

# Chemotherapeutic Medications and Their Emergent Complications



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## KEYWORDS

• Oncology • Chemotherapy • Adverse • Complication • Emergency

## KEY POINTS

- Presentations caused by chemotherapeutic injury may be concomitantly subtle and life threatening.
- Hypersensitivity reaction and anaphylaxis are systemic responses to chemotherapeutic agents. Remove the offending agent; prioritize airway, breathing, and circulation; and provide supportive management during ED observation.
- Management of anemia is focused on maintaining adequate oxygen-carrying capacity with less concern about the hemoglobin value.
- Any active hemorrhage is an indication for platelet transfusion.
- Extravasation necrosis initiates skin damage with the same signs and symptoms as local chemotherapy irritation. Toxin-specific antidote administration and early surgical consultation are indicated.

## INTRODUCTION

Neoplastic malignancies are the second most common cause of death in the United States, after cardiovascular diseases.<sup>1</sup> However, it is unclear, from a public health standpoint, what factors cause patients with cancer to seek emergency department (ED) evaluation. According to the National Ambulatory Medical Care Survey (NAMCS), approximately 29.2 million patients with a primary diagnosis of cancer received outpatient or ED care in 2010.<sup>2</sup> Emergency presentations from chemotherapeutic injury may be simultaneously life threatening and subtle, therefore clinicians must maintain an increased awareness of common postchemotherapy syndromes.

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This article originally appeared in *Emergency Medicine Clinics of North America*, Volume 32, Issue 3, August 2014.

Disclosure: None.

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Hematol Oncol Clin N Am 31 (2017) 995–1010

<http://dx.doi.org/10.1016/j.hoc.2017.08.005>

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## DRUG HYPERSENSITIVITY AND ANAPHYLAXIS

Almost all chemotherapeutic agents can cause allergic reactions (type I–IV hypersensitivity responses) in patients (**Box 1**). Immediate hypersensitivity (type I) reactions to chemotherapy are classically immunoglobulin E–mediated mast cell responses or slightly delayed cytokine activation of the chemotactic cascade. The typical signs and symptoms of type I hypersensitivity reactions develop in minutes to a few hours with rhinitis, urticaria, wheezing, angioedema, flushing, or pruritus. In general, these reactions are uncommon in the ED; they are most often seen and treated in the infusion center. The clinician should maintain an elevated clinical suspicion for alternative diagnoses as outlined in **Box 2**. The mainstays of treatment are antihistamines and corticosteroids, if not contraindicated by a chemotherapy regimen or comorbid condition. However, if treatment is unsuccessful, the patient may require immediate emergency management for signs of anaphylaxis such as tachycardia, alteration in level of consciousness (agitation or lethargy), stridor or change in vocal timbre, respiratory distress, hypotension, or cardiac or respiratory arrest. Corticosteroids, specifically dexamethasone and methylprednisolone, have demonstrated efficacy in both preventing and treating vomiting as well as hypersensitivity and anaphylactic reactions, most notably in cytarabine syndrome and cytokine release syndromes.<sup>3–5</sup> However, pediatric patients with acute myelogenous leukemia (AML) have an increased risk of death associated with corticosteroid administration.<sup>6</sup> If not clinically emergent, oncologic consultation is recommended before the administration of corticosteroids in any patient receiving chemotherapy.

## CHEMOTHERAPY-INDUCED DISORDERS OF HEMATOPOIESIS

Many chemotherapeutic agents induce bone marrow cytotoxicity and thus result in direct suppression of hematopoiesis. All blood cell lines may be affected, which may result in the development of neutropenia, anemia, or thrombocytopenia. Neutropenic fever is a common and significant adverse consequence of chemotherapy but is covered elsewhere in this issue. This article focuses on anemia and thrombocytopenia.

### *Anemia*

Anemia is prevalent in 30% to 90% of all patients with cancer.<sup>7</sup> The incidence and prevalence of anemia associated with chemotherapy varies widely depending on the type of underlying malignancy, patient age, comorbid conditions, chemotherapeutic regimen,

#### **Box 1**

##### **Drugs associated with hypersensitivity reactions**

- Cisplatin
- Paclitaxel
- Docetaxel
- Bleomycin
- L-Asparaginase
- Procarbazine
- Cytarabine
- Platinum-containing drugs (carboplatin): intravesically administered
- Monoclonal antibodies (anti-CD20, rituximab)

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