

# MRI finds breast cancer before it becomes dangerous

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A study in the *Lancet* (vol. 370, 11 August 2007) could lead to a change of paradigm in the early diagnosis of breast cancer. It states that magnetic resonance imaging (MRI) is substantially more accurate than mammography in diagnosing very early stages of breast cancer. Up to now MRI was thought to be hardly suited for the detection of such 'ductal carcinoma in situ (DCIS).

Researchers at the University of Bonn have now come to a completely different conclusion. In the past five years they examined more than 7000 women with both methods. In a total of 167 women the doctors found early forms of breast cancer – 152 (92 %) of these were found using MRT, 93 (56 %) with mammography.

Breast cancer forms in the cells which line the inside walls of the milk ducts. The tumour initially remains in the milk duct and is therefor called " intraductal cancer" or DCIS (ductal carcinoma in situ). Although even at this stage it is called a carcinoma, it behaves actually like a benign disease, which can always be treated successfully by operating on it. Only when the tumour grows out of the milk ducts into the breast's glandular tissue can it spread via blood and lymph vessels in the body. 'If we find DCIS and remove it we can prevent the formation of "real" breast cancer,' the Bonn radiologist Professor Christiane Kuhl explains. 'That way we prevent the development of a disease that is often life-threatening.'

However, there are different forms of intraductal carcinomas: the less

aggressive (low-grade) and highly aggressive (high-grade) DCIS. Whereas low-grade DCIS is relatively inert and may never spread beyond the milk duct (and thus may never pose a threat to the women affected), high-grade DCIS will virtually always break out of the milk ducts, and then will become dangerous, biologically aggressive high grade invasive breast cancer. This makes it all the more important to discover such high-grade DCIS.

It has been known for a long time that MRI is superior to mammography as far as the diagnosis of invasive breast cancer is concerned. However, the search for DCIS to date has been the preserve of mammography. It highlights small calcifications which form in the milk ducts affected. On the MRI scan, depositions of this kind are invisible. Therefore MRI was hitherto seen as unsuited for detecting intraductal carcinoma, which was one of the main reasons for only using mammography for the early detection of breast cancer.

With their results the Bonn researchers confounded this textbook wisdom. A total of 7319 women were investigated by Professor Kuhl and her colleagues in the last five years using both methods. In 167 of them they found early stages of breast cancer. 'Using mammography only 93 cases of DCIS could be seen, compared with 153 cases detected by MRT,' is how Professor Kuhl sums up the results. 'And not only that: it was above all the particularly aggressive high-grade DCIS which were especially reliably picked up using MRI, but especially difficult to detect using mammography.'

A total of 89 cases of high-grade DCIS were discovered by the doctors in the course of the study. MRI, detected 98 per cent of these aggressive pre-invasive breast cancers, with mammography only detecting 52 per cent. The reason for this was that as it appears, in particular the fast growing tumours do not develop the calcifications which constitute the basis of mammographic DCIS diagnosis. Instead, these DCIS are

pervaded by many small blood vessels in which the contrast medium that is injected for an MRT scan collects particularly well.

Professor Kuhl concludes from this that 'Our study demolishes a whole series of textbook dogmas. Firstly, it was always said that MRT was not able to find early stages of breast cancer in the milk ducts. As our results show, the opposite is true. MRT is far more sensitive than mammography.' The second prejudice is that MRT often leads to 'false positives', i.e. often causes 'false alarms'. 'Among our patients that was even less the case with MRI than with mammography,' Professor Kuhl emphasises. 'The positive predictive value of MRT was 59 per cent, compared to 55 per cent for mammography.' The third point was that until now it was assumed that MRI was only necessary for early detection of breast cancer in women with an increased risk of breast cancer. Yet many of the participants had taken part in the study as part of the perfectly normal cancer check-up. The conclusion of the Bonn research team is that MRI can improve the diagnosis of very early stages of breast cancer significantly, not simply with high-risk groups, but with all women.

However, Professor Kuhl does not want the Bonn results to be used as an argument against current mammography screening programmes. 'Mammography is a basic examination that is essential for early detection.' MRI is not yet ready for use as a mass screening tool. 'Too little use is made of the method in the field of breast imaging, so correspondingly there are too few radiologists who have been able to gain sufficient experience with this specific application,' she says. 'In order to evaluate the MRI scans, an experienced eye is needed. It is the radiologist that diagnoses the patient, not the magnet. In order to find these pre-invasive stages of breast cancer on an MRI scan, the images need to be evaluated according to specific criteria. Unfortunately awareness of this is not yet sufficiently widespread.'

Source: University of Bonn

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