Reviewer’s report

Title: Half-body MRI volumetry of abdominal adipose tissue in patients with obesity

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Reviewer: Federica Vernuccio

Reviewers report:

This study analyzes the possibility of calculating half volumetry of abdominal visceral and subcutaneous fat instead of the whole abdominal subcutaneous and visceral fat. The clinical value of this study is to overcome one of the main limitations in larger patients, that is the lack of possibility of including the whole abdomen in the FOV. Indeed, in the present study the abdominal subcutaneous adipose tissue could not be estimated in 50% of the whole cohort, as indicated in the limitation section. As indicated in the discussion section, by positioning the patient on one side, abdominal subc. and visc. fat could be estimated on the opposite side.

Strengths: novelty, overall sound statistical analysis, clinical utility
Weakness: Small sample size, inclusion of 1.5T and 3T MR scanner without providing data separately, no clinical and laboratory data, selection bias

Some of the points mentioned below were already asked by previous reviewers, but to date some of these points are yet not adequately addressed (a specific note has been but below when this occurs)

Major - 1. In the conclusion the author say: "we have presented a unique workaround method to reliably quantify abdominal adipose tissue in patients with higher grades of obesity using MRI"
However:

1 A - A bunch of study limitations - including small sample size, adoption of two MR scanners with different magnetic field, adoption of a custom-made software not previously validated in scientific publications (no reference provided, so I assume this), manual identification of the reference median line and therefore subject to inter-operator variability, which was not investigated in the study - makes difficult to draw firm conclusion ("to reliable quantify"). In addition, before drawing firm conclusions, a validation of the calculation after exam acquisition with a different patient positioning (the type of positioning suggested by authors in the discussion "Larger patients "could then be placed with a lateral offset on the MRI table to fully include one body half instead, preferentially the left one") should be at least suggested.

1 B - there might be biases as this patient population is a subgroup of obese patients and includes only those with BMI 30-41 kg/m². This limitation is acknowledged in the limitation section, but not in the Methods in the study population section. Considering that you only analyzed 26 patients out of 222 initial study cohort, this might have led to a different selection bias itself, and should be mentioned appropriately and limits the generalizability of data.

Introduction
Minor issue- Discussion of prior MRI studies evaluating "partial abdomen" approaches to assess VAT and SAT is lacking (Marzetti M, Brunton T, McCreight L, et al Quantitative MRI evaluation of whole

Materials and methods

Major issue - The study population section should include all the inclusion and exclusion criteria and the exclusion of pts with BMI > 41 kg/m² is not mentioned in the appropriate study population section ("MRI data were available from a total of 222 patients (October 2018) with a BMI above 30 kg/m² from an interventional clinical trial on obesity"). I strongly suggest to use STARD criteria appropriately when presenting inclusion and exclusion criteria of your study, as one of the reviewer had asked before.

Major issue - The adoption of two MR scanners with different magnetic fields should have prompted the authors to investigate whether there is any significant difference in the calculated data;

Major issue - I completely understand that MR parameters were explained in another study and you referenced it, but it is important to show in a table also the parameters in this study. The table however, in one of the two referenced studies, parameters are only provided for 1.5T MR scanner (Linder N Sci Rep. 2016 Mar 24;6:22261.) and the second one is not open access. Despite the second one (Schaudinn A et al NMR Biomed 2015) is not open access, I had access through my university and the materials and methods show that only a 1.5T MR scanner was used in that study. In this study I am reviewing today there are two MR scanners, a 1.5T and a 3T MR scanner and MR protocol parameters change between a 1.5T- and a 3T-MR scanner. Therefore, as already asked by a prior reviewer, technical details needs to be put in this study adequately.

Minor issue - The authors are using a custom-made software not previously validated (no reference provided at least) which is semiautomatic and therefore subject to inter- or intra-reader variability. This was not assessed by the authors. In addition, I think all measures should have been at least approved by a radiologist, which seems not to be the case. I suggest to perform this analysis to evaluated reproducibility of data you provide.

Minor issue - This study lacks evaluation of other standard measurements of body fatness including waist circumference and the waist/hip ratio, skinfold thickness using calipers at specific body sites (ie, trunk, thighs, shoulder blade, triceps, etc), bioelectric impedance. In addition, I would say that in clinical practice the inclusion of whole abdomen in the FOV may depend more on waist circumference than on BMI itself and this measurement should have been included in the analysis.

Minor issue - This study lacks a gold standard. Considering that the authors used a custom-made software and they do not mention about prior publication on it, I wander which was their gold standard for assessing fat body composition. Specifically, a comparison with DXA would have been better.

Results

1. Authors should investigate whether there was any statistically significant difference in age or BMI between M and F and add this in Table 1.
2. The author state "total segmentation times was about 12 min per patient.". I would suggest to provide date as mean and SD, and not so generically.

3. The authors wrote "Values of ASATL were significantly higher in females compared to males
(15,020 vs. 10,932 cm³). ASATL is defined by the authors as Abdominal subcutaneous tissue on the left side of the body. Then, I look at Table 1 and I read that ASATref mean was 15,020 in F and 10,932 in M. However ASAT ref was defined as Abdominal subcutaneous adipose tissue and should include the whole abdominal subcutaneous adipose tissue. I wonder how it can be that the mean of the left side only and of the whole abdomen can be the same; I would expect that the mean of half body is roughly half of the whole.

Discussion

I would suggest to add more emphasis on the clinical utility of your study specifically.

1. The limitation section should consider some of the limitations I discussed in the text above.

Minor issue - additional English editing needed

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Unable to assess

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Unable to assess

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
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I am able to assess the statistics

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