

# Correcting tiny differences in patient's position for radiotherapy could increase survival chances

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Very small differences in the way a patient lies during radiotherapy treatment for lung or oesophageal cancer can have an impact on how likely they are to survive, according to research presented at the ESTRO 37 conference.

These differences of only a few millimetres can mean that the radiation [treatment](#) designed to target [patients'](#) tumours can move fractionally closer to the [heart](#), where it can cause unintentional damage and reduce survival chances.

The finding suggests that survival could be improved by tightening up treatment guidelines to ensure patients are positioned more accurately.

Radiotherapy plays an important role in [cancer](#) care in, amongst others, hard to treat tumours such as lung and [oesophageal cancer](#). However, it can cause side-effects and previous research shows that [radiotherapy](#) to the chest can have negative long-term effects on the heart, for example, increasing the risk of heart disease.

When planning radiotherapy treatment, cancer specialists create a CT image of their patient. This reveals the exact position and size of the tumour within the body. At each subsequent treatment, another image is created and used to check that the patient and, therefore, the tumour is in the same position, within a certain threshold, before the treatment is

delivered.

The new research was presented by Corinne Johnson, a medical physics PhD student at the Manchester Cancer Research Centre, part of the Christie NHS Foundation Trust and the University of Manchester, UK.

She and her colleagues studied a group of 780 patients with non-small cell lung cancer who were treated with radiotherapy. For each treatment, patients were positioned on the treatment machine and an image was taken to confirm that they lay within 5mm of their original position. They used the data from these images to gauge how accurately the [radiotherapy dose](#) was delivered over the course of treatment, and whether it was shifted slightly closer or slightly further away from the patient's heart.

When they compared these data with how likely patients were to survive, they found that patients with slight shifts towards their hearts were around 30 per cent more likely to die than those with similar sized shifts away from their hearts.

When they repeated the research with a group of 177 oesophageal cancer patients, they found an even greater difference of around 50 per cent. In both groups the pattern of survival remained even when researchers took other factors such as the patient's age into account.

Johnson explains: "We already know that using imaging can help us to target cancers much more precisely and make radiotherapy treatment more effective.

"This study examines how small differences in how a patient is lying can affect survival, even when an imaging protocol is used. It tells us that even very small remaining errors can have a major impact on patients' survival chances, particularly when tumours are close to a vital organ like

the heart.

"By imaging patients more frequently and by reducing the threshold on the accuracy of their position, we can help lower the dose of radiation that reaches the heart and avoid unnecessary damage."

Johnson and her colleagues are now looking at the data in more detail to see whether particular regions of the heart are more sensitive to radiation than others, and they hope to investigate the effect of differences in patient position in other types of cancer.

President of ESTRO, Professor Yolande Lievens, head of the department of radiation oncology at Ghent University Hospital, Belgium, said: "Radiotherapy treatments are given according to strict protocols to ensure that patients get the most effective treatment with the fewest possible side-effects. This research suggests that changes to lung and oesophageal cancer protocols could positively impact the overall survival of patients with these cancers, both of which have relatively high mortality rates."

Provided by European Society for Radiotherapy and Oncology

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