Light and electron microscopic study of the effect of paracetamol on the heart of adult male albino rats and the possible protective effect of vitamin C Maha Abdel Baky Ahmed Fahmy

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Paracetamol is used to treat several conditions like headache, muscle aches, arthritis, backache, toothaches, colds, and fevers. There are several side effects which result from administration of paracetamol, as it may affect liver, kidney and even heart. Unexplained deaths and electrocardiographic changes associated with paracetamol poisoning have also been reported and wasn't been clearly discussed. Material and methods: The experimental study was carried out on 15 rats. The animals were divided into 3 groups, each group consists of 5 rats: Group1: Healthy control rats. Group 2: Rats received (0.5) ml of paracetamol/kg BW (oral).Group 3: Rats received (0.5) ml of paracetamol/kg BW (oral), and vitamin C (200 mg/kg BW). The animals were anesthetized by ether, the chest was opened to expose the heart for intracardiac perfusion with 10 ml of isotonic solution until the coming fluid is clear of blood, then 10% neutral buffered formalin. Each group is divided into two subgroups. The first subgroup was processed for light microscopy, and the second subgroup was processed for electron microscopy Treatment was done once daily for continuous 30 days. Results were in the form of presence of muscle disruption, invasion of muscle fibers by inflammatory cells, severely dilated and congested blood vessels, numerous and giant mitochondria. But, in group III there was some amelioration in the form of decrease in disruption of muscle fibers, decrease in congestion of blood vessels and mitochondria appeared in a normally arranged manner. The statistical analysis showed hypertrophy of muscle fibers in group II, and slight resolution in the hypertrophy in group III.

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Dear members of the editorial board of KAMJ, the manuscript entitled 'Light and electron microscopic study of the effect of paracetamol on the heart of adult male albino rats and the possible protective effect of vitamin C' has now been seen and reviewed.

- I. General aspects:
- (1) Although the topic of the manuscript is important and interesting, morphological changes observed in the myocardium are repeatedly presented in prior publications and have been reported from 1970s. I could not find any novel finding in this manuscript in the present form.
- (2) Most of the morphometric description in this manuscript is largely cursory and lacks clear quantitative aspects. Also, the light microscopic photomicrographs are not presented with the original magnification or even with a measuring bar on the bottom of the figures to allow proper judgment of any change in structural dimensions as those described for myofibers, nuclei, blood vessels, etc.

II. Particular points

Abstract:

- (1) In lines 9 and 10, 'Rats received 0.5 ml of paracetamol/BW.' It should be defined (/kg or mg BW).
- (2) In line 21, statistical analysis showed hypertrophy of muscle fibers in group II not in group III.

Material and methods:

- In line 1, 'the study was carried out on 15 rats (about 2 kg).' This weight appears to be incorrect. It should be revised and rewritten correctly (average and range).
- (2) In line 6, each group consisted of not consists of (all material and methods should be written in past tense).

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Figure 1



Photomicrograph of a section in the left ventricle of group I showing longitudinal cardiac muscle fibers. Notice their central large oval nuclei (white arrow) and transverse striations. H&E X 1000.

Figure 3



Photomicrograph of a section in the left ventricle of group II showing longitudinal cardiac muscle fibers with presence of disruption of a muscle fiber that is invaded by thick connective tissue cells and fibers (white arrow) and presence of abnormal vesicular nuclei (arrow head). H&E X1000.

Figure 2



Photomicrograph of a section in the left ventricle of group II showing longitudinal cardiac muscle fibers with presence of disruption of parts of the muscle fibers(arrow), and presence of abnormal rounded vesicular nuclei (arrow head). H&E X 1000.

Figure 4



Photomicrograph of a section in the left ventricle of group II showing longitudinal cardiac muscle fibers with presence severely dilated and congested blood vessels (arrow). H&E X1000.

- (3) In lines 8 and 9, the given dose should be defined (/kg or mg BW).
- (4) In histological study, line 4 each group was divided (not is divided).
- (5) In presentation of data, line 4 'standard error was measured,' although the table in the results presents SD not standard error.
- (6) In histological study, line 9 'according to ?????,' the sentence is incomplete.
- (7) In histological study, the technique for electron microscopy needs to be completed.
- (8) The method of morphometry (diameter of muscle cells) is not written.

Results:

- (1) In general, the text in the results should be revised and written in past tense.
- (2) In light microscopic study, line 3 striations not stration.
- (3) In light microscopic study, line 5 connective tissue fibers not connective fibers.
- (4) In electron microscopic study, line 6 'presence of numerous ?????' the sentence is incomplete.
- (5) In electron microscopic study, last paragraph, the explanation for muscle hypertrophy should not be written in the results.

Photomicrograph of a section in the left ventricle of group II showing longitudinal cardiac muscle fibers with presence severely dilated and congested blood vessels (arrow), disruption in some areas (arrow head), presence of nuclei of different size, shape and staining affinity (star). H&E X1000.

Figure 7



Electro photomicrograph of cardiomyocytes of group I showing regular sarcomers of the myofibrils, large amount of mitochondria between myofibrils (m) with obvious Z lines (white arrow). X 30.000.

Figure 6

Reference



Photomicrograph of a section in the left ventricle of group III showing longitudinal cardiac muscle fibers with some amelioration in the form of decrease in disruption of muscle fibers, and decrease in blood vessels congestion (arrow). H&E X400.

Figure 8



500 nm HV=80kV TEM Mag = 30000x

Electro photomicrograph of cardiomyocytes of group II showing regular sarcomers of the myofibrils with presence of some areas of muscle disruption (white arrow) and presence of large sized

(1) In general writing, the references should follow the guidelines of the journal consistently.

- (2) References 9 and 11 are not used in the text.
- (3) In reference 8, there is repetition of 'A study on paracetamol cardiotoxicity.'
- (4) Reference 16 is incomplete.

Legends and figures: in general, the magnification written for most light microscopic figures needs to be mitochondria (m). X 30.000.

revised and rewritten correctly, or use а measuring the bottom each bar at of photomicrograph(Figs 1-6).

Figs. 7-10, electron photomicrographs not electro micrographs.

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Figure 9



File Name = para-4.tif

500 nm HV=80kV TEM Mag = 30000x

Electro photomicrograph of cardiomyocytes of group II showing regular sarcomers of the myofibrils with presence of some areas of marked muscle disruption (white arrow) and presence of eight shaped mitochondria (star). X 30.000.

Arabic summary

Overall, it is poorly written and needs to be carefully rewritten and improved.

I would like to ask the author to carefully revise the manuscript according to my comments.

The editing of the whole manuscript needs to be revised according to the guidelines of your journal.

Figure 10



500 nm HV=80kV TEM Mag = 30000x

Electro photomicrograph of cardiomyocytes of group III showing regular sarcomers (s) of the myofibrils with decrease in areas of muscle disruption (white arrow) and also presence of large sized (eight shaped) mitochondria (m) in the region of disruption. X 30.000.

Yours sincerely,

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