

**ITRACONAZOLE- itraconazole capsule
AvPAK**

Itraconazole Capsules

(100 mg)

Rx Only

BOXED WARNING

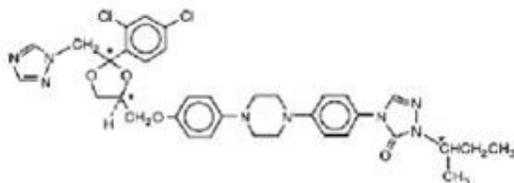
Congestive Heart Failure, Cardiac Effects and Drug Interactions:

Itraconazole capsules should not be administered for the treatment of onychomycosis in patients with evidence of ventricular dysfunction such as congestive heart failure (CHF) or a history of CHF. If signs or symptoms of congestive heart failure occur during administration of itraconazole capsules, discontinue administration. When itraconazole was administered intravenously to dogs and healthy human volunteers, negative inotropic effects were seen (see **CONTRAINDICATIONS, WARNINGS, PRECAUTIONS: Drug Interactions, ADVERSE REACTIONS: Post-marketing Experience, and CLINICAL PHARMACOLOGY: Special Populations** for more information).

Drug Interactions: Co-administration of the following drugs are contraindicated with itraconazole capsules: methadone, disopyramide, dofetilide, dronedarone, quinidine, ergot alkaloids (such as dihydroergotamine, ergometrine (ergonovine), ergotamine, methylergometrine (methylergonovine)), irinotecan, lurasidone, oral midazolam, pimozide, triazolam, felodipine, nisoldipine, ivabradine, ranolazine, eplerenone, cisapride, lovastatin, simvastatin, ticagrelor and, in subjects with varying degrees of renal or hepatic impairment, colchicine, fesoterodine, telithromycin and solifenacin (see **PRECAUTIONS: Drug Interactions Section for specific examples). Co-administration with itraconazole can cause elevated plasma concentrations of these drugs and may increase or prolong both the pharmacologic effects and/or adverse reactions to these drugs. For example, increased plasma concentrations of some of these drugs can lead to QT prolongation and ventricular tachyarrhythmias including occurrences of torsades de pointes, a potentially fatal arrhythmia (see **CONTRAINDICATIONS** and **WARNINGS** Sections, and **PRECAUTIONS: Drug Interactions** Section for specific examples).**

DESCRIPTION

Itraconazole, USP is an azole antifungal agent. Itraconazole, USP is a 1:1:1:1 racemic mixture of four diastereomers (two enantiomeric pairs), each possessing three chiral centers. It may be represented by the following structural formula and nomenclature:



(±)-1-[(*R**)-*sec*-butyl]-4-[*p*-[4-[*p*-[[2(*R**,4*S**)-2-(2,4-dichlorophenyl)-2-(1*H*-1,2,4-triazol-1-ylmethyl)-1,3-dioxolan-4-yl]methoxy]phenyl]-1-piperazinyl]phenyl]-Δ²-1,2,4-triazolin-5-one mixture with (±)-1-[(*R**)-*sec*-butyl]-4-[*p*-[4-[*p*-[[2(*S**,4*R**)-2-(2,4-dichlorophenyl)-2-(1*H*-1,2,4-triazol-1-ylmethyl)-1,3-dioxolan-4-yl]methoxy]phenyl]-1-piperazinyl]phenyl]-Δ²-1,2,4-triazolin-5-one

or

(±)-1-[(*RS*)-*sec*-butyl]-4-[*p*-[4-[*p*-[[2(*R*,4*S*)-2-(2,4-dichlorophenyl)-2-(1*H*-1,2,4-triazol-1-ylmethyl)-1,3-dioxolan-4-yl]methoxy]phenyl]-1-piperazinyl]phenyl]-Δ²-1,2,4-triazolin-5-one

Itraconazole, USP has a molecular formula of C₃₅H₃₈Cl₂N₈O₄ and a molecular weight of 705.64. It is a white or almost white powder. It is insoluble in water, very slightly soluble in alcohols, and freely soluble in dichloromethane. It has a pKa of 3.70 (based on extrapolation of values obtained from methanolic solutions) and a log (n-octanol/water) partition coefficient of 5.66 at pH 8.1.

Itraconazole capsules contain 100 mg of itraconazole, USP coated on sugar spheres. Inactive ingredients are black iron oxide, FD&C Blue No. 1, gelatin, hypromellose, liquid glucose, microcrystalline cellulose, polyethylene glycol, potassium hydroxide, propylene glycol, shellac, sodium lauryl sulfate, starch (of maize), strong ammonia solution, sucrose and titanium dioxide.

CLINICAL PHARMACOLOGY

Pharmacokinetics and Metabolism:

General Pharmacokinetic Characteristics

Peak plasma concentrations of itraconazole are reached within 2 to 5 hours following oral administration. As a consequence of non-linear pharmacokinetics, itraconazole accumulates in plasma during multiple dosing. Steady-state concentrations are generally reached within about 15 days, with C_{max} values of 0.5 mcg/ml, 1.1 mcg/ml and 2 mcg/ml after oral administration of 100 mg once daily, 200 mg once daily and 200 mg b.i.d., respectively. The terminal half-life of itraconazole generally ranges from 16 to 28 hours after single dose and increases to 34 to 42 hours with repeated dosing. Once treatment is stopped, itraconazole plasma concentrations decrease to an almost undetectable concentration within 7 to 14 days, depending on the dose and duration of treatment. Itraconazole mean total plasma clearance following intravenous administration is 278 ml/min. Itraconazole clearance decreases at higher doses due to saturable hepatic metabolism.

Absorption

Itraconazole is rapidly absorbed after oral administration. Peak plasma concentrations of itraconazole are reached within 2 to 5 hours following an oral capsule dose. The observed absolute oral bioavailability of itraconazole is about 55%.

The oral bioavailability of itraconazole is maximal when itraconazole capsules are taken immediately after a full meal. Absorption of itraconazole capsules is reduced in subjects

with reduced gastric acidity, such as subjects taking medications known as gastric acid secretion suppressors (e.g., H₂-receptor antagonists, proton pump inhibitors) or subjects with achlorhydria caused by certain diseases (see **PRECAUTIONS: Drug Interactions**). Absorption of itraconazole under fasted conditions in these subjects is increased when itraconazole capsules are administered with an acidic beverage (such as a non-diet cola). When itraconazole capsules were administered as a single 200-mg dose under fasted conditions with non-diet cola after ranitidine pretreatment, a H₂-receptor antagonist, itraconazole absorption was comparable to that observed when itraconazole capsules were administered alone (see **PRECAUTIONS: Drug Interactions**).

Itraconazole exposure is lower with the capsule formulation than with the oral solution when the same dose of drug is given (see **WARNINGS**).

Distribution

Most of the itraconazole in plasma is bound to protein (99.8%), with albumin being the main binding component (99.6% for the hydroxy-metabolite). It has also a marked affinity for lipids. Only 0.2% of the itraconazole in plasma is present as free drug. Itraconazole is distributed in a large apparent volume in the body (>700 L), suggesting extensive distribution into tissues. Concentrations in lung, kidney, liver, bone, stomach, spleen and muscle were found to be two to three times higher than corresponding concentrations in plasma, and the uptake into keratinous tissues, skin in particular, up to four times higher. Concentrations in the cerebrospinal fluid are much lower than in plasma.

Metabolism

Itraconazole is extensively metabolized by the liver into a large number of metabolites. *In vitro* studies have shown that CYP3A4 is the major enzyme involved in the metabolism of itraconazole. The main metabolite is hydroxy-itraconazole, which has *in vitro* antifungal activity comparable to itraconazole; trough plasma concentrations of this metabolite are about twice those of itraconazole.

Excretion

Itraconazole is excreted mainly as inactive metabolites in urine (35%) and in feces (54%) within one week of an oral solution dose. Renal excretion of itraconazole and the active metabolite hydroxy-itraconazole account for less than 1% of an intravenous dose. Based on an oral radiolabeled dose, fecal excretion of unchanged drug ranges from 3% to 18% of the dose.

As re-distribution of itraconazole from keratinous tissues appears to be negligible, elimination of itraconazole from these tissues is related to epidermal regeneration. Contrary to plasma, the concentration in skin persists for 2 to 4 weeks after discontinuation of a 4-week treatment and in nail keratin - where itraconazole can be detected as early as 1 week after start of treatment - for at least six months after the end of a 3-month treatment period.

Special Populations:

Renal Impairment:

Limited data are available on the use of oral itraconazole in patients with renal impairment. A pharmacokinetic study using a single 200-mg oral dose of itraconazole was conducted in three groups of patients with renal impairment (uremia: n=7; hemodialysis: n=7; and continuous ambulatory peritoneal dialysis: n=5). In uremic subjects with a mean creatinine clearance of 13 mL/min. × 1.73 m², the exposure, based on AUC, was slightly reduced compared with normal population parameters. This study did not demonstrate any significant effect of hemodialysis or continuous ambulatory peritoneal dialysis on the pharmacokinetics of itraconazole (T_{max}, C_{max},

and AUC_{0-8h}). Plasma concentration-versus-time profiles showed wide intersubject variation in all three groups. After a single intravenous dose, the mean terminal half-lives of itraconazole in patients with mild (defined in this study as CrCl 50 to 79 ml/min), moderate (defined in this study as CrCl 20 to 49 ml/min), and severe renal impairment (defined in this study as CrCl <20 ml/min) were similar to that in healthy subjects (range of means 42 to 49 hours vs 48 hours in renally impaired patients and healthy subjects, respectively). Overall exposure to itraconazole, based on AUC, was decreased in patients with moderate and severe renal impairment by approximately 30% and 40%, respectively, as compared with subjects with normal renal function. Data are not available in renally impaired patients during long-term use of itraconazole. Dialysis has no effect on the half-life or clearance of itraconazole or hydroxy-itraconazole (see **PRECAUTIONS and DOSAGE AND ADMINISTRATION**).

Hepatic Impairment:

Itraconazole is predominantly metabolized in the liver. A pharmacokinetic study was conducted in 6 healthy and 12 cirrhotic subjects who were administered a single 100-mg dose of itraconazole as capsule. A statistically significant reduction in mean C_{max} (47%) and a twofold increase in the elimination half-life (37 ± 17 hours vs. 16 ± 5 hours) of itraconazole were noted in cirrhotic subjects compared with healthy subjects. However, overall exposure to itraconazole, based on AUC, was similar in cirrhotic patients and in healthy subjects. Data are not available in cirrhotic patients during long-term use of itraconazole (see **CONTRAINDICATIONS, PRECAUTIONS: Drug Interactions and DOSAGE AND ADMINISTRATION**).

Decreased Cardiac Contractility:

When itraconazole was administered intravenously to anesthetized dogs, a dose-related negative inotropic effect was documented. In a healthy volunteer study of itraconazole intravenous infusion, transient, asymptomatic decreases in left ventricular ejection fraction were observed using gated SPECT imaging; these resolved before the next infusion, 12 hours later. If signs or symptoms of congestive heart failure appear during administration of itraconazole capsules, itraconazole should be discontinued (see **BOXED WARNING, CONTRAINDICATIONS, WARNINGS, PRECAUTIONS: Drug Interactions and ADVERSE REACTIONS: Post-marketing Experience** for more information).

MICROBIOLOGY

Mechanism of Action:

In vitro studies have demonstrated that itraconazole inhibits the cytochrome P450-dependent synthesis of ergosterol, which is a vital component of fungal cell membranes.

Antimicrobial Activity:

Itraconazole exhibits in vitro activity against *Blastomyces dermatitidis*, *Histoplasma capsulatum*, *Histoplasma duboisii*, *Aspergillus flavus*, *Aspergillus fumigatus*, and *Trichophyton* species (see **INDICATIONS AND USAGE: Description of Clinical Studies**).

Susceptibility Testing Methods:

For specific information regarding susceptibility test interpretive criteria and associated test methods and quality control standards recognized by FDA for this drug, please see: <https://www.fda.gov/STIC>.

Resistance:

Isolates from several fungal species with decreased susceptibility to itraconazole have been isolated in vitro and from patients receiving prolonged therapy.

Itraconazole is not active against Zygomycetes (e.g., *Rhizopus* spp., *Rhizomucor* spp.,

Mucor spp. and Absidia spp.), Fusarium spp., Scedosporium spp. and Scopulariopsis spp.

Cross-resistance:

Several in vitro studies have reported that some fungal clinical isolates with reduced susceptibility to one azole antifungal agent may also be less susceptible to other azole derivatives. The finding of cross-resistance is dependent on a number of factors, including the species evaluated, its clinical history, the particular azole compounds compared, and the type of susceptibility test that is performed.

Studies (both in vitro and in vivo) suggest that the activity of amphotericin B may be suppressed by prior azole antifungal therapy. As with other azoles, itraconazole inhibits the 14C-demethylation step in the synthesis of ergosterol, a cell wall component of fungi. Ergosterol is the active site for amphotericin B. In one study the antifungal activity of amphotericin B against *Aspergillus fumigatus* infections in mice was inhibited by ketoconazole therapy. The clinical significance of test results obtained in this study is unknown.

INDICATIONS AND USAGE

Itraconazole capsules are indicated for the treatment of the following fungal infections in immunocompromised and non-immunocompromised patients:

1. Blastomycosis, pulmonary and extrapulmonary
2. Histoplasmosis, including chronic cavitary pulmonary disease and disseminated, non-meningeal histoplasmosis, and
3. Aspergillosis, pulmonary and extrapulmonary, in patients who are intolerant of or who are refractory to amphotericin B therapy.

Specimens for fungal cultures and other relevant laboratory studies (wet mount, histopathology, serology) should be obtained before therapy to isolate and identify causative organisms. Therapy may be instituted before the results of the cultures and other laboratory studies are known; however, once these results become available, antiinfective therapy should be adjusted accordingly.

Itraconazole capsules are also indicated for the treatment of the following fungal infections in non-immunocompromised patients:

1. Onychomycosis of the toenail, with or without fingernail involvement, due to dermatophytes (tinea unguium), and
2. Onychomycosis of the fingernail due to dermatophytes (tinea unguium).

Prior to initiating treatment, appropriate nail specimens for laboratory testing (KOH preparation, fungal culture, or nail biopsy) should be obtained to confirm the diagnosis of onychomycosis (see **CLINICAL PHARMACOLOGY: Special Populations, CONTRAINDICATIONS, WARNINGS, and ADVERSE REACTIONS: Post-marketing Experience** for more information).

Description of Clinical Studies:

Blastomycosis:

Analyses were conducted on data from two open-label, non-concurrently controlled studies (N=73 combined) in patients with normal or abnormal immune status. The median dose was 200 mg/day. A response for most signs and symptoms was observed within the first 2 weeks, and all signs and symptoms cleared between 3 and 6 months. Results of these two studies demonstrated substantial evidence of the effectiveness of itraconazole for the treatment of blastomycosis compared with the natural history of

untreated cases.

Histoplasmosis:

Analyses were conducted on data from two open-label, non-concurrently controlled studies (N=34 combined) in patients with normal or abnormal immune status (not including HIV-infected patients). The median dose was 200 mg/day. A response for most signs and symptoms was observed within the first 2 weeks, and all signs and symptoms cleared between 3 and 12 months. Results of these two studies demonstrated substantial evidence of the effectiveness of itraconazole for the treatment of histoplasmosis, compared with the natural history of untreated cases.

Histoplasmosis in HIV-infected patients:

Data from a small number of HIV-infected patients suggested that the response rate of histoplasmosis in HIV-infected patients is similar to that of non-HIV-infected patients. The clinical course of histoplasmosis in HIV-infected patients is more severe and usually requires maintenance therapy to prevent relapse.

Aspergillosis:

Analyses were conducted on data from an open-label, "single-patient-use" protocol designed to make itraconazole available in the U.S. for patients who either failed or were intolerant of amphotericin B therapy (N=190). The findings were corroborated by two smaller open-label studies (N=31 combined) in the same patient population. Most adult patients were treated with a daily dose of 200 to 400 mg, with a median duration of 3 months. Results of these studies demonstrated substantial evidence of effectiveness of itraconazole as a second-line therapy for the treatment of aspergillosis compared with the natural history of the disease in patients who either failed or were intolerant of amphotericin B therapy.

Onychomycosis of the toenail:

Analyses were conducted on data from three double-blind, placebo-controlled studies (N=214 total; 110 given itraconazole capsules) in which patients with onychomycosis of the toenails received 200 mg of itraconazole capsules once daily for 12 consecutive weeks. Results of these studies demonstrated mycologic cure, defined as simultaneous occurrence of negative KOH plus negative culture, in 54% of patients. Thirty-five percent (35%) of patients were considered an overall success (mycologic cure plus clear or minimal nail involvement with significantly decreased signs) and 14% of patients demonstrated mycologic cure plus clinical cure (clearance of all signs, with or without residual nail deformity). The mean time to overall success was approximately 10 months. Twenty-one percent (21%) of the overall success group had a relapse (worsening of the global score or conversion of KOH or culture from negative to positive).

Onychomycosis of the fingernail:

Analyses were conducted on data from a double-blind, placebo-controlled study (N=73 total; 37 given itraconazole capsules) in which patients with onychomycosis of the fingernails received a 1-week course of 200 mg of itraconazole capsules b.i.d., followed by a 3-week period without itraconazole capsules, which was followed by a second 1-week course of 200 mg of itraconazole capsules b.i.d. Results demonstrated mycologic cure in 61% of patients. Fifty-six percent (56%) of patients were considered an overall success and 47% of patients demonstrated mycologic cure plus clinical cure. The mean time to overall success was approximately 5 months. None of the patients who achieved overall success relapsed.

CONTRAINDICATIONS

Congestive Heart Failure:

Itraconazole capsules should not be administered for the treatment of onychomycosis in patients with evidence of ventricular dysfunction such as congestive heart failure (CHF) or a history of CHF (see **BOXED WARNING, WARNINGS, PRECAUTIONS: Drug Interactions-Calcium Channel Blockers, ADVERSE REACTIONS: Post-marketing Experience, and CLINICAL PHARMACOLOGY: Special Populations**).

Drug Interactions:

Co-administration of a number of CYP3A4 substrates are contraindicated with itraconazole. Plasma concentrations increase for the following drugs: methadone, disopyramide, dofetilide, dronedarone, quinidine, ergot alkaloids (such as dihydroergotamine, ergometrine (ergonovine), ergotamine, methylergometrine (methylergonovine)), irinotecan, lurasidone, oral midazolam, pimozide, triazolam, felodipine, nisoldipine, ivabradine, ranolazine, eplerenone, cisapride, lovastatin, simvastatin, ticagrelor, and, in subjects with varying degrees of renal or hepatic impairment, colchicine, fesoterodine, telithromycin and solifenacin (see **PRECAUTIONS: Drug Interactions Section** for specific examples). This increase in drug concentrations caused by co-administration with itraconazole may increase or prolong both the pharmacologic effect and/or adverse reactions to these drugs. For example, increased plasma concentrations of some of these drugs can lead to QT prolongation and ventricular tachyarrhythmias including occurrences of torsade de pointes, a potentially fatal arrhythmia. Specific examples are listed in **PRECAUTIONS: Drug Interactions**.

Itraconazole should not be administered for the treatment of onychomycosis to pregnant patients or to women contemplating pregnancy.

Itraconazole capsules are contraindicated for patients who have shown hypersensitivity to itraconazole. There is limited information regarding cross-hypersensitivity between itraconazole and other azole antifungal agents. Caution should be used when prescribing itraconazole capsules to patients with hypersensitivity to other azoles.

WARNINGS

Hepatic Effects:

Itraconazole has been associated with rare cases of serious hepatotoxicity, including liver failure and death. Some of these cases had neither pre-existing liver disease nor a serious underlying medical condition, and some of these cases developed within the first week of treatment. If clinical signs or symptoms develop that are consistent with liver disease, treatment should be discontinued and liver function testing performed. Continued itraconazole use or reinstatement of treatment with itraconazole is strongly discouraged unless there is a serious or life-threatening situation where the expected benefit exceeds the risk (see PRECAUTIONS: Information for Patients and ADVERSE REACTIONS).

Cardiac Dysrhythmias:

Life-threatening cardiac dysrhythmias and/or sudden death have occurred in patients using drugs such as cisapride, pimozide, methadone, or quinidine concomitantly with itraconazole and/or other CYP3A4 inhibitors. Concomitant administration of these drugs with itraconazole is contraindicated (see **BOXED WARNING, CONTRAINDICATIONS, and PRECAUTIONS: Drug Interactions**).

Cardiac Disease:

Itraconazole capsules should not be administered for the treatment of onychomycosis in patients with evidence of ventricular dysfunction such as congestive heart failure (CHF) or a history of CHF. Itraconazole capsules should not be used for other indications in patients with evidence of ventricular dysfunction unless the benefit clearly outweighs the risk.

For patients with risk factors for congestive heart failure, physicians should carefully review the risks and benefits of itraconazole therapy. These risk factors include cardiac disease such as ischemic and valvular disease; significant pulmonary disease such as chronic obstructive pulmonary disease; and renal failure and other edematous disorders. Such patients should be informed of the signs and symptoms of CHF, should be treated with caution, and should be monitored for signs and symptoms of CHF during treatment. If signs or symptoms of CHF appear during administration of itraconazole capsules, discontinue administration.

Itraconazole has been shown to have a negative inotropic effect. When itraconazole was administered intravenously to anesthetized dogs, a dose-related negative inotropic effect was documented. In a healthy volunteer study of itraconazole intravenous infusion, transient, asymptomatic decreases in left ventricular ejection fraction were observed using gated SPECT imaging; these resolved before the next infusion, 12 hours later.

Itraconazole has been associated with reports of congestive heart failure. In post-marketing experience, heart failure was more frequently reported in patients receiving a total daily dose of 400 mg although there were also cases reported among those receiving lower total daily doses.

Calcium channel blockers can have negative inotropic effects which may be additive to those of itraconazole. In addition, itraconazole can inhibit the metabolism of calcium channel blockers. Therefore, caution should be used when co-administering itraconazole and calcium channel blockers due to an increased risk of CHF. Concomitant administration of itraconazole and felodipine or nisoldipine is contraindicated.

Cases of CHF, peripheral edema, and pulmonary edema have been reported in the post-marketing period among patients being treated for onychomycosis and/or systemic fungal infections (see **CLINICAL PHARMACOLOGY: Special Populations, CONTRAINDICATIONS, PRECAUTIONS: Drug Interactions, and ADVERSE REACTIONS: Post-marketing Experience** for more information).

Pseudoaldosteronism:

Pseudoaldosteronism, manifested by the onset of hypertension or worsening of hypertension, and abnormal laboratory findings (hypokalemia, low serum renin and aldosterone, and elevated 11-deoxycortisol), has been reported with itraconazole use in the postmarketing setting. Monitor blood pressure and potassium levels and manage as necessary. Management of pseudoaldosteronism may include discontinuation of itraconazole, substitution with an appropriate antifungal drug that is not associated with pseudoaldosteronism, or use of aldosterone receptor antagonists.

Interaction potential:

Itraconazole has a potential for clinically important drug interactions. Co-administration of specific drugs with itraconazole may result in changes in efficacy of itraconazole and/or the co-administered drug, life-threatening effects and/or sudden death. Drugs that are contraindicated, not recommended or recommended for use with caution in combination with itraconazole are listed in **PRECAUTIONS: Drug Interactions**.

Interchangeability:

Itraconazole capsules and itraconazole oral solution should not be used interchangeably. This is because drug exposure is greater with the Oral Solution than with the Capsules when the same dose of drug is given. In addition, the topical effects of mucosal exposure may be different between the two formulations. Only the oral solution has been demonstrated effective for oral and/or esophageal candidiasis.

PRECAUTIONS

General:

Itraconazole capsules should be administered after a full meal (see **CLINICAL PHARMACOLOGY: Pharmacokinetics and Metabolism**) .

Under fasted conditions, itraconazole absorption was decreased in the presence of decreased gastric acidity. The absorption of itraconazole may be decreased with the concomitant administration of antacids or gastric acid secretion suppressors. Studies conducted under fasted conditions demonstrated that administration with 8 ounces of a non-diet cola beverage resulted in increased absorption of itraconazole in AIDS patients with relative or absolute achlorhydria. This increase relative to the effects of a full meal is unknown (see **CLINICAL PHARMACOLOGY: Pharmacokinetics and Metabolism**) .

Hepatotoxicity:

Rare cases of serious hepatotoxicity have been observed with itraconazole treatment, including some cases within the first week. It is recommended that liver function monitoring be considered in all patients receiving itraconazole. Treatment should be stopped immediately and liver function testing should be conducted in patients who develop signs and symptoms suggestive of liver dysfunction.

Neuropathy:

If neuropathy occurs that may be attributable to itraconazole capsules, the treatment should be discontinued.

Immunocompromised Patients:

In some immunocompromised patients (e.g., neutropenic, AIDS or organ transplant patients), the oral bioavailability of itraconazole capsules may be decreased. Therefore, the dose should be adjusted based on the clinical response in these patients.

Cystic Fibrosis:

If a cystic fibrosis patient does not respond to itraconazole capsules, consideration should be given to switching to alternative therapy. For more information concerning the use of itraconazole in cystic fibrosis patients see the prescribing information for itraconazole oral solution.

Hearing Loss:

Transient or permanent hearing loss has been reported in patients receiving treatment with itraconazole. Several of these reports included concurrent administration of quinidine which is contraindicated (see **BOXED WARNING: Drug Interactions, CONTRAINDICATIONS: Drug Interactions and PRECAUTIONS: Drug Interactions**). The hearing loss usually resolves when treatment is stopped, but can persist in some patients.

Information for Patients:

- The topical effects of mucosal exposure may be different between the itraconazole capsules and oral solution. Only the oral solution has been demonstrated effective for oral and/or esophageal candidiasis. Itraconazole capsules should not be used interchangeably with itraconazole oral solution.

- Instruct patients to take itraconazole capsules with a full meal. Itraconazole capsules must be swallowed whole.
- Instruct patients about the signs and symptoms of congestive heart failure, and if these signs or symptoms occur during itraconazole administration, they should discontinue itraconazole and contact their healthcare provider immediately.
- Instruct patients to stop itraconazole treatment immediately and contact their healthcare provider if any signs and symptoms suggestive of liver dysfunction develop. Such signs and symptoms may include unusual fatigue, anorexia, nausea and/or vomiting, jaundice, dark urine, or pale stools.
- Instruct patients to contact their physician before taking any concomitant medications with itraconazole to ensure there are no potential drug interactions.
- Instruct patients that hearing loss can occur with the use of itraconazole. The hearing loss usually resolves when treatment is stopped, but can persist in some patients. Advise patients to discontinue therapy and inform their physicians if any hearing loss symptoms occur.
- Instruct patients that dizziness or blurred/double vision can sometimes occur with itraconazole. Advise patients that if they experience these events, they should not drive or use machines.

Drug Interactions:

Effect of Itraconazole on Other Drugs

Itraconazole and its major metabolite, hydroxy-itraconazole, are potent CYP3A4 inhibitors. Itraconazole is an inhibitor of the drug transporters P-glycoprotein and breast cancer resistance protein (BCRP). Consequently, itraconazole has the potential to interact with many concomitant drugs resulting in either increased or sometimes decreased concentrations of the concomitant drugs. Increased concentrations may increase the risk of adverse reactions associated with the concomitant drug which can be severe or life-threatening in some cases (e.g., QT prolongation, torsade de pointes, respiratory depression, hepatic adverse reactions, hypersensitivity reactions, myelosuppression, hypotension, seizures, angioedema, atrial fibrillation, bradycardia, priapism). Reduced concentrations of concomitant drugs may reduce their efficacy. Table 1 lists examples of drugs that may have their concentrations affected by itraconazole, but it is not a comprehensive list.

Refer to the approved product labeling to become familiar with the interaction pathways, risk potential, and specific actions to be taken with regards to each concomitant drug prior to initiating therapy with itraconazole.

Although many of the clinical drug interactions in Table 1 are based on information with a similar azole antifungal, ketoconazole, these interactions are expected to occur with itraconazole.

Table 1: Drugs Interactions with Itraconazole that Affect Concomitant Drug Concentrations

Drug Class	Contraindicated	Not Recommended	Use with Caution	Comments
		<i>It is recommended that the use of the drug be avoided during and up to two weeks after</i>		

	<p><i>Under no circumstances is the drug to be co-administered with itraconazole, and up to two weeks after discontinuation of treatment with itraconazole.</i></p>	<p><i>discontinuation of treatment with itraconazole, unless the benefits outweigh the potentially increased risks of side effects. If co-administration cannot be avoided, clinical monitoring for signs or symptoms of increased or prolonged effects or side effects of the interacting drug is recommended, and its dosage be reduced or interrupted as deemed necessary. When appropriate, it is recommended that plasma concentrations be measured. The label of the co-administered drug should be consulted for information on dose adjustment and adverse effects.</i></p>	<p><i>Careful monitoring is recommended when the drug is co-administered with itraconazole. Upon co-administration, it is recommended that patients be monitored closely for signs or symptoms of increased or prolonged effects or side effects of the interacting drug, and its dosage be reduced as deemed necessary. When appropriate, it is recommended that plasma concentrations be measured. The label of the co-administered drug should be consulted for information on dose adjustment and adverse effects.</i></p>	
Alpha Blockers		tamsulosin		
				<p>Methadone: The potential increase in plasma concentrations of methadone when co-administered with itraconazole may increase the risk of serious cardiovascular</p>

Analgesics	methadone		alfentanil, buprenorphine IV and sublingual, fentanyl, oxycodone, sufentanil	<p>events including QTc prolongation and <i>torsade de pointes</i>.</p> <p>Fentanyl: The potential increase in plasma concentrations of fentanyl when co-administered with itraconazole may increase the risk of potentially fatal respiratory depression.</p> <p>Sufentanil: No human pharmacokinetic data of an interaction with itraconazole are available. <i>In vitro</i> data suggest that sufentanil is metabolized by CYP3A4 and so potentially increased sufentanil plasma concentrations would be expected when co-administered with itraconazole.</p>
Antiarrhythmics	disopyramide, dofetilide, dronedarone, quinidine		digoxin	<p>Disopyramide, dofetilide, dronedarone, quinidine: The potential increase in plasma concentrations of these drugs when co-administered with itraconazole may increase the risk of serious cardiovascular events including QTc prolongation.</p>
				<p>Telithromycin: The potential increase in plasma concentrations of telithromycin in</p>

Antibacterials	telithromycin, in subjects with severe renal impairment or severe hepatic impairment	rifabutin	telithromycin	<p>subjects with severe renal impairment or severe hepatic impairment, when co-administered with itraconazole may increase the risk of serious cardiovascular events including QT prolongation and torsade de pointes.</p> <p>Rifabutin: See also under 'Drugs that may decrease itraconazole plasma concentrations'.</p>
Anticoagulants and Antiplatelet Drugs	ticagrelor	apixaban, rivaroxaban	coumarins, cilostazol, dabigatran	<p>Ticagrelor: The potential increase in plasma concentrations of ticagrelor may increase the risk of bleeding.</p> <p>Coumarins: Itraconazole may enhance the anticoagulant effect of coumarin-like drugs, such as warfarin.</p>
Anticonvulsants		carbamazepine		<p>Carbamazepine: <i>In vivo</i> studies have demonstrated an increase in plasma carbamazepine concentrations in subjects concomitantly receiving ketoconazole. Although there are no data regarding the effect of itraconazole on carbamazepine metabolism, because of the similarities between ketoconazole and itraconazole, concomitant administration of</p>

				itraconazole and carbamazepine may inhibit the metabolism of carbamazepine. See also under 'Drugs that may decrease itraconazole plasma concentrations'.
Antidiabetics			repaglinide, saxagliptin	
Antihelmintics and Antiprotozoals			praziquantel	
Antimigraine Drugs	ergot alkaloids, such as dihydroergotamine, ergometrine (ergonovine), ergotamine, methylergometrine (methylergonovine)		eletriptan	Ergot Alkaloids: The potential increase in plasma concentrations of ergot alkaloids when co-administered with itraconazole may increase the risk of ergotism, ie. a risk for vasospasm potentially leading to cerebral ischemia and/or ischemia of the extremities.
Antineoplastics	irinotecan	axitinib, dabrafenib, dasatinib, ibrutinib, nilotinib, sunitinib, trabectedin	bortezomib, busulphan, docetaxel, erlotinib, gefitinib, imatinib, ixabepilone, lapatinib, ponatinib, trimetrexate, vinca alkaloids	Irinotecan: The potential increase in plasma concentrations of irinotecan when co-administered with itraconazole may increase the risk of potentially fatal adverse events.
			alprazolam, aripiprazole,	Midazolam, triazolam: Co-administration of itraconazole and oral midazolam, or triazolam may cause several-fold increases in plasma concentrations of these drugs. This may potentiate and prolong hypnotic and sedative

Antipsychotics, Anxiolytics and Hypnotics	lurasidone, oral midazolam, pimozide, triazolam		buspirone, diazepam, haloperidol, midazolam IV, perospirone, quetiapine, ramelteon, risperidone	effects, especially with repeated dosing or chronic administration of these agents. Pimozide: The potential increase in plasma concentrations of pimozide when co- administered with itraconazole may increase the risk of serious cardiovascular events including QTc prolongation and <i>torsade de pointes</i> .
Antivirals		simeprevir	maraviroc, indinavir, ritonavir, saquinavir	Indinavir, ritonavir: See also under 'Drugs that may increase itraconazole plasma concentrations'.
Beta Blockers			nadolol	
Calcium Channel Blockers	felodipine, nisoldipine		other dihydropyridines, verapamil	Calcium channel blockers can have a negative inotropic effect which may be additive to those of itraconazole. The potential increase in plasma concentrations of calcium channel blockers when co- administered with itraconazole may increase the risk of congestive heart failure. Dihydropyridines: Concomitant administration of itraconazole may cause several-fold increases in plasma concentrations of dihydropyridines. Edema has been reported in patients concomitantly receiving

				itraconazole and dihydropyridine calcium channel blockers.
Cardiovascular Drugs, Miscellaneous	Ivabradine, ranolazine	aliskiren, sildenafil, for the treatment of pulmonary hypertension	bosentan, riociguat	Ivabradine: The potential increase in plasma concentrations of ivabradine when co-administered with itraconazole may increase the risk of ivabradine-related adverse events, such as atrial fibrillation, bradycardia, sinus arrest and heart block. Ranolazine: The potential increase in plasma concentrations of ranolazine when co-administered with itraconazole may increase the risk of serious cardiovascular events including QTc prolongation.
Diuretics	eplerenone			Eplerenone: The potential increase in plasma concentrations of eplerenone when co-administered with itraconazole may increase the risk of hyperkalemia and hypotension.
Gastrointestinal Drugs	cisapride		aprepitant	Cisapride: The potential increase in plasma concentrations of cisapride when co-administered with itraconazole may increase the risk of serious cardiovascular events including QTc prolongation.

Immunosuppressants		everolimus, temsirolimus	budesonide, ciclesonide, cyclosporine, dexamethasone, fluticasone, methylprednisolone, rapamycin (also known as sirolimus), tacrolimus	
Lipid Regulating Drugs	lovastatin, simvastatin		atorvastatin	The potential increase in plasma concentrations of atorvastatin, lovastatin, and simvastatin when co-administered with itraconazole may increase the risk of skeletal muscle toxicity, including rhabdomyolysis.
Respiratory Drugs		salmeterol		
Urological Drugs	fesoterodine, in subjects with moderate to severe renal impairment, or moderate to severe hepatic impairment, solifenacin, in subjects with severe renal impairment or moderate to severe hepatic impairment	darifenacin, vardenafil	fesoterodine, oxybutynin, sildenafil, for the treatment of erectile dysfunction, solifenacin, tadalafil, tolterodine	Fesoterodine: The potential increase in plasma concentrations of the fesoterodine active metabolite may be greater in subjects with moderate to severe renal impairment, or moderate to severe hepatic impairment, which may lead to an increased risk of adverse reactions. Solifenacin: The potential increase in plasma concentrations of solifenacin in subjects with severe renal impairment or moderate to severe hepatic impairment, when co- administered with itraconazole may increase the risk of

				serious cardiovascular events including QT prolongation.
Other	colchicine, in subjects with renal or hepatic impairment	colchicine, conivaptan, tolvaptan	cinacalcet	Colchicine: The potential increase in plasma concentrations of colchicine when co-administered with itraconazole may increase the risk of potentially fatal adverse events. Conivaptan and Tolvaptan: A safe and effective dose of either conivaptan or tolvaptan has not been established when co-administered with itraconazole.

Effect of Other Drugs on Itraconazole

Itraconazole is mainly metabolized through CYP3A4. Other substances that either share this metabolic pathway or modify CYP3A4 activity may influence the pharmacokinetics of itraconazole. Some concomitant drugs have the potential to interact with itraconazole resulting in either increased or sometimes decreased concentrations of itraconazole. Increased concentrations may increase the risk of adverse reactions associated with itraconazole. Decreased concentrations may reduce itraconazole efficacy.

Table 2 lists examples of drugs that may affect itraconazole concentrations, but is not a comprehensive list. Refer to the approved product labeling to become familiar with the interaction pathways, risk potential and specific actions to be taken with regards to each concomitant drug prior to initiating therapy with itraconazole.

Although many of the clinical drug interactions in Table 2 are based on information with a similar azole antifungal, ketoconazole, these interactions are expected to occur with itraconazole.

Table 2: Drug Interactions with Other Drugs that Affect Itraconazole Concentrations

Examples of Concomitant Drugs Within Class	Prevention or Management
Drug Interactions with Other Drugs that Increase Itraconazole Concentrations and May Increase Risk of Adverse Reactions Associated with Itraconazole	
Antibacterials	
Ciprofloxacin ^a Erythromycin ^a Clarithromycin ^a	Monitor for adverse reactions. Itraconazole dose reduction may be necessary.
Antineoplastics	
Idelalisib ^b	Monitor for adverse reactions. Itraconazole dose reduction may be necessary. See also Table 1.
Antivirals	
Cobicistat Darunavir (ritonavir-boosted) Elevitegravir (ritonavir-boosted) Fosamprenavir (ritonavir-boosted) Indinavir ^a Ombitasvir/Paritaprevir/Ritonavir with or without Dasabuvir Ritonavir Saquinavir	Monitor for adverse reactions. Itraconazole dose reduction may be necessary. For, cobicistat, elevitegravir, Indinavir, ombitasvir/paritaprevir/ritonavir with or without dasabuvir, ritonavir, and saquinavir, see also Table 1.
Calcium Channel Blockers	
Diltiazem	Monitor for adverse reactions. Itraconazole dose reduction may be necessary. See also Table 1.
Drug Interactions with Other Drugs that Decrease Itraconazole Concentrations and May Reduce Efficacy of Itraconazole	
Antibacterials	
Isoniazid Rifampicin ^a	Not recommended 2 weeks before and during itraconazole treatment.
Rifabutin ^a	Not recommended 2 weeks before, during, and 2 weeks after itraconazole treatment. See also Table 1.
Anticonvulsants	
Phenobarbital Phenytoin ^a	Not recommended 2 weeks before and during itraconazole treatment.
Carbamazepine	Not recommended 2 weeks before, during, and 2 weeks after itraconazole treatment. See also Table 1.
Antivirals	
Efavirenz ^a Nevirapine ^a	Not recommended 2 weeks before and during itraconazole treatment.

Gastrointestinal Drugs	
Drugs that reduce gastric acidity e.g. acid neutralizing medicines such as aluminum hydroxide, or acid secretion suppressors such as H ₂ -receptor antagonists and proton pump inhibitors.	Use with caution. Administer acid neutralizing medicines at least 2 hours before or 2 hours after the intake of itraconazole capsules
Miscellaneous Drugs and Other Substances	
Lumacaftor/ivacaftor	Not recommended 2 weeks before, during, and 2 weeks after itraconazole treatment.
^a Based on clinical drug interaction information with itraconazole.	

Pediatric Population

Interaction studies have only been performed in adults.

Carcinogenesis, Mutagenesis, and Impairment of Fertility:

Itraconazole showed no evidence of carcinogenicity potential in mice treated orally for 23 months at dosage levels up to 80 mg/kg/day (approximately 1 time the maximum recommended human dose [MRHD] of 400 mg/day based on body surface area comparisons). Male rats treated with 25 mg/kg/day (0.6 times the MRHD based on body surface area comparisons) had a slightly increased incidence of soft tissue sarcoma. These sarcomas may have been a consequence of hypercholesterolemia, which is a response of rats, but not dogs or humans, to chronic itraconazole administration. Female rats treated with 50 mg/kg/day (1.2 times the MRHD based on body surface area comparisons) had an increased incidence of squamous cell carcinoma of the lung (2/50) as compared to the untreated group. Although the occurrence of squamous cell carcinoma in the lung is extremely uncommon in untreated rats, the increase in this study was not statistically significant.

Itraconazole produced no mutagenic effects when assayed in DNA repair test (unscheduled DNA synthesis) in primary rat hepatocytes, in Ames tests with *Salmonella typhimurium* (6 strains) and *Escherichia coli*, in the mouse lymphoma gene mutation tests, in a sexlinked recessive lethal mutation (*Drosophila melanogaster*) test, in chromosome aberration tests in human lymphocytes, in a cell transformation test with C3H/10T $\frac{1}{2}$; C18 mouse embryo fibroblasts cells, in a dominant lethal mutation test in male and female mice, and in micronucleus tests in mice and rats.

Itraconazole did not affect the fertility of male or female rats treated orally with dosage levels of up to 40 mg/kg/day (1 time the MRHD based on body surface area comparisons), even though parental toxicity was present at this dosage level. More severe signs of parental toxicity, including death, were present in the next higher dosage level, 160 mg/kg/day (4 times the MRHD based on body surface area comparisons).

Pregnancy: Teratogenic effects:

Itraconazole was found to cause a dose-related increase in maternal toxicity, embryotoxicity, and teratogenicity in rats at dosage levels of approximately 40 mg/kg/day to 160 mg/kg/day (1 to 4 times the MRHD based on body surface area comparisons), and in mice at dosage levels of approximately 80 mg/kg/day (1 time the MRHD based on body surface area comparisons). Itraconazole has been shown to cross the placenta in a rat model. In rats, the teratogenicity consisted of major skeletal defects; in mice, it consisted of encephaloceles and/or macroglossia.

There are no studies in pregnant women. Itraconazole should be used for the treatment of systemic fungal infections in pregnancy only if the benefit outweighs the potential risk.

Itraconazole should not be administered for the treatment of onychomycosis to pregnant patients or to women contemplating pregnancy. Itraconazole should not be administered to women of childbearing potential for the treatment of onychomycosis unless they are using effective measures to prevent pregnancy and they begin therapy on the second or third day following the onset of menses. Highly effective contraception should be continued throughout itraconazole therapy and for 2 months following the end of treatment.

During post-marketing experience, cases of congenital abnormalities have been reported (see ADVERSE REACTIONS: Post-marketing Experience).

Nursing Mothers:

Itraconazole is excreted in human milk; therefore, the expected benefits of itraconazole therapy for the mother should be weighed against the potential risk from exposure of itraconazole to the infant. The U.S. Public Health Service Centers for Disease Control and Prevention advises HIV-infected women not to breast-feed to avoid potential transmission of HIV to uninfected infants.

Pediatric Use:

The efficacy and safety of itraconazole have not been established in pediatric patients.

The long-term effects of itraconazole on bone growth in children are unknown. In three toxicology studies using rats, itraconazole induced bone defects at dosage levels as low as 20 mg/kg/day (0.5 times the MRHD of 400 mg based on body surface area comparisons). The induced defects included reduced bone plate activity, thinning of the zona compacta of the large bones, and increased bone fragility. At a dosage level of 80 mg/kg/day (2 times the MRHD based on body surface area comparisons) over 1 year or 160 mg/kg/day (4 times the MRHD based on body surface area comparisons) for 6 months, itraconazole induced small tooth pulp with hypocellular appearance in some rats.

Geriatric Use:

Clinical studies of itraconazole capsules did not include sufficient numbers of subjects aged 65 years and over to determine whether they respond differently from younger subjects. It is advised to use itraconazole capsules in these patients only if it is determined that the potential benefit outweighs the potential risks. In general, it is recommended that the dose selection for an elderly patient should be taken into consideration, reflecting the greater frequency of decreased hepatic, renal, or cardiac function, and of concomitant disease or other drug therapy.

Transient or permanent hearing loss has been reported in elderly patients receiving treatment with itraconazole. Several of these reports included concurrent administration of quinidine which is contraindicated (see BOXED WARNING: Drug Interactions, CONTRAINDICATIONS: Drug Interactions and PRECAUTIONS: Drug Interactions).

HIV-Infected Patients:

Because hypochlorhydria has been reported in HIV-infected individuals, the absorption of itraconazole in these patients may be decreased.

Renal Impairment:

Limited data are available on the use of oral itraconazole in patients with renal impairment. The exposure of itraconazole may be lower in some patients with renal impairment. Caution should be exercised when itraconazole is administered in this patient population and dose adjustment may be needed (see CLINICAL PHARMACOLOGY: Special Populations and DOSAGE AND ADMINISTRATION).

Hepatic Impairment:

Limited data are available on the use of oral itraconazole in patients with hepatic

impairment. Caution should be exercised when this drug is administered in this patient population. It is recommended that patients with impaired hepatic function be carefully monitored when taking itraconazole. It is recommended that the prolonged elimination half-life of itraconazole observed in the single oral dose clinical trial with itraconazole capsules in cirrhotic patients be considered when deciding to initiate therapy with other medications metabolized by CYP3A4.

In patients with elevated or abnormal liver enzymes or active liver disease, or who have experienced liver toxicity with other drugs, treatment with itraconazole is strongly discouraged unless there is a serious or life-threatening situation where the expected benefit exceeds the risk. It is recommended that liver function monitoring be done in patients with pre-existing hepatic function abnormalities or those who have experienced liver toxicity with other medications (see CLINICAL PHARMACOLOGY: Special Populations and DOSAGE AND ADMINISTRATION).

ADVERSE REACTIONS

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 clinical practice.

Itraconazole has been associated with rare cases of serious hepatotoxicity, including liver failure and death. Some of these cases had neither pre-existing liver disease nor a serious underlying medical condition. If clinical signs or symptoms develop that are consistent with liver disease, treatment should be discontinued and liver function testing performed. The risks and benefits of itraconazole use should be reassessed (see WARNINGS : **Hepatic Effects** and PRECAUTIONS : **Hepatotoxicity and Information for Patients**).

Adverse Events in the Treatment of Systemic Fungal Infections

Adverse event data were derived from 602 patients treated for systemic fungal disease in U.S. clinical trials who were immunocompromised or receiving multiple concomitant medications. Treatment was discontinued in 10.5% of patients due to adverse events. The median duration before discontinuation of therapy was 81 days (range: 2 to 776 days). The table lists adverse events reported by at least 1% of patients.

Table 2: Clinical Trials of Systemic Fungal Infections: Adverse Events Occurring with an Incidence of Greater than or Equal to 1%

Body System/Adverse Event	Incidence (%) (N=602)
Gastrointestinal	
Nausea	11
Vomiting	5
Diarrhea	3
Abdominal Pain	2
Anorexia	1
Body as a Whole	
Edema	4
Fatigue	3
Fever	3
Malaise	1

Skin and Appendages	
Rash*	9
Pruritus	3
Central/Peripheral Nervous System	
Headache	4
Dizziness	2
Psychiatric	
Libido Decreased	1
Somnolence	1
Cardiovascular	
Hypertension	3
Metabolic/Nutritional	
Hypokalemia	2
Urinary System	
Albuminuria	1
Liver and Biliary System	
Hepatic Function Abnormal	3
Reproductive System, Male	
Impotence	1
* Rash tends to occur more frequently in immunocompromised patients receiving immunosuppressive medications.	

Adverse events infrequently reported in all studies included constipation, gastritis, depression, insomnia, tinnitus, menstrual disorder, adrenal insufficiency, gynecomastia, and male breast pain.

Adverse Events Reported in Toenail Onychomycosis Clinical Trials

Patients in these trials were on a continuous dosing regimen of 200 mg once daily for 12 consecutive weeks.

The following adverse events led to temporary or permanent discontinuation of therapy.

Table 3: Clinical Trials of Onychomycosis of the Toenail: Adverse Events Leading to Temporary or Permanent Discontinuation of Therapy

Adverse Event	Incidence (%) Itraconazole (N=112)
Elevated Liver Enzymes (greater than twice the upper limit of normal)	4
Gastrointestinal Disorders	4
Rash	3
Hypertension	2
Orthostatic Hypotension	1
Headache	1
Malaise	1
Myalgia	1
Vasculitis	1
Vertigo	1

The following adverse events occurred with an incidence of greater than or equal to 1% (N=112): headache: 10%; rhinitis: 9%; upper respiratory tract infection: 8%; sinusitis, injury: 7%; diarrhea, dyspepsia, flatulence, abdominal pain, dizziness, rash: 4%; cystitis,

urinary tract infection, liver function abnormality, myalgia, nausea: 3%; appetite increased, constipation, gastritis, gastroenteritis, pharyngitis, asthenia, fever, pain, tremor, herpes zoster, abnormal dreaming: 2%.

Adverse Events Reported in Fingernail Onychomycosis Clinical Trials

Patients in these trials were on a dosing regimen consisting of two 1-week treatment periods of 200 mg twice daily, separated by a 3-week period without drug.

The following adverse events led to temporary or permanent discontinuation of therapy.

Table 4: Clinical Trials of Onychomycosis of the Fingernail: Adverse Events Leading to Temporary or Permanent Discontinuation of Therapy

Adverse Event	Incidence (%) Itraconazole (N=37)
Rash/Pruritus	3
Hypertriglyceridemia	3

The following adverse events occurred with an incidence of greater than or equal to 1% (N=37): headache: 8%; pruritus, nausea, rhinitis: 5%; rash, bursitis, anxiety, depression, constipation, abdominal pain, dyspepsia, ulcerative stomatitis, gingivitis, hypertriglyceridemia, sinusitis, fatigue, malaise, pain, injury: 3%.

Adverse Events Reported from Other Clinical Trials

In addition, the following adverse drug reaction was reported in patients who participated in itraconazole capsules clinical trials: *Hepatobiliary Disorders*: hyperbilirubinemia.

The following is a list of additional adverse drug reactions associated with itraconazole that have been reported in clinical trials of itraconazole oral solution and itraconazole IV excluding the adverse reaction term "Injection site inflammation" which is specific to the injection route of administration:

Cardiac Disorders: cardiac failure, left ventricular failure, tachycardia;

General Disorders and Administration Site Conditions: face edema, chest pain, chills;

Hepatobiliary Disorders: hepatic failure, jaundice;

Investigations: alanine aminotransferase increased, aspartate aminotransferase increased, blood alkaline phosphatase increased, blood lactate dehydrogenase increased, blood urea increased, gamma-glutamyltransferase increased, urine analysis abnormal;

Metabolism and Nutrition Disorders: hyperglycemia, hyperkalemia, hypomagnesemia;

Psychiatric Disorders: confusional state;

Renal and Urinary Disorders: renal impairment;

Respiratory, Thoracic and Mediastinal Disorders: dysphonia, cough;

Skin and Subcutaneous Tissue Disorders: rash erythematous, hyperhidrosis;

Vascular Disorders: hypotension

Post-marketing Experience

Adverse drug reactions that have been first identified during post-marketing experience with itraconazole (all formulations) are listed in the table below. Because these reactions

are reported voluntarily from a population of uncertain size, reliably estimating their frequency or establishing a causal relationship to drug exposure is not always possible.

Table 5: Postmarketing Reports of Adverse Drug Reactions

Blood and Lymphatic System Disorders:	Leukopenia, neutropenia, thrombocytopenia
Immune System Disorders:	Anaphylaxis; anaphylactic, anaphylactoid and allergic reactions; serum sickness; angioneurotic edema
Nervous System Disorders:	Peripheral neuropathy, paresthesia, hypoesthesia, tremor
Eye Disorders:	Visual disturbances, including vision blurred and diplopia
Ear and Labyrinth Disorders:	Transient or permanent hearing loss
Cardiac Disorders:	Congestive heart failure
Respiratory, Thoracic and Mediastinal Disorders:	Pulmonary edema, dyspnea
Gastrointestinal Disorders:	Pancreatitis, dysgeusia
Hepatobiliary Disorders:	Serious hepatotoxicity (including some cases of fatal acute liver failure), hepatitis
Skin and Subcutaneous Tissue Disorders:	Toxic epidermal necrolysis, Stevens-Johnson syndrome, acute generalized exanthematous pustulosis, erythema multiforme, exfoliative dermatitis, leukocytoclastic vasculitis, alopecia, photosensitivity, urticaria
Musculoskeletal and Connective Tissue Disorders:	Arthralgia
Renal and Urinary Disorders:	Urinary incontinence, pollakiuria
Reproductive System and Breast Disorders:	Erectile dysfunction
General Disorders and Administration Site Conditions:	Peripheral edema
Investigations:	Blood creatine phosphokinase increased

There is limited information on the use of itraconazole during pregnancy. Cases of congenital abnormalities including skeletal, genitourinary tract, cardiovascular and ophthalmic malformations as well as chromosomal and multiple malformations have been reported during post-marketing experience. A causal relationship with itraconazole has not been established (see **CLINICAL PHARMACOLOGY: Special Populations, CONTRAINDICATIONS, WARNINGS, and PRECAUTIONS: Drug Interactions** for more information).

To report SUSPECTED ADVERSE REACTIONS contact AvKARE at 1-855-361-

3993; email drugsafety@avkare.com; or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

OVERDOSAGE

Itraconazole is not removed by dialysis. In the event of accidental overdosage, supportive measures should be employed. Contact a certified poison control center for the most up-to-date information on the management of itraconazole capsules overdosage (1-800- 222-1222 or www.poison.org).

In general, adverse events reported with overdose have been consistent with adverse drug reactions already listed in this package insert for itraconazole (see ADVERSE REACTIONS).

DOSAGE AND ADMINISTRATION

Itraconazole capsules should be taken with a full meal to ensure maximal absorption. Itraconazole capsules must be swallowed whole.

Itraconazole capsules are a different preparation than itraconazole oral solution and should not be used interchangeably.

Treatment of Blastomycosis and Histoplasmosis:

The recommended dose is 200 mg once daily (2 capsules). If there is no obvious improvement, or there is evidence of progressive fungal disease, the dose should be increased in 100-mg increments to a maximum of 400 mg daily. Doses above 200 mg/day should be given in two divided doses.

Treatment of Aspergillosis:

A daily dose of 200 to 400 mg is recommended.

Treatment in Life-Threatening Situations:

In life-threatening situations, a loading dose should be used.

Although clinical studies did not provide for a loading dose, it is recommended, based on pharmacokinetic data, that a loading dose of 200 mg (2 capsules) three times daily (600 mg/day) be given for the first 3 days of treatment.

Treatment should be continued for a minimum of three months and until clinical parameters and laboratory tests indicate that the active fungal infection has subsided. An inadequate period of treatment may lead to recurrence of active infection.

Itraconazole capsules and itraconazole oral solution should not be used interchangeably. Only the oral solution has been demonstrated effective for oral and/or esophageal candidiasis.

Treatment of Onychomycosis:

Toenails with or without fingernail involvement: The recommended dose is 200 mg (2 capsules) once daily for 12 consecutive weeks.

Treatment of Onychomycosis:

Fingernails only: The recommended dosing regimen is 2 treatment courses, each consisting of 200 mg (2 capsules) b.i.d. (400 mg/day) for 1 week. The courses are separated by a 3-week period without itraconazole capsules.

Use in Patients with Renal Impairment:

Limited data are available on the use of oral itraconazole in patients with renal impairment. Caution should be exercised when this drug is administered in this patient population (see **CLINICAL PHARMACOLOGY: Special Populations and PRECAUTIONS**).

Use in Patients with Hepatic Impairment:

Limited data are available on the use of oral itraconazole in patients with hepatic impairment. Caution should be exercised when this drug is administered in this patient population (see **CLINICAL PHARMACOLOGY: Special Populations, WARNINGS, and PRECAUTIONS**).

HOW SUPPLIED

Itraconazole capsules, **100 mg**, are supplied as a hard gelatin capsule filled with white to off-white pellets having “AMNEAL” printed on blue opaque cap and “630” on blue transparent body in black ink.

They are available as follows:

NDC 50268-450-12 (10 capsules per card, 2 cards per carton)

Dispensed in Unit Dose Package. For Institutional Use Only.

Store at 20° to 25°C (68° to 77°F); excursions permitted between 15° to 30°C (59° to 86°F) [see USP Controlled Room Temperature]. Protect from light and moisture.

Keep out of reach of children.

Manufactured for:

AvKARE

Pulaski, TN 38478

Mfg. Rev. 01-2025-09

AV Rev. 02/25(M) AvPAK

PATIENT INFORMATION

Itraconazole (IT-ra-KON-a-zole) Capsules

WHAT IS THE MOST IMPORTANT INFORMATION I SHOULD KNOW ABOUT ITRACONAZOLE CAPSULES?

Itraconazole capsules are used to treat fungal nail infections. However, itraconazole capsules are not for everyone. **Do not take itraconazole capsules for fungal nail infections if you have had heart failure, including congestive heart failure. You should not take itraconazole capsules if you are taking certain medicines that could lead to serious or life-threatening medical problems** (see “Who Should Not Take Itraconazole Capsules?” below).

If you have had heart, lung, liver, kidney or other serious health problems, ask your doctor if it is safe for you to take itraconazole capsules.

Itraconazole capsules can cause serious side effects, including:

1. **Heart failure.** Do not take itraconazole capsules if you have had heart failure, including congestive heart failure.

Stop taking itraconazole capsules and call your healthcare provider right away if you have any of these symptoms of congestive heart failure:

- shortness of breath

- swelling of your feet, ankles or legs
- sudden weight gain
- increased tiredness
- coughing up white or pink mucus (phlegm)
- fast heartbeat
- waking up at night more than normal for you

2. Heart problems and other serious medical problems. Serious medical problems that affect the heart and other parts of your body can happen if you take itraconazole capsules with certain other medicines. Do not take itraconazole capsules if you also take the following medicines:

- methadone
- disopyramide
- dofetilide
- dronedarone
- quinidine
- isavuconazole
- ergot alkaloids (such as dihydroergotamine, ergometrine ergonovine)
- ergotamine
- methylergometrine (methylergonovine)
- irinotecan
- lurasidone
- oral midazolam
- pimozide
- triazolam
- felodipine
- nisoldipine
- ivabradine
- ranolazine
- eplerenone
- cisapride
- naloxegol
- lomitapide
- lovastatin
- simvastatin
- avanafil
- ticagrelor
- venetoclax (see below)
- finerenone
- voclosporin

Do not take itraconazole capsules with venetoclax for chronic lymphocytic leukemia/small lymphocytic lymphoma when you first start treatment with venetoclax or with increasing doses of venetoclax.

This is not a complete list of medicines that can interact with itraconazole capsules. Itraconazole capsules may affect the way other medicines work, and other medicines may affect how itraconazole capsules works. You can ask your pharmacist for a list of medicines that interact with itraconazole capsules. Before you start taking itraconazole capsules, tell your healthcare provider about all the medicines you take, including prescription and over-the-counter medicines, vitamins, and herbal supplements.

Before you start any new medicine, ask your healthcare provider or pharmacist if it is safe to take it with itraconazole capsules.

3. Liver problems. Itraconazole capsules can cause serious liver problems which may be severe and lead to death. **Stop taking itraconazole capsules and call your**

healthcare provider right away if you have any of these symptoms of liver problems:

- tiredness
- loss of appetite for several days or longer
- nausea or vomiting
- dark or “tea-colored” urine
- your skin or the white part of your eyes turn yellow (jaundice)
- light-colored stools (bowel movement)

For more information about side effects, see **“What are the possible side effects of itraconazole capsules?”**

WHAT ARE ITRACONAZOLE CAPSULES?

- Itraconazole capsules are a prescription medicine used to treat the following fungal infections of the toenails, fingernails and other parts of the body: blastomycosis, histoplasmosis, aspergillosis, and onychomycosis.
- It is not known if itraconazole capsules are safe and effective in children.

Do not take Itraconazole capsules if you:

- have or have had heart failure, including congestive heart failure.
- take certain medicines. See “What is the most important information I should know about itraconazole capsules?”
- are pregnant or plan to become pregnant. Itraconazole capsules can harm your unborn baby. Tell your healthcare provider right away if you become pregnant while taking itraconazole capsules. Females who are able to become pregnant must use effective forms of birth control during treatment and for 2 months after stopping treatment with itraconazole capsules.
- are allergic to itraconazole or any of the ingredients in itraconazole capsules. See the end of this Patient Information leaflet for a complete list of ingredients in itraconazole capsules.

Before taking itraconazole capsules, tell your healthcare provider about all of your medical conditions, including if you:

- have heart problems.
- have liver problems.
- have kidney problems.
- have a weakened immune system (immunocompromised).
- have lung problems including cystic fibrosis.
- are breastfeeding or plan to breastfeed. Itraconazole can pass into your breast milk. You and your healthcare provider should decide if you will take itraconazole capsules or breastfeed.

Taking itraconazole capsules with certain medicines may affect each other. Taking itraconazole capsules with other medicines can cause serious side effects.

How should I take itraconazole capsules?

- Take itraconazole capsules exactly as prescribed by your healthcare provider. Your healthcare provider will tell you how much itraconazole capsules to take and when to take it.
- You will receive itraconazole capsules in a bottle. Your healthcare provider will decide the type of itraconazole capsules that is right for you.
- Take itraconazole capsules with a full meal.
- Swallow itraconazole capsules whole.
- You should not take itraconazole oral solution instead of itraconazole capsules, because they will not work the same way.
- If you take too much itraconazole capsules, call your healthcare provider or go to the

nearest hospital emergency room right away.

What should I avoid while taking itraconazole capsules?

Itraconazole capsules can cause dizziness and vision problems. Do not drive or operate machinery until you know how itraconazole capsules affect you.

What are the possible side effects of itraconazole capsules?

Itraconazole capsules may cause serious side effects, including:

• See **“What is the most important information I should know about itraconazole capsules?”**

• **New or worsening high blood pressure and low potassium levels in your blood (pseudoaldosteronism).** Your healthcare provider should check your blood pressure and potassium levels.

• **Nerve problems (neuropathy).** Call your healthcare provider right away if you have tingling or numbness in your hands or feet. Your healthcare provider may stop your treatment with itraconazole capsules if you have nerve problems.

• **Hearing loss.** Hearing loss can happen for a short time or permanently in some people who take itraconazole capsules. Stop taking itraconazole capsules and call your healthcare provider right away if you have any changes in your hearing.

The most common side effects of itraconazole capsules include: headache, rash, digestive system problems (such as nausea and vomiting), and edema.

Additional possible side effects include upset stomach, constipation, fever, inflammation of the pancreas, increase in blood pressure, menstrual disorder, erectile dysfunction, dizziness, muscle pain, painful joints, unpleasant taste, or hair loss.

These are not all the possible side effects of itraconazole capsules.

Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.

How should I store itraconazole capsules?

• Store itraconazole capsules at room temperature between 20° to 25°C (68° to 77°F); excursions permitted between 15° to 30°C (59° to 86°F).

• Keep itraconazole capsules dry and away from light.

Keep itraconazole capsules and all medicines out of the reach of children.

General information about the safe and effective use of itraconazole capsules

Medicines are sometimes prescribed for purposes other than those listed in a Patient Information leaflet. Do not use itraconazole capsules for a condition for which it was not prescribed. Do not give itraconazole capsules to other people, even if they have the same symptoms that you have. It may harm them.

You can ask your doctor or pharmacist for information about itraconazole capsules that is written for health professionals.

What are the ingredients in itraconazole capsules?

Active ingredients: itraconazole, USP

Inactive ingredients: black iron oxide, FD&C Blue No. 1, gelatin, hypromellose, liquid glucose, microcrystalline cellulose, polyethylene glycol, potassium hydroxide, propylene glycol, shellac, sodium lauryl sulfate, starch (of maize), strong ammonia solution, sucrose and titanium dioxide.

This Patient Information has been approved by the U.S. Food and Drug Administration.

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Manufactured for:

AvKARE

Pulaski, TN 38478

Mfg.Rev. 12-2024-07

AV Rev. 02/25 (M)

PACKAGE LABEL.PRINCIPAL DISPLAY PANEL

NDC 50268-450-12

Itraconazole Capsules, USP

100 mg

Rx Only

20 Capsules (2 X 10) Unit Dose

5026845012

NDC 50268-450-12

Itraconazole Capsules, USP

100 mg

Rx Only

20 Capsules (2 X 10) Unit Dose

5026845012

Each capsule contains: Itraconazole, USP 100 mg

Dosage: See accompanying product literature.

Store at 20° to 25°C (68° to 77°F); excursions permitted between 15° to 30°C (59° to 86°F) [see USP Controlled Room Temperature]. Protect from light and moisture.

Keep out of reach of children.

Manufactured for:
AvKARE
Pulaski, TN 38478
www.avkare.com

AVPAK
A PRODUCT OF AVKARE

Mfg. Rev. 08-2019-02 AV Rev. 03/23 (W)

ITRACONAZOLE

itraconazole capsule

Product Information

Product Type	HUMAN PRESCRIPTION DRUG	Item Code (Source)	NDC:50268-450(NDC:65162-630)
Route of Administration	ORAL		

Active Ingredient/Active Moiety

Ingredient Name	Basis of Strength	Strength
ITRACONAZOLE (UNII: 304NUG5GF4) (ITRACONAZOLE - UNII:304NUG5GF4)	ITRACONAZOLE	100 mg

Inactive Ingredients

Ingredient Name	Strength
FERROSFERRIC OXIDE (UNII: XM0M87F357)	
FD&C BLUE NO. 1 (UNII: H3R47K3TBD)	
GELATIN (UNII: 2G86QN327L)	
HYPROMELLOSES (UNII: 3NXW29V3WO)	
CELLULOSE, MICROCRYSTALLINE (UNII: OP1R32D61U)	
POTASSIUM HYDROXIDE (UNII: WZH3C48M4T)	
PROPYLENE GLYCOL (UNII: 6DC9Q167V3)	
SHELLAC (UNII: 46N107B71O)	
SODIUM LAURYL SULFATE (UNII: 368GB5141J)	
STARCH, CORN (UNII: O8232NY3SJ)	
AMMONIA (UNII: 5138Q19F1X)	
SUCROSE (UNII: C151H8M554)	
TITANIUM DIOXIDE (UNII: 15FIX9V2JP)	
DEXTRROSE (UNII: IY9XDZ35W2)	
POLYETHYLENE GLYCOL, UNSPECIFIED (UNII: 3WJQ0SDW1A)	

Product Characteristics

Color	blue (transparent) , blue (opaque)	Score	no score
Shape	CAPSULE	Size	22mm
Flavor		Imprint Code	AMNEAL;630
Contains			

Packaging

#	Item Code	Package Description	Marketing Start Date	Marketing End Date
1	NDC:50268-450-12	20 in 1 BOX, UNIT-DOSE	03/23/2018	
1	NDC:50268-450-11	1 in 1 BLISTER PACK; Type 0: Not a Combination Product		

Marketing Information

Marketing Category	Application Number or Monograph Citation	Marketing Start Date	Marketing End Date
ANDA	ANDA205080	03/23/2018	

Labeler - AvPAK (832926666)