

Systematic review of 3D mammography for breast cancer screening

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Objective

This review investigated the relative performance of digital breast tomosynthesis (DBT) (alone or with full field digital mammography (FFDM) or synthetic digital mammography) compared with FFDM alone for detecting breast cancer lesions in asymptomatic women.

Materials and Methods

A systematic review was carried out according to systematic reviewing principles provided in the Cochrane Handbook for Systematic Reviews of Diagnostic Test Accuracy. A protocol was developed a priori. The review was registered with PROSPERO (number CRD42014013949). Searches were undertaken in October 2014. Following selection, five studies were eligible. Hologic's Selenia® Dimensions® system was utilized for all studies.

Findings

- Higher cancer detection rates were observed when comparing DBT + FFDM with FFDM in two European studies: the summary difference per 1000 screens was 2.43 (95% CI: 1.8 to 3.1).
- Two European studies observed higher cancer detection and invasive cancer detection rates using DBT + FFDM than FFDM alone. The differences were statistically significant within studies and in the pooled analysis.
 - Both European studies found lower false positive rates for individual readers.
 - One found a lower recall rate based on conditional recall.
 - The second study was not designed to compare post-arbitration recall rates between FFDM and DBT + FFDM.
 - One European study presented data on interval cancer rates; sensitivity and specificity for DBT + FFDM were both higher compared to FFDM.
- In the US studies, cancer detection results were similar to those of the European studies, with two of the three US studies demonstrating an increased cancer detection rate.
 - One large multicenter US study showed a higher cancer detection rate for DBT + FFDM, while two smaller US studies did not find statistically significant differences.
 - Reductions in recall and false positive rates were observed in the US studies in favor of DBT + FFDM.
 - In comparison to FFDM, DBT, as an adjunct to FFDM, has a higher cancer detection rate, increasing the effectiveness of breast cancer screening.
 - Additional benefits of DBT may also include reduced recalls and, consequently, reduced costs and distress caused to women who would have been recalled.
 - The results of the US studies with regard to recall and false positive rates were much more consistent and showed sizable and statistically significant reductions in both recalls and false positives.
 - Reduced radiation exposure by replacing the FFDM with synthesized views from the DBT dataset is now feasible. Evidence on the relative performance of DBT + synthesized DM is growing.

Conclusion

Evidence from large scale studies in the US and Europe show that DBT + FFDM, compared to FFDM, yields higher invasive cancer detection rates, increasing the effectiveness of breast cancer screening. The use of DBT may reduce recalls and thereby reduce both program costs and distress caused by a false negative recall.

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