
RSNA 2014: New Device Could Reduce Mammography Discomfort



A new device that could result in more comfortable mammography for women is to be presented next week at the annual meeting of the Radiological Society of North America (RSNA). A study will outline how standardising the pressure applied in mammography could reduce the pain associated with breast compression, without sacrificing image quality.

Compression of the breast is an unavoidable and necessary step in mammography as it helps optimise the image quality and minimise the absorbed radiation dose. While essential, the mechanical compression often results in discomfort and pain for women, and may be a factor deterring some women to undergo mammography screening.

In addition, there is always a chance of over-compression or unnecessarily high pressure during compression, because of variations in breast size, composition, skin tautness and pain tolerance. While less frequent in the US, this is a common occurrence in Europe, especially for women with small breasts. In the US, under-compression or extremely low applied pressure is more common.

"This means that the breast may be almost not compressed at all, which increases the risks of image quality degradation and extra radiation dose," said Woutjan Branderhorst, PhD, a researcher in the Department of Biomedical Engineering and Physics at the Academic Medical Center in Amsterdam.

Adjustments in force can lead to substantial variation in the amount of pressure that is applied to the breast. It could range from less than three kilopascals (kPa) to greater than 30 kPa.

Dr. Branderhorst and colleagues came up with a theory that a compression protocol based on pressure rather than force could help reduce the pain and variability associated with the current force-based compression protocol. They have developed a device that displays the average pressure during compression. The device has been tested in a double-blinded, randomised control trial on 433 asymptomatic women scheduled for screening mammography.

During the study, three of the four compressions for each participant were standardised to a target force of 14 dekanewtons (daN). One randomly assigned compression was standardised to a target pressure of 10 kPa. The participants were asked to score their pain on a numerical rating scale. The 10 kPa pressure did not compromise radiation dose or image quality, and, on average, the women reported it to be less painful than the 14 daN force.

The findings could have significant implications for mammography. Nearly 39 million mammography exams are performed every year in the US. This translates into more than 156 million compressions. By adopting this new approach, a large amount of unnecessary pain could be avoided and radiation doses could be optimised without adversely affecting image quality or the proportion of required retakes.

Dr. Branderhorst is confident that standardising the applied pressure would help reduce over- and under-compression and could lead to a more reproducible imaging procedure that is associated with less pain. The new device can be added easily to existing mammography systems. Further research may be required to determine if the 10 kPa pressure is the optimal target.

The research team is also working on new methods that could help mammography technologists improve compression through better positioning of the breast.

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