

Covirin

Ribavirin

COMPOSITION

COVIRIN Capsule: Each capsule of contains Ribavirin USP 200 mg.

INDICATIONS AND USAGE

COVIRIN in combination with Direct-acting antivirals (DAA) including Sofosbuvir, Daclatasvir, Ledipasvir, Velpatasvir etc, or with Interferons is indicated for the treatment of patients with chronic hepatitis C (CHC) virus infection who have compensated liver disease.

The following points should be considered when initiating Ribavirin combination therapy with DAA or with Interferons:

- Safety and efficacy data are not available for treatment longer than 48 weeks.
- The safety and efficacy of Ribavirin and DAA therapy have not been established in liver or other organ transplant recipients, patients with decompensated liver disease, or previous non-responders to interferon therapy.
- The safety and efficacy of Ribavirin therapy for the treatment of adenovirus, RSV, parainfluenza or influenza infections have not been established. Ribavirin should not be used for these indications.

DO dosage AND ADMINISTRATION

COVIRIN should be taken with food. COVIRIN should be given in combination with DAA or with Interferons; it is important to note that COVIRIN should never be given as monotherapy.

Chronic Hepatitis C Monoinfection

Adult Patients

The recommended dose of COVIRIN Capsules is provided in The following table. The recommended duration of treatment for patients previously untreated with Ribavirin and interferon is 24 to 48 weeks. The daily dose of COVIRIN is 800 mg to 1200 mg administered orally in two divided doses.

Hepatitis C Virus (HCV) Genotype	COVIRIN Dose (daily)	Duration
Genotypes 1, 4	<75 kg = 1000 mg <p>≥75 kg = 1200 mg</p>	48 weeks <p>48 weeks</p>
Genotypes 2, 3	800 mg	24 weeks

Genotypes 2 and 3 showed no increased response to treatment beyond 24 weeks.

Data on genotypes 5 and 6 are insufficient for dosing recommendations.

Pediatric Patients

COVIRIN is available only as a 200 mg Capsule and therefore the healthcare provider should determine if this sized Capsule can be swallowed by the pediatric patient. Patients who initiate treatment prior to their 18th birthday should maintain pediatric dosing through the completion of therapy.

COVIRIN Dosing Recommendations for Pediatric Patients

Body Weight in kilograms (kg)	COVIRIN Daily Dose*	COVIRIN Number of Capsules
23 – 33	400 mg/day	1 x 200 mg Capsule A.M. <p>1 x 200 mg Capsule P.M.</p>
34 – 46	600 mg/day	1 x 200 mg Capsule A.M. <p>2 x 200 mg Capsules P.M.</p>
47 – 59	800 mg/day	2 x 200 mg Capsules A.M. <p>2 x 200 mg Capsules P.M.</p>
60 – 74	1000 mg/day	2 x 200 mg Capsules A.M. <p>3 x 200 mg Capsules P.M.</p>
≥75	1200 mg/day	3 x 200 mg Capsules A.M. <p>3 x 200 mg Capsules P.M.</p>

*approximately 15 mg/kg/day

Chronic Hepatitis C with HIV Coinfection

Adult Patients

The recommended dose for treatment of chronic hepatitis C in patients coinfected with HIV is COVIRIN 800 mg by mouth daily for a total duration of 48 weeks, regardless of HCV genotype.

Dose Modifications

Adult and Pediatric Patients

If severe adverse reactions or laboratory abnormalities develop during therapy, the **COVIRIN** dose should be modified or discontinued, if appropriate, until the adverse reactions abate or decrease in severity. If intolerance persists after dose adjustment, COVIRIN therapy should be discontinued. COVIRIN should be administered with caution to patients with pre-existing cardiac disease.

COVIRIN Dose Modification Guidelines in Adults and Pediatrics

Body weight in kilograms (kg)	Laboratory Values		
	Hemoglobin <10 g/dL in patients with no cardiac disease, or Decrease in hemoglobin of ≥2 g/dL during any 4 week period in patients with history of stable cardiac disease	Hemoglobin <8.5 g/dL in patients with no cardiac disease, or Hemoglobin <12 g/dL despite 4 weeks at reduced dose in patients with history of stable cardiac disease	
Adult Patients older than 18 years of age			
Any weight	1 x 200 mg Capsule A.M. <p>2 x 200 mg Capsules P.M.</p>		Discontinue COVIRIN
Pediatric Patients 5 to 18 years of age			
23 – 33 kg	1 x 200 mg Capsule A.M.		
34 – 46 kg	1 x 200 mg Capsule A.M. <p>1 x 200 mg Capsule P.M.</p>		
47 – 59 kg	1 x 200 mg Capsule A.M. <p>1 x 200 mg Capsule P.M.</p>		Discontinue COVIRIN
60 – 74 kg	1 x 200 mg Capsule A.M. <p>2 x 200 mg Capsules P.M.</p>		
≥75 kg	1 x 200 mg Capsule A.M. <p>2 x 200 mg Capsules P.M.</p>		

Adult Patients

Once COVIRIN has been withheld due to either a laboratory abnormality or clinical adverse reaction, an attempt may be made to restart COVIRIN at 600 mg daily and further increase the dose to 800 mg daily. However, it is not recommended that COVIRIN be increased to the original assigned dose (1000 mg to 1200 mg).

Pediatric Patients

Upon resolution of a laboratory abnormality or clinical adverse reaction, an increase in COVIRIN dose to the original dose may be attempted depending upon the physician’s judgment. If COVIRIN has been withheld due to a laboratory abnormality or clinical adverse reaction, an attempt may be made to restart COVIRIN at one-half the full dose.

Renal Impairment

The total daily dose of COVIRIN should be reduced for patients with creatinine clearance less than or equal to 50 mL/min.

Dosage Modification for Renal Impairment

Creatinine Clearance	COVIRIN Dose (daily)
30 to 50 mL/min	Alternating doses, 200 mg and 400 mg every other day
Less than 30 mL/min	200 mg daily
Hemodialysis	200 mg daily

The dose of COVIRIN should not be further modified in patients with renal impairment. If severe adverse reactions or laboratory abnormalities develop, COVIRIN should be discontinued, if appropriate, until the adverse reactions abate or decrease in severity. If intolerance persists after restarting COVIRIN, therapy should be discontinued.

No data are available for pediatric subjects with renal impairment.

CONTRAINDICATIONS

COVIRIN (Ribavirin) is contraindicated in:

- Women who are pregnant. COVIRIN may cause fetal harm when administered to a pregnant woman. COVIRIN is contraindicated in women who are or may become pregnant. If this drug is used during pregnancy, or if the patient becomes pregnant while taking this drug, the patient should be apprised of the potential hazard to the fetus.

- Men whose female partners are pregnant.

- Patients with hemoglobinopathies (e.g., thalassemia major or sickle-cell anemia).

- In combination with didanosine.

- Patients with Autoimmune hepatitis, Hepatic decompensation (Child-Pugh score greater than 6; class B and C) in cirrhotic CHC monoinfected patients before treatment, Hepatic decompensation (Child-Pugh score greater than or equal to 6) in cirrhotic CHC patients coinfected with HIV before treatment.

- Hypersensitivity to Ribavirin or any of the added pharmaceutical additives

WARNINGS AND PRECAUTIONS

Pregnancy

Ribavirin may cause birth defects and/or death of the exposed fetus. Ribavirin has demonstrated significant teratogenic and/or embryocidal effects in all animal species in which adequate studies have been conducted. These effects occurred at doses as low as one twentieth of the recommended human dose of Ribavirin. **Ribavirin therapy should not be started unless a report of a negative pregnancy test has been obtained immediately prior to planned initiation of therapy.**

Anemia

The primary toxicity of Ribavirin is hemolytic anemia, which was observed in approximately 13% of all Ribavirin treated subjects in clinical trials. Anemia associated with Ribavirin occurs within 1 to 2 weeks of initiation of therapy. Because the initial drop in hemoglobin may be significant, it is advised that hemoglobin or hematocrit be obtained pretreatment and at week 2 and week 4 of therapy or more frequently if clinically indicated.

Fatal and nonfatal myocardial infarctions have been reported in patients with anemia caused by Ribavirin. Patients should be assessed for underlying cardiac disease before initiation of Ribavirin therapy. Patients with pre-existing cardiac disease should have electrocardiograms administered before treatment, and should be appropriately monitored during therapy.

Hepatic Failure

Chronic hepatitis C (CHC) patients with cirrhosis may be at risk of hepatic decompensation and death when treated with alpha interferons. Cirrhotic CHC patients coinfected with HIV receiving highly active antiretroviral therapy (HAART) and interferon alfa-2a with or without ribavirin appear to be at increased risk for the development of hepatic decompensation compared to patients not receiving HAART. During treatment, patients’ clinical status and hepatic function should be closely monitored for signs and symptoms of hepatic decompensation.

Hypersensitivity

Severe acute hypersensitivity reactions (e.g., urticaria, angioedema, bronchoconstriction, and anaphylaxis) may have been observed during therapy. If such a reaction occurs, Ribavirin should be discontinued immediately and appropriate medical therapy instituted.

Pulmonary Disorders

Dyspnea, pulmonary infiltrates, pneumonitis, pulmonary hypertension, and pneumonia have been reported during combination therapy with Ribavirin.

Bone Marrow Suppression

Pancytopenia (marked decreases in RBCs, neutrophils and platelets) and bone marrow suppression have been reported in the literature to occur within 3 to 7 weeks after the combination therapy with Ribavirin.

Pancreatitis

Ribavirin therapy should be suspended in patients with signs and symptoms of pancreatitis, and discontinued in patients with confirmed pancreatitis.

ADVERSE REACTIONS

Significant adverse reactions associated with Ribavirin combination therapy include severe depression and suicidal ideation, hemolytic anemia, suppression of bone marrow function, autoimmune and infectious disorders, ophthalmologic disorders, cerebrovascular disorders, pulmonary dysfunction, colitis, pancreatitis, and diabetes.

DRUG INTERACTIONS

Nucleoside Reverse Transcriptase Inhibitors (NRTIs)

In vitro data indicate Ribavirin reduces phosphorylation of Lamivudine, Stavudine, and Zidovudine. However, no pharmacokinetic (e.g., plasma concentrations or intracellular triphosphorylated active metabolite concentrations) or pharmacodynamic (e.g., loss of HIV/HCV virologic suppression) interaction was observed when Ribavirin and Lamivudine (n=18), Stavudine (n=10), or Zidovudine (n=6) were co-administered as part of a multi-drug regimen to HCV/HIV coinfected patients.

Didanosine

Co-administration of Ribavirin and Didanosine is contraindicated. Didanosine or its active metabolite (dideoxyadenosine 5'-triphosphate) concentrations are increased when didanosine is co- administered with Ribavirin, which could cause or worsen clinical toxicities.

Zidovudine

Discontinuation of Zidovudine should be considered in combination therapy with Ribavirin as medically appropriate.

Drugs Metabolized by Cytochrome P450

In vitro studies indicate that Ribavirin does not inhibit CYP 2C9, CYP 2C19, CYP 2D6 or CYP 3A4.

Azathioprine

The use of Ribavirin to treat chronic hepatitis C in patients receiving Azathioprine has been reported to induce severe pancytopenia and may increase the risk of Azathioprine-related myelotoxicity. Patients receiving Azathioprine with Ribavirin should have complete blood counts, including platelet counts, monitored weekly for the first month, twice monthly for the second and third months of treatment, then monthly or more frequently if dosage or other therapy changes are necessary.

Covirin

Ribavirin

USE IN SPECIFIC POPULATIONS

Pregnancy

Pregnancy Category of Ribavirin is X. Ribavirin produced significant embryocidal and/or teratogenic effects in all animal species. Malformations of the skull, palate, eye, jaw, limbs, skeleton, and gastrointestinal tract were noted.

Nursing Mothers

It is not known whether Ribavirin is excreted in human milk. Because many drugs are excreted in human milk and to avoid any potential for serious adverse reactions in nursing infants from Ribavirin, a decision should be made either to discontinue nursing or therapy with COVIRIN, based on the importance of the therapy to the mother.

Pediatric Use

Pharmacokinetic evaluations in pediatric patients have not been performed. Safety and effectiveness of Ribavirin have not been established in patients below the age of 5 years.

Geriatric Use

Specific pharmacokinetic evaluations for Ribavirin in the elderly have not been performed.

Race

According to a study these is no clinically significant difference in Ribavirin pharmacokinetics among Black, Hispanic and Caucasian subjects.

Renal Impairment

Renal function should be evaluated in all patients prior to initiation of Ribavirin by estimating the patient’s creatinine clearance. Based on the pharmacokinetic and safety results from this trial, patients with creatinine clearance less than or equal to 50 mL/min should receive a reduced dose of Ribavirin and should be carefully monitored. Patients with clinically significant laboratory abnormalities or adverse reactions which are persistently severe or worsening should have therapy withdrawn.

Hepatic Impairment

The effect of hepatic impairment on the pharmacokinetics of Ribavirin following administration of Ribavirin has not been evaluated. The clinical trials of Ribavirin were restricted to patients with Child-Pugh class A disease.

Gender

No clinically significant differences in the pharmacokinetics of Ribavirin were observed between male and female subjects.

Organ Transplant Recipients

The safety and efficacy of DAA and COVIRIN treatment have not been established in patients with liver and other transplantations.

OVERDOSAGE

No cases of overdose with Ribavirin have been reported in clinical trials. Hypocalcemia and hypomagnesemia have been observed in persons administered greater than the recommended dosage of Ribavirin. In most of these cases, Ribavirin was administered intravenously at dosages up to and in some cases exceeding four times the recommended maximum oral daily dose.

DESCRIPTION

COVIRIN (Ribavirin) is a nucleoside analogue with antiviral activity. The chemical name of Ribavirin is 1-β-D ribofurano-*syn*-1-*H*-1,2,4-triazole-3-carboxamide and has the following structural formula:

	Manufactured By
	Everest Pharmaceuticals Ltd.
	BSCIC, Kanchpur, Narayangonj, Bangladesh

কোভাইরিন

রাইবাবাইরিন

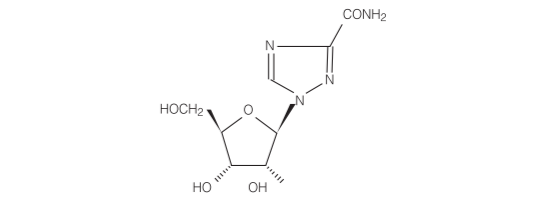
উপাদান
কোভাইরিন ক্যাপসুল: প্রতিটি ক্যাপসুলে আছে রাইবাবাইরিন ইউএসপি ২০০ মিঃ গ্রাঃ।
বর্ণনা
কোভাইরিন (রাইবাবাইরিন) একটি এন্টিভাইরাল এজেন্ট। রাইবাবাইরিন একটি কৃত্রিম নিউক্লিওসাইড এনালগ। রাইবাবাইরিন যে প্রক্রিয়ার মাধ্যমে এন্টিভাইরাল কার্যকারিতা প্রদর্শন করে তা পুরোপুরি জানা যায়নি। টিসু কালাচার প্রক্রিয়ায় রাইবাবাইরিন অনেক আরএনএ ভাইরাসের বিরুদ্ধে সরাসরি এন্টিভাইরাল কার্যকলাপ প্রদর্শন করে। রাইবাবাইরিন বিভিন্ন ভাইরাসের জেনোমের মধ্যে মিউটেশন ট্রিকেরোগেনি বাড়িয়ে দেয় এবং রাইবাবাইরিন ট্রাইফসফেট একটি বায়োক্রামিক্যাল বিক্রিয়ার মাধ্যমে এইচপিভি পলিমারেজকে বাধা প্রদান করে।
নির্দেশনা
কোভাইরিন ইন্টারফেরন আলফা বা সরাসরি কার্যকর এন্টিভাইরাল (DAA) এর সহযোগে ক্রনিক হেপাটাইটিস সি এর চিকিৎসায় ব্যবহৃত হয়। এক বছরের বেশী সময় ধরে চিকিৎসার জন্য কোন নিরাপত্তা এবং ফলপ্রসু তথ্য পাওয়া যায়নি।
মাত্রা এবং সেবনবিধি
কোভাইরিন বাবারের সাথে খেতে হবে। হেপাটাইটিস সি এর চিকিৎসায় রাইবাবাইরিনের একক ব্যবহার নির্দেশিত নয়।
ক্রনিক হেপাটাইটিস সি একক সক্রমণ
প্রাপ্তবয়স্কদের জন্য নির্ধারিত মাত্রা
সরাসরি কার্যকর এন্টিভাইরাল (DAA)/ পেগইন্টারফেরন এর সহযোগে রাইবাবাইরিন ২৪ থেকে ৪৮ সপ্তাহ পর্যন্ত ব্যবহার করতে হবে। এক্ষেত্রে দৈনিক মাত্রা (Dose) ৮০০ মিঃ গ্রাঃ থেকে ১২০০ মিঃ গ্রাঃ পর্যন্ত যা দুইবারে থেকে হবে।
হেপাটাইটিস সি এর জেনোটাইপ
কোভাইরিনের দৈনিক মাত্রা
চিকিৎসার সময়কাল
জেনোটাইপ ১, ৪
<৭৫ কেজি = ১০০০ গ্রাম
≥৭৫ কেজি = ১২০০ গ্রাম
৪৮ সপ্তাহ
৪৮ সপ্তাহ
জেনোটাইপ ২, ৩
৮০০ গ্রাম
২৪ সপ্তাহ

জেনোটাইপ ২ ও ৩ এর চিকিৎসা ২৪ সপ্তাহের মধ্যেই সীমাবদ্ধ থাকা উচিত। জেনোটাইপ ৫ ও ৬ এর ক্ষেত্রে কোভাইরিনের কোন মাত্রা নির্দেশিত নয়।

শিশুদের জন্য মাত্রা

৫ বছর থেকে ১৮ বছরের কম এমন শিশুদের কোভাইরিন এর মাত্রা তাদের ওজন অনুযায়ী নিম্নরূপঃ

ওজন (কেজি)	কোভাইরিনের দৈনিক মাত্রা	যতগুলো কোভাইরিন ক্যাপসুল খেতে হবে
২৩-৩৩	৪০০ মিঃ গ্রাঃ/দৈনিক	১টা ২০০ মিঃ গ্রাঃ কোভাইরিন ক্যাপসুল (সকালে) <p>১টা ২০০ মিঃ গ্রাঃ কোভাইরিন ক্যাপসুল (রাতে)</p>
৩৪-৪৬	৬০০ মিঃ গ্রাঃ/দৈনিক	১টা ২০০ মিঃ গ্রাঃ কোভাইরিন ক্যাপসুল (সকালে) <p>২টা ২০০ মিঃ গ্রাঃ কোভাইরিন ক্যাপসুল (রাতে)</p>
৪৭-৫৯	৮০০ মিঃ গ্রাঃ/দৈনিক	২টা ২০০ মিঃ গ্রাঃ কোভাইরিন ক্যাপসুল (সকালে) <p>২টা ২০০ মিঃ গ্রাঃ কোভাইরিন ক্যাপসুল (রাতে)</p>
৬০-৭৪	১০০০ মিঃ গ্রাঃ/দৈনিক	২টা ২০০ মিঃ গ্রাঃ কোভাইরিন ক্যাপসুল (সকালে) <p>৩টা ২০০ মিঃ গ্রাঃ কোভাইরিন ক্যাপসুল (রাতে)</p>
≥৭৫	১২০০ মিঃ গ্রাঃ/দৈনিক	৩টা ২০০ মিঃ গ্রাঃ কোভাইরিন ক্যাপসুল (সকালে) <p>৩টা ২০০ মিঃ গ্রাঃ কোভাইরিন ক্যাপসুল (রাতে)</p>



The empirical formula of Ribavirin is C₈H₁₂N₄ O₅ and the molecular weight is 244.2. Ribavirin is a white to off-white powder. It is freely soluble in water and slightly soluble in anhydrous alcohol.

COVIRIN (Ribavirin) is available as capsule. Each Capsule contains 200 mg of Ribavirin and required Pharmaceutical additives to give the best capsule dosage form.

CLINICAL PHARMACOLOGY

Mechanism of Action

The mechanism by which Ribavirin contributes to its antiviral efficacy is not fully understood. Ribavirin has direct antiviral activity in tissue culture against many RNA viruses. Ribavirin increases the mutation frequency in the genomes of several RNA viruses and Ribavirin triphosphate inhibits HCV polymerase in a biochemical reaction.

Pharmacokinetics

Absorption and Distribution

Data shown Ribavirin C_{max} was 2748±818 ng/mL and the average time to reach C_{max} was 2 hours. The terminal half-life of Ribavirin following administration of a single oral dose of Ribavirin is about 120 to 170 hours. The total apparent clearance following administration of a single oral dose of Ribavirin is about 26 L/h. There is extensive accumulation of Ribavirin after multiple dosing (twice daily) such that the C_{max} at steady state was four-fold higher than that of a single dose.

Elimination and Metabolism

The contribution of renal and hepatic pathways to Ribavirin elimination is not known. In vitro studies indicate that Ribavirin is not a substrate of CYP450 enzymes.

Renal Impairment

The apparent clearance of Ribavirin was reduced in subjects with creatinine clearance less than or equal to 50 mL/min, including subjects with ESRD on HD, exhibiting approximately 30% of the value found in subjects with normal renal function. Pharmacokinetic modeling and simulation indicates that a dose of 200 mg daily in patients with severe renal impairment and a dose of 200 mg daily alternating with 400 mg the following day in patients with moderate renal impairment will provide plasma Ribavirin exposures similar to that observed in patients with normal renal function receiving the standard 1000/1200 mg COVIRIN daily dose. These doses have not been studied in patients. Plasma Ribavirin is removed by hemodialysis with an extraction ratio of approximately 50%; however, due to the large volume of distribution of Ribavirin, plasma exposure is not expected to change with hemodialysis.

PHARMACEUTICAL INFORMATION

How Supplied

COVIRIN Capsule: Each HDPE bottle of COVIRIN contains 30 capsules (each capsule contains Ribavirin USP 200mg), a silica gel desiccant and polyester coil with a child-resistant closure.

Storage

Store at room temperature, below 30°C (86°F). Do not remove desiccant. Dispense in original bottle.

Keep COVIRIN out of the sight and reach of children.

	Manufactured By
	Everest Pharmaceuticals Ltd.
	BSCIC, Kanchpur, Narayangonj, Bangladesh

Everest

প্রতিনির্দেশনা
• গর্ভবতী মহিলা, গর্ভবতী মহিলাদের স্বামী, হিমোগ্লোবিনের সমসাজনিত রোগী। যেমন- গ্যালাক্টেমিয়া মেজর অথবা সিকেল সেল এনিমিয়া, অটোইমিউন হেপাটাইটিস অথবা চিকিৎসার পূর্বে বা সময়ে যকৃতের সমস্যা।
• রাইবাবাইরিন বা কোভাইরিন এর অন্য কোন উপাদানের প্রতি অতিসংবেদনশীল রোগীদের ক্ষেত্রে।

সতর্কতা

নিম্নলিখিত ক্ষেত্রে রাইবাবাইরিন গ্রহণ করার আগে চিকিৎসকের পরামর্শ নেওয়া উচিত:
ঊত্র হৃৎপিণ্ডের সমস্যা, কিডনীর অসুখ, রক্তের সমস্যা (যেমন সিকেল সেল এনিমিয়া, হিমোগ্লোবিন কমে যাওয়া), যকৃতের অন্যান্য প্রদাহসমূহ (যেমন অটোইমিউন হেপাটাইটিস) যকৃতের অন্য কোন সমস্যা, শ্বাস প্রশ্বাসের সমস্যা, অগ্নাশয়ের সমস্যা (যেমন অগ্নাশয়ের প্রদাহ) ডায়াবেটিস, এলার্জি ইত্যাদি।
যে সকল কাজে সতর্কতা প্রয়োজন: গাড়ী চালানো অথবা যন্ত্রপাতি চালানো। এছাড়া প্রাণীদের ক্ষেত্রে অতিরিক্ত সতর্কতা অবলম্বন প্রয়োজন।

পার্শ্বপ্রতিক্রিয়া

বমিবিমি ভাব, বমি, মাথা ব্যথা, মাথা ঘোরা, আপসা দৃষ্টি, পাকস্থলীর সমস্যা, দুগের সমস্যা এবং ফুর মত উপসর্গ (যেমন জ্বর, ঠাণ্ডা, গলা ব্যথা, মাংস