Current position on use of tomosynthesis (DBT) in the NHS Breast Screening Programme

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Until now, digital breast tomosynthesis (DBT) systems should not have been used in the NHS Breast Screening Programme except as part of clinical trials or officially organised NHS Breast Screening Programme (NHSBSP) practical evaluations. However, a number of systems are commercially available and some clinical trials have published data showing their potential for breast screening and assessment.

This paper updates the current position of the (NHSBSP) on DBT and the steps that are being taken to establish the role DBT systems may play in the future.

Evidence for use in assessment

An expert group was established in autumn 2012 to review the evidence for the use of DBT in assessment. The group found that most publications on the use of DBT investigated the use of specific machines from single suppliers, with most of the available evidence based on the Hologic Dimensions System.

The peer reviewed published literature, at that time, for the Hologic system demonstrated that breast DBT currently has no role to play in the assessment of calcifications, but is at least as good as spot compression views for the assessment of possible soft tissue abnormalities. This conclusion is largely based on a clinical evaluation conducted at Kings College Hospital, London.[1, 2]

There is sufficient evidence to justify the use of the Hologic Dimensions DBT system in assessment in the NHSBSP.

The use in assessment of some other manufacturer's systems is currently being evaluated and this guidance will be updated when these studies are completed.

Technical and practical evaluations

As with all new equipment to be used in the NHSBSP, as DBT systems become available, they must undergo rigorous technical and practical evaluation.

Technical and practical evaluations of the Hologic Dimensions system have been completed [3, 4]. The practical evaluation demonstrated that 3D visualisation of calcifications is comparable to 2D. Although, further peer reviewed published evidence is needed to support this. The technical evaluation of the Hologic

Dimensions DBT shows that doses are comparable to 2D. However, there is no agreed image quality standard for DBT yet.

The technical evaluation of the Siemens Inspiration in DBT mode has been completed and is also published on the NHSCSP website.

Evaluations of other manufacturer's systems are either in progress or being considered.

Current clinical and technical issues

The following issues need consideration:-

- The files associated with tomosynthesis are much larger than those acquired using 2D imaging. This will have implications for local and archival storage
- The images from currently available Tomosynthesis systems are in standard DICOM format known as BTO, or in CT format, as most PACS manufacturers will have workstations capable of displaying these images
- Two-view DBT is advised
- Using DBT does not mean that ultrasound can be omitted. Even if the DBT images appear normal, ultrasound imaging must be used
- At present there is insufficient evidence to support the use of the aggregated (or synthetic) 2D image that is sometimes obtained during a DBT acquisition as a replacement for a standard digital mammogram
- The radiation dose associated with a one-view DBT acquisition is typically about 2.2 mGy for 50 to 60 mm thick breasts.[5] This is slightly more than for a corresponding one-view 2D acquisition but well below the current national diagnostic reference level (DRL) of 3.5 mGy for one-view mammography

Quality control protocols

Guidance on quality control procedures for DBT systems (for radiographers and physicists) have been developed and are available on the NBSS website. The protocols build on the quality control procedures developed for use in the TOMMY trial.[5]

Although, there are some special phantoms for use in testing tomosynthesis systems, none have as yet become established for effectively investigating image quality.

Training

The expert group who reviewed the evidence for the use of DBT in assessment have made training recommendations and concluded that training on the use of DBT could be provided through any NHSBSP training centre. Minimum requirements for radiologists and radiographers were agreed as follows:

Radiologist training	Radiographer training
The group recommended that Radiologists should be required to attend an NHSBSP recognised DBT training course before embarking on clinical use of DBT. This should include: • Review of a minimum of 80 cases (40 of which must be assessed by the individual working independently) • Lectures on the technology, clinical application, and the evidence base • PACS retrieval, information sharing • The provision of information about the technology to women	This should include: • Vendor-specific training • 'How to use' advice • Practical and theoretical grounding in the technology • Routine QC and tolerances • Use of phantoms • Artefacts

Training for physicists in the quality control of DBT will be provided as part of basic and update courses for medical physicists organised by the National Breast Screening Programmes Quality Assurance Coordinating Group for Physics in conjunction with the Institute for Physics and Engineering in Medicine. The QA Group also agreed that training may be undertaken with buddy visits to regions with experience of DBT systems.

System suppliers should provide both specific training and applications training.

Trials of DBT in screening

A paper from Professor Per Skaane in Norway compared the use of digital mammography alone with the use of digital mammography and tomosynthesis for population-based breast screening.[6] This paper, along with evidence from other trials investigating the use of DBT in screening, will be reviewed in due course by the Advisory Committee on Breast Cancer Screening.

References

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