Optimizing chemotherapy protocol for diverse patient populations

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Background

- Chemotherapy is one of the main modalities of cancer treatment, but its efficacy and safety may vary depending on the patient 's genetic, cultural, and ethnic background.
- Factors such as pharmacogenomics, drug metabolism, drug interactions, toxicity profiles, adherence, and quality of life need to be considered when tailoring chemotherapy regimens to accommodate these variations among patients.
- International medical graduates have experience in treating cancer patients from different regions of the world and can provide insights on how to optimize chemotherapy protocols for diverse patient populations.

Objectives

- To review the current guidelines and evidence-based practices for chemotherapy administration in different settings and scenario s.
- To discuss how to adapt chemotherapy protocols to the specific needs and preferences of patients from different genetic, cult ural, and ethnic backgrounds.
- To provide oncology professionals with practical and relevant information on how to deliver optimal chemotherapy care to their diverse patient populations

Methods

- We conducted a literature search using PubMed, Google Scholar, and Cochrane Library databases to identify relevant articles o n chemotherapy optimization for diverse patient populations published in the last 10 years.
- We selected articles that reported on clinical trials, systematic reviews, meta-analyses, case reports, or expert opinions on the topic.
- We extracted and synthesized the key findings and recommendations from the selected articles using a thematic analysis approach

Results

- We identified 5 articles that met our inclusion criteria and covered various aspects of chemotherapy optimization for diverse patient populations.
- We categorized the articles into four main themes: pharmacogenomics, drug metabolism, drug interactions, and toxicity profiles.
- We summarized the main findings and recommendations from each theme in the following table:

THEME	FINDINGS	RECOMMENDATIONS
PHARMACOGENOMICS	-Genetic variations in drug-metabolizing enzymes, drug transporters, drug targets, and immune system can affect the response and toxicity of chemotherapy drugs. -Some examples of pharmacogenetic biomarkers that have been validated or are under investigation for chemotherapy optimization are: TPMT for thiopurines, DPYD for fluoropyrimidines, UGT1A1 for irinotecan, CYP2D6 for tamoxifen, KRAS/NRAS/BRAF for anti-EGFR agents, and PD-L1 for immunotherapy.	-Perform pharmacogenetic testing before initiating chemotherapy to identify patients who may benefit from dose adjustment, drug selection, or alternative therapy. -Use pharmacogenetic-guided algorithms or decision support tools to assist in chemotherapy optimization. -Educate patients and caregivers about the role and limitations of pharmacogenetics in chemotherapy.
DRUG METABOLISM	-Drug metabolism can be influenced by factors such as age, sex, body weight, liver function, kidney function, nutritional status, smoking status, alcohol consumption, and comorbidities. -These factors can affect the clearance, bioavailability, distribution, and elimination of chemotherapy drugs and alter their therapeutic window and toxicity risk.	-Assess the patient's baseline characteristics and organ function before initiating chemotherapy and monitor them periodically during treatment. -Adjust the dose or frequency of chemotherapy drugs according to the patient's metabolic status using validated formulas or nomograms. -Avoid or minimize the use of drugs that are known to have narrow therapeutic windows or high interindividual variability in metabolism.
DRUG INTERACTIONS	-Drug interactions can occur between chemotherapy drugs and other medications, herbal products, dietary supplements, foods, or beverages that the patient may be taking or consuming. -These interactions can affect the absorption, distribution, metabolism, excretion, or activity of chemotherapy drugs and lead to reduced efficacy or increased toxicity. -Some examples of clinically significant drug interactions with chemotherapy drugs are: warfarin with fluorouracil or capecitabine, anticonvulsants with irinotecan or etoposide, St. John's wort with imatinib or erlotinib, grapefruit juice with cyclophosphamide or Busulfan .	-Obtain a complete medication history from the patient before initiating chemotherapy and update it regularly during treatment. -Screen for potential drug interactions using reliable databases or resources and manage them accordingly. -Advise the patient to avoid or limit the intake of herbal products, dietary supplements, foods, or beverages that may interact with chemotherapy drugs. -Educate the patient about the signs and symptoms of drug interactions and encourage them to report any adverse events or changes in medication use.
TOXICITY PROFILES	-Toxicity profiles of chemotherapy drugs can vary depending on the patient's genetic, cultural, and ethnic background. -Some examples of toxicity differences among patient populations are: higher incidence of neutropenia and neuropathy in African Americans, higher incidence of hand-foot syndrome and diarrhea in Asians, higher incidence of mucositis and skin rash in Hispanics.	-Monitor the patient's toxicity symptoms and laboratory parameters during chemotherapy and grade them using standardized scales. -Implement prophylactic or supportive measures to prevent or reduce the severity of toxicity, such as growth factors, antiemetics, analgesics, or moisturizers. -Modify the dose or schedule of chemotherapy drugs or switch to alternative agents if toxicity becomes intolerable or lifethreatening. -Consider the patient's cultural and ethnic preferences and beliefs when managing toxicity and provide culturally sensitive and competent care.

Conclusions

- Chemotherapy optimization for diverse patient populations is a complex and challenging task that requires a multidisciplinary and individualized approach .
- Oncology professionals need to be aware of the factors that can affect the response and toxicity of chemotherapy drugs in different patient populations and apply the best available evidence and practices to tailor chemotherapy regimens accordingly.
- Further research is needed to identify more pharmacogenetic biomarkers, develop more accurate dosing formulas, evaluate more drug interactions, and compare more toxicity profiles for chemotherapy optimization for diverse patient populations.

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Disclosure

- No conflicts of interest to disclose.