subjects receiving Atosiban-Ferring infusions (10 to 300 µg/min over 12 hours), steady state plasma concentrations increased proportionally to the dose. The clearance, volume of distribution and half-life were found to be independent of the dose.

In women in pre-term labour receiving Atosiban-Ferring by infusion (300 µg/min for 6 to 12 hours), steady state plasma concentrations were reached within one hour following the start of the infusion (mean 442 ± 73 ng/ml, range 298 to 533 ng/ml).

Following completion of the infusion, plasma concentration rapidly declined with an initial (t_{α}) and terminal (t_{β}) half-life of 0.21 ± 0.01 and 1.7 ± 0.3 hours, respectively. Mean value for clearance was 41.8 ± 8.2 l/h. Mean value of volume of distribution was 18.3 ± 6.8 l.

Plasma protein binding of atosiban is 46 to 48% in pregnant women. It is not known whether the free fraction in the maternal and foetal compartments differs substantially. Atosiban does not partition into red blood cells.

Atosiban passes the placenta. Following an infusion of 300 µg/min in healthy pregnant women at term, the foetal/maternal atosiban concentration ratio was 0.12.

Two metabolites were identified in the plasma and urine from human subjects. The ratios of the main metabolite M1 (des-(Orn⁸, Gly-NH₂⁹)-[Mpa¹, D-Tyr(Et)², Thr⁴]-oxytocin) to atosiban concentrations in plasma were 1.4 and 2.8 at the second hour and at the end of the infusion respectively. It is not known whether M1 accumulates in tissues. Atosiban is found in only small quantities in urine, its urinary concentration is about 50 times lower than that of M1. The proportion of atosiban eliminated in faeces is not known. The main metabolite M1 is approximately 10 times less potent than atosiban in inhibiting oxytocin-induced uterine contractions *in vitro*. Metabolite M1 is excreted in milk (see section 4.6).

There is no experience with Atosiban-Ferring treatment in patients with impaired function of the liver or kidneys (see sections 4.2 and 4.4).

It is unlikely that atosiban inhibits hepatic cytochrome P₄₅₀ isoforms in humans (see section 4.5).

5.3 Preclinical safety data

No systemic toxic effects were observed during the two-week intravenous toxicity studies (in rats and dogs) at doses which are approximately 10 times higher than the human therapeutic dose, and during the three-months toxicity studies in rats and dogs (up to 20 mg/kg/day s.c.). The highest atosiban subcutaneous dose not producing any adverse effects was approximately two times the therapeutic human dose.

No studies were performed that covered fertility and early embryonic development. Reproduction toxicity studies with dosing from implantation up to late stage pregnancy, showed no effects on mothers and fetuses. The exposure of the rat foetus was approximately four times that received by the human foetus during intravenous infusions in women. Animal studies have shown inhibition of lactation as expected from the inhibition of action of oxytocin.

Atosiban was neither oncogenic nor mutagenic in *in vitro* and *in vivo* tests.

6 PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Mannitol, hydrochloric acid 1M and water for injections.

6.2 Incompatibilities

In the absence of incompatibility studies, this medicinal product should not be mixed with other medicinal products.

6.3 Shelf life

The expiry date of the product is indicated on the packaging materials. Once the vial has been opened, the product must be used immediately.

6.4 Special precautions for storage

Store at 2°C - 8°C, protected from light. Store in the original container.

The diluted solution should be used within 24 hours.

6.5 Nature and contents of container

One vial of solution for injection contains 0.9 ml. corresponding to 6.75mg atosiban. One vial of concentrate for solution for infusion contains 5 ml corresponding to 37.5mg.

Colourless glass vials, clear borosilicated (type I) sealed with grey siliconised bromo-butyl rubber stopper, type I, and flip-off cap of polypropylene and aluminium.

6.6 Instructions for use and handling

The vials should be inspected visually for particulate matter and discoloration prior to administration.

Preparation of the initial intravenous injection:

Withdraw 0.9 ml of a 0.9 ml labelled vial of Atosiban-Ferring 6.75 mg/0.9ml, solution for injection and administer slowly as an intravenous bolus dose over one minute, under adequate medical supervision in an obstetric unit. The Atosiban-Ferring 6.75 mg/0.9ml, solution for injection should be used immediately. In the absence of incompatibility studies, this medicinal product should not be mixed with other medicinal products (see section "Incompatibilities").

Preparation of intravenous infusion solution:

For intravenous infusion, following the bolus dose, atosiban 37.5 mg/5ml, concentrate for solution for infusion should be diluted in one of the following solutions:

- sodium chloride 9mg/ml (0.9%) solution for injection
- Ringer's lactate solution
- 5% w/v glucose solution

Withdraw 10 ml solution from a 100 ml infusion bag and discard. Replace it by 10 ml atosiban 37.5 mg/5 ml concentrate for solution for infusion from two 5 ml vials to obtain a concentration of 75 mg atosiban in 100 ml.

The reconstituted product is a clear, colourless solution without particles.

The loading infusion is given by infusing 24 ml/hour (18 mg/hour) of the above prepared solution over the 3 hour period under adequate medical supervision in an obstetric unit. After three hours the infusion rate is reduced to 8 ml/hour.

Prepare new 100 ml bags in the same way as described to allow the infusion to be continued. If an infusion bag with a different volume is used, a proportional calculation should be made for the preparation. To achieve accurate dosing, a controlled infusion device is recommended to adjust the rate of flow in drops/minute. An intravenous microdrip chamber can provide a convenient range of infusion rates within the recommended dose levels for atosiban.

If other medicinal products need to be given intravenously at the same time, the intravenous cannula can be shared or another site of intravenous administration can be used. This permits the continued independent control of the rate of infusion.

7 MANUFACTURER

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8 LICENSE HOLDER

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9 REGISTRATION NUMBER

119-10-29995

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