

Loncil

Trifluridine & Tipiracil

COMPOSITION

Loncil 15/6.14 tablet: Each film coated tablet contains Trifluridine BP 15 mg & Tipiracil Hydrochloride INN equivalent to Tipiracil 6.14 mg.

Loncil 20/8.19 tablet: Each film coated tablet contains Trifluridine BP 20 mg & Tipiracil Hydrochloride INN equivalent to Tipiracil 8.19 mg.

PHARMACOLOGICAL ACTIONS

Mechanism of Action

Trifluridine and Tipiracil consists of a thymidine-based nucleoside analog, Trifluridine, and the thymidine phosphorylase inhibitor, tipiracil, at a molar ratio 1:0.5 (weight ratio, 1:0.471). Inclusion of Tipiracil increases Trifluridine exposure by inhibiting its metabolism by thymidine phosphorylase.

Following uptake into cancer cells, Trifluridine is incorporated into DNA, interferes with DNA synthesis and inhibits cell proliferation. Trifluridine/Tipiracil demonstrated anti-tumor activity against KRAS wild-type and mutant human colorectal cancer xenografts in mice.

Pharmacokinetics

After twice daily dosing of Trifluridine and Tipiracil, systemic exposure (AUC) of Trifluridine increased more than dose-proportionally over the dose range of 15 mg/m² (0.43 times the recommended dose) to 35 mg/m².

The accumulation of Trifluridine was 3-fold for AUC_{0-12hr} and 2-fold for C_{max} at steady state while no accumulation was observed for tipiracil.

Administration of a single dose of Trifluridine and Tipiracil 35 mg/m² increased the mean AUC_{0-last} of Trifluridine by 37-fold and C_{max} by 22-fold with reduced variability compared to administration of a single dose of Trifluridine 35 mg/m² alone.

Absorption

Following a single oral administration of Trifluridine and Tipiracil at 35 mg/m² in patients with cancer, the mean time to peak plasma concentration (T_{max}) of Trifluridine was around 2 hours.

Food Effect

A standardized high-fat, high-calorie meal decreased Trifluridine C_{max}, Tipiracil C_{max} and AUC by approximately 40%, but did not change Trifluridine AUC compared to those in a fasting state in patients with cancer following administration of a single dose of Trifluridine and Tipiracil 35 mg/m².

Distribution

Trifluridine mainly binds to human serum albumin. The in vitro protein binding of Trifluridine in human plasma is >96%, independent of drug concentration and presence of Tipiracil. Plasma protein binding of Tipiracil is below 8%.

Elimination

After administration of Trifluridine and Tipiracil 35 mg/m², the mean elimination half-life (t_{1/2}) of Trifluridine was 1.4 hours and of Tipiracil was 2.1 hours after a single dose. The mean elimination half-life at steady state of Trifluridine was 2.1 hours and of Tipiracil was 2.4 hours.

Metabolism

Trifluridine and Tipiracil are not metabolized by cytochrome P450 (CYP) enzymes. Trifluridine is mainly eliminated by metabolism via thymidine phosphorylase to form an inactive metabolite, 5-(Trifluoromethyl) uracil (FTY). No other major metabolites were detected in plasma or urine.

Excretion

After single oral administration of Trifluridine and Tipiracil (60 mg) with [14C]-Trifluridine, the total cumulative excretion of radioactivity was 60% of the administered dose. The majority of recovered radioactivity was eliminated into urine (55% of the dose) as FTY and Trifluridine glucuronide isomers within 24 hours and the excretion into feces and expired air was <3% for both. The unchanged Trifluridine was <3% of administered dose recovered in the urine and feces.

After single oral administration of Trifluridine and Tipiracil (60 mg) with [14C]-Tipiracil Hydrochloride, recovered radioactivity was 77% of the dose, which consisted of 27% urinary excretion and 50% fecal excretion. Tipiracil was the major component and 6-HMU was the major metabolite in urine, and feces.

Specific Populations

Based on the population pharmacokinetic analysis, there is no clinically relevant effect of age, sex, or race (White or Asian) on the pharmacokinetics of Trifluridine or Tipiracil.

Patients with Renal Impairment

In a dedicated renal impairment study, all patients received Trifluridine and Tipiracil 35 mg/m² twice daily except for patients with severe renal impairment who received 20 mg/m² twice daily. Mild renal impairment (CL_{cr} of 60 to 89 mL/min as determined by the Cockcroft-Gault formula) had no clinically important effect on steady-state AUC_{0-last} of Trifluridine and tipiracil. Moderate renal impairment (CL_{cr} of 30 to 59 mL/min) increased steady-state AUC_{0-last} of Trifluridine by 56% and Tipiracil by 139% compared to normal renal function (CL_{cr} ≥ 90 mL/min). Severe renal impairment (CL_{cr} of 15 to 29 mL/min) increased the dose-normalized steady-state AUC_{0-last} of Trifluridine by 140% and Tipiracil by 614% compared to normal renal function. The pharmacokinetics of Trifluridine and Tipiracil have not been studied in patients with end stage renal disease.

Patients with Hepatic Impairment

No clinically important differences in the mean exposures of Trifluridine and Tipiracil were observed between patients with mild hepatic impairment (total bilirubin ≤ ULN and AST > ULN or total bilirubin <1 to 1.5 times ULN and any AST) to moderate hepatic impairment (total bilirubin >1.5 to 3 times ULN and any AST) and patients with normal hepatic function (total bilirubin and AST ≤ ULN); however, 5 of 6 patients with moderate hepatic impairment experienced Grade 3 or 4 increased bilirubin levels. The pharmacokinetics of Trifluridine and Tipiracil have not been studied in patients with severe hepatic impairment.

Drug Interaction Studies

In vitro studies indicated that Trifluridine, Tipiracil, and FTY did not inhibit the CYP enzymes and had no inductive effect on CYP1A2, CYP2B6, or CYP3A4/5.

In vitro studies indicated that Trifluridine was not an inhibitor of or substrate for human uptake and efflux transporters.

THERAPEUTIC INDICATIONS

Metastatic Colorectal Cancer

Trifluridine and Tipiracil is indicated for the treatment of adult patients with metastatic colorectal cancer previously treated with fluoropyrimidine, oxaliplatin-and irinotecan-based chemotherapy, an anti-VEGF biological therapy, and if RAS wild-type, an anti-EGFR therapy.

Metastatic Gastric Cancer

Trifluridine and Tipiracil is indicated for the treatment of adult patients with metastatic gastric or gastroesophageal junction adenocarcinoma previously treated with at least two prior lines of chemotherapy that included a fluoropyrimidine, a platinum, either a taxane or irinotecan, and if appropriate, HER2/neu-targeted therapy.

DOSAGE AND ADMINISTRATION

Recommended Dosage

The recommended dosage of Trifluridine and Tipiracil is 35

mg/m² up to a maximum of 80 mg per dose (based on the Trifluridine component) orally twice daily with food on Days 1 through 5 and Days 8 through 12 of each 28-day cycle until disease progression or unacceptable toxicity. Round dose to the nearest 5 mg increment.

Instruct patients to swallow the tablet whole.

Instruct patients not to retake doses of Trifluridine and Tipiracil that are vomited or missed and to continue with the next scheduled dose.

Trifluridine and Tipiracil is a cytotoxic drug. Follow applicable special handling and disposal procedures.

Recommended Dosage According to Body Surface Area (BSA)

| BSA (m ²) | Total daily dose (mg) | Dose (mg) administered twice daily | Tablets per dose | |
|-----------------------|-----------------------|------------------------------------|------------------|-------|
| | | | 15 mg | 20 mg |
| < 1.07 | 70 | 35 | 1 | 1 |
| 1.07 - 1.22 | 80 | 40 | 0 | 2 |
| 1.23 - 1.37 | 90 | 45 | 3 | 0 |
| 1.38 - 1.52 | 100 | 50 | 2 | 1 |
| 1.53 - 1.68 | 110 | 55 | 1 | 2 |
| 1.69 - 1.83 | 120 | 60 | 0 | 3 |
| 1.84 - 1.98 | 130 | 65 | 3 | 1 |
| 1.99 - 2.14 | 140 | 70 | 2 | 2 |
| 2.15 - 2.29 | 150 | 75 | 1 | 3 |
| ≥2.30 | 160 | 80 | 0 | 4 |

CONTRAINDICATIONS

None.

WARNINGS AND PRECAUTIONS

Severe Myelosuppression

In the 868 patients who received Trifluridine and Tipiracil in RECURSE and TAGS, Trifluridine and Tipiracil caused severe and life-threatening myelosuppression (Grade 3-4) consisting of anemia (18%), neutropenia (38%), thrombocytopenia (5%) and febrile neutropenia (3%). Two patients (0.2%) died due to neutropenic infection/sepsis and four other patients (0.5%) died due to septic shock. A total of 12% of Trifluridine and Tipiracil-treated patients received granulocyte-colony stimulating factors.

Obtain complete blood counts prior to and on Day 15 of each cycle of Trifluridine and Tipiracil and more frequently as clinically indicated. Withhold Trifluridine and Tipiracil for severe myelosuppression and resume at the next lower dosage.

Embryo-Fetal Toxicity

Based on animal studies and its mechanism of action, Trifluridine and Tipiracil can cause fetal harm when administered to a pregnant woman. Trifluridine/Tipiracil caused embryo-fetal lethality and embryo-fetal toxicity in pregnant rats when orally administered during gestation at dosage levels resulting in exposures lower than those achieved at the recommended dosage of 35 mg/m² twice daily. Advise pregnant women of the potential risk to the fetus. Advise females of reproductive potential to use an effective method of contraception during treatment with Trifluridine and Tipiracil and for at least 6 months after the final dose.

SIDE EFFECTS

The most common adverse reactions or laboratory abnormalities (≥10%) are anemia, neutropenia, fatigue/asthenia, nausea, thrombocytopenia, decreased appetite, diarrhea, vomiting, and pyrexia.

USE IN SPECIFIC POPULATIONS

Pregnancy

Based on animal data and its mechanism of action Trifluridine and Tipiracil can cause fetal harm.

Lactation

There are no data on the presence of Trifluridine, Tipiracil or its metabolites in human milk or its effects on the breastfed child or on milk production.

Females and Males of Reproductive Potential

Pregnancy Testing

Verify pregnancy status in females of reproductive potential prior to initiating Trifluridine and Tipiracil.

Contraception

Trifluridine and Tipiracil can cause fetal harm when administered to a pregnant woman.

Females

Advise females of reproductive potential to use effective contraception during treatment with Trifluridine and Tipiracil and for at least 6 months after the final dose.

Males

Because of the potential for genotoxicity, advise males with female partners of reproductive potential to use condoms during treatment with Trifluridine and Tipiracil and for at least 3 months after the final dose.

Pediatric Use

Safety and effectiveness of Trifluridine and Tipiracil in pediatric patients have not been established.

Geriatric Use

No overall differences in effectiveness were observed in patients 65 or older versus younger patients.

Renal Impairment

No dose adjustment is recommended for patients with mild or moderate renal impairment (CL_{cr} of 30 to 89 mL/min as determined by the Cockcroft-Gault formula). Reduce the dose of Trifluridine and Tipiracil for patients with severe renal impairment (CL_{cr} of 15 to 29 mL/min). The pharmacokinetics of Trifluridine and Tipiracil have not been studied in patients with end stage renal disease.

DRUG INTERACTIONS STUDIES

In vitro studies indicated that Trifluridine, Tipiracil, and FTY did not inhibit the CYP enzymes and had no inductive effect on CYP1A2, CYP2B6, or CYP3A4/5.

In vitro studies indicated that Trifluridine was not an inhibitor of or substrate for human uptake and efflux transporters.

PHARMACEUTICAL INFORMATION

Storage

Store below 30°C, dry place and keep away from light. Keep out of the reach of children.

PACKAGING

Loncil 15/6.14 tablet: Each commercial box contains 20 tablets in Alu-Alu blister pack.

Loncil 20/8.19 tablet: Each commercial box contains 40 tablets in Alu-Alu blister pack.

Manufactured By

Beacon Pharmaceuticals PLC

Bhaluka, Mymensingh, Bangladesh

LF47901