Carboplatin: Drug information

(For additional information see "Carboplatin: Patient drug information" and see "Carboplatin: Pediatric drug information")

For abbreviations and symbols that may be used in Lexicomp (show table)

ALERT: US Boxed Warning

Experienced physician:

Carboplatin should be administered under the supervision of a qualified physician experienced in the use of cancer chemotherapeutic agents. Appropriate management of therapy and complications is possible only when adequate treatment facilities are readily available.

Bone marrow suppression:

Bone marrow suppression is dose related and may be severe, resulting in infection or bleeding. Anemia may be cumulative and may require transfusion support.

Vomiting:

Vomiting is a frequent drug-related side effect.

Hypersensitivity reactions:

Anaphylactic-like reactions to carboplatin have been reported and may occur within minutes of carboplatin administration. Epinephrine, corticosteroids, and antihistamines have been employed to alleviate symptoms.

Brand Names: Canada

Carboplatin Injection; Carboplatin Injection BP

Pharmacologic Category

Antineoplastic Agent, Alkylating Agent; Antineoplastic Agent, Platinum Analog

Dosing: Adult

Note: Doses for adults are commonly calculated by the target AUC using the Calvert formula, where **Total dose (mg) = Target AUC x (GFR + 25)**. If estimating glomerular filtration rate (GFR) instead of a measured GFR, the Food and Drug Administration (FDA) recommends that clinicians consider capping estimated GFR at a maximum of 125 mL/minute to avoid potential toxicity. Carboplatin is associated with a moderate emetic potential in adult patients; antiemetics are recommended to prevent nausea and vomiting (Basch 2011; Roila 2016).

Ovarian cancer, advanced: *Manufacturer's labeling:* IV: 360 mg/m^2 every 4 weeks (as a single agent) **or** 300 mg/m^2 every 4 weeks (in combination with cyclophosphamide) for 6 cycles **or** Target AUC 4 to 6 (single agent; in previously-treated patients)

> *Off-label dosing for advanced ovarian cancer:* IV: Target AUC 5 to 7.5 every 3 weeks (in combination with paclitaxel) (Ozols 2003; Parmar 2003) **or** Target AUC 2 once weekly (in combination with weekly paclitaxel) for 18 consecutive weeks (Pignata 2014) **or** Target AUC 5 every 3 weeks (in combination with docetaxel) (Vasey 2004)
>
> *Off-label dosing for malignant germ cell tumor:* IV: 400 mg/m^2 on day 1 (in combination with etoposide) every 4 weeks for 3 cycles (Williams 2004)

Anal cancer, advanced (off-label use): IV: Target AUC 6 on days 1 and 22 every 6 weeks for up to 4 cycles (in combination with paclitaxel and fluorouracil) (Hainsworth 2001) **or** Target AUC 5 or 6 every 3 weeks (in combination with paclitaxel) (Kim 2014). Additional data may be necessary to further define the role of carboplatin in the treatment of this condition.

Bladder cancer (off-label use): IV: Target AUC 5 every 3 weeks (in combination with gemcitabine) (Bamias 2006) **or** Target AUC 6 every 3 weeks (in combination with paclitaxel) (Vaughn 2002)

Breast cancer, metastatic (off-label use): IV: Target AUC 6 every 3 weeks (in combination with trastuzumab and paclitaxel) (Robert 2006) **or** Target AUC 6 every 3 weeks (in combination with trastuzumab and docetaxel) (Pegram 2004; Valero 2011)

Cervical cancer, recurrent or metastatic (off-label use): IV: Target AUC 5 every 3 weeks (in combination with paclitaxel) (Pectasides 2009) **or** Target AUC 5 to 6 every 4 weeks (in combination with paclitaxel) (Tinker 2005) **or** 400 mg/m^2 every 28 days (as a single agent) (Weiss 1990)

Endometrial cancer (off-label use): IV: Target AUC 5 every 3 weeks (in combination with paclitaxel) (Pectasides 2008) **or** Target AUC 2 on days 1, 8, and 15 every 28 days (in combination with paclitaxel) (Secord 2007)

Esophageal cancer (off-label use): IV: Target AUC 2 once weekly for 5 weeks (in combination with paclitaxel and radiation therapy) prior to surgery (van Hagen 2012; van Meerten 2006) **or** Target AUC 5 every 3 weeks (in combination with paclitaxel) (El-Rayes 2004)

Gastric cancer (off-label use): IV: Target AUC 2 once weekly for 5 weeks (in combination with paclitaxel and concurrent radiation) prior to surgery (van Hagen 2012) **or** Target AUC 5 to 6 every 3 weeks (in combination with paclitaxel) (Gadgeel 2003)

Head and neck cancer (off-label use): IV: Target AUC 5 every 3 weeks (in combination with cetuximab) (Chan 2005) **or** Target AUC 5 every 3 weeks (in combination with cetuximab and fluorouracil) (Vermorken 2008) **or** 300 mg/m^2 every 4 weeks (in combination with fluorouracil) (Forastiere 1992) **or** Target AUC 6 every 3 weeks (in combination with paclitaxel) (Clark 2001) **or** Target AUC 1.5 weekly for 7 weeks (in combination with radiation, following 3 cycles of docetaxel, cisplatin, and fluorouracil [TPF] induction therapy [begin carboplatin/radiation therapy 3 to 8 weeks after the start of TPF cycle 3]) (Haddad 2013; Posner 2007)

Hematopoietic stem cell transplant (HSCT) for metastatic germ cell tumors: IV: 700 mg/m^2/day for 3 days beginning 5 days prior to peripheral stem cell infusion (in combination with etoposide) for 2 cycles (Einhorn 2007). Additional data may be necessary to further define the role of carboplatin in the treatment of this condition.

Hodgkin lymphoma, relapsed or refractory (off-label use): IV: Target AUC 5 (maximum dose: 800 mg) for 2 cycles (in combination with ifosfamide and etoposide) (Moskowitz 2001)

Malignant pleural mesothelioma (off-label use): IV: Target AUC 5 every 3 weeks (in combination with pemetrexed) (Castagneto 2008; Ceresoli 2006)

Melanoma, advanced or metastatic (off-label use): IV: Target AUC 2 days on 1, 8, and 15 every 4 weeks (in combination with paclitaxel) (Rao 2006). Additional data may be necessary to further define the role of carboplatin in the treatment of this condition.

Merkel cell carcinoma (off-label use): IV: Target AUC 4.5 on day 1 of weeks 1, 4, 7, and 10 (in combination with etoposide and synchronous radiation therapy) (Poulsen 2003) **or** Target AUC 2 on day 1 weekly for up to 5 doses (administered concurrently with radiation), followed (beginning 3 weeks after radiation therapy) by carboplatin with a target AUC of 4.5 on day 1 (in combination with etoposide) every 3 weeks for 3 cycles (Poulsen 2008)

Neuroendocrine tumors, advanced, atypical or poorly differentiated (nonpulmonary) (off-label use): IV: Target AUC 6 every 3 weeks (in combination with etoposide) for 4 to 6 cycles (Skarlos 2001; Strosberg 2010).

Non-Hodgkin lymphomas, relapsed or refractory (off-label use): IV: Target AUC 5 (maximum dose: 800 mg) per cycle for 3 cycles (in combination with rituximab, ifosfamide and etoposide) (Kewalramani 2004)

Non-small cell lung cancer (off-label use): IV: Target AUC 6 every 3 to 4 weeks (in combination with paclitaxel) (Ramalingam 2008; Schiller 2002; Strauss 2008) **or** Target AUC 6 every 3 weeks (in combination with bevacizumab and paclitaxel) (Sandler 2006) **or** Target AUC 5 every 3 weeks (in combination with pemetrexed) (Gronberg 2009) **or** Target AUC 6 every 3 weeks (in combination with pemetrexed and bevacizumab) for up to 4 cycles followed by maintenance therapy (Patel 2013) **or** in combination with radiation therapy and paclitaxel (Belani 2005):

Target AUC 6 every 3 weeks for 2 cycles **or**

Target AUC 6 every 3 weeks for 2 cycles; then target AUC 2 weekly for 7 weeks **or**

Target AUC 2 every week for 7 weeks; then target AUC 6 every 3 weeks for 2 cycles

Sarcomas: Ewing sarcoma, osteosarcoma (off-label uses): IV: 400 mg/m^2/day for 2 days every 21 days (in combination with ifosfamide and etoposide) (van Winkle 2005)

Small cell lung cancer (off-label use): IV: Target AUC 6 every 3 weeks (in combination with etoposide) (Skarlos 2001) **or** Target AUC 5 every 3 weeks (in combination with irinotecan) (Hermes 2008) **or** Target AUC 5 every 28 days (in combination with irinotecan) (Schmittel 2006)

Testicular cancer (off-label use): IV: Target AUC 7 as a one-time dose (Oliver 2011) **or** 700 mg/m^2/day for 3 days beginning 5 days prior to peripheral stem cell infusion (in combination with etoposide) for 2 cycles (Einhorn 2007)

Thymic malignancies (off-label use): IV: Target AUC 5 every 3 weeks (in combination with paclitaxel) (Lemma 2008)

Thyroid cancer (anaplastic), advanced: IV: Target AUC 6 on day 1 every 3 weeks (in combination with paclitaxel) for 6 cycles (Smallridge 2012; Sosa 2014) **or** Target AUC 2 once weekly (in combination with

weekly paclitaxel) (Smallridge 2012)

Unknown primary adenocarcinoma (off-label use): IV: Target AUC 6 every 3 weeks (in combination with paclitaxel) (Briasoulis 2000) **or** Target AUC 6 every 3 weeks (in combination with docetaxel) (Greco 2000) **or** Target AUC 6 every 3 weeks (in combination with paclitaxel and etoposide) (Hainsworth 2006)

Dosing: Pediatric

(For additional information see "Carboplatin: Pediatric drug information")

Carboplatin is associated with a high emetic potential in pediatric patients; antiemetics are recommended to prevent nausea and vomiting (Dupuis 2011).

Central nervous system tumors (off-label use):

Glioma: Infants ≥3 months, Children, and Adolescents: IV:

Induction: 175 mg/m^2 weekly for 4 weeks every 6 weeks for 2 cycles, with a 2-week recovery period between courses (in combination with vincristine) (Packer 1997)

Maintenance: 175 mg/m^2 weekly for 4 weeks (in combination with vincristine) for up to 12 cycles, with a 3-week recovery period between cycles (Packer 1997)

Neuroblastoma, localized and unresectable: IV: Children ≥10 kg: 200 mg/m^2/day days 1, 2, and 3 every 21 days for 2 cycles (in combination with etoposide for 2 cycles then followed by cyclophosphamide, doxorubicin and vincristine) (Rubie 1998) **or** Children <1 year: 6.6 mg/kg/day days 1, 2, and 3 (in combination with etoposide for 2 cycles, then followed by cyclophosphamide, doxorubicin, and vincristine) (Rubie 2001)

Hematopoietic stem cell transplant (HSCT) (off-label use): IV:

Infants ≥6 months and Children ≤3 years: Consolidation regimen: 17 mg/kg over 2 hours on days 0 and 1 of a 21-day cycle for 3 cycles (in combination with thiotepa), followed by stem cell infusion at least 48 hours after the last thiotepa dose (Cohen 2015)

Children and Adolescents: Conditioning regimen: ~500 mg/m^2/day for 3 consecutive days; dosing utilized pediatric Calvert formula with a target AUC 7 (in combination with thiotepa and topotecan) (Gilheeny 2010; Kushner 2001)

Retinoblastoma (off-label use):

Rodriguez-Galindo 2003: Infants and Children: IV:

GFR ≥50 mL/minute/m^2: 560 mg/m^2 in combination with vincristine every 21 days for 8 cycles

GFR < 50 mL/minute/m^2: Dosing utilized modified Calvert formula with a target AUC 6.5 in combination with vincristine every 21 days for 8 cycles

Friedman 2000:

Infants and Children ≤3 years: IV: 18.6 mg/kg on day 0 every 28 days in combination with etoposide and vincristine for 6 cycles (VEC regimen)

Children >3 years: IV: 560 mg/m^2 on day 0 every 28 days in combination with etoposide and

vincristine for 6 cycles (VEC regimen)

Sarcomas: Ewing sarcoma, osteosarcoma (off-label uses): IV: 400 mg/m^2/day for 2 days every 21 days (in combination with ifosfamide and etoposide) (van Winkle 2005)

Wilms tumor (off-label use): Children and Adolescents: IV: 160 mg/m^2/day for 5 consecutive days every 21 days (in combination with etoposide) for 2 cycles (Pein 1994) **or** 400 mg/m^2/day for 2 days (in combination with ifosfamide and etoposide) every 21 days (ICE regimen) (Abu-Ghosh 2002) **or** modified Calvert formula with a target AUC 6 for 1 day (in combination with ifosfamide and etoposide) every 21 days (ICE regimen) for 2 cycles, followed by vincristine, dactinomycin and doxorubicin (VAD regimen), surgery, radiation therapy, the VAD regimen and one more cycle of ICE for a total of 36 weeks of treatment (Daw 2009). Additional data may be necessary to further define the role of carboplatin in the treatment of this condition.

Dosing: Geriatric

The Calvert formula should be used to calculate dosing for elderly patients. Refer to adult dosing.

Dosing: Renal Impairment

Note: Dose determination with Calvert formula uses GFR and, therefore, inherently adjusts for renal dysfunction.

The manufacturer's labeling recommends the following dosage adjustments for single-agent therapy:
Adults:

Baseline CrCl 41 to 59 mL/minute: Initiate at 250 mg/m^2 and adjust subsequent doses based on bone marrow toxicity

Baseline CrCl 16 to 40 mL/minute: Initiate at 200 mg/m^2 and adjust subsequent doses based on bone marrow toxicity

Baseline CrCl ≤15 mL/minute: There are no dosage adjustments provided in the manufacturer's labeling.

The following dosage adjustments have also been recommended:

Aronoff 2007:

Adults (**Note:** For dosing based on **mg/m^2**):

GFR >50 mL/minute: No dosage adjustment is necessary

GFR 10 to 50 mL/minute: Administer 50% of the usual dose

GFR <10 mL/minute: Administer 25% of the usual dose

Hemodialysis: Administer 50% of the usual dose

Continuous ambulatory peritoneal dialysis (CAPD): Administer 25% of the usual dose

Continuous renal replacement therapy (CRRT): 200 mg/m^2

Children:

GFR <50 mL/minute: Use Calvert formula incorporating patient's GFR

Hemodialysis, peritoneal dialysis, continuous renal replacement therapy (CRRT): Use

Calvert formula incorporating patient's GFR

Janus 2010: Hemodialysis: Carboplatin dose (mg) = Target AUC x 25; administer on a nondialysis day, hemodialysis should occur between 12 to 24 hours after carboplatin dose

Dosing: Hepatic Impairment There are no dosage adjustments provided in the manufacturer's labeling; however, carboplatin undergoes minimal hepatic metabolism therefore dosage adjustment may not be needed.

Dosing: Obesity

American Society of Clinical Oncology (ASCO) Guidelines for appropriate chemotherapy dosing in obese adults with cancer (excludes HSCT dosing): Dosing based on GFR should be considered in obese patients; GFR should not exceed 125 mL/minute (Griggs 2012).

American Society for Blood and Marrow Transplantation (ASBMT) practice guideline committee position statement on chemotherapy dosing in obesity: Utilize actual body weight (full weight) for calculation of body surface area (when applicable) in carboplatin dosing for hematopoietic stem cell transplant conditioning regimens in adults. Based on the literature, there is no consensus for carboplatin dosing based on AUC in transplant conditioning regimens or dosing adjustments during transplant for obese patients (Bubalo 2014).

Dosing: Adjustment for Toxicity Platelets <50,000 cells/mm^3 or ANC <500 cells/mm^3: Administer 75% of the usual dose

Dosage Forms Excipient information presented when available (limited, particularly for generics); consult specific product labeling.

Solution, Intravenous:

Generic: 50 mg/5 mL (5 mL); 150 mg/15 mL (15 mL); 450 mg/45 mL (45 mL); 600 mg/60 mL (60 mL)

Solution, Intravenous [preservative free]:

Generic: 50 mg/5 mL (5 mL); 150 mg/15 mL (15 mL); 450 mg/45 mL (45 mL); 600 mg/60 mL (60 mL)

Generic Equivalent Available (US) Yes

Administration Carboplatin is associated with a moderate emetic potential in adult patients and a high emetic potential in pediatric patients; antiemetics are recommended to prevent nausea and vomiting (Basch 2011; Dupuis 2011; Roila 2016).

Infuse over at least 15 minutes; usually infused over 15 to 60 minutes, although some protocols may require infusions up to 24 hours. When administered as a part of a combination chemotherapy regimen, sequence of administration may vary by regimen; refer to specific protocol for sequence recommendation.

Needles or IV administration sets that contain aluminum should not be used in the preparation or administration of carboplatin; aluminum can react with carboplatin resulting in precipitate formation and loss

of potency.

Hazardous Drugs Handling Considerations

Hazardous agent (NIOSH 2016 [group 1]).

Use appropriate precautions for receiving, handling, administration, and disposal. Gloves (single) should be worn during receiving, unpacking, and placing in storage.

NIOSH recommends double gloving, a protective gown, ventilated engineering controls (a class II biological safety cabinet or a compounding aseptic containment isolator), and closed system transfer devices (CSTDs) for preparation. Double gloving, a gown, and (if dosage form allows) CSTDs are required during administration (NIOSH 2016).

Use **Ovarian cancer, advanced:** Initial treatment of advanced ovarian cancer in combination with other established chemotherapy agents; palliative treatment of recurrent ovarian cancer after prior chemotherapy, including cisplatin-based treatment

Use: Off-Label

Anal cancer (advanced); Bladder cancer; Breast cancer (metastatic); Central nervous system tumors; Cervical cancer (recurrent or metastatic); Endometrial cancer; Esophageal cancer; Gastric cancer; Head and neck cancer; Hematopoietic stem cell transplant (adults); Hematopoietic stem cell transplant (pediatric); Hodgkin lymphoma (relapsed or refractory); Malignant pleural mesothelioma; Melanoma (advanced or metastatic); Merkel cell carcinoma; Neuroendocrine tumors, advanced, atypical or poorly differentiated (nonpulmonary); Non-Hodgkin lymphomas (relapsed or refractory); Non-small cell lung cancer; Retinoblastoma; Sarcomas (Ewing sarcoma and osteosarcoma); Small cell lung cancer; Testicular cancer; Thymic malignancies; Thyroid cancer (anaplastic), advanced; Unknown primary adenocarcinoma; Wilms tumor (pediatric)

Medication Safety Issues

Sound-alike/look-alike issues:

CARBOplatin may be confused with CISplatin, oxaliplatin

Paraplatin may be confused with Platinol

High alert medication:

This medication is in a class the Institute for Safe Medication Practices (ISMP) includes among its list of drug classes which have a heightened risk of causing significant patient harm when used in error.

Geriatric Patients: High-Risk Medication:

Beers Criteria: Carboplatin is identified in the Beers Criteria as a potentially inappropriate

medication to be used with caution in patients 65 years and older due to its potential to cause or exacerbate syndrome of inappropriate antidiuretic hormone secretion (SIADH) or hyponatremia; monitor sodium concentration closely when initiating or adjusting the dose in older adults (Beers Criteria [AGS 2015]).

Adverse Reactions

Percentages reported with single-agent therapy.

>10%:

Central nervous system: Pain (23%)

Endocrine & metabolic: Hyponatremia (29% to 47%), hypomagnesemia (29% to 43%), hypocalcemia (22% to 31%), hypokalemia (20% to 28%)

Gastrointestinal: Vomiting (65% to 81%), abdominal pain (17%), nausea (without vomiting: 10% to 15%)

Hematologic & oncologic: Bone marrow depression (dose related and dose limiting; nadir at ~21 days with single-agent therapy), anemia (71% to 90%; grades 3/4: 21%), leukopenia (85%; grades 3/4: 15% to 26%), neutropenia (67%; grades 3/4: 16% to 21%), thrombocytopenia (62%; grades 3/4: 25% to 35%)

Hepatic: Increased serum alkaline phosphatase (24% to 37%), increased serum AST (15% to 19%)

Hypersensitivity: Hypersensitivity (2% to 16%)

Neuromuscular & skeletal: Weakness (11%)

Renal: Decreased creatinine clearance (27%), increased blood urea nitrogen (14% to 22%)

1% to 10%:

Central nervous system: Peripheral neuropathy (4% to 6%), neurotoxicity (5%)

Dermatologic: Alopecia (2% to 3%)

Gastrointestinal: Constipation (6%), diarrhea (6%), dysgeusia (1%), mucositis (≤1%), stomatitis (≤1%)

Hematologic & oncologic: Bleeding complications (5%), hemorrhage (5%)

Hepatic: Increased serum bilirubin (5%)

Infection: Infection (5%)

Ophthalmic: Visual disturbance (1%)

Otic: Ototoxicity (1%)

Renal: Increased serum creatinine (6% to 10%)

<1%, postmarketing, and/or case reports (Limited to important or life-threatening): Anaphylaxis, anorexia, bronchospasm, cardiac failure, cerebrovascular accident, dehydration, embolism, erythema, febrile neutropenia, hemolytic anemia (acute), hemolytic-uremic syndrome, hypertension, hypotension, injection site reaction (pain, redness, swelling), limb ischemia (acute), malaise, metastases, pruritus, skin

rash, tissue necrosis (associated with extravasation), urticaria, vision loss

Contraindications History of severe allergic reaction to carboplatin, cisplatin, other platinum-containing formulations, mannitol, or any component of the formulation; should not be used in patients with severe bone marrow depression or significant bleeding

Warnings/Precautions

Concerns related to adverse effects:

• Bone marrow suppression: **[US Boxed Warning]: Bone marrow suppression, which may be severe, is dose related; may result in infection (due to neutropenia) or bleeding (due to thrombocytopenia); anemia may require blood transfusion.** Reduce dosage in patients with bone marrow suppression; cycles should be delayed until WBC and platelet counts have recovered. In patients receiving single agent carboplatin, the median nadir typically occurs at day 21. Patients who have received prior myelosuppressive therapy and patients with renal dysfunction are at increased risk for bone marrow suppression. Anemia is cumulative. Monitor blood counts closely.

• Gastrointestinal toxicity: **[US Boxed Warning]: Vomiting may occur.** Carboplatin is associated with a moderate emetic potential in adult patients and a high emetic potential in pediatric patients; antiemetics are recommended to prevent nausea and vomiting (Basch 2011; Dupuis 2011; Roila 2016). Nausea and vomiting may be more severe in patients who have received prior emetogenic therapy.

• Hypersensitivity/anaphylactoid reactions: **[US Boxed Warning]: Anaphylactic-like reactions have been reported with carboplatin; may occur within minutes of administration. Epinephrine, corticosteroids and antihistamines have been used to treat symptoms.** The risk of allergic reactions (including anaphylaxis) is increased in patients previously exposed to platinum therapy. Skin testing and desensitization protocols have been reported (Confina-Cohen 2005; Lee 2004; Markman 2003).

• Liver function abnormalities: High doses (>4 times the recommended dose) have resulted in severe abnormalities of liver function tests.

• Neurotoxicity: Although peripheral neuropathy occurs infrequently, the incidence of peripheral neuropathy is increased in patients >65 years and those who have previously received cisplatin treatment.

• Ototoxicity: Ototoxicity may occur when administered concomitantly with aminoglycosides. Clinically significant hearing loss has been reported to occur in pediatric patients when therapy was administered at higher than recommended doses in combination with other ototoxic agents (eg, aminoglycosides). In a study of children receiving carboplatin for the treatment of retinoblastoma, those <6 months of age at treatment initiation were more likely to experience ototoxicity; long-term audiology monitoring is recommended (Qaddoumi 2012).

• Renal toxicity: Carboplatin has a limited potential for nephrotoxicity unless administered concomitantly with aminoglycosides. Use caution with concomitant administration with aminoglycosides or other nephrotoxic medications.

• Vision loss: Loss of vision (usually reversible within weeks of discontinuing) has been reported with higher than recommended doses.

Disease-related concerns:

• Renal impairment: Use with caution in patients with renal impairment; patients with renal dysfunction are at increased risk for bone marrow suppression.

Concurrent drug therapy issues:

• Drug-drug interactions: Potentially significant interactions may exist, requiring dose or frequency adjustment, additional monitoring, and/or selection of alternative therapy. Consult drug interactions database for more detailed information.

• Taxane derivatives: When administered as sequential infusions, taxane derivatives (docetaxel, paclitaxel) should be administered before the platinum derivatives (carboplatin, cisplatin) to limit myelosuppression and to enhance efficacy.

Special populations:

• Elderly: Patients >65 years are more likely to develop thrombocytopenia (severe) and peripheral neuropathy.

Other warnings/precautions:

• Dosing with Calvert formula: When calculating the carboplatin dose using the Calvert formula and an estimated glomerular filtration rate (GFR), the laboratory method used to measure serum creatinine may impact dosing. Compared to other methods, standardized isotope dilution mass spectrometry (IDMS) may underestimate serum creatinine values in patients with low creatinine values (eg, ≤0.7 mg/dL) and may overestimate GFR in patients with normal renal function. This may result in higher calculated carboplatin doses and increased toxicities. If using IDMS, the Food and Drug Administration (FDA) recommends that clinicians consider capping estimated GFR at a maximum of 125 mL/minute to avoid potential toxicity.

• Experienced physician: **[US Boxed Warning]: Should be administered under the supervision of an experienced cancer chemotherapy physician.**

Metabolism/Transport Effects

None known.

Drug Interactions

(For additional information: Launch drug interactions program) Lexicomp®

Aminoglycosides: May enhance the ototoxic effect of CARBOplatin. Especially with higher doses of carboplatin. *Risk C: Monitor therapy*

BCG (Intravesical): Immunosuppressants may diminish the therapeutic effect of BCG (Intravesical). *Risk X: Avoid combination*

BCG (Intravesical): Myelosuppressive Agents may diminish the therapeutic effect of BCG (Intravesical). *Risk X: Avoid combination*

Bexarotene (Systemic): CARBOplatin may increase the serum concentration of Bexarotene (Systemic). *Risk C: Monitor therapy*

CloZAPine: Myelosuppressive Agents may enhance the adverse/toxic effect of CloZAPine. Specifically,

the risk for neutropenia may be increased. *Risk C: Monitor therapy*

Coccidioides immitis Skin Test: Immunosuppressants may diminish the diagnostic effect of Coccidioides immitis Skin Test. *Risk C: Monitor therapy*

Deferiprone: Myelosuppressive Agents may enhance the neutropenic effect of Deferiprone. *Risk X: Avoid combination*

Denosumab: May enhance the adverse/toxic effect of Immunosuppressants. Specifically, the risk for serious infections may be increased. *Risk C: Monitor therapy*

Dipyrone: May enhance the adverse/toxic effect of Myelosuppressive Agents. Specifically, the risk for agranulocytosis and pancytopenia may be increased *Risk X: Avoid combination*

Echinacea: May diminish the therapeutic effect of Immunosuppressants. *Risk D: Consider therapy modification*

Fingolimod: Immunosuppressants may enhance the immunosuppressive effect of Fingolimod. Management: Avoid the concomitant use of fingolimod and other immunosuppressants when possible. If combined, monitor patients closely for additive immunosuppressant effects (eg, infections). *Risk D: Consider therapy modification*

Fosphenytoin-Phenytoin: Platinum Derivatives may decrease the serum concentration of Fosphenytoin-Phenytoin. *Risk C: Monitor therapy*

Leflunomide: Immunosuppressants may enhance the adverse/toxic effect of Leflunomide. Specifically, the risk for hematologic toxicity such as pancytopenia, agranulocytosis, and/or thrombocytopenia may be increased. Management: Consider not using a leflunomide loading dose in patients receiving other immunosuppressants. Patients receiving both leflunomide and another immunosuppressant should be monitored for bone marrow suppression at least monthly. *Risk D: Consider therapy modification*

Lenograstim: Antineoplastic Agents may diminish the therapeutic effect of Lenograstim. *Risk D: Consider therapy modification*

Natalizumab: Immunosuppressants may enhance the adverse/toxic effect of Natalizumab. Specifically, the risk of concurrent infection may be increased. *Risk X: Avoid combination*

Nivolumab: Immunosuppressants may diminish the therapeutic effect of Nivolumab. *Risk D: Consider therapy modification*

Ocrelizumab: May enhance the immunosuppressive effect of Immunosuppressants. *Risk C: Monitor therapy*

Palifermin: May enhance the adverse/toxic effect of Antineoplastic Agents. Specifically, the duration and severity of oral mucositis may be increased. Management: Do not administer palifermin within 24 hours before, during infusion of, or within 24 hours after administration of myelotoxic chemotherapy. *Risk D: Consider therapy modification*

Pimecrolimus: May enhance the adverse/toxic effect of Immunosuppressants. *Risk X: Avoid combination*

Promazine: May enhance the myelosuppressive effect of Myelosuppressive Agents. *Risk C: Monitor therapy*

Roflumilast: May enhance the immunosuppressive effect of Immunosuppressants. *Risk D: Consider*

therapy modification

Sipuleucel-T: Immunosuppressants may diminish the therapeutic effect of Sipuleucel-T. *Risk C: Monitor therapy*

SORAfenib: May enhance the adverse/toxic effect of CARBOplatin. Management: Concurrent sorafenib with carboplatin and paclitaxel in patients with squamous cell lung cancer is contraindicated. Use in other settings is not specifically contraindicated but should be approached with added caution. *Risk X: Avoid combination*

Tacrolimus (Topical): May enhance the adverse/toxic effect of Immunosuppressants. *Risk X: Avoid combination*

Taxane Derivatives: Platinum Derivatives may enhance the myelosuppressive effect of Taxane Derivatives. Administer Taxane derivative before Platinum derivative when given as sequential infusions to limit toxicity. *Risk D: Consider therapy modification*

Tertomotide: Immunosuppressants may diminish the therapeutic effect of Tertomotide. *Risk C: Monitor therapy*

Tofacitinib: Immunosuppressants may enhance the immunosuppressive effect of Tofacitinib. Management: Concurrent use with antirheumatic doses of methotrexate or nonbiologic disease modifying antirheumatic drugs (DMARDs) is permitted, and this warning seems particularly focused on more potent immunosuppressants. *Risk X: Avoid combination*

Topotecan: Platinum Derivatives may enhance the adverse/toxic effect of Topotecan. *Risk D: Consider therapy modification*

Trastuzumab: May enhance the neutropenic effect of Immunosuppressants. *Risk C: Monitor therapy*

Vaccines (Inactivated): Immunosuppressants may diminish the therapeutic effect of Vaccines (Inactivated). Management: Vaccine efficacy may be reduced. Complete all age-appropriate vaccinations at least 2 weeks prior to starting an immunosuppressant. If vaccinated during immunosuppressant therapy, revaccinate at least 3 months after immunosuppressant discontinuation. *Risk D: Consider therapy modification*

Vaccines (Live): Immunosuppressants may enhance the adverse/toxic effect of Vaccines (Live). Immunosuppressants may diminish the therapeutic effect of Vaccines (Live). Management: Avoid use of live organism vaccines with immunosuppressants; live-attenuated vaccines should not be given for at least 3 months after immunosuppressants. *Risk X: Avoid combination*

Pregnancy Risk Factor

D (show table)

Pregnancy Implications

Adverse events have been observed in animal reproduction studies. May cause fetal harm if administered during pregnancy. Women of childbearing potential should avoid becoming pregnant during treatment.

Breast-Feeding Considerations

It is not known if carboplatin is excreted in breast milk. Due to the potential for toxicity in breast-feeding infants, the manufacturer recommends discontinuing breast-feeding during carboplatin treatment.

Monitoring Parameters

CBC (with differential and platelet count), serum electrolytes, serum

creatinine and BUN, creatinine clearance, liver function tests; audiology evaluations (children <6 months); signs/symptoms of hypersensitivity reactions

Mechanism of Action Carboplatin is a platinum compound alkylating agent which covalently binds to DNA; interferes with the function of DNA by producing interstrand DNA cross-links. Carboplatin is apparently not cell-cycle specific.

Pharmacodynamics/Kinetics

Distribution: V_d: 16 L (based on a dose of 300 to 500 mg/m^2); into liver, kidney, skin, and tumor tissue

Protein binding: Carboplatin: 0%; Platinum (from carboplatin): Irreversibly binds to plasma proteins

Metabolism: Minimally hepatic to aquated and hydroxylated compounds

Half-life elimination: CrCl >60 mL/minute: Carboplatin: 2.6 to 5.9 hours (based on a dose of 300 to 500 mg/m^2); Platinum (from carboplatin): ≥5 days

Excretion: Urine (~70% as carboplatin within 24 hours; 3% to 5% as platinum within 1 to 4 days)

Pricing: US

Solution (CARBOplatin Intravenous)

50 mg/5 mL (5 mL): $12.00

150 mg/15 mL (15 mL): $28.98

450 mg/45 mL (45 mL): $78.00

600 mg/60 mL (60 mL): $86.04

Disclaimer: The pricing data provide a representative AWP and/or AAWP price from a single manufacturer of the brand and/or generic product, respectively. The pricing data should be used for benchmarking purposes only, and as such should not be used to set or adjudicate any prices for reimbursement or purchasing functions. Pricing data is updated monthly.

International Brand Names Actoplatin (ID, PH); Adcarb (LK); B-Platin (BR); Bagotanilo (MX); Balidon (CO); Biocarb (IN); Biovinate (PH); Biplatinex (VE); Blastocarb (CL, CR, DO, GT, HN, NI, PA, SV); Blastocarb RU (MX); Bobei (CN); Bocartin (VN); Bopacatin (SK); Boplatex (CR, DO, GT, HN, NI, PA, SV); Carbopa (MY); Carboplat (AR, BD, DE, MX); Carboplatin (AE, AU, CY, DK, IL, JO, KW, LB, LT, NO, NZ, PL, SA); Carboplatin a (PT); Carboplatin Abic (TH); Carboplatin DBL (MY); Carboplatin dbl (PT); Carboplatin “Delta West” (HR); Carboplatin-David Bull (LU); Carboplatin-Medac (LU); Carboplatin-Teva (HU); Carboplatino (CU); Carboplatinum Cytosafe-Delta West (LU); Carbosin (BE, GR, ID, KR, LU, PH, ZW); Carbosin Lundbeck (FI); Carbotec (MX); Carbotin (BD); Carbotinol (PH, SA); Carcan (ID); Carplan (KR); Cobalmin (PE); Cycloplatin (CZ, HU); Cytocarb (LB); Delta West Carboplatin (ID, PH); Karbopa (UA); Kemocarb (JO, LK, PH, SG, TH, TW, VN, ZW); Kemokarb (UA); Megaplatin (LB); Naproplat (LK, PH); Neoplatin (KR); Nuvaplast (CR, DO, GT, HN, NI, PA, SV); Omilipis (AR, PY); Oncocarb (PE); Oncocarbin (IN); P&U Carboplatin (ZA); Paraplatin (AT, BE, BG, CH, EC, EE, EG, ES, FI, FR, GB, HK, HN, HR, HU, IE, IT, JO, LU, NL, PH, PT, QA, RU, SE, TH, TR, TW, UY); Pharmaplatin (PK); Unicarb (LK); Vancel (BR, PY); Womastin (LK)

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