

Winning the Fight Against Cancer

Athena HY Chew,¹ Nagarajan Chandramouli,² MBBS, MRCP, FRCPath, Ravindran Kanesvaran,^{3,4} MRCP, MD, FAMS, Gopalakrishna N Iyer,^{4,5} MBBS, PhD, FRCS, William YK Hwang,^{2,3,4} MBBS, FRCP, FAMS

Abstract

Advances in cytotoxic chemotherapy, surgical oncology, genomic medicine, targeted small molecule treatment, cancer immunotherapy and biology-driven precision radiation oncology have resulted in significant improvements in outcomes of cancer treatment, with an increasing number of patients achieving long-term disease control or even being potentially cured. Concurrent advances in palliative care and geriatric oncology have also helped to ensure that patients are managed holistically by considering their physical, social, psychological and emotional needs in a personalised manner.

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Introduction

The fight against cancer has been a protracted one that has claimed countless casualties across the millennia. Despite numerous advances in modern medicine, it remains a formidable enemy that has overtaken other ailments like infectious and heart diseases to become the leading cause of death worldwide, with an estimated 9.6 million deaths in 2018 alone.¹

Several analogies have been used for this fight against cancer, including that of a traditional battlefield, where the dreaded disease is seen as an invader while doctors and scientists use all the weapons in their arsenal against the onslaught. However, this analogy is flawed as cancer cells arise from normal cells and the battleground is the patient. We prefer the analogy of the fight against criminal gangs (the cancer) that arise in a city (the patient). The ‘criminals’ may arise because of genetic mutations (e.g. Li-Fraumeni syndrome) or due to exposure to a toxic neighbourhood environment (e.g. smoking and radiation), and start to proliferate with an intent to gain

power and steal the resources of the city. There is a lot more finesse needed for this fight because an all-out battle could lay the entire city to waste.

Traditional Cytotoxic Chemotherapy

Traditional cytotoxic chemotherapy is akin to the heavy artillery used in battle. It hijacks the need for cancer cells to divide by sabotaging the mechanisms for DNA replication. However, normal cells that undergo cell division during chemotherapy would also be affected by this approach. Cells with the shortest cell cycles are those from the bone marrow, hair follicles, skin and gastrointestinal tract, which are therefore the most sensitive to the effects of chemotherapy. Hence, patients receiving cytotoxic chemotherapy commonly have hair loss, gastrointestinal symptoms, skin changes and a drop in blood counts.² Moreover, while chemotherapy is moderately effective with cancers with a short replication time, it is less effective with tumours with a slow growth rate such as carcinoid tumours.³ Early attempts to reduce

¹ Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore

² Department of Haematology, Singapore General Hospital, Singapore

³ Division of Medical Oncology, National Cancer Centre Singapore, Singapore

⁴ Duke-NUS Medical School, Singapore

⁵ Division of Surgery and Surgical Oncology, National Cancer Centre Singapore, Singapore

Address for Correspondence: Prof William YK Hwang, Executive Offices, National Cancer Centre Singapore, 11 Hospital Crescent, Singapore 169610.

Email: william.hwang.y.k@singhealth.com.sg

