SSA20-05

Scientific Papers

A Standard for Mechanical Compression in Mammography?

Sunday, 11:25 - 11:35 AM
Location: S404AB

PARTICIPANTS:

Jerry E De Groot MS: Nothing to Disclose
Wouijan Branderhorst PhD (Presenter): Employee, SigmaScreening BV
Mireille Breeders PhD: Nothing to Disclose
Cornelis A Grimbergen PhD: Founder, Sigmascreening Employee, Sigmascreening Board Member, Sigmascreening Patent holder, Sigmascreening
Gerard J den Heeten MD, PhD: Founder, Sigmascreening

CITE THIS ABSTRACT

PURPOSE

In mammography, mechanical compression often causes discomfort and pain in Europe. Depending on the individual technician, the compression force is typically adjusted to breast size, composition, skin tautness and pain tolerance. Prior research showed that this leads in practice to a large variation in pressure, ranging from <3 kPa (23 mmHg) to >30 kPa (225 mmHg). We developed a device that displays the average pressure during compression, to standardize the pressure on current mammographic devices that only display force. We aim to study the effects of standardizing pressure on absorbed glandular dose (AGO), the number of required retakes and reported pain, and compare it with standardizing force as the best available alternative.

METHOD AND MATERIALS

A double-blinded randomized controlled trial was performed on 433 asymptomatic women scheduled for screening mammography. For each participant, three of the four compressions were standardized to a target force of 14 daN. One randomly assigned compression was standardized to a target pressure of 10 kPa (75 mmHg). Participants scored pain on a numerical rating scale. Three experienced breast screening radiologists indicated which images required a retake.

RESULTS

The average AGO and proportion of required retakes were in the normal range for the 10 kPa compressions. Average AGO values were 0.5% (MLO, not significant)- 3.2% (CC, $p<0.001$) lower for the 10 kPa protocol despite an average increase in breast thickness. The reader study showed no degradation of image quality; the proportion of retakes required for the 10 kPa compressions was 4.2% versus 1.4% (95% C.I. [0.4-4.4%]) for the 14 daN compressions. Average pain scores were 10% (MLO)- 24% (CC) lower in the 10 kPa protocol ($p<0.001$) and the proportion of women experiencing severe pain (NRS >= 7) was 27% (MLO)- 46% (CC) lower ($p<0.001$).

CONCLUSION

Mammographic compressions can be standardized to 10 kPa pressure without compromising radiation dose and apparent image quality, while being less painful than standardizing to 14 daN force which could substantially reduce complaints. Further research is required whether

10kPa (under arterial blood pressure) Is the optimal target pressure.

CLINICAL RELEVANCE/APPLICATION

For the millions of mammograms obtained yearly this study shows that a large amount of unnecessary pain can be avoided without adversely affecting radiation dose or the proportion of required retakes.