

HIGHLIGHTS OF PRESCRIBING INFORMATION

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

HYDREA (hydroxyurea) capsules, for oral use
Initial U.S. Approval: 1967

-----**RECENT MAJOR CHANGES**-----
Indications and Usage, melanoma (1) Removed 7/2015
Indications and Usage, carcinoma of the ovary (1) Removed 7/2015
Dosage and Administration (2) 7/2015

-----**INDICATIONS AND USAGE**-----
HYDREA is an antimetabolite indicated for the treatment of:

- Resistant chronic myeloid leukemia. (1)
- Locally advanced squamous cell carcinomas of the head and neck, (excluding lip) in combination with concurrent chemoradiation. (1)

-----**DOSAGE AND ADMINISTRATION**-----

- Individualize treatment based on tumor type, disease state, response to treatment, patient risk factors, and current clinical practice standards. (2.1)
- Renal impairment: Reduce the dose of HYDREA by 50% in patients with creatinine clearance less than 60 mL/min. (2.3, 8.6, 12.3)

-----**DOSAGE FORMS AND STRENGTHS**-----

- Capsules: 500 mg (3)

-----**CONTRAINDICATIONS**-----

- In patients who have demonstrated a previous hypersensitivity to hydroxyurea or any other component of its formulation. (4)

-----**WARNINGS AND PRECAUTIONS**-----

- Myelosuppression: Do not give if bone marrow function is markedly depressed. Monitor hematology labs and interrupt, reduce dose as appropriate. (5.1)

- Malignancies: Advise protection from sun exposure and monitor for secondary malignancies. (5.2)
- Embryo-fetal toxicity can cause fetal harm Advise of potential risk to a fetus and use of effective contraception. (5.3, 8.1)
- Vasculitic toxicities: Discontinue HYDREA and initiate alternative management if this occurs. (5.4)
- Risks with concomitant use of antiretroviral drugs: Pancreatitis, hepatotoxicity, and neuropathy have occurred. Monitor for signs and symptoms in patients with HIV infection using antiretroviral drugs; discontinue HYDREA, and implement treatment. (5.5)
- Radiation recall: Monitor for skin erythema in patients who previously received radiation and manage symptomatically. (5.6)

-----**ADVERSE REACTIONS**-----

Most common adverse reactions (≥30%) are hematological, gastrointestinal symptoms, and anorexia. (6)

To report SUSPECTED ADVERSE REACTIONS, contact Bristol-Myers Squibb at 1-800-721-5072 or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

-----**DRUG INTERACTIONS**-----

Antiretroviral drugs (7)

-----**USE IN SPECIFIC POPULATIONS**-----

- *Nursing Mothers*: Hydroxyurea is excreted in human milk. Discontinue nursing during treatment with HYDREA. (8.3)
- *Geriatric Use*: Care should be taken in dose selection and may require a lower dose regimen and monitoring of renal function. (8.5)

See 17 for **PATIENT COUNSELING INFORMATION**

Revised: 7/2015

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*Sections or subsections omitted from the full prescribing information are not listed.

FULL PRESCRIBING INFORMATION

1 INDICATIONS AND USAGE

HYDREA is indicated for the treatment of:

- Resistant chronic myeloid leukemia.
- Locally advanced squamous cell carcinomas of the head and neck (excluding the lip) in combination with chemoradiation.

2 DOSAGE AND ADMINISTRATION

2.1 Dosing Information

HYDREA is used alone or in conjunction with other antitumor agents or radiation therapy to treat neoplastic diseases. Individualize treatment based on tumor type, disease state, response to treatment, patient risk factors, and current clinical practice standards.

Base all dosage on the patient's actual or ideal weight, whichever is less.

HYDREA is a cytotoxic drug. Follow applicable special handling and disposal procedures [see *References (15)*].

Prophylactic administration of folic acid is recommended [see *Warnings and Precautions (5.7)*].

2.2 Dose Modifications for Toxicity

Monitor for the following and reduce the dose or discontinue HYDREA accordingly:

- Myelosuppression [see *Warnings and Precautions (5.1)*]
- Cutaneous vasculitis [see *Warnings and Precautions (5.4)*]

Monitor blood counts at least once a week during HYDREA therapy. Severe anemia must be corrected before initiating therapy with HYDREA. Consider dose modifications for other toxicities.

2.3 Dose Modifications for Renal Impairment

Reduce the dose of HYDREA by 50% in patients with measured creatinine clearance of less than 60 mL/min or with end-stage renal disease (ESRD) [see *Use in Specific Populations (8.6)* and *Clinical Pharmacology (12.3)*].

Creatinine Clearance (mL/min)	Recommended HYDREA Initial Dose (mg/kg daily)
≥60	15
<60 or ESRD*	7.5

* On dialysis days, administer HYDREA to patients following hemodialysis.

Close monitoring of hematologic parameters is advised in these patients.

3 DOSAGE FORMS AND STRENGTHS

Capsules: 500 mg opaque green cap and opaque pink body imprinted with “HYDREA” and “830.”

4 CONTRAINDICATIONS

HYDREA is contraindicated in patients who have demonstrated a previous hypersensitivity to hydroxyurea or any other component of the formulation.

5 WARNINGS AND PRECAUTIONS

5.1 Myelosuppression

Hydroxyurea causes severe myelosuppression. Treatment with hydroxyurea should not be initiated if bone marrow function is markedly depressed. Bone marrow suppression may occur, and leukopenia is generally its first and most common manifestation. Thrombocytopenia and anemia occur less often and are seldom seen without a preceding leukopenia. Bone marrow depression is more likely in patients who have previously received radiotherapy or cytotoxic cancer chemotherapeutic agents; use hydroxyurea cautiously in such patients.

Evaluate hematologic status prior to and during treatment with HYDREA. Provide supportive care and modify dose or discontinue HYDREA as needed. Recovery from myelosuppression is usually rapid when therapy is interrupted.

5.2 Malignancies

Hydroxyurea is a human carcinogen. In patients receiving long-term hydroxyurea for myeloproliferative disorders, secondary leukemia has been reported. Skin cancer has also been reported in patients receiving long-term hydroxyurea. Advise protection from sun exposure and monitor for the development of secondary malignancies.

5.3 Embryo-Fetal Toxicity

Hydroxyurea may cause fetal harm when administered to a pregnant woman. Hydroxyurea is genotoxic. Hydroxyurea has been demonstrated to be a potent teratogen in a wide variety of animal models, including mice, hamsters, cats, miniature swine, dogs, and monkeys at doses within 1-fold of the human dose given on a mg/m^2 basis. Hydroxyurea is embryotoxic and causes fetal malformations at 180 mg/kg/day in rats and at 30 mg/kg/day in rabbits. Single doses of ≥ 375 mg/kg to rats caused growth retardation and impaired learning ability. Advise pregnant women of the potential risk to a fetus. Advise females of reproductive potential to use effective contraception during and after treatment with HYDREA for at least 30 days after therapy. Females of reproductive potential should also ensure that their male partner, who is/has taken HYDREA, uses effective contraception during and after treatment for at least 1 year after

therapy. Advise males of reproductive potential to use effective contraception during and after treatment with HYDREA for at least 1 year after therapy [see *Use in Specific Populations* (8.1, 8.3)].

5.4 Vasculitic Toxicities

Cutaneous vasculitic toxicities, including vasculitic ulcerations and gangrene, have occurred in patients with myeloproliferative disorders during therapy with hydroxyurea. These vasculitic toxicities were reported most often in patients with a history of, or currently receiving, interferon therapy. If cutaneous vasculitic ulcers occur, institute treatment and discontinue of HYDREA.

5.5 Risks with Concomitant Use of Antiretroviral Drugs

Pancreatitis, hepatotoxicity, and peripheral neuropathy have occurred when hydroxyurea was administered concomitantly with antiretroviral drugs, including didanosine and stavudine [see *Drug Interactions* (7.1)].

5.6 Radiation Recall

Patients who have received irradiation therapy in the past may have an exacerbation of postirradiation erythema. Monitor for skin erythema in patients who previously received radiation and manage symptomatically.

5.7 Macrocytosis

HYDREA may cause macrocytosis, which is self-limiting, and is often seen early in the course of treatment. The morphologic change resembles pernicious anemia, but is not related to vitamin B₁₂ or folic acid deficiency. This may mask the diagnosis of pernicious anemia. Prophylactic administration of folic acid is recommended.

6 ADVERSE REACTIONS

The following adverse reactions are described in detail in other labeling sections:

- Myelosuppression [see *Warnings and Precautions* (5.1)]
- Malignancies [see *Warnings and Precautions* (5.2)]
- Embryo-fetal toxicity [see *Warnings and Precautions* (5.3)]
- Vasculitic toxicities [see *Warnings and Precautions* (5.4)]
- Risks with concomitant use of antiretroviral drugs [see *Warnings and Precautions* (5.5)]
- Radiation recall [see *Warnings and Precautions* (5.6)]
- Macrocytosis [see *Warnings and Precautions* (5.7)]

Postmarketing Experience

The following adverse reactions have been identified during postapproval use of HYDREA. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency.

- *Gastrointestinal disorders:* stomatitis, anorexia, nausea, vomiting, diarrhea, and constipation
- *Skin and subcutaneous tissue disorders:* maculopapular rash, skin ulceration, dermatomyositis-like skin changes, peripheral and facial erythema, hyperpigmentation, atrophy of skin and nails, scaling, violet papules, and alopecia
- *Renal and urinary disorders:* dysuria, elevations in serum uric acid, blood urea nitrogen (BUN), and creatinine levels
- *Nervous system disorders:* headache, dizziness, drowsiness, disorientation, hallucinations, and convulsions
- *General Disorders:* fever, chills, malaise, edema, and asthenia
- *Hepatobiliary disorders:* elevation of hepatic enzymes
- *Respiratory disorders:* diffuse pulmonary infiltrates, dyspnea, and pulmonary fibrosis

Adverse reactions observed with combined hydroxyurea and irradiation therapy are similar to those reported with the use of hydroxyurea or radiation treatment alone. These effects primarily include bone marrow depression (anemia and leukopenia), gastric irritation, and mucositis. Almost all patients receiving an adequate course of combined hydroxyurea and irradiation therapy will demonstrate concurrent leukopenia. Platelet depression ($<100,000$ cells/mm³) has occurred in the presence of marked leukopenia. HYDREA may potentiate some adverse reactions usually seen with irradiation alone, such as gastric distress and mucositis.

7 DRUG INTERACTIONS

7.1 Increased Toxicity with Concomitant Use of Antiretroviral Drugs

Pancreatitis

In patients with HIV infection during therapy with hydroxyurea and didanosine, with or without stavudine, fatal and nonfatal pancreatitis have occurred. Hydroxyurea is not indicated for the treatment of HIV infection; however, if patients with HIV infection are treated with hydroxyurea, and in particular, in combination with didanosine and/or stavudine, close monitoring for signs and symptoms of pancreatitis is recommended. Permanently discontinue therapy with hydroxyurea in patients who develop signs and symptoms of pancreatitis.

Hepatotoxicity

Hepatotoxicity and hepatic failure resulting in death have been reported during postmarketing surveillance in patients with HIV infection treated with hydroxyurea and other antiretroviral

drugs. Fatal hepatic events were reported most often in patients treated with the combination of hydroxyurea, didanosine, and stavudine. Avoid this combination.

Peripheral Neuropathy

Peripheral neuropathy, which was severe in some cases, has been reported in patients with HIV infection receiving hydroxyurea in combination with antiretroviral drugs, including didanosine, with or without stavudine.

7.2 Test Interference

Interference with Uric Acid, Urea, or Lactic Acid Assays

Studies have shown that there is an analytical interference of hydroxyurea with the enzymes (urease, uricase, and lactate dehydrogenase) used in the determination of urea, uric acid, and lactic acid, rendering falsely elevated results of these in patients treated with hydroxyurea.

8 USE IN SPECIFIC POPULATIONS

8.1 Pregnancy

Pregnancy Category D

Risk Summary

HYDREA can cause fetal harm when administered to a pregnant woman. There are no adequate and well-controlled studies in pregnant women. 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 harm to the fetus. Women of childbearing potential should be advised to avoid becoming pregnant.

Drugs which affect DNA synthesis, such as hydroxyurea, may be potential mutagenic agents.

The physician should carefully consider this possibility before administering this drug to male or female patients who may contemplate conception [*see Warnings and Precautions (5.3)*].

Animal Data

Hydroxyurea has been demonstrated to be a potent teratogen in a wide variety of animal models, including mice, hamsters, cats, miniature swine, dogs, and monkeys at doses within 1-fold of the human dose given on a mg/m^2 basis. Hydroxyurea is embryotoxic and causes fetal malformations (partially ossified cranial bones, absence of eye sockets, hydrocephaly, bipartite sternebrae, missing lumbar vertebrae) at 180 $\text{mg}/\text{kg}/\text{day}$ (about 0.8 times the maximum recommended human daily dose on a mg/m^2 basis) in rats and at 30 $\text{mg}/\text{kg}/\text{day}$ (about 0.3 times the maximum recommended human daily dose on a mg/m^2 basis) in rabbits. Embryotoxicity was characterized by decreased fetal viability, reduced live litter sizes, and developmental delays. Hydroxyurea crosses the placenta. Single doses of ≥ 375 mg/kg (about 1.7 times the maximum

recommended human daily dose on a mg/m^2 basis) to rats caused growth retardation and impaired learning ability.

8.3 Nursing Mothers

Hydroxyurea is excreted in human milk. Because of the potential for serious adverse reactions with hydroxyurea, discontinue nursing during treatment with HYDREA.

8.4 Pediatric Use

Safety and effectiveness in pediatric patients have not been established.

8.5 Geriatric Use

Elderly patients may be more sensitive to the effects of hydroxyurea, and may require a lower dose regimen. Hydroxyurea is excreted by the kidney, and the risk of adverse reactions to this drug may be greater in patients with impaired renal function. Because elderly patients are more likely to have decreased renal function, care should be taken in dose selection, and it may be useful to monitor renal function [*see Dosage and Administration (2.3)*].

8.6 Renal Impairment

The exposure to hydroxyurea is higher in patients with creatinine clearance of less than 60 mL/min or in patients with end-stage renal disease (ESRD). Reduce dosage and closely monitor the hematologic parameters when HYDREA is to be administered to these patients [*see Dosage and Administration (2.3) and Clinical Pharmacology (12.3)*].

8.7 Hepatic Impairment

There are no data that support specific guidance for dosage adjustment in patients with hepatic impairment. Close monitoring of hematologic parameters is advised in these patients.

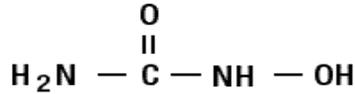
10 OVERDOSAGE

Acute mucocutaneous toxicity has been reported in patients receiving hydroxyurea at dosages several times the therapeutic dose. Soreness, violet erythema, edema on palms and soles followed by scaling of hands and feet, severe generalized hyperpigmentation of the skin, and stomatitis have also been observed.

11 DESCRIPTION

HYDREA (hydroxyurea capsules, USP) is an antimetabolite available for oral use as capsules containing 500 mg hydroxyurea. Inactive ingredients include citric acid, colorants (D&C Yellow No. 10, FD&C Blue No. 1, FD&C Red No. 40, and D&C Red No. 28), gelatin, lactose, magnesium stearate, sodium phosphate, and titanium dioxide.

Hydroxyurea is a white crystalline powder. It has a molecular weight of 76.05. Its structural formula is:



12 CLINICAL PHARMACOLOGY

12.1 Mechanism of Action

The precise mechanism by which hydroxyurea produces its antineoplastic effects cannot, at present, be described. However, the reports of various studies in tissue culture in rats and humans lend support to the hypothesis that hydroxyurea causes an immediate inhibition of DNA synthesis by acting as a ribonucleotide reductase inhibitor, without interfering with the synthesis of ribonucleic acid or of protein. This hypothesis explains why, under certain conditions, hydroxyurea may induce teratogenic effects.

Three mechanisms of action have been postulated for the increased effectiveness of concomitant use of hydroxyurea therapy with irradiation on squamous cell (epidermoid) carcinomas of the head and neck. *In vitro* studies utilizing Chinese hamster cells suggest that hydroxyurea (1) is lethal to normally radioresistant S-stage cells, and (2) holds other cells of the cell cycle in the G1 or pre-DNA synthesis stage where they are most susceptible to the effects of irradiation. The third mechanism of action has been theorized on the basis of *in vitro* studies of HeLa cells. It appears that hydroxyurea, by inhibition of DNA synthesis, hinders the normal repair process of cells damaged but not killed by irradiation, thereby decreasing their survival rate; RNA and protein syntheses have shown no alteration.

12.3 Pharmacokinetics

Absorption

Following oral administration of HYDREA, hydroxyurea reaches peak plasma concentrations in 1 to 4 hours. Mean peak plasma concentrations and AUCs increase more than proportionally with increase of dose.

There are no data on the effect of food on the absorption of hydroxyurea.

Distribution

Hydroxyurea distributes throughout the body with a volume of distribution approximating total body water.

Hydroxyurea concentrates in leukocytes and erythrocytes.

Metabolism

Up to 60% of an oral dose undergoes conversion through saturable hepatic metabolism and a minor pathway of degradation by urease found in intestinal bacteria.

Excretion

In patients with sickle cell anemia, the mean cumulative urinary recovery of hydroxyurea was about 40% of the administered dose.

Specific Populations

Renal Impairment

The effect of renal impairment on the pharmacokinetics of hydroxyurea was assessed in adult patients with sickle cell disease and renal impairment. Patients with normal renal function (creatinine clearance [CrCl] >80 mL/min), mild (CrCl 50-80 mL/min), moderate (CrCl = 30-50 mL/min), or severe (<30 mL/min) renal impairment received a single oral dose of 15 mg/kg hydroxyurea. Patients with ESRD received two doses of 15 mg/kg separated by 7 days; the first was given following a 4-hour hemodialysis session, the second prior to hemodialysis. The exposure to hydroxyurea (mean AUC) in patients with CrCl <60 mL/min and those with ESRD was 64% higher than in patients with normal renal function (CrCl >60 mL/min). Reduce the dose of HYDREA when it is administered to patients with creatinine clearance of <60 mL/min or with ESRD following hemodialysis [see *Dosage and Administration (2.3)* and *Use in Specific Populations (8.6)*].

13 NONCLINICAL TOXICOLOGY

13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility

See Warnings and Precautions (5.2) for carcinogenesis and mutagenesis information.

Conventional long-term studies to evaluate the carcinogenic potential of hydroxyurea have not been performed. However, intraperitoneal administration of 125 to 250 mg/kg hydroxyurea (about 0.6-1.2 times the maximum recommended human oral daily dose on a mg/m² basis) thrice weekly for 6 months to female rats increased the incidence of mammary tumors in rats surviving to 18 months compared to control. Hydroxyurea is mutagenic *in vitro* to bacteria, fungi, protozoa, and mammalian cells. Hydroxyurea is clastogenic *in vitro* (hamster cells, human lymphoblasts) and *in vivo* (SCE assay in rodents, mouse micronucleus assay). Hydroxyurea causes the transformation of rodent embryo cells to a tumorigenic phenotype.

Impairment of Fertility: Hydroxyurea administered to male rats at 60 mg/kg/day (about 0.3 times the maximum recommended human daily dose on a mg/m² basis) produced testicular atrophy, decreased spermatogenesis, and significantly reduced their ability to impregnate females.

15 REFERENCES

OSHA. <http://www.osha.gov/SLTC/hazardousdrugs/index.html>.

16 HOW SUPPLIED/STORAGE AND HANDLING

16.1 How Supplied

HYDREA[®] (hydroxyurea capsules, USP) is supplied as 500 mg capsules in HDPE bottles with a plastic safety screw cap. Each bottle contains 100 capsules. The cap is opaque green and the body is opaque pink. The capsules are imprinted on both sections with “HYDREA” and “830” in black ink (NDC 0003-0830-50).

16.2 Storage

Store at 25°C (77°F); excursions permitted to 15°C-30°C (59°F-86°F) [see USP Controlled Room Temperature]. Keep tightly closed.

16.3 Handling and Disposal

HYDREA is a cytotoxic drug. Follow applicable special handling and disposal procedures [*see References (15)*].

To decrease the risk of contact, advise caregivers to wear disposable gloves when handling HYDREA or bottles containing HYDREA. Wash hands with soap and water before and after contact with the bottle or capsules when handling HYDREA. Do not open HYDREA capsules. Avoid exposure to crushed or opened capsules. If contact with crushed or opened capsules occurs on the skin, wash affected area immediately and thoroughly with soap and water. If contact with crushed or opened capsules occurs on the eye(s), the affected area should be flushed thoroughly with water or isotonic eyewash designated for that purpose for at least 15 minutes. If the powder from the capsule is spilled, immediately wipe it up with a damp disposable towel and discard in a closed container, such as a plastic bag; as should the empty capsules. The spill areas should then be cleaned three times using a detergent solution followed by clean water. Keep the medication away from children and pets. Contact your doctor for instructions on how to dispose of outdated capsules.

17 PATIENT COUNSELING INFORMATION

- There is a risk of myelosuppression. Monitoring blood counts weekly throughout the duration of therapy should be emphasized to patients taking HYDREA [*see Warnings and Precautions (5.1)*]. Advise patients to report signs and symptoms of infection or bleeding immediately.
- Advise patients that there is a risk of cutaneous vasculitic toxicities and secondary malignancies including leukemia and skin cancers [*see Warnings and Precautions (5.2, 5.4)*].
- Advise females of reproductive potential of the potential risk to a fetus and to inform their healthcare provider of a known or suspected pregnancy. Advise females and males of reproductive potential to use contraception during and after treatment with HYDREA [*see Warnings and Precautions 5.3 and Use in Specific Populations (8.1)*].

- Advise females to discontinue breastfeeding during treatment with HYDREA [*see Use in Specific Populations (8.3)*].
- Patients with HIV infection should contact their physician for signs and symptoms of pancreatitis, hepatic events, and peripheral neuropathy [*see Warnings and Precautions (5.5)*].
- Postirradiation erythema can occur in patients who have received previous irradiation therapy [*see Warnings and Precautions (5.6)*].

Manufactured for:
Bristol-Myers Squibb Company
Princeton, New Jersey 08543 USA

Product of Italy

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