Human African trypanosomiasis chemotherapy: present and future prospects.

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Abstract

Chemotherapy of African trypanosomiasis currently centres on three key drugs: pentamidine for chemoprophylaxis; suramin for treatment of the early stages of the disease; and melarsaprol for treatment of late stages when trypanosomes are present in the CNS. No drug is in routine use to prevent transmission during blood transfusion. In contrast, there are no drugs registered for chemoprophylactic use in Chagas' disease, though two, nifurtimox and benznidazole, are marketed in some countries in Latin America for treatment of both acute and chronic cases.

Keywords: Chagas disease, Nifurtimox, Benznidazole, Antimicrobial chemoprophylaxis.

Introduction

Chemotherapy is a type of cancer treatment that involves the use of one or more anti-cancer medications (chemotherapeutic agents or alkylating agents) as part of a prescribed chemotherapy regimen. Chemotherapy is sometimes shortened as chemo and occasionally CTX or CTx. Chemotherapy may be administered with the intention of curing which usually always requires drug combinations, extending life, or reducing symptoms (palliative chemotherapy. One of the main subspecialties of the medical field known as medical oncology, which is dedicated exclusively to pharmacotherapy for cancer, is chemotherapy [1].

Inhibition of DNA repair can complement chemotherapy since the term chemotherapy has evolved to refer to the non-specific use of intracellular toxins to prevent mitosis or cause DNA damage. More specialised drugs that block extracellular signals are not included by the phrase chemotherapy's connotation (signal transduction). Hormone therapies are now defined as the development of treatments with particular molecular or genetic targets that block the growth-promoting signals from traditional endocrine hormones (mainly oestrogens for breast cancer and androgens for prostate cancer). The term "targeted therapy" is used to describe various growth-signal inhibitions, such as those linked to receptor tyrosine kinases [2].

Importantly, the administration of medications (such as chemotherapy, hormone therapy, or targeted therapy) is considered systemic therapy for cancer because these treatments enter the bloodstream and can, in theory, treat cancer at any anatomic site in the body. When treating cancer, systemic therapy is frequently combined with other techniques that fall under the category of local therapy (i.e., therapies whose effectiveness is restricted to the anatomic area where they are applied), including radiation therapy, surgery, or hyperthermia therapy. Traditional chemotherapeutic drugs are cytotoxic because they prevent cell division (mitosis), but cancer cells respond differently to these drugs than other types of cells. Chemotherapy can be largely viewed as a method of damaging or stressing cells, which may then result in cell death if apoptosis is triggered. The destruction to healthy cells in the bone marrow, digestive tract, and hair follicles—cells that divide quickly and are susceptible to anti-mitotic drugs—is a major cause of chemotherapy's side effects. The most frequent adverse effects of chemotherapy as a result are baldness, mucositis (inflammation of the digestive system lining), and myelosuppression (reduced generation of blood cells, resulting in immunosuppression) [3].

Chemotherapy medications are frequently used in a variety of disorders caused by detrimental immune system overactivity against self-due to their impact on immune cells, particularly lymphocytes (so-called autoimmunity). These include multiple sclerosis, vasculitis, systemic lupus erythematosus, rheumatoid arthritis, and many others.

Chemotherapy dosage can be challenging: If the dose is too low, it won't work against the tumour, but if it's too high, the toxicity (side effects) will be intolerable for the patient. Based on estimated body surface area, the typical approach for calculating chemotherapy dosage (BSA). Instead of taking a direct measurement of body area, the BSA is typically estimated using a monogram or a mathematical calculation using the recipient's weight and height. This formula was developed in an earlier study from 1916 that tried to convert drug doses discovered in lab animals to equal doses for people. There were just nine human participants in the study. The BSA formula was accepted as the official standard for chemotherapy doses when chemotherapy first emerged in the 1950s [4].

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Due to the fact that the formula only considers the person's weight and height, the accuracy of this method for determining consistent doses has been questioned. Age, sex, metabolism, disease status, organ function, drug-to-drug interactions, genetics, and obesity are just a few of the many variables that affect a drug's absorption and clearance, all of which have a significant impact on the actual concentration of the drug in a person's circulation. As a result, there is significant heterogeneity in the systemic concentration of chemotherapeutic medications in individuals receiving BSA doses; this variability has been shown to be greater than ten-fold for numerous drugs [5].

Conclusion

The proposed classification schema provides a practical means to determine the emetogenic potential of individual chemotherapy agents and combination regimens during the 24 hours after administration.

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