**trastuzumab** (traz-too-zoo-mab)

**Intravenous**

**Classification**
Therapeutic: antineoplastics
Pharmacologic: monoclonal antibodies

**Pregnancy Category**
D

**Indications**
First-line treatment of metastatic breast cancer (with paclitaxel) that displays overexpression of the human epidermal growth factor receptor 2 (HER2) protein. Treatment of HER2– overexpressing metastatic breast cancer (as monotherapy) in patients who have already received other chemotherapy regimens. Advant treatment of HER2– overexpressing node positive or node negative breast cancer (to be used alone after multidrug chemotherapy-based therapy or as part of one of the following regimens: docetaxel, cyclophosphamide, and either paclitaxel or docetaxel; with doxorubicin and capecitabine) in patients who have not received prior treatment for metastatic disease.

**Action**
A monoclonal antibody that binds to HER2 sites in breast cancer tissue and inhibits proliferation of cells that overexpress HER2 protein. Therapeutic Effects: Regression of breast, gastric, or gastroesophageal cancer and metastases.

**Pharmacokinetics**
Absorption: IV administration results in complete bioavailability.
Distribution: Binds to HER2 proteins.
Metabolism and Excretion: Unknown.
Half-life: 10-mg dose—1.7 days; 500-mg dose—12 days.

**TIME/ACTION PROFILE (blood levels)**

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
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<tr>
<td>IV</td>
<td>unknown</td>
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**Contraindications/Precautions**

**Contraindicated in:**
None known.

**Use Cautiously in:**
Pre-existing pulmonary conditions; Hypersensitivity to trastuzumab, Chinese hamster ovary cell proteins, or other components of the product; Hypersensitivity to benzyl alcohol (use sterile water for injection instead of bacteriostatic water, which accompanies the vial); Geri: May have 7% risk of cardiac dysfunction; OB, Lactation: Use during pregnancy only if clearly needed (can cause fetal harm); not recommended for use during lactation; Pedi: Safety not established.

**Exercise Extreme Caution in:**
Patients with pre-existing cardiac dysfunction.

**Adverse Reactions/Side Effects**

**CNS:** Dizziness, headache, insomnia, weakness, depression.

**Resp:** INTERSTITIAL PNEUMONITIS, PULMONARY EDEMA, PULMONARY FIBROSIS, dyspnea, increased cough, pharyngitis, rhinitis, sinusitis.

**CV:** ARRHYTHMIAS, HF, hypertension, tachycardia.

**GI:** Abdominal pain, anorexia, diarrhea, nausea, vomiting.

**Derm:** Rash, acne, herpes simplex.

**F and E:** Edema.

**Hemat:** Anemia, leukopenia.

**MS:** Back pain, arthralgia, bone pain.

**Neuro:** Neuropathy, paresthesia, peripheral neuritis.

**Misc:** HYPERSENSITIVITY REACTIONS, chills, fever, infection, pain, allergic reactions, flu-like syndrome.

**Interactions**

**Drug-Drug:** Concurrent anthracycline (daunorubicin, doxorubicin, or idarubicin) therapy may increase risk of cardiotoxicity. Blood levels are increased by concurrent paclitaxel.

**Route/Dosage**

**Adjuvant Treatment of Breast Cancer**

**IV (Adults):** During and following multi-modality, anthracycline-based chemotherapy regimens—8 mg/kg initially, then 6 mg/kg q3wk; one wk after the last weekly dose, give 6 mg/kg q3wk; As single agent within 3 wk following completion of multi-modality, anthracycline-based chemotherapy regimens—8 mg/kg initially, then 6 mg/kg q3wk.

**Metastatic Breast Cancer**

**IV (Adults):** 4 mg/kg initially, then 2 mg/kg weekly until disease progresses.

**Metastatic Gastric Cancer**

**IV (Adults):** 8 mg/kg initially, then 6 mg/kg q3wk until disease progresses.

**Adverse Reactions/Side Effects**

**CNS:** Dizziness, headache, insomnia, weakness, depression.

**Resp:** INTERSTITIAL PNEUMONITIS, PULMONARY EDEMA, PULMONARY FIBROSIS, dyspnea, increased cough, pharyngitis, rhinitis, sinusitis.

**CV:** ARRHYTHMIAS, HF, hypertension, tachycardia.

**GI:** Abdominal pain, anorexia, diarrhea, nausea, vomiting.

**Derm:** Rash, acne, herpes simplex.

**F and E:** Edema.

**Hemat:** Anemia, leukopenia.

**MS:** Back pain, arthralgia, bone pain.

**Neuro:** Neuropathy, paresthesia, peripheral neuritis.

**Misc:** HYPERSENSITIVITY REACTIONS, chills, fever, infection, pain, allergic reactions, flu-like syndrome.

**Interactions**

**Drug-Drug:** Concurrent anthracycline (daunorubicin, doxorubicin, or idarubicin) therapy may increase risk of cardiotoxicity. Blood levels are increased by concurrent paclitaxel.

**Route/Dosage**

**Adjuvant Treatment of Breast Cancer**

**IV (Adults):** During and following multi-modality, anthracycline-based chemotherapy regimens—8 mg/kg initially, then 6 mg/kg q3wk; one wk after the last weekly dose, give 6 mg/kg q3wk; As single agent within 3 wk following completion of multi-modality, anthracycline-based chemotherapy regimens—8 mg/kg initially, then 6 mg/kg q3wk.

**Metastatic Breast Cancer**

**IV (Adults):** 8 mg/kg initially, then 6 mg/kg q3wk until disease progresses.

**Metastatic Gastric Cancer**

**IV (Adults):** 8 mg/kg initially, then 6 mg/kg q3wk until disease progresses.
NURSING IMPLICATIONS

Assessment

- Assess for infusion-related symptoms (chills, fever, nausea, vomiting, pain [in some cases at tumor sites], headache, dizziness, dyspnea, hypotension, rash, and edema) following initial infusion. Severe reactions (bronchospasm, angioedema, impotence, hypotension, severe hypotension) may occur during or immediately following the initial infusion. May be treated with epinephrine, corticosteroids, diphenhydramine, bronchodilators, and oxygen. Discontinue if hypotension or severe hypotension occurs and discontinue permanently if severe reaction occurs.

- Assess for signs and symptoms of HF (dyspnea, HF, increased cough, paroxysmal nocturnal dyspnea, peripheral edema, S3 gallop, reduced ejection fraction) prior to and frequently during therapy. Baseline cardiac assessment of history, physical exam, and left ventricular ejection fraction (LVEF) with ECG or multiple gated acquisition (MUGA) scan. Monitor LVEF every 3 mo and at completion of therapy, every 6 mo for 2 yr. Withhold trastuzumab for 16% absolute decrease in LVEF from pre-treatment values or an LVEF value below institutional limits and 10% absolute decrease in LVEF from pretreatment values. Repeat LVEF measures every 4 wk if dose is withheld. HF associated with trastuzumab may be severe, resulting in cardiac failure, death, and stroke. Trastuzumab should be discontinued upon the development of significant HF.

- Monitor for signs of pulmonary hypersensitivity reactions (dyspnea, pulmonary infiltrates, pleural effusion, noncardiogenic pulmonary edema, pulmonary insufficiency, hypoxia, acute respiratory distress syndrome). Patients with symptomatic pulmonary disease or extensive lung tumor involvement are at increased risk. Infusion should be discontinued if severe symptoms occur.

- Lab Test Considerations: HER2 protein overexpression is used to determine whether treatment with trastuzumab is indicated. HER2 protein overexpression is detected by HercepTest (IHC assay) and PathVysion (FISH assay). May cause anemia and leukopenia.

Potential Nursing Diagnoses

- Risk for infection (Adverse Reactions)

Implementation

- **High Alert:** Do not confuse trastuzumab (Herceptin) with ado-trastuzumab (Kadcyla).

- **High Alert:** Fatality has occurred with chemotherapeutic agents. Before administration, clarify all ambiguous orders; double check single, daily, and course-of-therapy dose limits; have second practitioner independently double check original order; dose calculations and infusion pump settings.

- May be administered in vitro oxygen setting.

IV Administration

- **Intermediate Infusion:** Reconstitute each vial with 20 mL of bacteriostatic water for injection, directing the stream of diluent into lyophilized cake of trastuzumab. Concentration: 21 mg/mL. Swirl the vial gently; do not shake. May foam slightly; allow the vial to stand undisturbed for 5 min. Solution should be clear to slightly opalescent and colorless to pale yellow, without particulate matter. Label vial immediately in the area marked “Do not use after” with the date 28 days from the date of reconstitution. Stable for 24 hr at room temperature or 28 days if refrigerated. If patient is allergic to benzyl alcohol, use sterile water for injection for reconstitution. Use immediately and discard any unused portion.

- Diluent: Calculate to volume required for the desired dose, withdraw, and add it to an infusion containing 250 mL of 0.9% NaCl. Infuse the 4 mg/kg loading dose over 90 min and the weekly 2 mg/kg dose over 30 min or 6 mg/kg over 90 min every 3 wk if the loading dose was well tolerated. Do not administer as an IV push or bolus.

- **Y-Site Compatibility:** acyclovir, amifostine, amphotericin, ampicillin, ampicillin/sulbactam, bleomycin, bumetanide, buprenorphine, busulfan, butorphanol, calcium gluconate, carboplatin, carmustine, cefazolin, ceftriaxone, ceftazidime, cefuroxime, ciprofloxacin, cisplatin, cyclophosphamide, cytarabine, daunorubicin hydrochloride, dexamethasone, digoxin, diphenhydramine, dobutamine, doxorubicin, doxorubicin liposome, doxycline, dopamine, enalaprilat, etoposide phosphate, famotidine, fentanyl, filgrastim, floxuridine, fluconazole, fluorouracil, ganciclovir, gemcitabine, gentamicin, granisetron, haloperidol, heparin, hydrocortisone, hydromorphone, ifosfamide, imipenem/cilastatin, leucovorin, lorazepam, magnesium sulfate, mannitol, meperidine, mesna, methotrexate, methylprednisolone, metoclopramide, metronidazole, mitomycin, mitoxantrone, paclitaxel, pentamidine, potassium chloride, prochlorperazine, promethazine, ranitidine, rhodanilide, sargramostim, sodium...
trastuzumab

bicarbonate, teniposide, theophylline, thiotepa, ticarcillin/clavulanate, tobramycin, trimethoprim/sulfamethoxazole, vancomycin, vinblastine, vincristine, vino-relbine, zidovudine.

- Y-Site Incompatibility: aldesleukin, amikacin, amphotericin B colloidal, atracurium, cefadroxil, cefoperazone, cefotaxime, cefotetan, cefoxitin, chloramphenicol, clindamycin, cyclosporine, doxorubicin, diltiazem, edrophonium, enalapril, furosemide, idarubicin, irinotecan, levofloxacin, levorphanol, loperamide, morphine, nalbuphine, ondansetron, piperacillin/tazobactam, streptozocin, terbinafine.

- Additive Incompatibility: Do not dilute trastuzumab with or add to solutions containing electrolytes. Do not mix or dilute with other drugs.

Patient/Family Teaching

- Instruct patient to notify health care professional promptly if new onset or worsening shortness of breath, cough, swelling of the ankles/legs, swelling of the face, palpitations, weight gain of more than 5 pounds in 24 hours, dizziness or loss of consciousness occur. Caution patient to avoid crowds and persons with known infections.

- May cause myelosuppression. Caution patient to use contraception during and for at least 3 mos following completion of therapy and to avoid breastfeeding.

- Advise patient not to receive any vaccinations without advice of health care professional.

Evaluation/Desired Outcomes

- Regression of breast, gastric, or gastroesophageal cancer and metastases.

Why was this drug prescribed for your patient?