Role of statins for the prevention of anthracycline-induced cardiomyopathy: a meta-analysis

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Topic(s):
Cardio-Oncology

Citation:

Background: Anthracyclines are key components of many chemotherapeutic regimens, having demonstrated efficacy in lymphomas and many solid tumors. However, a major factor limiting their use is a cumulative, dose-related cardiotoxicity which ultimately leads to asymptomatic and symptomatic heart failure. Oxidative stress is considered as a major mechanism in anthracycline-induced cardiomyopathy. Statins have been shown to possess anti-oxidative, pleiotropic effects besides their anti-inflammatory and lipid-lowering effects.

Purpose: This study evaluated the potential role of statin for the prevention of anthracycline-induced cardiomyopathy.

Methods: Using MEDLINE, EMBASE, ScienceDirect, Scopus, Google Scholar, ClinicalKey, Cochrane Database of Systematic Reviews, clinicaltrials.gov, and Cochrane Central Register of Controlled Trials databases, a search for eligible studies was conducted until December 2018. Included studies were evaluated based on the Cochrane Collaboration's tool for assessing risk of bias. Our primary outcome of interest was the development of anthracycline-induced cardiomyopathy. We also investigated the mean change in LVEF pre- and post-chemotherapy with anthracycline. Review Manager (RevMan) 5.3 was utilized to compute for relative risk and mean change in LVEF. A random effects model was applied for all meta-analyses.

Results: We identified 3 studies involving 332 cancer patients, showing that in cancer patients undergoing anthracycline-based chemotherapy, pre-treatment with statins was associated with a lower risk of developing anthracycline-induced cardiomyopathy (RR 0.33, 95% CI 0.14-0.79, p<0.05). There was a significant decrease in LVEF among patients who were not treated with statins [Mean difference -6.25, 95% CI -11.68 - (-) 0.82, p= 0.02]

Conclusions: Pre-treatment with statins on cancer patients undergoing anthracycline chemotherapy may prevent the development of anthracycline-induced cardiomyopathy and reduction in LVEF. This will expand the utility of statin as a medication for the prevention and treatment of cardiovascular diseases.