Author's response to reviews

Title: Iodine concentration calculated by dual-energy computed tomography (DECT) as a future parameter to evaluate thyroid metabolism in patients with hyperthyroidism

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Author’s response to reviews:

Reviewer 1:

There are some errors in the manuscript. Please see the attached file.

#0 First page (abstract):

This page is automatically generated on the web site. So, we can’t control font styles, like superscript. Please see our abstract in next page.

#1 Please rewrite the BACKGROUND part.

The Background section should explain the background to the study, its aims, a summary of the existing literature and why this study was necessary or its contribution to the field.

We completely revised the BACKGROUND section in the abstract.

#2 We can get rid of comma in this sentence.

We deleted it.

#3 Style of citation numbers: superscript

Please note that BMC Medical Imaging uses square brackets instead of the superscript style for the in-text reference citations.
#4 plural, correlations is better than correlation.

We revised the word “correlation” to “correlations.”

Reviewer 2:

The idea is a great one and has promise. Unfortunately, the study design, sample size and statistical analyses are major limitations.

#1

1) First, it was not clear when the DECT was performed (e.g. 0, 5, 10, or 200 days after the RAI study?).

On p5, L46–51 (Patients subsection in MATERIALS AND METHODS), we wrote “who were scheduled for radioactive iodine ablation therapy,” which meant that DECT was performed before the administered therapies (RAI). Because our description might be confusing for the readers, we revised this sentence.

2) It was also not clear if the patients were still on the iodine restricted diet at the time of the DECT.

The patients were on the iodine-restricted diet before and during RAI. However, because DECT was performed before RAI, we did not add this information.

3) The RAI potentially would interfere with the "baseline" iodine concentration in the thyroid glands.

Please note that your understanding is accurate. However, we did not perform DECT after RAI.

#2 Second, the authors evaluate 13 women with hyperthyroidism or Graves disease. It would be helpful to know the breakdown and the laboratory values for these patients as well as their clinical symptoms.

We placed the laboratory data in the Patients subsection.

#3 Third, the authors "double" their sample sizes by considering each lobe of the thyroid gland as separate. This results in greater similarity because the authors forget that there is a within person correlation (i.e. correlation between the right and left lobes of a gland). Other issues like reliability were not assessed.

In Figure 4, we focused on the linearity between CT values and iodine concentrations calculated by DECT. Theoretically, these two parameters should show very strong correlation when using the same ROIs given that the phantom study showed high linearity between iodine concentrations and CT values in Koonce’s paper (ref. #15). However, in clinical situations, only
a moderate correlation between CT values and iodine concentrations was observed by DECT. We discussed this issue in the second paragraph of the Discussion section.

#4 Fourth, the correlations (based on 13 individuals), given the small sample size, should use the Spearman's correlation statistic. The sample size is so small a t-test may be unreliable. A permutation test or a sign test may be more informative.

Thank you for your good suggestion.

We used Spearman's correlation to evaluate correlations and used the Wilcoxon signed-rank test to compare uptakes at 3 h and 24 h. We revised the “Statistical analysis” subsection, re-analyzed our data, and added new values (red colored numbers).

#5 Lastly, a nice biological explanation for the importance should be provided.

We revised our first paragraph in the Discussion section according to your suggestion.