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Can leaded glasses protect the eye lens in patients undergoing neck computed tomography?

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Handling editor:
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1st Editorial decision
31-Mar-2021

Ref.: Ms. No. JCTRes-D-21-00008
Can leaded glasses protect the eye lens in patients undergoing neck computed tomography?
Journal of Clinical and Translational Research

Dear Dr Ebrahimnejad Gorji,

Reviewers have now commented on your paper. You will see that they are advising that you revise your manuscript. If you are prepared to undertake the work required, I would be pleased to reconsider my decision.

For your guidance, reviewers' comments are appended below.

If you decide to revise the work, please submit a list of changes or a rebuttal against each point which is being raised when you submit the revised manuscript. Also, please ensure that the track changes function is switched on when implementing the revisions. This enables the reviewers to rapidly verify all changes made.

Your revision is due by Apr 30, 2021.

To submit a revision, go to https://www.editorialmanager.com/jctres/ and log in as an Author. You will see a menu item call Submission Needing Revision. You will find your submission record there.

Yours sincerely

Michal Heger
Editor-in-Chief
Journal of Clinical and Translational Research

Reviewers' comments:

Reviewer #1: 1) Where did you get the lead glass? Explain their thickness, linear attenuation coefficients and their characteristics.
2) Why not use a lead shield for this application, or what is the advantage of lead glass over lead itself?
3) Certainly in this work we are not looking to check the quality of CT scan images of the eye area, so lead protection is better than lead glass protection.
4) In the following studies, the role of foam under shields is mentioned. Read these and use them for better explanation in the text of the article.
5) How exactly were the calibrators of the TL dosimeters exactly? Did you apply the ECC coefficients? See the article below.
6) use your data in writing the conclusion.
7) According to Figure 2, why the protection efficiency of glasses in different patients is different? The efficiency of protection has nothing to do with the type of disease. Explain this.

Reviewer #2: Reduction of radiation burden is essential with the increasing amount of CTs made every day, which makes the study very relevant.
I have some fundamental critic on the design of the study. The investigators want to show is that wearing lead galsses decreases the absorbed dose in the eye during a CT scan. In this study, the investigators measured the difference in radiation on the back and the front side of the glasses. Because during a CT, the radiation comes from all sites, there is a considerable amount of radiation entering the eye that not passes the glasses. Therefore the difference in radiation on the front and backside of the glass is not a direct measure of reducing the absorbed does in the eye. It is even conceivable that a lead headband on the back of the skull will give a comparable reduction in absorbed dose in the eye. So I suggest a better approach to estimate the absorbed dose in the eye from the Hounsfield units and compare scans from patients with and without wearing glasses.
The reduction of 0.67 in eye dose, the authors claim, does not convince me to be the actual reduction in absorbed dose in the eye.

Reviewer #3: Please specify details regarding CT ATCM of the Siemens scanner i.e. Quality reference mAs and strength of modulation

Please specify lead equivalent thickness of the glasses used in the paper

Please specify method for TLD dose calculation i.e. Are the dose from each TLD averaged?

Authors' response

Cover letter

Dear editor-in-chief of **"Journal of Clinical and Translational Research"**

Dr. Michal Heger,

The authors greatly appreciate for your letter and the opportunity to revise our paper entitled "**Can leaded glasses protect the eye lens in patients undergoing neck computed tomography**?". We have included the reviewer's comments immediately after this letter and responded to them individually, indicating exactly how we addressed each concern or problem and describing the changes we have made.

Sincerely yours

Dr Ebrahimnejad Gorji,

Reviewers' comments:

Reviewer #1:

1) Where did you get the lead glass? Explain their thickness, linear attenuation coefficients and their characteristics.

The radioprotective glasses are used commonly in medical imaging centers. The thickness, and other characteristics of the glasses have been explained in the text. Dear reviewer, the linear attenuation was not available in the information presented by the manufacturer.

2) Why not use a lead shield for this application, or what is the advantage of lead glass over lead itself?

In the current work, we wanted to show the eye dose reduction value of the glasses as an easy and accessible tool compared to the lead shield. Because using the lead shield for patients during the CT examinations must be performed with higher health protocols. The relevant explanations have been mentioned in the introduction and discussion sections.

3) Certainly in this work we are not looking to check the quality of CT scan images of the eye area, so lead protection is better than lead glass protection.

The radioprotective glasses have used in our study because they are relatively low cost devices which could be found in almost all radiology/imaging centres. In contrast, most of the imaging centers (in our country) have not eye lead shields.

4) In the following studies, the role of foam under shields is mentioned. Read these and use them for better explanation in the text of the article.

Answer: Dear referee, we did not see/receive any articles or their information (like title or citation). As you have mentioned, adding foam under the shields can reduce the metal artifact during CT scans when lead shields are using. In general, foam and air have relatively similar densities, as a result, similar X-ray attenuation characteristics. Since in the present study, we have used the radioprotective glasses, and regarding the glasses geometry they always have several millimeters distances from the eye, consequently, the high-density artifact will be reduced. In addition, in our study, we just acquired the CT images from the neck, and the eyes were usually located outside or partly at the edge of the radiation field, therefore, the probable artifacts in the eye regions would not affect the neck CT examination.

5) How exactly were the calibrators of the TL dosimeters exactly? Did you apply the ECC coefficients? See the article below.

Dear reviewer, the relevant explanations for TLD calibrations have been written in the new version, however, we have not received the mentioned articles.

6) Use your data in writing the conclusion.

Thanks a lot for your consideration. The conclusion section has been revised.

7) According to Figure 2, why the protection efficiency of glasses in different patients is different? The efficiency of protection has nothing to do with the type of disease. Explain this.

The differences may relate to different scan ranges used for each patient and also the size of patients which could affect the scatter dose during neck examinations (the mean of estimated dosimetry parameters has been reported in table 1). These explanations were added in the text.

Reviewer #2:

Reduction of radiation burden is essential with the increasing amount of CTs made every day, which makes the study very relevant.

I have some fundamental critic on the design of the study. The investigators want to show is that wearing lead galsses decreases the absorbed dose in the eye during a CT scan. In this study, the investigators measured the difference in radiation on the back and the front side of the glasses. Because during a CT, the radiation comes from all sites, there is a considerable amount of radiation entering the eye that not passes the glasses. Therefore the difference in radiation on the front and backside of the glass is not a direct measure of reducing the absorbed does in the eye. It is even conceivable that a lead headband on the back of the skull will give a comparable

reduction in absorbed dose in the eye. So I suggest a better approach to estimate the absorbed dose in the eye from the Hounsfield units and compare scans from patients with and without wearing glasses. The reduction of 0.67 in eye dose, the authors claim, does not convince me to be the actual reduction in absorbed dose in the eye.

Thanks a lot for your review to our manuscript. Although, in general for measuring the dose reduction during CT scan it is better to cover the investigated organs, in the current study, we have just wanted to show the role of radioprotective glasses as an easy and common radioprotective device available in many imaging centers during neck CT examination. Our purpose was not to evaluate the precise absorbed dose in the eyes. Also, it is notable that the most probable received dose in the eye region occurs in the front side of the eye because the skull bones (backside of the eyes) can protect the eye received doses, and X rays produced by the CT scan tube in the range of kV energy spectrum mainly absorbed (>90%) in few centimeters of tissue below the entrance surface. Furthermore, since the front and backsides received doses can detect by the TLDs and the reduction can be compared, in other words, the role of lead glasses (dose reduction) can be clarified by TLDs. Dear reviewer, following the reports, it should be mentioned that the eye dose is not measurable, the Hp (3), was recommended to be used by the ICRP which measured on the skin using the dosimeters. The assessment of Hp was suggested applying conversion coefficients. We used the reported conversion coefficients from air kerma to Hp (3) for eye lens dose assessment as calculated in a cylinder calibration phantom which is close to the mass and shape of a human head for photon reference radiations.

Reviewer #3:

Please specify details regarding CT ATCM of the Siemens scanner i.e. Quality reference mAs and strength of modulation.

Dear reviewer, the ATCM was used in previous studies and the quality reference mAs and modulations were reported in their investigations. Our purpose for bringing the results of these studies was to present the effect of ATCM in eye dose reduction during CT scan. We did not use the ATCM in our study, however, if you mean that the quality reference mAs and strength of modulation of the previous works should be added in text, we will add them.

Please specify lead equivalent thickness of the glasses used in the paper.

Thanks for your comment. The thickness of the glasses has been written in the new version.

Please specify method for TLD dose calculation i.e. Are the dose from each TLD averaged?

Thanks a lot for your comment. The relevant explanations for TLD calibrations have been added in the text.

2nd Editorial decision
01-May-2021

Ref.: Ms. No. JCTRes-D-21-00008R1
Can leaded glasses protect the eye lens in patients undergoing neck computed tomography?

Journal of Clinical and Translational Research

Dear author(s),

Reviewers have submitted their critical appraisal of your paper. The reviewers' comments are appended below. Based on their comments and evaluation by the editorial board, your work was FOUND SUITABLE FOR PUBLICATION AFTER MINOR REVISION.

If you decide to revise the work, please itemize the reviewers' comments and provide a point-by-point response to every comment. An exemplary rebuttal letter can be found on at http://www.jctres.com/en/author-guidelines/ under "Manuscript preparation." Also, please use the track changes function in the original document so that the reviewers can easily verify your responses.

Your revision is due by May 31, 2021.

To submit a revision, go to https://www.editorialmanager.com/jctres/ and log in as an Author. You will see a menu item call Submission Needing Revision. You will find your submission record there.

Yours sincerely,

Michal Heger
Editor-in-Chief
Journal of Clinical and Translational Research

Reviewers' comments:

Reviewer #1: The following articles are done in your country. The procedure and the results are explained in detail. They also offer the advantage of using similar protections in CT scans. Add these articles to the review section and compare them with the results of your work. This will definitely increase the quality of the article and be welcomed by the readers.

1) Mehnati P, Malekzadeh R, Yousefi Sooteh M. New Bismuth composite shield for radiation protection of breast during coronary CT angiography. Iranian Journal of Radiology. 2019 Jul 31;16(3).

2) Mehnati P, Malekzadeh R, Divband B, Yousefi Sooteh M. Assessment of the effect of nano-composite shield on radiation risk prevention to Breast during computed tomography. Iranian Journal of Radiology. 2020 Jan 31;17(1).

3) Malekzadeh R, Sadeghi Zali V, Jahanbakhsh O, Okutan M, Mesbahi A. The preparation and characterization of silicon-based composites doped with BaSO4, WO3, and PbO nanoparticles for shielding applications in PET and nuclear medicine facilities. Nanomedicine Journal. 2020 Oct 1;7(4):324-34.

Reviewer #2: I think I finally understand what you have measured.

As a thought experiment, when we put the lead glasses with TLDs on the front and the back in the CT (without a patient) and then make a CT scan, both TLDs would measure the same dose. Because when the CT source rotates around the glass, both TLDs are evenly shielded from the radiation by the lead glass.
But when we put the lead glass (with the TLDs) on the patient's head and perform a CT scan, the readout will be different for both TLDs and represent the dose reduction for the area covered by the lead glasses.
Could you add an explanation like above to the paper to better clarify how exactly you came to the dose reduction of 64.9%

Authors' response

Cover letter

Dear editor-in-chief of **"Journal of Clinical and Translational Research"**

Dr. Michal Heger,

The authors greatly appreciate your letter and the opportunity to revise our paper entitled "**Can leaded glasses protect the eye lens in patients undergoing neck computed tomography**?". We have included the reviewer's comments immediately after this letter and responded to them individually highlighted with yellow color in the text.

Reviewer #1:

The following articles are done in your country. The procedure and the results are explained in detail. They also offer the advantage of using similar protections in CT scans. Add these articles to the review section and compare them with the results of your work. This will definitely increase the quality of the article and be welcomed by the readers.

1) Mehnati P, Malekzadeh R, Yousefi Sooteh M. New Bismuth composite shield for radiation protection of breast during coronary CT angiography. Iranian Journal of Radiology. 2019 Jul 31;16(3).
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3) Malekzadeh R, Sadeghi Zali V, Jahanbakhsh O, Okutan M, Mesbahi A. The preparation and characterization of silicon-based composites doped with BaSO4, WO3, and PbO nanoparticles for shielding applications in PET and nuclear medicine facilities. Nanomedicine Journal. 2020 Oct 1;7(4):324-34.

Answer: Dear referee, thanks a lot for introducing the valuable studies. The above-mentioned studies have been added to the discussion section and highlighted.

Reviewer #2:

I think I finally understand what you have measured. As a thought experiment, when we put the lead glasses with TLDs on the front and the back in the CT (without a patient) and then

make a CT scan, both TLDs would measure the same dose. Because when the CT source rotates around the glass, both TLDs are evenly shielded from the radiation by the lead glass. But when we put the lead glass (with the TLDs) on the patient's head and perform a CT scan, the readout will be different for both TLDs and represent the dose reduction for the area covered by the lead glasses. Could you add an explanation like above to the paper to better clarify how exactly you came to the dose reduction of 64.9%

Answer: Dear referee, thanks a lot for your valuable comment. The relevant explanation has been added in text and highlighted.

3rd Editorial decision
10-May-2021

Ref.: Ms. No. JCTRes-D-21-00008R2
Can leaded glasses protect the eye lens in patients undergoing neck computed tomography?
Journal of Clinical and Translational Research

Dear author(s),

Reviewers have submitted their critical appraisal of your paper. The reviewers' comments are appended below. Based on their comments and evaluation by the editorial board, your work was FOUND SUITABLE FOR PUBLICATION AFTER MINOR REVISION.

If you decide to revise the work, please itemize the reviewers' comments and provide a point-by-point response to every comment. An exemplary rebuttal letter can be found on at http://www.jctres.com/en/author-guidelines/ under "Manuscript preparation." Also, please use the track changes function in the original document so that the reviewers can easily verify your responses.

Your revision is due by Jun 09, 2021.

To submit a revision, go to https://www.editorialmanager.com/jctres/ and log in as an Author. You will see a menu item call Submission Needing Revision. You will find your submission record there.

Yours sincerely,

Michal Heger
Editor-in-Chief
Journal of Clinical and Translational Research

Reviewers' comments:

Dear authors,

Your manuscript has now passed through the peer review procedure.

However, before we can move to publication of your work, the manuscript must be thoroughly proofread and its English language level raised to academic English, in line with our author guidelines.

Preferably, you involve a native speaker in the next revision round or engage a third party service provider. If you can find neither, feel free to contact the editorial office (m.heger@jctres.com) so that we can help you find a language editor for a fee.

Please do not take this request lightly. Our journal is committed to high-end science, which in our opinion also entails proper use of language.

Thank you and kindest regards,

Michal Heger
Editor

4th Editorial decision
19-May-2021

Ref.: Ms. No. JCTRes-D-21-00008R3
Can leaded glasses protect the eye lens in patients undergoing neck computed tomography?
Journal of Clinical and Translational Research

Dear author(s),

Reviewers have submitted their critical appraisal of your paper. The reviewers' comments are appended below. Based on their comments and evaluation by the editorial board, your work was FOUND SUITABLE FOR PUBLICATION AFTER MINOR REVISION.

If you decide to revise the work, please itemize the reviewers' comments and provide a point-by-point response to every comment. An exemplary rebuttal letter can be found on at http://www.jctres.com/en/author-guidelines/ under "Manuscript preparation." Also, please use the track changes function in the original document so that the reviewers can easily verify your responses.

Your revision is due by Jun 18, 2021.

To submit a revision, go to https://www.editorialmanager.com/jctres/ and log in as an Author. You will see a menu item call Submission Needing Revision. You will find your submission record there.

Yours sincerely,

Michal Heger
Editor-in-Chief
Journal of Clinical and Translational Research

Reviewers' comments:

Dear authors,

Thank you for submitting a revised version of your manuscript.

The language needs further polishing, unless you can present compelling arguments for why toxicity (abstract) and radiation (3rd paragraph Introduction) should adopt a plural form. This is one of the many indicators confirming that you did not heed my advice to involve a native speaker in the proofreading process.

Please redo the revision with proper language editing. I cannot publish papers where the authors commit linguistic infarctions for which there is really no excuse. If you choose to publish your work in a journal where English is the main language, then you should accept responsibility for properly communicating in that language.

My first native language is Czech and my second native language is Dutch. I, too, have no excuse and always make sure I stay married to the English language so that I can do my job properly and don't get egg on my face.

Thank you for understanding and hopefully complying with my second request,

Michal Heger
Editor

5th Editorial decision
14-Jun-2021

Ref.: Ms. No. JCTRes-D-21-00008R4
Can leaded glasses protect the eye lens in patients undergoing neck computed tomography?
Journal of Clinical and Translational Research

Dear authors,

I am pleased to inform you that your manuscript has been accepted for publication in the Journal of Clinical and Translational Research.

You will receive the proofs of your article shortly, which we kindly ask you to thoroughly review for any errors.

No problem to add Dr. Alaba Tolulope Agbele to the author list of course. You may send an email to Mr. Daniel de Klerk to arrange this (d.deklerk@jctres.com) by forwarding him this mail with your explicit request. This decision letter will show him it is OK with me.

Thank you for submitting your work to JCTR.

Kindest regards,

Michal Heger
Editor-in-Chief
Journal of Clinical and Translational Research

Comments from the editors and reviewers: