

The use of tomosynthesis, in addition to standard mammograms, in routine breast screening

What is the purpose of breast screening?

Currently in Scotland, women aged between 50 and 70 are invited to participate in breast screening every 3 years. Women over 70 years are encouraged to arrange an appointment.

Breast screening aims to find breast cancers early. The earlier a cancer is found, the better the chances are of treating it successfully.

Breast screening is done at special clinics, or at mobile screening units. During screening, a woman's breasts are X-rayed, one at a time. The type of X-ray used for breast screening is called a mammogram. If any abnormalities are seen on a woman's mammogram, she will be sent a letter asking her to attend for further tests. Approximately 4% of women are 'recalled' for further tests, but most do not have cancer.

There are some risks to women attending breast screening. A mammogram requires a small dose of radiation. Radiation can cause cancer, but the risk from having a mammogram is very low. It is also possible that breast screening may result in a cancer being detected and treated, which might never have caused any harm in a woman's lifetime. This is called over-diagnosis. However, most experts agree that the overall benefits of breast screening outweigh the risks. It is estimated that the effect of the UK breast screening programmes is a 20% reduction in breast cancer mortality.

What is tomosynthesis?

Tomosynthesis is an advanced type of mammogram, which takes a 3D image of the breast. Tomosynthesis images allow experts to have a closer look at the tissue in the breast, as compared to a standard mammogram.

Tomosynthesis requires roughly the same dose of radiation as a standard mammogram. Therefore, if a woman has both tomosynthesis and a standard mammogram, she will receive a double dose of radiation. This would still be a very small amount of radiation. However, an alternative may be to use the images from tomosynthesis to generate a 2D image which can be used in place of a standard mammogram. The 2D image generated from tomosynthesis images is called a 'synthetic 2D image'.

Most of the machines used for screening mammograms in Scotland can also be used for tomosynthesis, but they would need to be upgraded first. This would cost £50,000 per machine. If tomosynthesis was used in screening, there would be other costs to consider. These include staff training, costs associated with storing the images, and increased staff time spent examining tomosynthesis images.

What we did

We looked for research studies which helped to answer the following questions.

In women attending breast screening, would the use of tomosynthesis in addition to standard mammograms (or synthetic 2D images):

- Result in more cancers being detected?
- Result in fewer women being recalled unnecessarily for further tests?
- Reduce the number of women dying from breast cancer?
- Be good value for money?

What we found

The studies we found told us that if tomosynthesis was used in breast screening, along with standard mammograms, more cancers would be detected. The studies also told us that synthetic 2D images can be used in place of standard mammograms, avoiding the problem of double radiation dose.

It is not clear from the studies whether the use of tomosynthesis would mean that fewer women would be recalled after their initial breast screen for further tests.

We did not find any information on the value for money of the use of tomosynthesis in screening.

We did not find any studies which told us whether adding tomosynthesis to routine breast screening would result in fewer women dying from breast cancer. Just because more cancers would be detected, this does not necessarily mean that treating these additional cancers would result in fewer women dying. This is because the cancers may never have caused any harm in a woman's lifetime, or they might be particularly aggressive cancers for which early treatment makes no difference to survival.

What is our advice to NHSScotland?

Any changes to the breast screening programme in Scotland requires careful consideration of the overall pros and cons. We need to be certain that the benefits outweigh the risks to the people being screened. As there are still some gaps in our knowledge, we have advised that tomosynthesis should not be used in routine breast screening at the moment.

Future work

Research is ongoing in this area. A large study is due to be published in 2020 (the PROSPECTS study), and this should fill some of the gaps in our knowledge.

This plain language summary has been produced based on SHTG Advice Statement 005/18 April 2018.