

Can cancer itself damage the heart?

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Research presented today at EuroEcho-Imaging 2015 raises the possibility that cancer itself may damage heart muscle irrespective of exposure to cancer drug therapies. Researchers from the UK's first dedicated cardio-oncology clinic found that both treated and untreated cancer patients had impaired heart function.

The annual meeting of the European Association of Cardiovascular Imaging (EACVI), a registered branch of the European Society of Cardiology (ESC), is held 2 to 5 Dec. 2015 in Seville, Spain.

"It is well known that chemotherapy is potentially toxic to the heart, making cancer patients more prone to [cardiovascular complications](#) such as [heart failure](#), hypertension or myocardial ischaemia," said Dr Rajdeep S. Khattar, last author of the abstract and consultant cardiologist at the Royal Brompton Hospital in London, UK. "Our study raises the possibility that [tumour growth](#) itself may also damage the heart which could have important implications for monitoring."

The definition of cardiotoxicity is based on a reduced ejection fraction (less than 55%) and symptoms of heart failure. Ejection fraction is a coarse measure of left ventricular function and is assessed by echocardiography. It refers to the percentage of blood pumped into the circulation when the heart contracts. For example, if there is 100 ml of blood in the left ventricle and 65 ml is pumped out, the ejection fraction is 65%.

The current study applied a more subtle measure of left ventricular

function using echocardiography called strain. It indicates how well the myocardial fibres contract. Previous studies have shown that cancer patients who have had chemotherapy can have a normal ejection fraction but reduced strain and that this may predict subsequent cardiotoxicity.

Dr Khattar said: "Our study carried this finding a step further to see if untreated cancer patients with a normal ejection fraction also had reduced strain measurements."

The study compared myocardial strain in three groups with a normal ejection fraction (55% or more): 43 patients with cancer who were currently being treated or had received treatment in the past, 36 patients with as yet untreated cancer, and 20 healthy individuals matched to the cancer groups for age and gender.

The researchers found that both groups of cancer patients had similarly reduced strain measurements, indicating impaired [heart function](#), compared to the healthy individuals.

"All of the cancer patients had a preserved [ejection fraction](#) so by this coarse measure their hearts were functioning normally," said Dr Khattar. "But the strain measurements showed that they did have myocardial dysfunction."

He continued: "What was really new was the finding of reduced strain, and therefore myocardial dysfunction, in the group of patients with cancer who had not yet received treatment. This raises the possibility that the tumour itself may have a direct and deleterious effect on the function of the heart."

Patients with reduced strain before they start their cancer drug therapies may be predisposed to developing heart failure during the course of their treatment. "These patients might need closer monitoring," said Dr

Khattar. "This would be a real change because at the moment, [cancer patients](#) don't, as a matter of routine, have a cardiovascular risk assessment by a cardiologist."

This is only the second study in humans which suggests that cancer might have a direct effect on the heart. A study published in September found elevated cardiovascular biomarkers in patients with as yet untreated cancer. "It could be that the tumour produces these inflammatory markers which then leads to the reduction in myocardial function that we found," said Dr Khattar.

Dr Khattar will continue to follow the patients in the current study to find out if their rates of heart failure and death are predicted by the strain measurements. He said: "If it transpires that the patients with reduced strain prior to cancer treatment are more prone to heart failure and death then it would be important to implement closer monitoring of patients with cancer than is conducted currently."

More information: Noemi Pavo et al. Cardiovascular biomarkers in patients with cancer and their association with all-cause mortality, *Heart* (2015). [DOI: 10.1136/heartjnl-2015-307848](https://doi.org/10.1136/heartjnl-2015-307848)

Alexander R Lyon. Disparate worlds drawing closer together: cardiovascular biomarkers predict cancer outcomes in treatment-naïve patients, *Heart* (2015). [DOI: 10.1136/heartjnl-2015-308208](https://doi.org/10.1136/heartjnl-2015-308208)

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