OPEN PEER REVIEW

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Published in: Iranian Journal of Radiology: 17(2); e83479

Peer Review Report for "Optimal Monochromatic Energy Levels in Dual-Energy Spectral CT Pulmonary Angiography with Low Contrast Medium Dosage"

Author(s): Dong Han, Weihua Shi, Xiaoxia Chen, Jieli Zhou, Yong Yu, Xin Tian, Jing Chen, Mengting Liu, Taiping He

Review Timeline:

Submit Date: 20 Aug 2018
Revised Date: 5 Feb 2020
Accepted Date: 18 Feb 2020

Revision (0)

Here, you can see the **Reviewers**, **Associate Editors** and **EICs'** comments from the beginning to the end of the revision process.

REFEREE: Reviewer | **Revision** (0) 16 Nov 2018

Dear AE,
I read the manuscript and find it a good and applicable article. my comments are:
1. In the abstract there is 'SPSS 19' software for statistical analysis while in the patient and methods the author/s has mentioned "SPSS 23" software (page 8, line 2)
2. There isn't enough reason for choosing the 60-80 kV. Why the researcher/s choose these range? Using low kV and high mA causes higher patient dose. So it could be better than the author/s introduce proper reference about choosing this range. There were not enough reasons in the other references that if they considered about the patient dose or not.
3. It could be better to mention the range of the "certain energy range" P.13
4. In the abstract part there is "25 ml of CM" and also in the introduction but in page 5, there is "total 8 ml" and the author/s hasn't described it why?
5. Coming to enhancement ability versus reaction potential, the author/s doesn't mention why they choose "Ioversol".
6. Choosing of scanning delay time technique (page 5) should have a reference.
7. Using ASiR algorithm helps to reduce noise and patient dose up to 65%. There is not

sufficient explanation of how and why they choose 50%.
8. Describe the reason why researchers choose 30 patients and the statistical formula that total number derived.
9. There should be more explanation and discussion about the results and also interpretation of charts and tables in the discussion section. For example: what is the difference between figure 2a, 2b, 2c, and 2d and the description of it.
10. There should be points or marks on the reconstructed image to show the differences.
Thanks.

REFEREE: Reviewer | **Revision** (0) 19 Nov 2018

Dear AE,
The article is novel and useful for routine practice in radiology. So it can be published in the journal.
Thanks.

REFEREE: Associate Editor | **Revision** (0) 21 Nov 2018

Dear EIC
The reviewer(s) have recommended publication, but also suggest some minor revisions to the manuscript. Therefore, I invite the author to respond to the reviewer(s)' comments and revise his manuscript.
Kind regards,

REFEREE: Associate Editor | **Revision** (0) 22 Nov 2018

Dear EIC,
The manuscript is studied, and there are some comments which should be addressed by the author. According to the comments, the document needs major revision.
Kind regards,

REFEREE: EIC | **Revision** (0) 24 Nov 2018

Dear Author,
The reviewers' comments are mentioned. Please correct the details as mentioned above carefully according to reviewers' request.
Thanks.

OPEN PEER REVIEW

Revision (1)

Reply to Reviewers

Ideally, the reviewing process can significantly improve the submitted manuscripts by allowing the authors to take into account the advice of reviewers. Author(s) must reply to all reviewers' comments in a separate Word file, point by point. A "**Reply to Reviewers**" document is submitted along with revised manuscript during submission of revised files, summarizing the changes that the authors made in response to the reviewers' comments. The responses to reviewers' comments specifies how the authors addressed each comment the reviewers made.

You can read the authors' responses to the reviewers' comments in the next page.

Dear Dr. Taiping He,

Thank you for submitting your valuable manuscript to our journal. We would like to inform you that the peer review process of your manuscript is complete and requires "**Major Revision**". Although it has several useful points, it needs **Major Revision** to be reviewed again. Below you can find the abstracts of the peer review decision made by our editorial board members.

A: Thanks to the reviewers' comments and editors for their professional comments, and thanks for giving us the opportunity to revise the manuscript, which enabled us to learn a lot in the process of revision.

Reviewers' Comments:

#Reviewer 1:

With thanks
The article is novel and useful for routine practice in radiology. So it can be published in the journal.
A: Thank you very much for your comments.

#Reviewer 2:

Dear Author/s
I read the manuscript and find it a good and applicable article. my comments are:
-1. In the abstract there is 'SPSS 19' software for statistical analysis while in the patient and methods the author/s has mentioned "SPSS 23" software (page 8, line 2)
A: Thank you for your comment. The manuscript was modified by several authors, and different authors used different versions of SPSS software to verify and analyze the data, resulting in inconsistency between the abstract and the text version. The manuscript involved a consistency test of the subjective scores of two radiologists. As the subjective scores was an ordered multiple classification variable, the weighted-kappa test should be adopted for the consistency test, while the version below SPSS 24 does not support this test method. Therefore, all data analysis results in the revised version were re-analyzed with SPSS 25 and the text and results have been modified in the corresponding positions in the revised version.

-2. There isn't enough reason for choosing the 60-80 kV. Why the researcher/s choose these range? Using low kV and high mA causes higher patient dose. So it could be better that the author/s introduce proper reference about choosing this range. There were not enough reason in the other references that if they

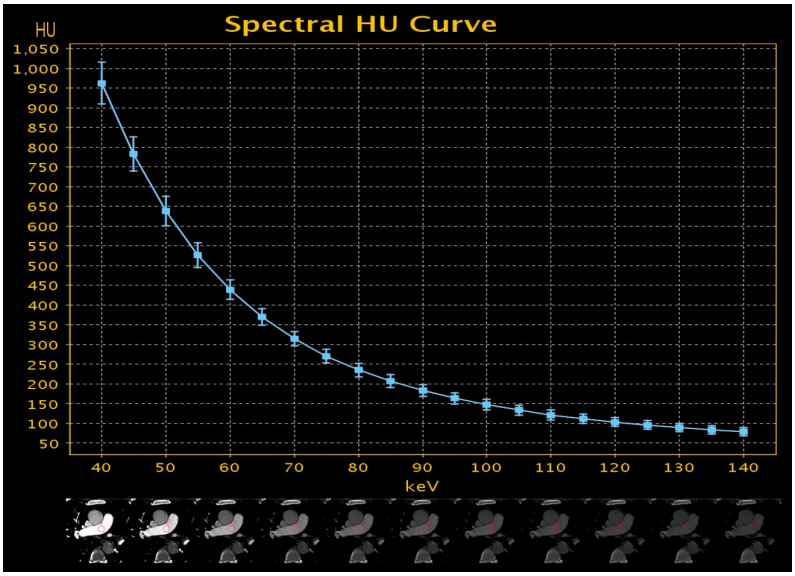
considered about patient dose or not.

A: Thank you for your comment. We analyzed images with photon energies between 60keV and 80keV which correspond to the average energy level of about 80kV (tube voltage) and 140kV (tube voltage), respectively. Different from the conventional approach of using low kV and high mA that may have lower penetration power and may cause higher patient dose, all patients in this study were scanned once using the spectral imaging mode, which did not result in higher doses. The dual-energy spectral CT scanner used uses single source and rapid switching between high and low voltage (140kVp/80kVp) in 0.5 milliseconds to provide coherent dual-energy information. Thus, 101 sets of (40keV-140keV, not the tube voltages in kV) monochromatic images were reconstructed. These images with different energy levels have different characteristics, the high-energy level images have lower CT attenuation values, lower contrast ratio and lower noise, while the low-energy level monochromatic images can improve the density resolution of the images, which also helps to improve the CT value of the substance being tested, but the image noise increased at the same time.

The reduced contrast dose in our study certainly affected the enhancement effect of pulmonary artery. Therefore, in our study, the reduced contrast dose was compensated by using the characteristics of higher absorption of iodine by lower energy photons, we selected monochromatic images containing the low energy photons as well as higher energy photons for comparison (60-80 keV). Our results indicated that the enhancements of pulmonary artery in the high energy levels were unable to meet the imaging diagnostic requirements (75 keV and 80 keV pulmonary artery CT values in this study were less than 300 HU). Although the enhancement of pulmonary artery was significantly improved below 60 keV, the image noise was also significantly increased because the iterative reconstruction algorithm (ASIR) was not available for images with energy levels below 60keV on our scanner, due to equipment constraints to suppress noise, which will affect the diagnosis of pulmonary embolism. Therefore, the monochromatic images range of 60-80keV were selected in this study. References were added to the discussion section.

-3. It could be better to mention the range of the “certain energy range” P.13

A: Thank you for your comment. The characteristics of monochromatic images were described in the question 2. The noise reduction of monochromatic images has no specific range, but was an asymptotic process, as shown by the error bar of the graph below. So we have changed a more appropriate narrative in the article.



The square was the CT value of pulmonary artery and the error bar was the image noise.

-4. In the abstract part there is “25 ml of CM” and also in the introduction but in page 5, there is “total 8 ml” and the author/s hasn’t described it why?

A: Thank you for your comment. The ideal CTPA scan should collect data when the pulmonary artery is adequately enhanced while the pulmonary vein is not enhanced, but the time window is very narrow, only 2-3 seconds. The bolus tracking (BT) technique commonly used at present was influenced by scanning experience, individual circulatory differences in patients and equipment, there was no uniform standard for the trigger threshold, monitoring point and start scan delay time, and it is more difficult to grasp the scan delay time when the dosage of contrast agent is low. In our study, a test bolus (TB) technique was used. The basic principle is to inject a small dose of contrast agent (8ml in our study) before the formal scan. The time-density curve of pulmonary arterial enhancement was obtained, and the peak time of pulmonary arterial enhancement was obtained individually and accurately. Then a normal contrast dose (25ml in our study) for pulmonary artery imaging was injected to trigger the scanning at this time point to optimize pulmonary artery enhancement. The "total 8 ml" on page 5 of the manuscript was a clerical error and has been revised in the revised manuscript.

-5. Coming to enhancement ability versus reaction potential, the author/s doesn’t mention why they choose “Ioversol”.

A: Thank you for your comment. We did not select a specific type of contrast agent since we were limited by the availability of contrast medium, and because Ioversol was the most common type of contrast agent in our daily clinical work.

-6. Choosing of scanning delay time technique (page 5) should have a reference.

A: Thank you for your comment. In the discussion section of this article, we have

added the comparison between the Bolus Tracking and Test Bolus monitoring techniques, and cited relevant references.

-7. Using ASiR algorithm helps to reduce noise and patient dose up to 65%. There is not sufficient explanation of how and why they choose 50%.

A: Thank you for your comment. All patients in this study were scanned once by using spectral imaging, and the scan protocol for the spectral scanning mode (GSI-36:260 mA) with the lowest radiation dose in the chest was selected. The monochromatic images of 60-80 keV were reconstructed after scanning for analysis and comparison, so the radiation dose of patients was not increased. In the aspect of ASiR weight selection, low-weight ASiR has limited ability to suppress noise. High-weight ASiR can suppress noise obviously, but the spatial resolution and image quality will be reduced (1). We selected the 50% ASiR weights in our study based on the published weights used by other researchers in abdominal low-dose CT scans (2) and portal vein imaging studies (3,4). This weight was also the most commonly used weight in our daily work. Because this weight can restrain noise better and keep enough image resolution. We have described it in the discussion section and cited relevant references.

1. Wang F, Zhang Y, Xue H, Han W, Yang X, Jin Z, et al. Combined use of iterative reconstruction and monochromatic imaging in spinal fusion CT images. *Acta Radiol*. 2017;**58**(1):62-69. doi:10.1177/0284185116631182. [PMID: 26917784].

2.Zhu Z, Zhao XM, Zhao YF, Wang XY, Zhou CW. Feasibility Study of Using Gemstone Spectral Imaging (GSI) and Adaptive Statistical Iterative Reconstruction (ASIR) for Reducing Radiation and Iodine Contrast Dose in Abdominal CT Patients with High BMI Values[J]. *PLoS One*. 2015;**10**(6):e0129201. doi: https://doi.org/10.1371/journal.pone.0129201. [PMID:26079259].

3.Ma CL, Chen XX, Lei YX, Zhang XR, Jia YJ, Tian X, et al. Clinical value of dual-energy spectral imaging with adaptive statistical iterative reconstruction for reducing contrast medium dose in CT portal venography: in comparison with standard 120-kVp imaging protocol. *Br J Radio*l. 2016; **89**(1062):20151022. doi: 10.1259/bjr.20151022.[PMID: 27031376].

4.Zhao L, Winklhofer S, Yang Z, Wang K, He W. Optimal Adaptive Statistical Iterative Reconstruction Percentage in Dual-energy Monochromatic CT Portal Venography. *Acad Radiol*. 2016;**23**(3):337-343. doi: 10.1016/j.acra.2015.11.004. [PMID:26777591].

-8. Describe the reason why researchers choose 30 patients and the statistical formula that total number derived.

A: Thank you for your comments. In the pre-experimental data, the CNRmean of pulmonary arteries of five groups of single-energy images were paired by Stata 14.2 (α with both sides 0.05 and power 0.8) software to calculate the required sample size. The maximum total sample size based on the CNRmean values was determined to be 24 and was chosen as the minimum sample size in our study. Since the 30 patients collected in our study were more than 24 patients we believe the results and conclusions were relatively

stable.

	60keV	65keV	70keV	75keV	80keV
60keV	-				
65keV	23	-			
70keV	22	24	-		
75keV	5	4	4	-	
80keV	2	-	-	-	-

"-" was N/A

(*) Cheng J, Yin Y, Wu H, Zhang Q, Hua J, Hua X, et al. Optimal Monochromatic Energy Levels in Spectral CT Pulmonary Angiography for the Evaluation of Pulmonary Embolism[J]. *PLoS ONE*. 2013;**8**(5):e63140. doi:10.1371/journal.pone.0063140. [PMID:23667583].

-9. There should be more explanation and discussion about the results and also interpretation of charts and tables in the discussion section. For example: what is the difference between figure 2a, 2b, 2c and 2d and description of it.

A: Thank you for your comments. We have added a brief account of the results in the first paragraph of the discussion section. In the discussion section, the ASiR weight selection and the application of small dose contrast agent bolus test method were discussed in detail, and relevant references were also cited. Figure 2a, 2b, 2c and 2d and revised tables 3 and 4 had overlaps, so we deleted the original 2b and 2c in the revised version, and only retained figure 2a and 2d (Figure 2b in the revised version) to express visual perception.

-10. There should be points or marks on the reconstructed image to show the differences.

A: thank you for your comments. We have added markers to the blood vessels in figure 3.

Associate Editor's Comments:

Associate Editor 1:

....

Associate Editor 2:

-1-please add background to the abstract according to journal format.

A: thank you for your comments. We have added the background section to the abstract.

-2-please add in method section that the ethics committee has approved the study.

A: thank you for your comments. In the 3.1. Patients Group section, there was an approval statement from the Ethics Committee.

-3-what is the meaning of minor in this part: Pregnant women and minors? Please clarify.

A: thank you for your comments. Patients younger than 18 years of age were considered minors. We have modified the expression to make it clearer.

-4-why didn't the authors determine the beginning of scanning time after reaching to a sufficient HU of contrast in aorta? [they begin scanning in all of the patients after 2 sec].

A: Thank you for your comment. The ideal CTPA scan should collect data when the pulmonary artery is adequately enhanced while the pulmonary vein is not enhanced, but the time window is very narrow, only 2-3 seconds. The bolus tracking (BT) technique commonly used at present was influenced by scanning experience, individual circulatory differences in patients and equipment, there was no uniform standard for the trigger threshold, monitoring point and start scan delay time, and it is more difficult to grasp the scan delay time when the dosage of contrast agent is low. In our study, a test bolus (TB) technique was used. The basic principle is to inject a small dose of contrast agent (8ml in our study) before the formal scan. The time-density curve of pulmonary arterial enhancement was obtained, and the peak time of pulmonary arterial enhancement was obtained individually and accurately. Then a normal contrast dose (25ml in our study) for pulmonary artery imaging was injected to trigger the scanning at this time point to optimize pulmonary artery enhancement. The "total 8 ml" on page 5 of the manuscript was a clerical error and has been revised in the revised manuscript.

The reason for adding 2 seconds to the peak enhancement time of TB in our study was that the peak enhancement time of contrast agent (25ml) used for pulmonary artery imaging was usually delayed by 2 seconds. Because of the English translation in the original manuscript, the description position of this 2 seconds was incorrect and has been revised in the revised manuscript.

-5-how many radiologists did apply the ROIs? And what were their inter- and intraobserver reliability in this regard?

A: thank you for your comments. Because of the good contrast of pulmonary artery in CTPA, the placement of ROIs was performed by only one radiologist. The ROIs were placed on three consecutive planes of the measured object, and the average values of three times were used for analysis. The intraclass correlation coefficient (ICC) of pulmonary artery measured three times by the physician was 0.985±0.009 and the background noise was 0.847±0.136, all $p<0.001$, with high repeatability. Corresponding statistical methods and results have been added to the revised version.

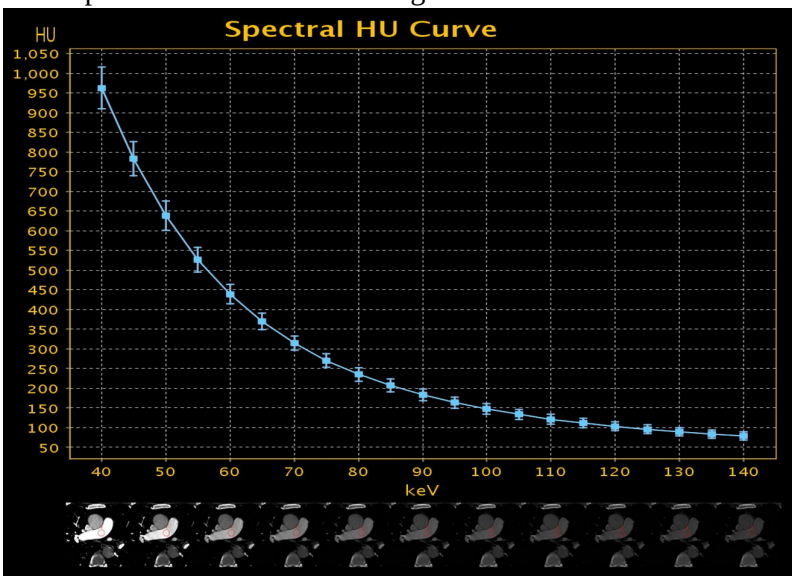
-6-please cite the SPSS version according to the current information of the SPSS inc.

A: Thank you for your comment. The manuscript was modified by several authors,

and different authors used different versions of SPSS software to verify and analyze the data, resulting in inconsistency between the abstract and the text version. The manuscript involved a consistency test of the subjective scores of two radiologists. As the subjective scores is an ordered multiple classification variable, the weighted-kappa test should be adopted for the consistency test, while the version below SPSS 24 does not support this test method. Therefore, all data analysis results in the revised version were re-analyzed in SPSS 25 and have been modified in the corresponding positions in the revised version.

-7-the authors mentioned the project as prospective while they have calculated new protocol variables retrospectively [:After scanning, monochromatic images with photon energies of 60-80keV (at energy incremental of 5keV) using the 50% adaptive statistical iterative reconstruction (50%ASiR) algorithm were retrospectively reconstructed] please clarify this point. If the data are retrospectively reconstructed based on the routine protocols, there is no need to implement new protocol. Please explain.

A: Thank you very much for your comments. This study was a prospective design in the sense that the conventional CTPA in our institution uses 120kVp tube voltage up to the point of our study. Dual-energy Spectral CTPA was thus a new scan protocol. The reconstruction part had to be optimized after the data acquisition to determine the optimal energy level for CTPA at low contrast dose condition. All patients in this study were scanned by one-time spectral imaging, and the protocol of energy spectrum scanning (GSI-36:260 mA) with the lowest radiation dose in the chest was selected. The scanned energy spectrum data can be used as raw data to reconstruct monochromatic images of 40-140 keV retrospectively, as shown in the following figure. In this study, using the characteristics of high contrast of low-level single-energy images, we select a lower level monochromatic energy range (60-80 keV), and assume that the optimal monochromatic images level should be within this range.



-8-the authors mentioned mean values in table 3 and 4 for three kVs 60, 65 and 70. It is better to mention the comparisons and P-values for 75 and 80 too.
A: Thank you for your comment. Because 75 keV and 80 keV can no longer meet the diagnostic requirements, adding 75 and 80 keV data tables to tables 3 and 4 would be significantly too large, so only 60-70 keV data were listed in the preliminary draft. Data of 75 keV and 80 keV have been added to the revised version, and the differences between the two comparisons were shown by different color blocks to keep the tables simple.

-9-please add legend for figure 2. Please
A: Thank you for your comment. The original Figures 2a, 2b, 2c and 2d and revised tables 3 and 4 hap overlaps, so we deleted the original 2b and 2c in the revised version, and only retained figures 2a and 2d (Figure 2b in the revised version) to express visual perception.

-10-it seems all the statistical tests should be performed based on the dependent statistical tests [such as repeated measure ANOVA instead of ANOVA, Friedman instead of kruskalwallis or Q-cochran instead of chi-square]. Please explain and correct if it is needed. [because all measurements are done in the same group of 30 patients]
A: Thank you for your comment. We consulted the statistician for the correct statistical methods to be used and have made some corrections. For measurement data, we used one-way repeated measure ANOVA. Friadman test and Cheran's Q test were used for counting data. We revised it in the manuscript. Fortunately, there was no statistical change in the conclusion.

-11-the authors mentioned correlation coefficient between BMI vs. subjective scores as R=1.260. this is wrong as this coefficient should be lower than 1.
A: Thank you for your comment. This was a clerical error. R should be 0.126. The manuscripts and drawings have been revised.

-12-the authors mentioned they calculated kappa, while there is no kappa agreement in the paper.
A: Thank you for your comment. Results 4.3 dealt with the consistency of subjective evaluation of image quality by two radiologists, and the kappa results have been added in corresponding locations.

OPEN PEER REVIEW

Revision (1)

Here, you can see the **Reviewers**, **Associate Editors** and **EICs'** comments from the beginning to the end of the revision process.

REFEREE: Reviewer | **Revision** (1) 1 Aug 2019

Dear AE,
Because of acceptable answers of author, this article is acceptable .
Thanks.

REFEREE: Reviewer | **Revision** (1) 5 Aug 2019

Dear AE,
The authors have revised many points. there are two points that is better to be clarified:
1- In tables 3, 4 and 5, some columns and cells are colored to light blue or heavy blue. what are the meaning of this colored design? if they are related to some statistical analyses, It is better to be clarified.
2- In tables 3-5, the authors have reported the P-values for within group comparisons [from reoeated measure ANOVA in tables 3 and 4 and from friedman and cochran in table 5] these P values have been mentioned in right columns. It seems these p values show the result of whole comparison between all groups but they does not show pairwise comparison between each pair groups. For example, we don't know if the groups 60 and 65 are different? Or if the 65 and 70 are different? Even, a significant stat difference between 60 and 80 could result in a significant p value in repeated measure ANOVA and this does not necessarily mean that the 60 and 65 or 60 and 70 are different. On the other hand, adding all pairwise comparisons P values are boring and unnecessary. (10 p-values for each row!!) I ask the authors to add the most important pairwise comparisons P- values in each row. Or they can represent the data in each method that is preferable and appropriately concise to keep a good writing style for the paper]. This data is a good adjunct for paper and I recommend the authors to add this data to paper. This may be yielded by tests based on bonferroni correction. (one representation method is for example as follows -regarding 75 and 80 are not important, I have deleted them as you noted-: for MPA SNR: [65]>[60=70])
3- There are some graphs in responses and some important points in responses. I ask the authors add all important points in responses that could be important for readers. If the paper is ok and they are not important for readers, it would be OK and I mention this point only for emphasis.
Thanks.

REFEREE: Associate Editor | **Revision** (1) 16 Aug 2019

Dear EIC
The reviewer(s) have recommended publication, but also suggest some minor revisions to the manuscript. Therefore, I invite the author to respond to the reviewer(s)' comments and revise his manuscript.
Kind regards,

REFEREE: EIC | **Revision (1)**

17 Aug 2019

Dear Author,
Your article is reviewed by the reviewers carefully. According to their comments, this document needs minor revision. Please follow their comments as requested.
Thanks.

OPEN PEER REVIEW

Revision (2)

Reply to Reviewers

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You can read the authors' responses to the reviewers' comments in the next page.

Dear Dr. Taiping He,

Thank you for submitting your valuable manuscript to the journal. We would like to inform you that the peer review of your manuscript is now completed and despite several useful points, it needs **"Minor Revision"**. Below you may find the peer review comments. Please reply to them one-by-one and re-submit it again.

A: Thanks to the reviewers' comments and editors.

Reviewers' Comments:

#Reviewer 1:

The authors have revised many points. there are two points that is better to be clarified:
1-in tables 3, 4 and 5, some columns and cells are colored to light blue or heavy blue. what are the meaning of this colored design? if they are related to some statistical analyses, It is better to be clarified.
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1-&2- A: Thank you for your comments. As stated in the second question, there are too many *P* values to report when comparing five sets of data in pairs. Our results show that the CT value of 65 keV pulmonary artery can satisfy the diagnosis, had higher SNR, CNR and lower image noise than other energy levels. Therefore, in Table 3-5, We use three color blocks to represent the three levels of *P* value of the 65 keV parameter compared with other keV parameters (Adjusted by Bonferroni test): dusty blue represents the *P* value is less than 0.001, light blue represents *P* value less than 0.05, and dark blue represents *P* value greater than 0.05. Sorry for the unclear

explanation, we have indicated it below Table 3-5.

3-there are some graphs in responses and some important points in responses. I ask the authors add all important points in responses that could be important for readers. If the paper is ok and they are not important for readers, it would be OK and I mention this point only for emphasis.
A: Thank you for your comments.

#Reviewer 2:
Because of acceptable answers of author, this article is acceptable
A: Thank you very much for your comments.

OPEN PEER REVIEW

Revision (2)

Here, you can see the **Reviewers**, **Associate Editors** and **EICs'** comments from the beginning to the end of the revision process.

Madjid Shakiba: Reviewer | **Revision** (2) — 4 Oct 2019

Dear AE,
The study is reviewed carefully. According to comments and revisions by the author, this manuscript is accepted.
Thanks

REFEREE: Associate Editor | **Revision** (2) — 6 Nov 2019

Dear EIC
Based on the authors' answers to the reviewers' comments, the reviewer(s) have recommended publication.
Kind regards.

Mehranoosh Dolatshahi: Associate Editor | **Revision** (2) — 14 Dec 2019

Dear EIC,
Please the authors respond to the following comment. Then, highlight any changes they make in the manuscript.
Based on the journal policy, tables should not be color designed. Please design the tables in an appropriate format without color.
Thank you.

Kavous Firouznia: EIC | **Revision** (2) — 15 Dec 2019

Dear authors,
Your article needs Minor Revision.
Regards

OPEN PEER REVIEW

Revision (3)

Reply to Reviewers

Ideally, the reviewing process can significantly improve the submitted manuscripts by allowing the authors to take into account the advice of reviewers. Author(s) must reply to all reviewers' comments in a separate Word file, point by point. A "**Reply to Reviewers**" document is submitted along with revised manuscript during submission of revised files, summarizing the changes that the authors made in response to the reviewers' comments. The responses to reviewers' comments specifies how the authors addressed each comment the reviewers made.

You can read the authors' responses to the reviewers' comments in the next page.

Dear Dr. Taiping He,

Thank you for submitting your valuable manuscript to the journal. We would like to inform you that the peer review of your manuscript is now completed and despite several useful points, it needs **"Minor Revision"**. Below you may find the peer review comments. Please reply to them one-by-one and re-submit it again.

A: Thanks a lot.

Reviewers' Comments:

Reviewer 1:
a

Associate Editor's Comments:

Associate Editor 1:
....
Associate Editor 2:
Dear author,
Please respond to the following comment. Then, highlight any changes you make in the manuscript. Please do not make any changes in the manuscript other than responding to the comments, because they will not be considered.
Based on the journal policy, tables should not be color designed. Please design the tables in an appropriate format without color.
Thank you.

A. Thank you, I'm sorry that we didn't follow the journal policy. We have changed the color cell of the previous manuscript to the superscript, and mark the modified place red.

OPEN PEER REVIEW

Revision (3)

Here, you can see the **Reviewers**, **Associate Editors** and **EICs'** comments from the beginning to the end of the revision process.

Mehranoosh Dolatshahi: Associate Editor | **Revision** (3) 17 Feb 2020

Dear EIC
Based on the authors' answers to the reviewers' comments, the reviewer(s) have recommended publication.
Kind regards.

Kavous Firouznia: EIC | **Revision** (3) 18 Feb 2020

Dear authors,
Your article is acceptable for the publication.
Regards