Reviewer's report

Title: Connectivity analysis tool enables semi-automated segmentation and quantification of adipose tissue magnetic resonance images in patients with monogenic metabolic syndrome

Version: 1 Date: 3 July 2006
Reviewer: Vincenzo Positano

Reviewer's report:

General

This is a reasonably well-written manuscript. The experimental methods described are comprehensive. Study of fat amount and distribution in human body by MRI is an important issue. Although some work was carried out about automatic and semi-automatic analysis of fat distribution in abdomen, analysis of extremities is quite new and important.

The main limitation of the study is the low number of subjects involved, as correctly recognized by the authors in the discussion. Taking into account this main limitation, the paper title is in my opinion too strong. Moreover, the title doesn’t include the main novelty of the paper, that is the study of lower extremities.

My suggestion is to change the title in something as: “Semi-Automated Segmentation And Quantification Of Adipose Tissue in calf and thigh by MRI: a preliminary study in Patients With Monogenic Metabolic Syndrome”

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

Page 6, Magnetic resonance imaging: the acquisition procedure should be better detailed. Authors should provide FOV, flip angle, NEX, and image size (rowsxcolumns).

How the images in figure 1 were obtained? Are simple a reconstruction from transaxial images or was really acquired? Mode details should be provided because the authors refer to these images in the results section.

Page 7, line 13: It is not clear what “a distance in pixel set to 1.00 mm” means. If the image processing is performed in 3D, this may be: the image stack was interpolated to obtain 1mm cubic voxels. Standardization to 8 bit reduce image dynamic and may reduce the accuracy in SAT detection. The used software seems to be able to work on the original DICOM 16-bit images (http://rsb.info.nih.gov/ij/features.html), so 8bit down-sampling should be avoided.

Interpolation to 1mm voxels increment the partial volume effect, especially in z direction. This may reduces the accuracy in the SAT detection. I don’t see any reason to perform this operations instead to use original data. I suspect that the software used may be not able to work on non-cubic voxels. I appreciate the use of a free software and, because the software is free, some limitation may be accepted. However, the authors should elaborate this point.

Page 10. The Pearson correlation coefficient was used to assess the inter- and intra-observer variability. Clearly, a dependence may exist across data acquired from the same subject. If a simple linear regression is used, results are not valid since the data contain 17 samples from 4 subjects with no correction for multiple dependent/correlated samples. More advanced statistics (two-way anova) should be used instead.

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

Page 2, Abstract, Results: The fact that percentages of SAT are calculated respect to the whole extremities size should be clarified in order to make the abstract self-consistent.
Page 5: Background. The authors correctly state that quantification of fat by MRI is important. There are some interesting papers about automatic quantification of abdominal SAT and VAT in MRI that may be cited to reinforce the authors statement:


Page 8, line 3: In my opinion, the average percent adipose tissue/slice index doesn’t make so many sense. It is just a (wrong) approximation of the percent volume defined below that should be used instead.

Discussion: The error committed due to the inclusion of some VAT in the measurement may be quantified by the used software by manual definition of SAT region.

**What next?:** Accept after minor essential revisions

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No

**Declaration of competing interests:**

I declare that I have no competing interests.