

Cardio-oncology at the Cross Roads

Chemotherapy and immunotherapy are currently saving millions of lives, demonstrating how quickly cancer treatment has improved in recent decades! A more recent issue, though, is that many cancer survivors experience harmful heart issues after receiving therapy. Cardio-oncology, which examines the relationship between cancer treatment and potential cardiac harm, was born out of these concerns.

Despite chemotherapy being the cornerstone of cancer care, the prescription of certain drugs prove to be especially harmful to the heart. Anthracyclines, such as doxorubicin, often used as powerful chemotherapy agents- have been recorded to cause damage to DNA, proteins as well as certain cell membranes. This results in the heart's oxidative stress and mitochondrial injury, making it difficult for the heart cells to produce energy! Over time, this may lead to heart-muscle weakness, and in extreme cases- eventual heart failure.

Although some modern immunotherapies have completely transformed cancer treatment over the years, some also have adverse side-effects! For instance, immuncheckpoint inhibitors might occasionally trigger the immune system to target vital tissues, like the heart. This eventually leads to serious conditions like Myocarditis- dangerous inflammation of the heart's tissue. Another phenomenon caused by CAR-T cell treatment, is a process known as Cytokine release syndrome, which appears to engineer immune cells to fight cancer. However, at times, this causes the body to overflow with inflammatory chemicals, resulting in abnormal cardiac rhythms, low blood pressure and potential heart failure!

Thankfully, innovative methods and technology are being created to counteract these adverse effects. Researchers and engineers are working to safeguard the heart from more harm, and several preventive medications are already in use. Beta blockers and ACE inhibitors enhance heart function in many susceptible patients, whereas dexrazoxane helps protect the heart against anthracycline harm! Regarding immunotherapy, medications like tocilizumab aid in the management and regulation of cytokine storms. In addition to medicine, several more recent medications are even being developed to lessen the quantity of medication that enters the heart. The resistance of the heart is strengthened by careful observation, blood tests, and maintaining lifestyle factors like exercise!

To conclude, cancer therapy now stands at a crossroads: where treatment that can save lives can also harm the very organ which sustains life. By truly understanding how chemotherapy and immunotherapy could possibly damage the heart at a molecular level, medicine can now move towards a future where cancer is defeated without sacrificing one's cardiovascular health!