

Chemotherapy Basics for Hospitalists



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KEYWORDS

• Chemotherapy • Biologic therapy • Targeted therapy • Immunotherapy
• Adverse events • Palliative care • Cancer • Oncology

HOSPITAL MEDICINE CLINICS CHECKLIST

1. Different types of chemotherapy are available: traditional chemotherapy, targeted therapies, biologic therapies, and immunotherapy.
2. The goals of chemotherapy can be adjuvant, curative, or palliative.
3. Conventional chemotherapy consists of alkylating agents, antimetabolites, anti-tumor antibiotics, topoisomerase inhibitors, and mitotic inhibitors.
4. Endocrine therapy involves manipulating hormonal pathways to control tumor growth.
5. Immunotherapy stimulates the innate immune system to target malignant cells.
6. Targeted therapies inhibit certain molecular pathways that control malignant growth.
7. Common complications of chemotherapy include nausea, vomiting, alopecia, mucositis, cytopenias, and diarrhea.
8. Early palliative care consultation is recommended for all patients with advanced (stage IV) cancer.

DEFINITIONS

What is chemotherapy?

In the early 1900s, German chemist Paul Ehrlich coined the term chemotherapy.¹ He defined it as the use of chemicals to treat disease, believing that each illness had a

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so-called magic bullet, eventually discovering arsenicals to treat syphilis. In the 1940s, chemotherapy for the treatment of cancer began with the use of nitrogen mustard for lymphoma.¹ Chemotherapy now describes drugs that kill cancer cells. Conventional chemotherapy drugs target DNA integrity or chromosomal migration, resulting in cell death.²

What is targeted therapy?

Targeted therapies interact with molecules that are critical to tumor growth and proliferation.² Examples include epidermal growth factor receptor antibodies, proteasome inhibitors, and tyrosine kinase inhibitors. Targeted agents differ from conventional chemotherapy in regulating specific pathways instead of indiscriminately acting on all dividing cells.²

What is immunotherapy?

Immunotherapy refers to macromolecules such as antibodies, cytokines, and vaccines that can induce the host immune system to kill or regulate the growth of tumor cells.² Examples include interferon, interleukin-2, and bacillus Calmette-Guérin.

What is biological therapy?

Biological therapy is an umbrella term that can include both immunotherapy and targeted therapy. It is used broadly to describe substances derived from living organisms, synthetic versions of such substances, or living organisms used to treat cancer.³

What are the goals of chemotherapy?

Curative chemotherapy is intended to eradicate all cancer cells from the body to achieve a cure. Neoadjuvant therapy is given before surgery to decrease the size of the primary tumor to facilitate surgical resection. Adjuvant therapy is given after radiation or surgery to prevent cancer recurrence. Palliative chemotherapy is used when cure is no longer possible and the goal is to slow down the progression of disease and alleviate symptoms.⁴

How often is chemotherapy given?

Chemotherapy is typically given in regular intervals called cycles. A cycle involves administering chemotherapy on certain days, followed by a period of no treatment to allow the body to recover from toxic side effects. Clinical trials determine chemotherapy doses and cycle lengths.⁵

What are some common side effects of chemotherapy?

Some of the most common side effects are nausea, vomiting, fatigue, cytopenias, diarrhea, alopecia, and mucositis. Side effects vary depending on the regimen.

How are side effects graded?

The National Cancer Institute has published standardized definitions for adverse events called the Common Terminology Criteria for Adverse Events (CTCAE). Adverse events are graded from 1 to 5, as shown in (Table 1).

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