Reviewer's report

Title: Diffusion-weighted imaging: a valuable aid for the determination of the margin of breast carcinoma

Version: 2 Date: 21 February 2008

Reviewer: Marc Lemort

Reviewer's report:

Major compulsory revisions

I have a major concern about the rationale underlying this study, as its methodology. I agree that pre-operative assessment of safe margins is important for proper surgical management and oncological safety. This is the major point to which this study was aimed. Authors postulate that ADC values may be abnormal in the limits of a so-called "molecular" margin that could be at distance from the gross tumour margin which is evaluated using conventional sequences. They also refer to cellularity as the main explanation for diffusion abnormalities that could be observed in tumours. If pathologists are not able to detect this increased cellularity in this so-called "molecular" margin, what could be the explanation of the decreased ADC? This point has to be addressed in the presentation of the rationale of the study. In addition, a correlation with the pathological analysis of the operative specimens (particularly regarding regularity of tumour limits, margins and tumour size) could have been particularly helpful.

Referring to the imaging protocol, the workers can determine all tumour borders based on T1w FFE, T2wTSE and DWI EPI, and can depict a first 5mm ROI layer from this border. Could the workers discuss on the precision and the consistency of this evaluation? Provided that malignant tumours show different (and well categorized) morphologic aspects on MRI and that their margins appearance can be smooth, irregular or spiculated, how can the authors exclude a partial volume of tumour in selecting their layer1? Could the ADC value of the layer1 be significantly different compared to outer layers due to a partial volume averaging? In this case, their observation could reflect a methodology imprecision, as long as in a 5mm layer in contact with the tumour studied with a 2.7mm spatial resolution using DWI, it seems to be difficult to exclude presence of small tumour foci. Authors say that MRI has a "higher resolution than that of mammography and ultrasonography (US)" that is, properly said, inexact even if sensitivity could be higher. In addition, diffusion sequences are not high-resolution methods. A correlation of the size of tumour computed from high-resolution morphological MRI sequences with the tumour area measured from the diffusion sequence should be feasible and seems necessary: are the measured areas significantly different, taking into account the differences in resolution?

It is also surprising that there is no case of lobular carcinoma in the evaluation. For this histology, new tools for assessing tumour margins are particularly
important, since conservative surgery is performed today for these patients too and the tumour limits are often not well defined by conventional methods (mammography and US). Is there some recruitment bias?

I think these important questions have to be answered before considering publication of this paper. If the authors maintain that assessing a safe tumour margin is the aim of the study, the suggested additional analysis has to be done. Otherwise, the study has to be focused on the value of DWI in increasing specificity of diagnosis. On this point the study seem to be satisfying, confirming other data in the literature with similar thresholds.

Minor essential revisions::
- Statistical analysis: the software cited for the ROC curve analysis is not a statistical software, but a Windows installer software! Please change and give the good reference.
- References: ref 13 and 21 are the same; please list it only once

What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:
I declare that I have no competing interests