

# Pharmacode position may change as per Supplier's m/c requirement & additional small pharma code may appear on the front / back panel



## PROFESSIONAL INFORMATION:

### SCHEDULING STATUS:

**LODOZ (Tablet)**

### COMPOSITION:

Each film-coated tablet contains lamivudine 150 mg and zidovudine 300 mg.  
Excipients: colloidal silicon dioxide, magnesium stearate, microcrystalline cellulose, sodium starch glycolate, Opadry 13B58802 IH White (hypromellose, titanium dioxide, polyethylene glycol 400, polysorbate 80), Sugar free.

### PHARMACOLOGICAL CLASSIFICATION:

A.20.2. Antiviral agents.

### PHARMACOLOGICAL ACTION:

**Pharmacodynamic properties:**  
Lamivudine and zidovudine are selective inhibitors of human immunodeficiency virus (HIV)-1 and HIV-2. Lamivudine has been shown to be synergistic with zidovudine, inhibiting the replication of HIV in cell culture. Both drugs are metabolized, sequentially, to triphosphates (TP). Lamivudine-TP and zidovudine-TP are substrates for and competitive inhibitors of HIV reverse transcriptase. However, their main antiviral activity is through incorporation of the mono-phosphate form into the viral DNA chain, resulting in chain termination. Lamivudine and zidovudine triphosphates have been identified as a metabolite of zidovudine following intravenous dosing.  
Individually, lamivudine and zidovudine has resulted in HIV clinical isolates, which show reduced sensitivity *in vitro* to the nucleoside analogue to which they have been exposed. However, *in vitro* studies also indicate that zidovudine-resistant virus isolates can become zidovudine sensitive when they simultaneously acquire resistance to lamivudine. Furthermore *in vivo* there is clinical evidence that lamivudine plus zidovudine delays the emergence of zidovudine resistance in antiretroviral naïve patients.

### Pharmacokinetic properties:

Lamivudine and zidovudine are well absorbed from the gastrointestinal tract. The bioavailability of oral lamivudine in adults is normally between 50 to 85 % and for zidovudine 60 to 70 %. Absorption of lamivudine is delayed, but not reduced, by ingestion with food. Binding to plasma protein is reported to be less than 36 %. Because of first-pass metabolism, systemic bioavailability of zidovudine is approximately 65 %. Bioavailability in neonates up to 14 days old is approximately 89 % and in neonates over 14 days old is approximately 75 %. Adverse effects are usually related to oral administration. Lamivudine and zidovudine penetrate the central nervous system and reach the cerebrospinal fluid (CSF). Metabolism of lamivudine is a minor route of elimination. Lamivudine is mainly cleared by renal excretion. Interactions with lamivudine are low due to the small extent of hepatic metabolism (5 to 10 %) and low plasma binding. The 5'-glucuronide of zidovudine is the major metabolite in both plasma and urine, accounting for approximately 50 to 80 % of the administered dose eliminated by renal excretion. 3-amino-2'-deoxythymidine (AMT) has been identified as a metabolite of zidovudine following intravenous dosing.

### Pharmacokinetics of the lamivudine and zidovudine combination when used in combination with other antiretroviral agents:

**Zidovudine:**  
Pharmacokinetic interaction studies indicate that there were no clinically significant alterations to zidovudine pharmacokinetics when given concomitantly with the following antiretroviral agents:  
• Nucleoside reverse transcriptase inhibitors (NRTIs): zalcitabine, didanosine and abacavir;  
• Non-nucleoside reverse transcriptase inhibitors (NNRTIs): nevirapine and efavirenz; and  
• Protease inhibitors: indinavir sulphate, saquinavir mesylate, nelfinavir and nelfinavir.  
There is a known interaction between zidovudine and stavudine (d4T) (see "INTERACTIONS"). The concomitant use of these two agents should be avoided.

**Lamivudine:**  
Pharmacokinetic interaction studies indicate that there were no clinically significant alterations to Lamivudine pharmacokinetics when given concomitantly with the following antiretroviral agents:  
• Non-nucleoside reverse transcriptase inhibitors (NNRTIs): efavirenz; and  
• Protease inhibitors: indinavir sulphate, ritonavir and nelfinavir.

### Pharmacokinetics of lamivudine and zidovudine combination when used in combination with other tuberculostatic agents:

**Zidovudine:**  
Co-administration of zidovudine and rifampicin decreases the AUC of zidovudine by approximately 48 %; however the clinical significance of this is unknown.  
**Lamivudine:**  
Metabolism of lamivudine is a minor route of elimination. Lamivudine is mainly cleared by renal excretion of unchanged drug. The likelihood of metabolic drug interactions e.g. rifampicin with lamivudine is low due to the small extent of hepatic metabolism (5 to 10 %) and low plasma binding.

### INDICATIONS:

**LODOZ** is indicated as part of antiretroviral combination therapy for the treatment of HIV infected adults and children over 12 years of age, with progressive immunodeficiency (CD4 Count  $\geq 500$  cells/mm<sup>3</sup>).

### CONTRAINDICATIONS:

- Hypersensitivity to lamivudine, zidovudine or to any ingredient of the preparation.
- Patients with abnormally low neutrophil counts ( $< 0.75 \times 10^9/l$ ), or abnormally low haemoglobin levels ( $< 7.5$  g/dl).
- Children below 12 years of age (insufficient data available).
- The combination of zidovudine with either ribavirin or stavudine is antagonistic *in vitro*. The concomitant use of either ribavirin or stavudine with **LODOZ** should be avoided.

### WARNINGS AND SPECIAL PRECAUTIONS:

Lactic acidosis and severe hepatomegaly with steatosis, including fatal cases, have been reported with the use of lamivudine alone or in combination, in the treatment of HIV infection.

### Haematology:

Anaemia, neutropenia and leucopenia (usually secondary to neutropenia) can be expected to occur in patients with advanced symptomatic HIV disease receiving zidovudine; therefore haematological parameters should be carefully monitored (see "CONTRAINDICATIONS") in patients receiving **LODOZ**. These haematological effects are not usually observed before four to six weeks therapy. It is generally recommended that blood tests be performed for patients with advanced symptomatic HIV disease, on at least a bi-weekly basis for the first three months of therapy and thereafter at least monthly.

In patients with early HIV disease haematological adverse reactions are infrequent. Blood tests may be performed less often, for example every one to three months depending on the overall condition of the patient. If haemoglobin levels are decreased by more than 25 % from baseline and falls in the neutrophil count of more than 50 % from baseline more frequent monitoring may be required.

If severe anaemia or myelo-suppression occurs during treatment with **LODOZ** in patients with pre-existing bone marrow compromise (e.g. haemoglobin  $< 9$  g/dl (5.9 mmol/l) or neutrophil count  $< 1.0 \times 10^9/l$ ) (see "DOSAGE AND DIRECTIONS FOR USE"), dosage adjustment of zidovudine may be required. As dosage adjustment of **LODOZ** is not possible separate preparations of zidovudine and lamivudine should be used. Physicians should refer to the individual package leaflets of these drugs for dosage specifications.

### Lactic acidosis / hyperlactataemia:

Use of **LODOZ** can result in potentially fatal lactic acidosis as a consequence of mitochondrial dysfunction. Rare but potentially fatal incidences of lactic acidosis, in the absence of hypoxaemia, and severe hepatomegaly with steatosis in patients treated with zidovudine, have been reported. It is not known whether these events are causally related to zidovudine, but they have been reported in HIV-positive patients without AIDS.

Clinical features are non-specific, and include nausea, vomiting, abdominal pain, dyspnoea, fatigue and weight loss. In patients with asymptomatic symptoms or biochemistry, measure the venous lactate level (normal  $< 2$  mmol/l) and the serum bicarbonate and respond as follows:  
• Lactate  $2$  to  $5$  mmol/l with minimum symptoms: switch to agents that are less likely to cause lactic acidosis.  
• Lactate  $5$  to  $10$  mmol/l with symptoms and/or with blood bicarbonate  $< 18$  mmol/l: Stop NRTIs and change treatment option. Once lactate has settled, use medicines that are less likely to cause lactic acidosis. Exclude other causes, (e.g. sepsis, uraemia, diabetic ketoacidosis, thyrotoxicosis and hypothyroidism).  
• Lactate  $> 10$  mmol/l: STOP therapy (80 % mortality).

The above lactate values may not be applicable to paediatric patients.  
Caution should be exercised when administering **LODOZ** to patients with known risk factors for liver disease.

Treatment with **LODOZ** should be suspended in any patient who develops clinical or laboratory findings suggestive of lactic acidosis or hepatotoxicity.

### Mitochondrial dysfunction:

Nucleoside and nucleotide analogues have been demonstrated *in vitro* and *in vivo* to cause a variable degree of mitochondrial damage. There have been reports of mitochondrial dysfunction in HIV negative infants exposed *in utero* and/or post-natally to nucleoside analogues. Apart from lactic acidosis/hyperlactataemia (see above) other manifestations of mitochondrial dysfunction include myopathy, peripheral neuropathy, and peripheral neuropathy. Some late-onset neurological disorders have been reported (hypertonia, convulsion, abnormal behaviour). It is not known whether the neurological disorders are transient or permanent. Any foetus exposed *in utero* to nucleoside and nucleotide analogues, even HIV negative infants/children, should have clinical and laboratory follow-up and should be fully investigated for possible mitochondrial dysfunction in case of relevant sign and symptoms.

High numbers of chromosome breakages in peripheral blood lymphocytes from AIDS patients receiving zidovudine have also been observed. The clinical implications of these findings are unclear.

Both lamivudine and zidovudine were shown to cross the placenta in reproductive animal studies, and have demonstrated evidence of early embryonic deaths in the rabbit (including abortion), rat and/or rabbit (zidovudine). Lamivudine was not teratogenic in animal studies. Zidovudine given to rats during organogenesis at maternally toxic doses, resulted in an increased incidence of malformations. Foetal abnormalities did not occur at lower doses.

With regards to fertility studies in male and female rats, neither zidovudine nor lamivudine have shown evidence of impairment. No data is available on their effect of this combination on human female fertility. Sperm count morphology or motility has not been affected in male rats and in female rats. A carcinogenic risk to humans can thus not be excluded, due to the animal carcinogenicity and mutagenicity data. Lamivudine did not show any carcinogenic potential, in long-term oral carcinogenicity studies in rats and mice. Treatment-related effects were limited to late-appearing vaginal neoplasms, in animals treated with zidovudine. The relevance of these tumours for humans is still unclear, and any theoretical risk of carcinogenicity should be balanced against the proven therapeutic benefit.

The relevance of these findings to both infected and uninfected infants exposed to zidovudine is unknown. However, pregnant women considering using **LODOZ** during pregnancy should be informed of these findings.

### Pancreatitis:

Pancreatitis has been observed in some patients receiving **LODOZ**. A causal relationship between drug treatment and underlying HIV disease could not be established. Pancreatitis must be considered whenever a patient develops abdominal pain, nausea, vomiting or elevated biochemical markers. Discontinue use of **LODOZ** until diagnosis of pancreatitis is excluded.

### Patients with moderate to severe renal impairment:

In patients with moderate to severe renal impairment, the terminal half-life of **LODOZ** is increased due to decreased clearance. The dose of **LODOZ** should therefore be adjusted (see "DOSAGE AND DIRECTIONS FOR USE").

### Pharmacology:

**Pharmacodynamic properties:**  
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### Pharmacology:

**Pharmacodynamic properties:**  
Lamivudine and zidovudine are selective

## PROFESSIELE INLIGTING:

### SKEDULERINGSTATUS:

[S4]

### EIENDOMSNAAM EN DOSEERVORM:

#### LODIZ (Tablet)

#### SAEMSTELLING:

Elke filmbedekte tablet bevat 150 mg lamivudien en 300 mg misoprostol. **Espekte:** koloidale silikonoksied, magnesiumstearaat, mikrokrystalyn selulose, natriumsteyngliksolaat, Opadry 1385802 H Wt (hipromellose, itaanoksied, polietilengliksolaat 400, polisorbaat 80), Sukrover.

### FARMAKOLOGIESE KLASIFIKASIE:

A 20.2.8 Virusresemiddels

### FARMAKOLOGIESE WERKING:

#### Lamivudien (3TC) is 'n antiviraal:

Lamivudien en sidovudien is selektiewe inhibeerders van menslike immunokortkorsiv (MIV-1 en MIV-2. Dit is aangemon dat lamivudien sinergies met sidovudien in die inhibisie van replisering van MIV in sekulêre iv. Beide middels word opeenvolgend deur sellulêre kinases na die 5'-trifosfaat (5'-TMP) gemetaboliseer. Lamivudien-TP is sidovudien-TP is substrat vir en inhibeerders van MIV-transkripsie. Hul belangrikste antivirale aktiwiteit is egter deur die inkorporering van die monofosfaat in die virus-DNA-ketting, wat lei tot die bediening van die ketting. Lamivudien- en sidovudien-trifosfaat toon aansienlik minder affiniteit vir DNA-poliemeras van die gasheersel. Individueel het lamivudien en sidovudien teen MIV-1 en MIV-2 'n verlaagde sensitiviteit tot die nukleosiedanaloga wearaan hulle toegelê is toon, geleë. In vitro studies toon egter ook aan dat sidovudien-weerstandigheid virusale sitosien-sidovudien-saak raak wanneer hulle terselfertyd weerstand teen lamivudien raak. In vivo is daar verde kiniese bewyse dat lamivudien plus sidovudien die ontwikkeling van sidovudienweerstand by pasiënte wat naief tot antiretrovirosumiddels is, vertraag.

#### Farmakokinetiese eienskappe:

Lamivudien en sidovudien word goed veral deur die maagdemerksaal geabsorbeer. Die bioeksaibaarheid van orale lamivudien by volwassenes is normaalweg tussen 80 tot 85% en vir sidovudien 60 tot 70%. Die absorpsie van lamivudien word deur die inname van voedsel vertraag, maar nie verminder nie. Daar word aangemon dat die binding aan plasmaproteïen minder as 36% is.

Weens verskeibeding met die 3TC is die sistemiese bioeksaibaarheid van sidovudien ongeveer 65%. Die bioeksaibaarheid by neonate tot op 14 dae ouderton is 89%. By neonate ouer as 14 dae neem dit af na ongeveer 61%. Toediening saam met 'n hoë-temperatuur kan die tempo en mate van absorpsie vertraag.

Lamivudien en sidovudien penetreer die sentrale senuestelsel en bereik die serebrospinale vloeistof (SSV). Die metabolisme van lamivudien is 'n minder belangrike roete van eliminasi. Lamivudien word hoofsaaklik as onveranderde middel deur die riere uitgeskei. Interaksies met lamivudien is min weens die geringe mate van lewermetabolisme (5 tot 10%) en die plasmasbinding daarvan.

Die 5-glukuronied van sidovudien word deur die nieres uitgeskei in beide die plasma en urine en verteenwoordig ongeveer 50 tot 80% van die toegedreie dosis wat deur die riere uitgeskei word. 3-amino-3-deoksilamien (AMT) is as 'n metaboliet van sidovudien na intravenuse toediening geïdentifiseer.

#### Farmakokinetika van die lamivudien- en sidovudienkombinasie wanneer in kombinasie met ander antiretrovirosumiddels gebruik word:

##### Sidovudien:

Farmakokinetiese en middelinteraksiestudies toon aan dat daar geen klinies betekenisvolle veranderinge in die farmakokinetika van lamivudien was wanneer dit saam met die volgende antiretrovirosumiddels toegedien is nie:

- Nukleosied tetrakarpitaatsinibeerders (NNTTs): zidovudien, didanosien en abasvir;
- Nie-nukleosied tetrakarpitaatsinibeerders (NNTTs): nevirapin en efavirenz; en
- Protasesinibeerders: indinavir/alfalaf, sakvinavir/maalaf, ritonavir, amprenavir en nefinavir.

Daar is 'n bekende interaksie tussen sidovudien en stavudien (d4T) (sien "INTERAKSIES"). Die gelyktydige gebruik van hierdie middels behoort vermy te word.

##### Lamivudien:

Farmakokinetiese en middelinteraksiestudies toon aan dat daar geen klinies betekenisvolle veranderinge in die farmakokinetika van lamivudien was wanneer dit saam met die volgende antiretrovirosumiddels toegedien is nie:

- Nie-nukleosied tetrakarpitaatsinibeerders (NNTTs): zidovudien, didanosien, en
- Protasesinibeerders: indinavir/alfalaf, ritonavir en nefinavir.

#### Farmakokinetika van die lamivudien- en sidovudienkombinasie wanneer in kombinasie met ander nukleosiedstudies middels gebruik word:

##### Sidovudien:

Die medetoediening van sidovudien en ritampisen verminder die AOK van sidovudien met ongeveer 48%. Die kiniese betekenis hiervan is egter onbekend.

##### Lamivudien:

Die metabolisme van lamivudien is 'n minder belangrike roete van eliminasi. Lamivudien word hoofsaaklik as onveranderde middel deur die riere uitgeskei. Die waarskynlike mate van middelinteraksie by ritampisen met lamivudien is klein weens die geringe lewermetabolisme (5 tot 10%) en lae plasmasbinding daarvan.

### INDIKASIES:

**LODIZ** word aangemon as deel van antiretroviro kombinasie terapie vir die behandeling van MIV-geïnfekteerde volwassenes en kinders ouer as 12 jaar, met progressiewe immunitekort (CD4-waarde s 500 selle/mm<sup>3</sup>).

#### KONTRA-INDIKASIES:

- Hipersensitiewe teen lamivudien, sidovudien of enige bestanddeel van die preparaat.
- Pasiënte met abnormaal lae neutrofielgetalle (< 0,75 x 10<sup>9</sup>), of abnormaal lae hemoglobienvlakke (< 7,5 g/dl).
- Kinders jonger as 12 jaar met ernstige nefrotiese (NTTs), nefritis, en
- In vitro is die kombinasie van sidovudien met of ribavirin of stavudien antagonistes. Die gelyktydige gebruik van of ribavirin of stavudien saam met **LODIZ** behoort vermy te word.

#### WAARSKUWINGS EN SPESIALE VOORSORGMATREËLS:

**Melksuursidose** is 'n erge hepatogalliese toestand, insluitend fatale gevalle, is met die gebruik van lamivudien alleen of in kombinasie, by die behandeling van MIV-infekteerde aangemon.

#### Hematologiese:

Daar kan vermy word dat bloedminderde, neutropenie en leukopenie (gewoonlik sekondêr tot neutropenie) voorkom by pasiënte met gevorderde simptomatiese MIV-siekte wat sidovudien ontvang. Daarom moet hematologiese parameters noukeurig gemonitor word (sien "KONTRA-INDIKASIES") by pasiënte wat **LODIZ** ontvang. Hierdie hematologiese effekte word gewoonlik nie voor 4 tot 8 dae na die begin van die behandeling waargeneem. Daar word gewoontlik dae bloettoets uitgevoer vir pasiënte met gevorderde simptomatiese MIV-siekte, ten minste op 'n twee-weekse basis vir die eerste drie maande van terapie en daarna minstens maandeliks.

By pasiënte met vroeë MIV-siekte kan hematologiese newe-effekte nie dikwels voor nie. Bloettoets kan minder gereeld uitgevoer word, byvoorbeeld elke een tot drie maande, afhngende van die algehele toestand van die pasiënt. Indien erge bloedminderde of mielê-onderdrukking plaasvind tydens behandeling met **LODIZ** of by pasiënte met voorbestaanende beemrugkompromie, by hemoglobin < 9 g/dl (5,9 mmol/l) of neutrofiel telling < 1,0 x 10<sup>9</sup> (sien "DOSEERING EN GEBRUIKSAANWYSYNGS") moet die behandeling gestaak word.

Indien erge bloedminderde of mielê-onderdrukking plaasvind tydens behandeling met **LODIZ** of by pasiënte met voorbestaanende beemrugkompromie, by hemoglobin < 9 g/dl (5,9 mmol/l) of neutrofiel telling < 1,0 x 10<sup>9</sup> (sien "DOSEERING EN GEBRUIKSAANWYSYNGS") moet die behandeling gestaak word.

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