

# DOXERCALCIFEROL- doxercalciferol injection, solution

Hospira, Inc.

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## HIGHLIGHTS OF PRESCRIBING INFORMATION

These highlights do not include all the information needed to use DOXERCALCIFEROL INJECTION safely and effectively. See full prescribing information for DOXERCALCIFEROL INJECTION.

### DOXERCALCIFEROL injection, for intravenous use

Initial U.S. Approval: 2000

#### INDICATIONS AND USAGE

DOXERCALCIFEROL Injection is a synthetic vitamin D<sub>2</sub> analog indicated for treatment of secondary hyperparathyroidism in adult patients with chronic kidney disease (CKD) on dialysis. (1)

#### DOSAGE AND ADMINISTRATION

- Before initiating treatment, ensure serum calcium is not above the upper limit of normal. (2.1)
- Initiate dosing at 4 mcg by bolus intravenous administration three times weekly at the end of dialysis (no more frequently than every other day). Maximum dose is 18 mcg weekly. (2.3)
- Target the maintenance dose of Doxercalciferol Injection to intact parathyroid hormone (PTH) levels within the desired therapeutic range and serum calcium within normal limits. (2)
- See Full Prescribing Information for dose titration, laboratory monitoring, and important administration instructions. (2)

#### DOSAGE FORMS AND STRENGTHS

Injection: (3)

- 4 mcg/2 mL (2 mcg/mL) multiple-dose 2 mL vial
- 10 mcg/5 mL (2 mcg/mL) multiple-dose 5 mL vial

#### CONTRAINDICATIONS

- Hypercalcemia. (4)
- Vitamin D toxicity. (4)
- Known hypersensitivity to doxercalciferol or any of the inactive ingredients of Doxercalciferol Injection. (4)

#### WARNINGS AND PRECAUTIONS

- **Hypercalcemia:** Can occur during treatment with Doxercalciferol Injection and can lead to cardiac arrhythmias and seizures. Severe hypercalcemia may require emergency attention. Risk may be increased when used concomitantly with high dose calcium preparations, thiazide diuretics, or vitamin D compounds. Monitor serum calcium prior to initiation and during treatment and adjust dose accordingly. (2, 5.1)
- **Digitalis Toxicity:** Hypercalcemia increases the risk of digitalis toxicity. In patients using digitalis compounds, monitor serum calcium and patients for signs and symptoms of digitalis toxicity. Increase frequency of monitoring when initiating or adjusting the dose of Doxercalciferol Injection. (5.2)
- **Serious Hypersensitivity Reactions:** Anaphylaxis, with symptoms of angioedema, hypotension, unresponsiveness, chest discomfort, shortness of breath, and cardiopulmonary arrest, has been reported in hemodialysis patients after administration of Doxercalciferol Injection. Monitor patients upon treatment initiation for hypersensitivity reactions. Should a reaction occur, discontinue and treat. (5.3)
- **Adynamic Bone Disease:** May develop and increase risk of fractures if intact PTH levels are suppressed to abnormally low levels. Monitor intact PTH levels to avoid oversuppression and adjust dose if needed. (5.4)

#### ADVERSE REACTIONS

The most common adverse reactions in patients with CKD on dialysis (incidence >5%) were headache, malaise, edema, nausea/vomiting, dyspnea, dizziness, pruritus, and bradycardia. (6.1)

To report SUSPECTED ADVERSE REACTIONS, contact Pfizer, Inc. at 1-800-438-1985 or FDA at 1-800-FDA-1088 or [www.fda.gov/medwatch](http://www.fda.gov/medwatch).

#### DRUG INTERACTIONS

- **Cytochrome P450 inhibitors:** Formation of the active doxercalciferol moiety may be hindered and may necessitate dosage adjustment. Monitor intact PTH and serum calcium concentrations closely. (7)
- **Enzyme inducers:** Formation of the active doxercalciferol moiety may be affected and may necessitate dosage adjustment. Monitor intact PTH and serum calcium concentrations closely. (7)
- **Magnesium-containing products:** Combined use may cause hypermagnesemia. Monitor serum magnesium concentrations more frequently and adjust dose as needed. (7)

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**FULL PRESCRIBING INFORMATION**

**1 INDICATIONS AND USAGE**

Doxercalciferol Injection is indicated for the treatment of secondary hyperparathyroidism in adult patients with chronic kidney disease (CKD) on dialysis.

## 2 DOSAGE AND ADMINISTRATION

### 2.1 Prior to Initiation of Doxercalciferol Injection

- Ensure serum calcium is not above the upper limit of normal before initiating treatment with Doxercalciferol Injection [see *Warnings and Precautions (5.1)*].

### 2.2 Important Administration Instructions for Doxercalciferol Injection

- Administer Doxercalciferol Injection intravenously as a bolus dose at the end of dialysis.
- Inspect Doxercalciferol Injection visually prior to administration; the solution should appear clear and colorless. Do not use if the solution is not clear or particles are present.
- After initial vial use, store opened multiple-dose vial for up to 14 days at room temperature. Discard unused portion of multiple-dose vial after 14 days [see *How Supplied/Storage and Handling (16)*].

### 2.3 Dosage Recommendations for Doxercalciferol Injection

- Initiate Doxercalciferol Injection at a dose of 4 mcg given by bolus intravenous administration three times weekly at the end of dialysis (no more frequently than every other day).
- Target the maintenance dose of Doxercalciferol Injection to intact parathyroid hormone (PTH) levels within the desired therapeutic range and serum calcium within normal limits.
- Monitor serum calcium, phosphorus, and intact PTH levels weekly after initiation of therapy or dose adjustment.
- Titrate the dose of Doxercalciferol Injection based on intact PTH. The dose may be increased at 8-week intervals by 1 mcg to 2 mcg if intact PTH is not lowered by 50% and fails to reach the target range. The maximum dose is 18 mcg weekly. Prior to raising the dose, ensure serum calcium is within normal limits.
- Suspend or decrease the dose if intact PTH is persistently and abnormally low to reduce the risk of adynamic bone disease [see *Warnings and Precautions (5.4)*] or if serum calcium is consistently above the normal range to reduce the risk of hypercalcemia [see *Warnings and Precautions (5.1)*]. If suspended, the drug should be restarted one week later at a dose that is at least 1 mcg lower.

### 2.4 Drug Interactions that May Require Dosage Adjustments of Doxercalciferol Injection

- Increased monitoring of serum calcium and dose adjustment of Doxercalciferol Injection may be necessary when given concomitantly with drugs that may increase the risk of hypercalcemia [see *Drug Interactions (7)*].
- Increased monitoring of both serum calcium and intact PTH as well as dose adjustment of Doxercalciferol Injection may be necessary when given concomitantly with cytochrome P450 inhibitors or enzyme inducers [see *Drug Interactions (7)*].

## 3 DOSAGE FORMS AND STRENGTHS

Injection: clear and colorless solution available as follows:

- 4 mcg/2 mL (2 mcg/mL) multiple-dose 2 mL vial
- 10 mcg/5 mL (2 mcg/mL) multiple-dose 5 mL vial

## 4 CONTRAINDICATIONS

Doxercalciferol Injection is contraindicated in patients with:

- Hypercalcemia [see *Warnings and Precautions (5.1)*]
- Vitamin D toxicity [see *Warnings and Precautions (5.1)*]
- Known hypersensitivity to doxercalciferol or any of the inactive ingredients of Doxercalciferol Injection; serious hypersensitivity reactions including anaphylaxis and angioedema have been reported [see *Warnings and Precautions (5.3)*, *Adverse Reactions (6.2)*].

## 5 WARNINGS AND PRECAUTIONS

### 5.1 Hypercalcemia

Hypercalcemia may occur during Doxercalciferol Injection treatment. Acute hypercalcemia may increase the risk of cardiac arrhythmias and seizures and may potentiate the effect of digitalis on the heart [see *Warnings and Precautions (5.2)*]. Chronic hypercalcemia can lead to generalized vascular calcification and other soft-tissue calcification. Severe hypercalcemia may require emergency attention.

Hypercalcemia may be exacerbated by concomitant administration of high doses of calcium-containing preparations, thiazide diuretics, or other vitamin D compounds [see *Drug Interactions (7)*]. In addition, high intake of calcium and phosphate concomitantly with vitamin D compounds may lead to hypercalciuria and hyperphosphatemia. Patients with a history of hypercalcemia prior to initiating therapy may be at increased risk for development of hypercalcemia with Doxercalciferol Injection. In these circumstances, frequent serum calcium monitoring and Doxercalciferol Injection dose adjustments may be required.

When initiating Doxercalciferol Injection or adjusting Doxercalciferol Injection dose, measure serum calcium weekly. Once a maintenance dose has been established, measure serum calcium monthly for 3 months and then every 3 months. If hypercalcemia occurs, reduce the dose or discontinue Doxercalciferol Injection until serum calcium is normal [see *Dosage and Administration (2)*].

Inform patients about the symptoms of elevated calcium (feeling tired, difficulty thinking clearly, loss of appetite, nausea, vomiting, constipation, increased thirst, increased urination and weight loss) and instruct them to report new or worsening symptoms when they occur.

### 5.2 Digitalis Toxicity

Doxercalciferol Injection can cause hypercalcemia [see *Warnings and Precautions (5.1)*] which increases the risk of digitalis toxicity. In patients using Doxercalciferol Injection concomitantly with digitalis compounds, monitor both serum calcium and patients for signs and symptoms of digitalis toxicity. Increase the frequency of monitoring when initiating or adjusting the dose of Doxercalciferol Injection [see *Drug Interactions (7)*].

### 5.3 Serious Hypersensitivity Reactions

Serious hypersensitivity reactions, including fatal outcome, have been reported post marketing in patients on hemodialysis following administration of Doxercalciferol Injection. Hypersensitivity reactions include anaphylaxis with symptoms of angioedema (involving face, lips, tongue and airways), hypotension, unresponsiveness, chest discomfort, shortness of breath, and cardiopulmonary arrest. These reactions may occur separately or together.

Monitor patients receiving Doxercalciferol Injection upon initiation of treatment for hypersensitivity reactions. Should a hypersensitivity reaction occur, discontinue Doxercalciferol Injection, monitor and treat if indicated [see *Contraindications (4)*].

### 5.4 Adynamic Bone Disease

Adynamic bone disease with subsequent increased risk of fractures may develop if intact PTH levels are suppressed by Doxercalciferol Injection to abnormally low levels. Monitor intact PTH levels to avoid oversuppression and adjust the Doxercalciferol Injection dose, if needed [see *Dosage and Administration (2)*].

## 6 ADVERSE REACTIONS

The following adverse reactions are discussed in greater detail in another section of the label:

- Hypercalcemia [see *Warnings and Precautions (5.1)*]
- Serious Hypersensitivity Reactions [see *Warnings and Precautions (5.3)*]

- Adynamic Bone Disease [see Warnings and Precautions (5.4)]

## 6.1 Clinical Trials Experience

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice.

The safety of Doxercalciferol Injection has been established from adequate and well-controlled studies of doxercalciferol capsules and from studies of another doxercalciferol injection product (doxercalciferol injection) [see *Clinical Studies (14)*]. Below is a display of the adverse reactions of doxercalciferol capsules and doxercalciferol injection from these studies.

Doxercalciferol capsules for oral use were evaluated in two placebo-controlled, double-blind studies in patients with CKD on hemodialysis. Patients were treated with doxercalciferol capsules (n=61) or placebo (n=61). After randomization to two groups, eligible patients underwent an 8-week washout period during which no vitamin D derivatives were administered to either group. Subsequently, all patients received doxercalciferol capsules in an open-label fashion for 16 weeks followed by a double-blind period of 8 weeks during which patients received either doxercalciferol capsules or placebo. Adverse reactions occurring in the doxercalciferol capsules groups at a frequency of 2% or greater, and more frequently than in the placebo group are presented in Table 1.

**Table 1: Adverse Reactions Occurring in  $\geq 2\%$  of Doxercalciferol Capsules-Treated Patients with CKD on Dialysis and Greater than Placebo in Two Double-Blind Clinical Studies**

Adverse Reaction*	Doxercalciferol (n=61)	Placebo (n=61)
	%	%
Edema	34	21
Malaise	28	20
Headache	28	18
Nausea/Vomiting	21	20
Dizziness	12	10
Dyspnea	12	7
Pruritus	8	7
Bradycardia	7	5
Anorexia	5	3
Dyspepsia	5	2
Arthralgia	5	0
Weight increase	5	0
Abscess	3	0
Sleep disorder	3	0

\* A patient who reported the same medical term more than once was counted only once for that medical term.

Doxercalciferol injection was studied in 70 patients with CKD on hemodialysis in two 12-week, open-label, single-arm, multi-center studies [see *Clinical Studies (14)*]. The incidence of hypercalcemia and hyperphosphatemia increased during therapy with doxercalciferol injection. Patients with higher pre-treatment serum levels of calcium ( $>10.5$  mg/dL) or phosphorus ( $>6.9$  mg/dL) were more likely to experience hypercalcemia or hyperphosphatemia.

There was no placebo group included in the studies of doxercalciferol injection. Adverse reactions in patients with CKD on hemodialysis receiving Doxercalciferol Injection are expected to be similar to those reported in placebo-controlled studies of doxercalciferol capsules presented in Table 1.

## 6.2 Postmarketing Experience

The following adverse reactions have been identified during postapproval use of Doxercalciferol Injection. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to estimate their frequency or to establish a causal relationship to drug exposure.

Hypersensitivity reactions, including fatal outcome, have been reported in patients on hemodialysis following administration of Doxercalciferol Injection. Hypersensitivity reactions include anaphylaxis with symptoms of angioedema (involving face, lips, tongue and airways), hypotension, unresponsiveness, chest discomfort, shortness of breath, cardiopulmonary arrest, pruritus, and skin burning sensation.

## 7 DRUG INTERACTIONS

Table 2 includes clinically significant drug interactions with doxercalciferol.

**Table 2: Clinically Significant Drug Interactions with Doxercalciferol**

<b>Drugs that May Increase the risk of Hypercalcemia</b>	
<i>Clinical Impact</i>	Concomitant administration of high doses of calcium-containing preparations or other vitamin D compounds may increase the risk of hypercalcemia. Thiazide diuretics are known to induce hypercalcemia by reducing excretion of calcium in the urine.
<i>Examples</i>	Calcium-containing products, other vitamin D compounds or thiazide diuretics
<i>Intervention</i>	Monitor serum calcium concentrations more frequently and adjust Doxercalciferol Injection dose as needed [see Warnings and Precautions (5.1)].
<b>Digitalis Compounds</b>	
<i>Clinical Impact</i>	Doxercalciferol can cause hypercalcemia which can potentiate the risk of digitalis toxicity.
<i>Intervention</i>	Monitor patients for signs and symptoms of digitalis toxicity and increase frequency of serum calcium monitoring when initiating or adjusting the dose of Doxercalciferol Injection in patients receiving digitalis compounds [see Warnings and Precautions (5.2)].
<b>Cytochrome P450 Inhibitors</b>	
<i>Clinical Impact</i>	Doxercalciferol is activated by CYP 27 in the liver. Cytochrome P450 inhibitors may inhibit the 25-hydroxylation of doxercalciferol and thus reduce the formation of active doxercalciferol moiety [see Clinical Pharmacology (12.3)].
<i>Examples</i>	Ketoconazole and erythromycin
<i>Intervention</i>	If a patient initiates or discontinues therapy with a cytochrome P450 inhibitor, dose adjustment of Doxercalciferol Injection may be necessary. Monitor intact PTH and serum calcium concentrations closely.
<b>Enzyme Inducers</b>	
<i>Clinical Impact</i>	Doxercalciferol is activated by CYP 27 in the liver. Enzyme inducers may affect the 25-hydroxylation of doxercalciferol [see Clinical Pharmacology (12.3)].
<i>Examples</i>	Glutethimide and phenobarbital
<i>Intervention</i>	If a patient initiates or discontinues therapy with an enzyme inducer, dose adjustment of Doxercalciferol Injection may be necessary. Monitor intact PTH and serum calcium concentrations closely.
<b>Magnesium-containing Products</b>	
<i>Clinical Impact</i>	Concomitant administration of Doxercalciferol Injection and high doses of magnesium-containing products may increase the risk of hypermagnesemia.
<i>Examples</i>	Magnesium-containing products such as antacids
<i>Intervention</i>	Avoid use of magnesium-containing products and Doxercalciferol Injection.

## 8 USE IN SPECIFIC POPULATIONS

## **8.1 Pregnancy**

### Risk Summary

The limited available data with Doxercalciferol Injection in pregnant women are insufficient to identify a drug-associated risk for major birth defects, miscarriage or adverse maternal or fetal outcomes. There are risks to the mother and fetus associated with chronic kidney disease in pregnancy [*see Clinical Considerations*]. In reproduction studies in rats and rabbits administered doxercalciferol during organogenesis at up to 20 mcg/kg/day and 0.1 mcg/kg/day, respectively (approximately 25 times (rats) and less than (rabbits) the maximum recommended human oral dose of 60 mcg/week based on mcg/m<sup>2</sup> body surface area), no adverse developmental effects were observed [*see Data*].

The estimated background risk of major birth defects and miscarriage for the indicated population is unknown. In the U.S. general population, the estimated background risk of major birth defects and miscarriage in clinically recognized pregnancies is 2%–4% and 15%–20%, respectively.

### Clinical Considerations

#### *Disease-associated maternal and/or embryo/fetal risk*

Chronic kidney disease in pregnancy increases the risk for maternal hypertension and preeclampsia, miscarriage, preterm delivery polyhydramnios, still birth, and low-birth-weight infants.

### Data

#### *Animal Data*

There were no adverse effects on fetal development when doxercalciferol was administered at doses up to 20 mcg/kg/day in pregnant rats or doses up to 0.1 mcg/kg/day in pregnant rabbits during the period of organogenesis.

## **8.2 Lactation**

### Risk Summary

There is no information available on the presence of doxercalciferol in human milk, the effects of the drug on the breastfed infant, or the effects of the drug on milk production. Infants exposed to Doxercalciferol Injection through breast milk should be monitored for signs and symptoms of hypercalcemia [*see Clinical Considerations*].

The developmental and health benefits of breastfeeding should be considered along with the mother's clinical need for Doxercalciferol Injection and any potential adverse effects on the breastfed child from Doxercalciferol Injection or from the underlying maternal condition.

### Clinical Considerations

Infants exposed to Doxercalciferol Injection through breast milk should be monitored for signs and symptoms of hypercalcemia, including seizures, vomiting, constipation and weight loss. Monitoring of serum calcium in the infant should be considered.

## **8.4 Pediatric Use**

Safety and efficacy of Doxercalciferol Injection in pediatric patients have not been established.

## **8.5 Geriatric Use**

Clinical studies of doxercalciferol injection did not include sufficient numbers of patients 65 years or over to determine whether they respond differently from younger subjects. In general, dose selection for an elderly patient should be cautious, usually starting at the low end of the dosing range, reflecting the greater frequency of decreased hepatic or cardiac function, and of concomitant disease or other drug therapy.

## 8.6 Hepatic Impairment

Patients with hepatic impairment may not metabolize Doxercalciferol Injection appropriately. More frequent monitoring of intact PTH, calcium, and phosphorus levels should be done in patients with hepatic impairment.

## 10 OVERDOSAGE

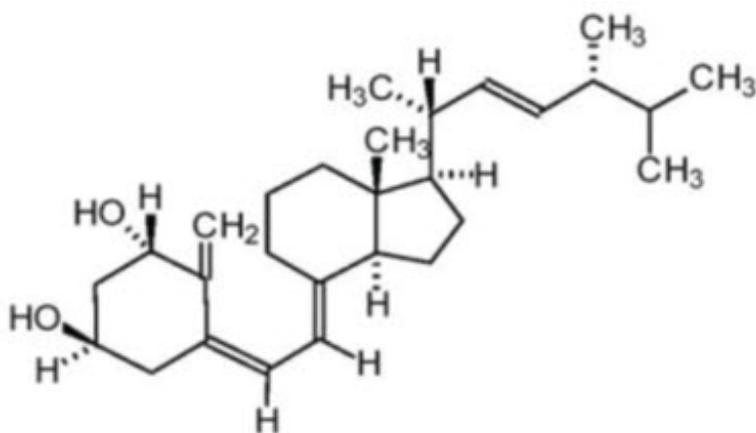
Overdosage of Doxercalciferol Injection may lead to hypercalcemia, hypercalciuria, and hyperphosphatemia [see *Warnings and Precautions (5.1)*]. The treatment of acute overdosage should consist of supportive measures and discontinuation of Doxercalciferol Injection administration. Serum calcium levels should be measured until normal.

Based on similarities between Doxercalciferol Injection and its active metabolite,  $1\alpha,25\text{-(OH)}_2\text{D}_2$ , it is expected that doxercalciferol is not removed from the blood by dialysis.

## 11 DESCRIPTION

Doxercalciferol is a synthetic vitamin  $\text{D}_2$  analog. Doxercalciferol undergoes metabolic activation *in vivo* to form  $1\alpha,25\text{-dihydroxyvitamin D}_2$  ( $1\alpha,25\text{-(OH)}_2\text{D}_2$ ), a naturally occurring, biologically active form of vitamin  $\text{D}_2$ .

Doxercalciferol is a colorless crystalline compound with a calculated molecular weight of 412.65 and a molecular formula of  $\text{C}_{28}\text{H}_{44}\text{O}_2$ . It is soluble in oils and organic solvents, but is relatively insoluble in water. Chemically, doxercalciferol is  $(1\alpha,3\beta,5Z,7E,22E)\text{-9,10-secoergosta-5,7,10(19),22-tetraene-1,3-diol}$ . The structural formula is:



Doxercalciferol Injection is a sterile, clear, and colorless solution.

The 2 mL multiple-dose vials contain 4 mcg/2 mL (2 mcg/mL) of doxercalciferol. Each milliliter (mL) of solution contains 2 mcg doxercalciferol and the following inactive ingredients: ethanol, 96% (0.078 mL); polysorbate 20 (10 mg); sodium chloride (1.5 mg); butylated hydroxytoluene (0.02 mg); sodium phosphate dibasic, heptahydrate (14.4 mg); sodium phosphate monobasic, monohydrate (1.8 mg); and disodium edetate (1.1 mg).

The 5 mL multiple-dose vials contain 10 mcg/5 mL (2 mcg/mL) of doxercalciferol. Each milliliter (mL) of solution contains 2 mcg doxercalciferol and the following inactive ingredients: ethanol, 96% (0.078 mL); polysorbate 20 (10 mg); sodium chloride (1.5 mg); butylated hydroxytoluene (0.02 mg); sodium phosphate dibasic, heptahydrate (14.4 mg); sodium phosphate monobasic, monohydrate (1.8 mg); and disodium edetate (1.1 mg).

## 12 CLINICAL PHARMACOLOGY

### 12.1 Mechanism of Action

Doxercalciferol is a synthetic vitamin D<sub>2</sub> analog that requires metabolic activation to form the active 1 $\alpha$ ,25-(OH)<sub>2</sub>D<sub>2</sub> metabolite, which binds to the vitamin D receptor (VDR) to result in the selective activation of vitamin D responsive pathways. Vitamin D and doxercalciferol have been shown to reduce PTH levels by inhibiting PTH synthesis and secretion.

### 12.3 Pharmacokinetics

#### Absorption

In healthy volunteers, peak blood levels of 1 $\alpha$ ,25-(OH)<sub>2</sub>D<sub>2</sub>, the major metabolite of doxercalciferol, are attained at 8 hours after a single intravenous dose of doxercalciferol.

#### Elimination

The mean elimination half-life of 1 $\alpha$ ,25-(OH)<sub>2</sub>D<sub>2</sub> after an oral dose is approximately 32 to 37 hours with a range of up to 96 hours.

#### *Metabolism*

Doxercalciferol is activated by CYP 27 in the liver to form 1 $\alpha$ ,25-(OH)<sub>2</sub>D<sub>2</sub> (major metabolite) and 1 $\alpha$ ,24-dihydroxyvitamin D<sub>2</sub> (minor metabolite). Activation of doxercalciferol does not require the involvement of the kidneys.

#### Specific Populations

##### *Patients with renal impairment*

The mean elimination half-life of 1 $\alpha$ ,25-(OH)<sub>2</sub>D<sub>2</sub> in patients with end-stage renal disease (ESRD) and in healthy volunteers appears to be similar following an oral dose. Doxercalciferol Injection is not approved for oral use.

Hemodialysis causes a temporary increase in 1 $\alpha$ ,25-(OH)<sub>2</sub>D<sub>2</sub> mean concentrations, presumably due to volume contraction. 1 $\alpha$ ,25-(OH)<sub>2</sub>D<sub>2</sub> is not removed from blood during hemodialysis.

## 13 NONCLINICAL TOXICOLOGY

### 13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility

In a 104-week carcinogenicity study in rats, there was an increased incidence of benign and malignant adrenal pheochromocytomas in both males and females at oral doses of 0.04, 0.13, and 0.39 mcg/kg/day (less than the maximum recommended human oral dose of 60 mcg/week based on mcg/m<sup>2</sup> body surface area). This increased incidence of pheochromocytomas in rats may be due to altered calcium homeostasis by doxercalciferol. No evidence of genetic toxicity was observed in an *in vitro* bacterial mutagenicity assay (Ames test) or a mouse lymphoma gene mutation assay. Doxercalciferol caused structural chromatid and chromosome aberrations in an *in vitro* human lymphocyte clastogenicity assay with metabolic activation. However, doxercalciferol was negative in an *in vivo* mouse micronucleus clastogenicity assay.

Doxercalciferol had no effect on male or female fertility in rats at oral doses up to 2.5 mcg/kg/day (approximately 3 times the maximum recommended human oral dose of 60 mcg/week based on mcg/m<sup>2</sup> body surface area).

## 14 CLINICAL STUDIES

The safety and efficacy of Doxercalciferol Injection have been established based on adult studies of doxercalciferol injection in patients with CKD on hemodialysis. Below is a display of the results of

these studies of doxercalciferol injection.

The safety and effectiveness of doxercalciferol injection was evaluated in two open-label, single-arm, multi-center clinical studies (Study C and Study D) in a total of 70 patients with CKD on hemodialysis. Patients in Study C were an average age of 54 years (range: 23 to 73), were 50% male, and were 61% African-American, 25% Caucasian, and 14% Hispanic, and had been on hemodialysis for an average of 65 months. Patients in Study D were an average age of 51 years (range: 28 to 76), were 48% male, and 100% African-American and had been on hemodialysis for an average of 61 months. This group of 70 of the 138 patients who had been treated with doxercalciferol capsules in prior clinical studies received doxercalciferol injection in an open-label fashion for 12 weeks following an 8-week washout (control) period. Dosing of doxercalciferol injection was initiated at the rate of 4 mcg administered at the end of each dialysis session (3 times weekly) for a total of 12 mcg per week. The dosage of doxercalciferol injection was adjusted to achieve intact PTH levels (measured weekly) within a targeted range of 150 pg/mL to 300 pg/mL. The dosage was increased by 2 mcg per dialysis session after 8 weeks of treatment if the intact PTH levels remained above 300 pg/mL and were greater than 50% of baseline levels. The maximum dosage was limited to 18 mcg per week. If at any time during the study intact PTH fell below 150 pg/mL, doxercalciferol injection was immediately suspended and restarted at a lower dosage the following week. Mean weekly doses ranged from 9 mcg to 13 mcg in Study C and ranged from 9 mcg to 12 mcg in Study D.

Fifty-two (74%) of the 70 patients who were treated with doxercalciferol injection achieved intact PTH levels  $\leq 300$  pg/mL. Forty-one (59%) of these patients exhibited plasma intact PTH levels  $\leq 300$  pg/mL on at least 3 occasions. Thirty-six (51%) patients had plasma intact PTH levels  $< 150$  pg/mL on at least one occasion during study participation. Decreases in plasma intact PTH from baseline values were calculated using as baseline the average of the last 3 values obtained during the 8-week washout period and are displayed in Table 3.

**Table 3: Intact PTH Summary Data for Patients with CKD on Dialysis Receiving Doxercalciferol Injection in Studies C and D**

Intact PTH Level	Study C (n=28)	Study D (n=42)	Combined Protocols (n=70)
Baseline (Mean of Weeks -2, -1, and 0)			
Mean (SE)	698 (60)	762 (65)	736 (46)
Median	562	648	634
On-treatment (Week 12*)			
Mean (SE)	406 (63)	426 (60)	418 (43)
Median	311	292	292
Change from Baseline <sup>†</sup>			
Mean (SE)	-292 (55)	-336 (41)	-318 (33)
Median	-274	-315	-304
P-value <sup>‡</sup>	0.004	0.001	<0.001

\* Values were carried forward for the two patients on study for 10 weeks

<sup>†</sup> Treatment intact PTH minus baseline intact PTH

<sup>‡</sup> Wilcoxon one-sample test

Doxercalciferol injection treatment resulted in at least 30% reduction from baseline in mean intact PTH levels during the 12-week open-label treatment period in more than 92% of the 70 treated patients.

## 16 HOW SUPPLIED/STORAGE AND HANDLING

Doxercalciferol Injection is a clear, colorless solution in multiple-dose amber glass vials supplied as

follows:

<b>Total Strength per Total Volume</b>	<b>Strength per mL</b>	<b>Flip-off Cap Color</b>	<b>Vial Count per Carton × Total Vial Volume and Vial Type</b>	<b>Carton NDC</b>
4 mcg/2 mL	2 mcg/mL	Orange	50 × 2 mL multiple-dose vials	0409-1330-01
10 mcg/5 mL	2 mcg/mL	Gray	50 × 5 mL multiple-dose vials	0409-1331-01

### Storage

Store multiple-dose vials at 20°C to 25°C (68°F to 77°F) [see USP controlled room temperature].  
Protect from light. Store unopened vial in original carton. Discard vial 14 days after opening.

## **17 PATIENT COUNSELING INFORMATION**

### Hypercalcemia

Advise patients to contact a health care provider if they develop symptoms of elevated calcium (e.g. feeling tired, difficulty thinking clearly, loss of appetite, nausea, vomiting, constipation, increased thirst, increased urination and weight loss) [see *Warnings and Precautions (5.1)*].

### Hypersensitivity

Inform patients that hypersensitivity reactions can occur with Doxercalciferol Injection [see *Warnings and Precautions (5.3)*].

### Monitoring

Inform patients that they will need routine monitoring of laboratory parameters such as calcium and intact PTH while receiving Doxercalciferol Injection. Inform patients that more frequent monitoring is necessary during the initiation of therapy, following dose changes or when potentially interacting medications are started or discontinued [see *Dosage and Administration (2)*, *Drug Interactions (7)*].

### Drug Interactions

Advise patients to inform their physician of all medications, including prescription and nonprescription drugs, and supplements they are taking. Advise patients to also inform their physician that they are receiving Doxercalciferol Injection if a new medication is prescribed [see *Drug Interactions (7)*].

This product's label may have been updated. For the current prescribing information, please visit [www.pfizer.com](http://www.pfizer.com).

Distributed by Hospira, Inc., Lake Forest, IL 60045 USA

LAB-0887-3.0

### **PRINCIPAL DISPLAY PANEL - 5 mL Vial Label**

5 mL Multi-Dose Vial

Rx only

Doxercalciferol

Injection

10 mcg/5 mL (2 mcg/mL)

For Intravenous Use Only

Dist. by Hospira, Inc.

Lake Forest, IL 60045 USA

5 mL Multi-Dose Vial Rx only NDC 0409-1331-11		FPO / 6.7 MIL	RL10131	LOT ####AA EXP DMMYYYY
<b>Doxercaliferol Injection</b>	Discard vial 14 days after opening			
<b>10 mcg/5 mL (2 mcg/mL)</b>				
<b>For Intravenous Use Only</b>	Discard after _____/_____/_____			
Dist. by Hospira, Inc. Lake Forest, IL 60045 USA				

**PRINCIPAL DISPLAY PANEL - 5 mL Vial Carton**

▲ TOP ▲

50 x 5 mL Multi-Dose Vials

Rx only

NDC 0409-1331-01

Doxercaliferol Injection

10 mcg/5 mL (2 mcg/mL)

For Intravenous Use Only

Store unopened vial in original carton;

discard vial 14 days after opening

Hospira

▲ TOP ▲

50 x 5 mL Multi-Dose Vials Rx only NDC 0409-1331-01

## Doxercalciferol Injection

10 mcg/5 mL (2 mcg/mL)

**For Intravenous Use Only**  
Store unopened vial in original carton;  
discard vial 14 days after opening



**TURN OVER**

▲ TOP ▲

50 x 5 mL Multi-Dose Vials Rx only NDC 0409-1331-01

## Doxercalciferol Injection

10 mcg/5 mL (2 mcg/mL)

**For Intravenous Use Only**  
Store unopened vial in original carton;  
discard vial 14 days after opening



50 x 5 mL Multi-Dose Vials    Rx only    NDC 0409-1331-01

**Doxercalciferol Injection**

**10 mcg/5 mL (2 mcg/mL)**

**For Intravenous Use Only**  
**Store unopened vial in original carton;**  
**discard vial 14 days after opening**

CA10105

\*\*\*\*\*  
 SN    \*\*\*\*\*  
 EXP    \*\*\*\*\*  
 LOT    \*\*\*\*\*  
 FPO

67 IN 1 DEO HQ93, 323, 030  
 LOT    \*\*\*\*\*  
 EXP    \*\*\*\*\*  
 SN    \*\*\*\*\*

CA 101 05

( 01 ) 1030 4091 331 010

10105

Hospira

Contains preservative  
 Store unopened vial in original carton;  
 discard vial 14 days after opening

Hospira

50 x 5 mL Multi-Dose Vials    Rx only    NDC 0409-1331-01

**Doxercalciferol Injection**

**10 mcg/5 mL (2 mcg/mL)**

**For Intravenous Use Only**  
**Store unopened vial in original carton;**  
**discard vial 14 days after opening**

CA10105

Hospira

\*\*\*\*\*  
 SN    \*\*\*\*\*  
 EXP    \*\*\*\*\*  
 LOT    \*\*\*\*\*  
 FPO

**▲ TOP ▲**

**Protect from light.**  
**For intravenous use only.**  
**Usual dosage:** See prescribing information  
 Store at 20° to 25°C (68° to 77°F)  
 [See USP Controlled Room Temperature.]  
**Contents:**  
**Active Ingredient:**  
 Doxercalciferol, 0.0002%

**Inactive Ingredients:** Ethanol, 96% USP, 7.8% (v/v); Sodium Phosphate Dibasic, Hepta hydrate, USP, 1.44%; Polysorbate 20, NF, 1.00%; Sodium Phosphate Monobasic; Monohydrate, USP, 0.18%; Sodium Chloride, USP, 0.15%; Disodium Edetate, USP, 0.11%; Butylated Hydroxytoluene (BHT), NF, 0.002%; Water for Injection, USP, QS

Doxercalciferol Injection  
 10 mcg/5 mL (2 mcg/mL)  
 50 x 5 mL Multi-Dose Vials.  
**Store unopened vial in original carton; discard vial 14 days after opening**

**MADE IN TAIWAN**  
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 Lake Forest, IL 60045 USA

Hospira

**PRINCIPAL DISPLAY PANEL - 2 mL Vial Label**

NDC 0409-1330-11  
 Rx only  
 2 mL Multi-Dose Vial  
 Doxercalciferol  
 Injection

4 mcg/2 mL (2 mcg/mL)

For Intravenous Use Only

NDC 0409-1330-11 Rx only  
2 mL Multi-Dose Vial

**Doxercalciferol  
Injection**

**4 mcg/2 mL (2 mcg/mL)**  
**For Intravenous Use Only**

Discard vial 14 days  
after opening

Dist. by Hospira, Inc.  
Lake Forest, IL 60045 USA

FPO / 6.7 MIL

RL10130

#####AA  
DMMYYY

**PRINCIPAL DISPLAY PANEL - 2 mL Vial Carton**

▲ TOP ▲

50 x 2 mL Multi-Dose Vials

Rx only

NDC 0409-1330-01

Doxercalciferol Injection

4 mcg/2 mL (2 mcg/mL)

For Intravenous Use Only

Store unopened vial in original carton;  
discard vial 14 days after opening

Hospira

▲ TOP ▲

50 x 2 mL Multi-Dose Vials Rx only NDC 0409-1330-01

## Doxercalciferol Injection

**4 mcg/2 mL (2 mcg/mL)**

**For Intravenous Use Only**  
**Store unopened vial in original carton;**  
**discard vial 14 days after opening**



▲ TOP ▲

50 x 2 mL Multi-Dose Vials Rx only NDC 0409-1330-01

## Doxercalciferol Injection

**4 mcg/2 mL (2 mcg/mL)**

**For Intravenous Use Only**  
**Store unopened vial in original carton;**  
**discard vial 14 days after opening**



**TURN OVER**


  
 For Intravenous Use Only
   
 Store unopened vial in original carton;
   
 discard vial 14 days after opening
   
 Contains preservative

**4 mcg/2 mL (2 mcg/mL)**
  
**Doxercalciferol Injection**

50 x 2 mL Multi-Dose Vials Rx only NDC 0409-1330-01


  
 (01)103 04091330013

CA10104


  
 GTIN 1030492330013
   
 LOT \*\*\*\*\*
   
 EXP DMMYYYY
   
 SN \*\*\*\*\*

50 x 2 mL Multi-Dose Vials Rx only NDC 0409-1330-01

**50 x 2 mL Multi-Dose Vials Rx only NDC 0409-1330-01**
  
**Doxercalciferol Injection**
  
**4 mcg/2 mL (2 mcg/mL)**

**For Intravenous Use Only**
  
**Store unopened vial in original carton;**
  
**discard vial 14 days after opening**


  
 CA10104


  
 SN \*\*\*\*\*
   
 EXP DMMYYYY
   
 LOT \*\*\*\*\*
   
 GTIN 1030492330013

**▲ TOP ▲**

**Protect from light.**
  
**For Intravenous use only.**

**Usual dosage:** See prescribing Information.

Store at 20° to 25°C (68° to 77°F) [See USP Controlled Room Temperature.]

**Contents:**
  
**Active ingredient:** Doxercalciferol, 0.0002%

**Inactive ingredients:** Ethanol, 96% USP, 7.8% (v/v); Sodium Phosphate Dibasic, Heptahydrate, USP, 1.44%; Polysorbate 20, NF, 1.00%; Sodium Phosphate Monobasic, Monohydrate, USP, 0.18%; Sodium Chloride, USP, 0.15%; Disodium Edetate, USP, 0.11%; Butylated Hydroxytoluene (BHT), NF, 0.002%; Water for Injection, USP, QS

Doxercalciferol Injection
   
 4 mcg/2 mL (2 mcg/mL)
   
**50 x 2 mL Multi-Dose Vials.**

**Store unopened vial in original carton; discard vial 14 days after opening**



**DOXERCALCIFEROL**  
doxercalciferol injection, solution

Product Information				
Product Type	HUMAN PRESCRIPTION DRUG	Item Code (Source)	NDC:0409-1331	
Route of Administration	INTRAVENOUS			
Active Ingredient/Active Moiety				
	Ingredient Name	Basis of Strength	Strength	
	DOXERCALCIFEROL (UNII: 3DIZ9LF5Y9) (DOXERCALCIFEROL - UNII:3DIZ9LF5Y9)	DOXERCALCIFEROL	2 ug in 1 mL	
Inactive Ingredients				
	Ingredient Name	Strength		
	ALCOHOL (UNII: 3K9958V90M)	0.078 mL in 1 mL		
	POLYSORBATE 20 (UNII: 7T1F30V5YH)	10 mg in 1 mL		
	SODIUM CHLORIDE (UNII: 451W47IQ8X)	1.5 mg in 1 mL		
	BUTYLATED HYDROXYTOLUENE (UNII: 1P9D0Z171K)	0.02 mg in 1 mL		
	SODIUM PHOSPHATE, DIBASIC, HEPTAHYDRATE (UNII: 70WT22SF4B)	14.4 mg in 1 mL		
	SODIUM PHOSPHATE, MONOBASIC, MONOHYDRATE (UNII: 593YOG76RN)	1.8 mg in 1 mL		
	EDETATE DISODIUM (UNII: 7FLD91C86K)	1.1 mg in 1 mL		
	WATER (UNII: 059QF0K00R)			
Packaging				
#	Item Code	Package Description	Marketing Start Date	Marketing End Date
1	NDC:0409-1331-01	50 in 1 CARTON	10/24/2019	10/24/2019
1	NDC:0409-1331-11	5 mL in 1 VIAL, MULTI-DOSE; Type 0: Not a Combination Product		
Marketing Information				
Marketing Category	Application Number or Monograph Citation	Marketing Start Date	Marketing End Date	
NDA	NDA208614	10/24/2019	10/24/2019	

DOXERCALCIFEROL			
doxercalciferol injection, solution			
Product Information			
Product Type	HUMAN PRESCRIPTION DRUG	Item Code (Source)	NDC:0409-1330
Route of Administration	INTRAVENOUS		
Active Ingredient/Active Moiety			
	Ingredient Name	Basis of Strength	Strength

<b>DOXERCALCIFEROL</b> (UNII: 3DIZ9LF5Y9) (DOXERCALCIFEROL - UNII:3DIZ9LF5Y9)		<b>DOXERCALCIFEROL</b>	2 ug in 1 mL	
<b>Inactive Ingredients</b>				
<b>Ingredient Name</b>			<b>Strength</b>	
ALCOHOL (UNII: 3K9958V90M)			0.078 mL in 1 mL	
POLYSORBATE 20 (UNII: 7T1F30V5YH)			10 mg in 1 mL	
SODIUM CHLORIDE (UNII: 451W47IQ8X)			1.5 mg in 1 mL	
BUTYLATED HYDROXYTOLUENE (UNII: 1P9D0Z171K)			0.02 mg in 1 mL	
SODIUM PHOSPHATE, DIBASIC, HEPTAHYDRATE (UNII: 70WT22SF4B)			14.4 mg in 1 mL	
SODIUM PHOSPHATE, MONOBASIC, MONOHYDRATE (UNII: 593YOG76RN)			1.8 mg in 1 mL	
EDETATE DISODIUM (UNII: 7FLD91C86K)			1.1 mg in 1 mL	
WATER (UNII: 059QF0KO0R)				
<b>Packaging</b>				
<b>#</b>	<b>Item Code</b>	<b>Package Description</b>	<b>Marketing Start Date</b>	<b>Marketing End Date</b>
1	NDC:0409-1330-01	50 in 1 CARTON	10/24/2019	
1	NDC:0409-1330-11	2 mL in 1 VIAL, MULTI-DOSE; Type 0: Not a Combination Product		
<b>Marketing Information</b>				
<b>Marketing Category</b>		<b>Application Number or Monograph Citation</b>	<b>Marketing Start Date</b>	<b>Marketing End Date</b>
NDA		NDA208614	10/24/2019	

**Labeler** - Hospira, Inc. (141588017)

### Establishment

Name	Address	ID/FEI	Business Operations
Hospira, Inc.		030606222	ANALYSIS(0409-1330, 0409-1331), LABEL(0409-1330, 0409-1331), MANUFACTURE(0409-1330, 0409-1331), PACK(0409-1330, 0409-1331)

### Establishment

Name	Address	ID/FEI	Business Operations
Hospira, Inc.		093132819	ANALYSIS(0409-1330, 0409-1331), LABEL(0409-1330, 0409-1331), MANUFACTURE(0409-1330, 0409-1331), PACK(0409-1330, 0409-1331)