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: 12 July 2006

Reviewer: Jürgen Machann

Reviewer's report:

General

The paper presents neither a new methodology for assessment of MR images for visualization of adipose tissue nor a new postprocessing procedure for quantification. Furthermore, the low number of patients and the not well-matched healthy controls limit the scientific importance. Detailed criticisms please see below.

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

Methods:

Page 5, line 15: 23.5 vs. 24.8 is comparable but not well matched!
Page 5, line 16: same for the age, 50 and 63 is not matched!
Page 6, line 10ff: is this the description of whole body imaging? What’s the rationale for whole body imaging, when only lower extremities are relevant for this study?
Page 6, line 16f: are the measurement parameters for mid-calf and mid-thigh the same as for whole body imaging?
Page 7, line 2ff: how was the threshold between lean tissue and fat determined? By determination of a histogram? Automatically or manually by taking the signal intensity of the seed point? Please add this information!
Page 7, line 7ff: Why are fatty septa added to subcutaneous adipose tissue? This is a different lipid compartment and should be separated from subcutaneous adipose tissue!
Page 8, line 4: â€œ the average of 17 slices was reported as the average percent adipose tissue/slice. Seems to be the average percent adipose tissue/region!? 
Page 8, line 13: how many observers were involved in the evaluation? This information should also be given here!

Results:

Page 9, line 20f: increased visceral fat in the FPLD2 subject compared with the FPLD3 subject. As you did not quantify visceral adipose tissue and the images in Figure 1 stem from different coronal slices (spine is visible in FPLD3 but not in FPLD2 patient) this statement should be omitted!
Page 10: determination of intra- and inter-observer correlation imply manual determination of threshold, otherwise the correlation should be 1! What about inhomogeneities of the signal distribution? Are they corrected?
Page 10, line 11: is this the result for inter-observer correlation(?), as intra-observer correlation is given above.
Page 10, line 21ff: no subcutaneous connectedness map of fat. There is no subcutaneous fat â€“ but in the Methods you told about also including the fatty septa in the musculature. Was this not included in this patient?

Discussion:

Page 12, line 1f: clinical assessment of adipose tissue distribution â€œ is crude. There is an increasing number of studies dealing with quantification of total body adipose tissue and its distribution. So soften this statement!
Page 13, line 9f: controls did not provide the ideal BMI and age-matching criteriaâ€¦ Here you confirm that
the data are not matching very well. It should be possible to select subjects with really matching anthropometric data (however, it will not change the results dramatically).
Page 13, line 20: intra- or intermyocellular depots: these can be determined by proton MRS (add Schick et al, MRM 1993, Boesch et al., MRM 1997 and e.g. Brechtel et al., JMRI 2000, where a patient with Acquired generalized lipoatrophy was assessed by fat selective MRI and MRS)

Table 1:
What’s the rationale for differentiation between mean sc+inf volume / slice and Overall sc+inf volume (%)? What’s the difference between these values?

Figures:
Figure 1
Survey images of lower extremities are sufficient as the other body parts are not subject to the quantitative evaluation. Statement about visceral adipose tissue content can not be made from these images!

Figure 2
Thigh image of patient GL0096 is cutted! Please show the complete image!

Figure 3
sc + inf image seems to be different from the original image (compare infiltrated fat). Please show corresponding images from the same slice! Furthermore it seems that fatty bone marrow of the tibia was removed, but not bone marrow of fibula! Please describe in the text whether bone marrow was included in the quantification or not!

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

Abstract:
Page 2, line 22, 23: FPLD2/3 patient instead of patients!
Page 3, line 1: semi-automated quantification of adipose tissue instead of semi-automated adipose tissue imaging

Background:
Page 4, line 5ff: sentence is not complete! ë€¦ the salient clinical and biochemicalë€¦???
Page 4, line 11: LMNA: please write it out

Discussion:
Page 11, line 14: ë€¦ and mid-thigh sections of FPLD patients compared toë€¦ Remove â€œinâ€ after patients.
Page 12, line 14: The method has instead of does have
Page 12, lines 23: this patient instead of these patients!
Page 13, line 11: factors such as difference in age, add â€œasâ€ remove â€œasâ€

Discretionary Revisions (which the author can choose to ignore)

What next?: Reject because scientifically unsound

Level of interest: An article of limited interest

Quality of written English: Acceptable

Statistical review: No

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