E20. Implementation of screening for breast cancer

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Background

Discussions on the use of breast cancer screening and on the best ways of implementation are ongoing. Discussions include the effect of screening, the potential side effects (additional imaging and biopsies or overdiagnosis), the limitations of mammography screening (such as interval carcinomas) and the possibilities for further improvements.

In this presentation we will give an overview on the present advances of screening mammography and its quality assurance and on the discussed possibilities and limitations of other imaging tests.

Material and methods

This presentation is based on a review of the available literature (PubMed) and a critical analysis of benefits and risks.

Results

Mammographic screening is one of the best proven methods in medicine. While to date an average proven mortality reduction of approximately 20% [1] is often mentioned, it should be remembered that this mortality reduction is based on the debatable exclusion of some randomised studies and emphasis on other studies. Also, based on their specific structure (comparison of the outcome of invited versus non-invited women instead of the outcome of truly participating versus non-participating women), the known existing cross-over leads to an underestimation of the true effect or benefit for the participating woman.

Irrespective of this discussion, mammographic screening is a proven effective method to decrease mortality and to save women's lives. Even though potential side effects need to be considered, monitored and reduced as far as possible, their estimation or calculation only becomes possible in programmes with the described high quality assurance and level of documentation. Side effects like recall for additional imaging or percutaneous biopsy should be considered with respect to their medical meaning. Realistically, the side effect of any recall and its associated transient psychological stress to the woman appears to be minimal compared to a lost life. This fact also appears to be perceived in exactly this way by the vast majority of screened women, even though this has so far not been accepted by those who criticise the screening. Discussions on overdiagnosis are important, especially for a better individualised treament and for an adequate risk communication with the patient. However, it should be appreciated that many successes of medicine (like the constantly increasing life expectancy) have so far been achieved by innumerous overdiagnoses or overtreatments (use of antibiotics, chemotherapies etc.). [2,3]

One major advantage of screening programmes has been the establishment of systematic quality control and learning by feedback. The European Guidelines for Breast Cancer screening, [4] even though based on experts' opinions (only), have set sensible standards, and the implementation of these guidelines as fundamentals of breast screening allow a good effect to be secured with acceptable side effects.

One of the latest successful examples has been the introduction of a huge screening programme in Germany which is based on the European Guidelines. The programme, which included extensive training of all participants, strict quality assurance, monitoring by random checks, and systematic documentation, is showing first successes, as evaluation of the first results shows that all parameters of the European Guidelines (except participation rate) could indeed, on average, already be fulfilled during the first round. [5]

In spite of the achieved successes, an understandable desire exists to further improve the effect of screening and to further increase mortality reduction. When discussing the potentials of other imaging methods, it needs to be emphasised that no statistically founded data exist on the use of other methods for systematic screening of women without increased risk.

As to the added use of magnetic resonance imaging (MRI), single institution and multicentre studies exist which prove a significantly higher senisitivty of MRI compared to mammography and ultrasound in the high risk population. Disadvantages of MR screening, even in this population, concern a (varying) usually three times higher biopsy rate compared to mammography screening, a high number of follow-up recommendations and the complicated and expensive histopathological

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assessment of lesions detected by MR only. Whether the mentioned benefits and risks are transferrable to other patient selections is quite uncertain, since this specific population includes younger women with much more dense breast tissue and different types of breast cancers (different histological types as well as different grading).

Considering the non-negligible estimated increase of side effects, the lack of data on a reliably higher effect, the increased probability of overdiagnoses and the high costs, no recommendation for MR screening outside high risk populations exists worldwide. [6,7]

When analysing the available data on ultrasound performed in asymptomatic women at risk, ultrasound technology today appears capable of detecting small malignancies. [7,8] When extrapolating data from risk populations to the usual screening population, two extra carcinomas could possibly become detectable per 1000 women with dense breasts if ultrasound were used in addition to mammography screening. [7] This might correspond to another mortality reduction among women with dense breasts of >35%.

Unfortunately, the existing studies also indicate that by the additional use of ultrasound, biopsy rates very probably would increase by a factor of 3 to 5. No reliable data appear to exist concerning the expected numbers of additional follow-up recommendations. A significant rise might occur. Also, so far, no proven quality assurance programme has yet been established for breast ultrasound.

Interesting technologies which have not yet been tested for screening include tomosynthesis or automated 3D ultrasound. They appear, interestingly, to increase standardisation and reproducibility and/or detection rate in dense breast tissue. While first results are promising, one major problem might concern feasibility of reading the many more available images. So, possibly, the application of these methods might depend on the parallel development of intelligent CAD-programs which will in the future support the human readers.

Conclusion

To date, mass screening by mammography remains an effective, and indeed is the only proven, imaging modality that is capable of reducing mortality. In high risk women, intensified surveillance by mammography (ultrasound) and MRI appears to be the best presently available choice. In view of side effects (false positive calls) and limitations (as compared to prophylacti mastecomy), adequate patient information appears necessary.

Further development and testing of new methods and their quality assurance remain important future tasks.

Conflict of interest statement

None declared.

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