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A Prospective Cross-Sectional Pilot Study Investigated the Late Cardiac Toxicity of Neo-Adjuvant Chemo Radiation in Oesophageal Cancer Survivors

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Abstract

Despite an increase in oesophageal cancer cure rates since the development of neoadjuvant chemo radiation (nCRT), there is mounting evidence of treatment-related cardiac damage, the exact causes of which are yet unknown. The main goal of this study was to compare surgical resection plus nCRT to surgical resection alone in EC patients in order to detect (subclinical) cardiac dysfunction.

Keywords: Radiation toxicity; Cardiac toxicity and oesophageal cancer

Introduction

Neo-adjuvant chemo radiation (nCRT) has increased the cure rates for oesophageal cancer (EC) patients; however this treatment's positive effects could be compromised by radiation-induced cardiac damage. According to the CROSS study, patients who received nCRT before surgery had significantly higher survival rates than those who underwent surgery alone, with tolerable acute and perioperative toxicity [1]. One year following therapy, both groups' quality of life was comparable. So, in many parts of the world, nCRT became the normative treatment for EC. Radiation-induced cardiac and pulmonary damage has, however, come to be recognised as a therapeutically relevant issue following thoracic irradiation for lung, breast, and haematological cancers [2]. Studies using the SEER database that included EC patients revealed that irradiated individuals had higher cardiac mortality than patients who underwent surgery. Recent studies contrasting modern organ-sparing radiation methods like proton therapy or IMRT with more traditional methods discovered lower rates of cardiac morbidity and mortality from all causes. Additionally, patients who had been exposed to radiation as well as those who had radiotherapy using less sophisticated procedures had greater rates of (cardiovascular) postoperative complications [3-5].

Heart disease and oesophageal cancer

The local ethics committee approved this study, and it is listed on clinicaltrials.gov (NCT03396614). From our institutional database, we chose all patients who underwent curative surgery plus or minus neoadjuvant CRT for EC. We contacted patients to ask whether they would be interested to participate in this study once healthcare practitioners confirmed the patients' survival and disease state [6]. We contacted a total of 36 nCRT patients and 40 control individuals. Twenty-two and twenty-six patients, respectively, provided written informed consent. According to answer order, inclusion was made. Participants spent a day at our hospital. They were questioned about their medical background and physical capabilities. The EORTC Quality of Life Questionnaires (EORTC-QLQ), measuring the physical, mental, and social health of cancer patients (C-30), and OES-18, concentrating [7,8]. Both HS-TNT and NT pro BNP are thought of as measurements of myocardial necrosis that also predict the onset of heart failure and overall survival. NT pro BNP is regarded as an early biomarker for heart failure and is predictive for cardiac events and overall survival. The European Association of Cardiovascular Imaging's recommendations were followed when performing echocardiography. In this procedure, valve abnormalities, strain imaging, evaluations of the right and left systolic and diastolic function parameters, and examinations for pulmonary hypertension symptoms were all included. The amount of coronary calcifications was counted using an ECG-triggered CT scan on a dual source CT scanner without contrast enhancement. The Coronary Artery Calcium (CAC) score, based on the Agatston method, was calculated and expressed. While taking a breath, a cardiac MRI scan was done[9,10].

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