Reviewer's report

Title: High-resolution 3D micro-CT imaging of breast microcalcifications - a preliminary analysis

Version: 3 Date: 19 October 2013

Reviewer: Phil Salmon

Reviewer's report:

1. This is a sound experimental microCT study with a clear result albeit from relatively few samples / cases. By and large the method is sound technically. The application - microcalcifications in relation to breast cancer, is a complex area that is very well reviewed and addressed by the experimental study and by comparison to other gold standard pathology. The result is experimentally justified and important clinically in regard to pathology.

2. Page 6, line 11: “female patients above age 45 get a routine mammography every two years”. Where? Belgium? EU?

3. Page 7, microCT imaging method. The x-ray setting - no filter and 60 kV, is appropriate. However the need for 4x downsizing of projection images of such a small (3mm diameter) sample suggests insufficient x-ray signal strength. This should be addressed by checking camera exposure time and if necessary by frame averaging. With this instrument (Skyscan 1076) 9 or 18 micron pixel size should have been attainable for these samples.

4. Page 8, line 8; the local adaptive thresholding in SkyScan CTAnalyser is not the method of Waarsing, but our own quite different algorithm (statistically analyzing neighborhood voxel grey level histograms).

5. Page 8, Image analysis: one more parameter that might be looked at is fractal dimension, indicating complexity of structure. Note - recent versions of CTAn have had faulty implementation of FD, but a corrected version is available now.

6. One recent study at the Massachusetts General Hospital, USA, used microCT to look at breast cancers pathologically (but not the shape of calcifications). This should be cited. There are two papers from this work:


Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Declaration of competing interests:

I am an employee of the company that made and supplied the microCT scanner used in this study, Bruker-microCT (formerly SkyScan).