Original Article

The Potential Ameliorative Impact of Platelet Rich Plasma on Thioacetamide-Induced Liver Fibrosis in Albino Rats: Histomorphometric and Biochemical Study

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ABSTRACT

Introduction: Worldwide liver diseases are considered one of the greatest causes of death. Liver fibrosis resulting from liver injuries, if not treated, leads to liver cirrhosis. Cirrhosis may result in liver dysfunction, portal hypertension, or hepatocellular carcinoma. Thioacetamide (TAA) is a hepatotoxic drug that is applied for the induction of liver fibrosis resembling that occurs in humans. Application of Platelet-rich plasma (PRP) in managing many diseases is presently an area of great scientific interest. Being rich in platelets, secretory proteins and growth factors might promote the healing activity in case of liver fibrosis.

Aim of the Work: Examining the potential ameliorative impact of PRP on TAA induced hepatic fibrosis in male adult albino rat model.

Materials and Methods: 44 male adult albino rats were distributed into four groups; the control group; received intraperitoneal (i.p) saline twice weekly. The (PRP) group; received i.p PRP twice weekly. The (TAA) group; received i.p TAA twice weekly. The (TAA+PRP) group; received i.p of TA twice weekly, in addition to PRP starting from 4th week of TAA administration until the end of the experiment. All treatments were given for 7 weeks. After 24 hours of the last injection of TAA and PRP, animals were sacrificed. Samples were obtained for biochemical and histomorphometric studies.

Results: The TAA group revealed histological results of liver fibrosis. Administration of PRP showed a marked improvement in the liver architecture and the biochemical results.

Conclusion: PRP reversed hepatocellular damage and fibrosis in addition to the improvement of the liver function tests.

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Key Words: Liver fibrosis, PRP, thioacetamide.

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INTRODUCTION

Liver disease is a global health burden, as it is accused for causing two million deaths yearly worldwide.[1] Liver fibrosis results from liver injuries,[2] where accumulation of collagen in the extracellular matrix occurs.[3] There are various etiologies that cause liver fibrosis, like viral hepatitis, alcoholic and nonalcoholic steatohepatitis. Unopposed fibrosis disturbs the liver's normal architecture and function, ultimately resulting in liver cirrhosis. Clinical outcomes of cirrhosis are liver failure, portal hypertension, and hepatocellular carcinoma[4].

The main commanders of hepatic fibrosis are myofibroblasts that are derived from hepatic stellate cells (HSCs) and portal fibroblasts. In addition, other cells are also accused to have a role in the fibrogenic pathway, involving cells lining the sinusoids; endothelial and Kupffer cells, hepatocytes, and cholangiocytes[4].

Thioacetamide (TAA) is an organophosphorus compound, that is utilized as a hepatotoxicant substance that is applied to produce acute and chronic hepatic injury. It is used in rodents to produce liver injury models including centrilobular necrosis, fibrosis, cirrhosis as well as hepatocellular carcinoma[5,6,7].

Until present, no reliable cure for liver fibrosis has been discovered. Platelet rich plasma (PRP) is an extremely concentrated platelets preparation. The use of PRP in regenerative therapy has progressed to involve wide varieties of clinical problems including different forms of tissue damage.[8] PRP releases many growth factors and cytokines that enhance the recovery of the damaged parts through relocation and proliferation of necessary cells[9] Thus, this research was done to examine the potential protective impact of PRP on thioacetamide induced hepatic fibrosis, in a trial to find a reliable treatment for this medical condition.

MATERIALS AND METHODS

Drugs and chemicals

Thioacetamide (TAA) was bought from Alpha Chemika Company in a powder form dissolved in 0.9% saline. Additional chemicals were obtained from local commercial suppliers.

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Platelet rich plasma (PRP) preparation

Blood was taken under sterile conditions from ocular veins of the rats, then transferred into blood tubes with sodium citrate (3.8%) anticoagulant. Then centrifugation of blood at 1000 rpm for 15 min at 20°C was done, afterward a 5 min rest period, then an additional cycle of centrifugation at 3000 rpm for 15 min at 20°C. The platelet rich portion of the supernatant was separated by a pipette, dissolved in phosphate buffer saline (PBS) (1:1) and kept at room temperature.[10,11]

Experimental animals

44 male adult albino rats, age of 6-8 weeks and weighing 150-200 gm, were raised in the Physiology Department House of Animal, Alexandria Faculty of Medicine, Egypt. Animals were distributed into four groups; control group; received intraperitoneal (i.p) saline twice weekly on the 2nd and 5th day of the week. (PRP) group; received PRP (0.5mL/kg 1:1 in PBS i.p injection) twice weekly on the second and fifth day of the week. (TAA) group; received i.p injection of TAA (200 mg/kg) twice weekly on the second and fifth day of the week. (TAA+PRP) group; received i.p injection of TA (200 mg/kg) twice weekly on the second and fifth day of the week, in addition to PRP starting from fourth week of TAA administration until completion of the experiment. All treatments were given for 7 weeks. After 24 hours of the last injection of the TAA and PRP doses, animals were sacrificed.[12,13]

Histological assessment

The liver was removed and divided into 2 specimens. The first specimen was prepared to get paraffin sections stained by Hematoxylin and Eosin (H&E) and trichrome stains, to be examined by the light microscope.[14] The other specimen was prepared for transmission electron microscopic examination (TEM).[15]

Morphometric analysis

Digital images were obtained at magnification (x100), (x200) and (x400), to determine area percent (%) of collagen and the width of sinusoids in trichrome and H&E-stained liver sections respectively. While electron micrographs of liver sections were taken using TEM (Jeol 100 CX, Tokyo, Japan). Images were taken at different magnifications to determine the surface area of bile canaliculi. All measurements were assessed via NIH Image J (v1.49) software.[16,17]

Biochemical study of liver function tests

Blood was taken from the retro-orbital plexus in plain tube vacutainers and left for 30 minutes to clot. Serum was then separated by centrifugation 3000 r/min for 10 mins and frozen at 80°C, to analyze serum glutamic-pyruvic transaminase (SGPT) or alanine aminotransferase (ALT) and serum glutamic oxaloacetic transaminase (SGOT) or aspartate aminotransferase (AST).[18]

RESULTS

Histological assessment

Examination using the light microscope for the control and PRP groups' H&E-stained sections, revealed normal liver architecture (Figures 1,2), where the central veins appeared with the hepatocytes radiating from them. Hepatocytes were polyhedral showing central nuclei and granular acidophilic cytoplasm, binucleated cells were additionally revealed. Endothelial and Von Kupffer cells are seen lining hepatic sinusoids. Portal tracts enclosed by minimal amount of connective tissue (CT) were revealed. Oppositely, TAA group revealed disorganized hepatic architecture. Thick CT septa were observed bridging between the portal tracts and in between the hepatocytes giving a picture of lobulation. Moreover, perivascular mononuclear cellular infiltration surrounding the portal areas and in between hepatocytes were observed. Dilatation of the portal tract vessels was observed. Some hepatocytes appeared with a hypereosinophilic cytoplasm, and others were ballooned with vacuolated cytoplasm. The nuclei showed changes that were in the form of karyolitic nuclei and margination of chromatin. In addition, cells with pyknotic nuclei were also revealed. Most of the blood sinusoids were dilatated (Figure 3). Interestingly, TAA+PRP revealed a preserved liver architecture with minimal histological changes. Most hepatocytes appeared normal. The portal tract blood vessels and the blood sinusoids showed slight dilatation. Besides, slight perivascular mononuclear cellular infiltration was seen (Figure 4).

Light microscopic assessment of the control and PRP groups stained by Masson's trichrome showed normal liver collagen dissemination, where scanty collagen deposition surrounding central veins and portal tracts were revealed. Oppositely, sections of TAA group revealed massive amount of collagen deposition surrounding central veins, portal tracts and the sinusoids. Furthermore, collagen was noticed surrounding the whole lobule revealing thick CT septa forming distinct hepatic lobulation. While TAA+PRP group revealed markedly fewer collagen deposition in comparison to TAA group (Figure 5).

Examination using the TEM of liver sections of the control and PRP groups showed normal hepatic architecture. Hepatocytes showed euchromatic nuclei with prominent nucleoli. Mitochondria, rER, sER and Golgi apparatus were revealed into the cytoplasm. Bile canaliculi between two adjacent hepatocytes were noticed (Figure 6). On the other hand, TAA group revealed marked alterations in liver ultrastructure. Most cells showed rarefaction of the cytoplasm pushing the organelles towards the periphery of the cell and around the nucleus. Mitochondria with dense matrix were observed. Some hepatocytes showed small nuclei and others showed irregularly shaped nuclei. While some nuclei showed margination of the heterochromatin and the nucleoli. Myofibroblast cells were noticed with

collagen fibrils deposition around. Moreover, dilatation and proliferation of the bile canaliculi were noticed with few and short microvilli protruding into their lumina (Figure 7). Interestingly, TAA+PRP group revealed many areas with normal ultrastructural pattern. Where the hepatocytes showed euchromatic nuclei and normal mitochondria in the cytoplasm. Few hepatocytes showed mild affection where their cytoplasm revealed some rarefaction. Hepatic stellate cells were observed again with lipid droplets in their cytoplasm. On the other hand, myofibroblasts were still revealed in few areas surrounded by few collagen fibrils. Bile canaliculi were of almost normal caliber in most areas (Figure 8).

Morphometric analysis

Analysis of the mean area percent of collagen in sections stained by trichrome revealed that PRP group (3.93 ± 2.77) in comparison to control group (3.50 ± 1.78) showed no significant difference. While TAA group (11.89 ± 2.48) showed a significant rise in comparison to control group. Noteworthy, a significant decrease was recorded in TAA+PRP group (4.24 ± 1.62) compared to TAA group, with no significant difference in comparison to control group. For the morphometric analysis of the surface area of bile canaliculi, when comparing PRP group (0.53 ± 0.21) to control group (0.39 ± 0.16) no significant difference was noted. While the mean surface area of bile canaliculi in TAA group (2.64 ± 1.56) showed a significant increase in comparison to control group. Interesting, a significant decrease in TAA+PRP group (0.34 ± 0.26) as compared to TAA group, but in comparison to control group no significant difference is detected. Concerning the mean blood sinusoids width, no significant difference for PRP group (4.58 ± 1.85) in comparison to the control group (4.59 ± 1.42). While the measurements for TAA group (8.35 ± 2.36) showed a significant increase in comparison to control group. Oppositely for the measurements of TAA+PRP group (4.25 ± 1.39) a significant decrease was recorded in comparison to TAA group, while when compared to control group no significant difference was detected (Figure 9).

Biochemical assessment of Liver Function Tests

For the mean level of serum ALT, there was no significant difference between in PRP group (28.00 ± 2.10) as compared to the control group (28.67 ± 2.50). On the other hand, the mean level of serum ALT in TAA group (64.67 ± 3.98) was significantly increased than that of the control group. Alternatively, there was a significant decrease in the mean level of serum ALT in TAA+PRP group IV (29.50 ± 2.74) compared to TAA group, with no significant difference as compared to the control group. Similarly for the mean level of serum AST The current study revealed no significant difference between PRP group (32.00 ± 2.76) as compared to the control group (32.33 ± 1.75). While the mean level of serum AST in TAA group (88.33 ± 7.53) was significantly increased in comparison to the control group. On the other hand, there was a significant decrease in the mean level of serum AST in TAA+PRP group (32.33 ± 2.58) in comparison to TAA group, with no significant difference when compared to the control group (Figure 10).

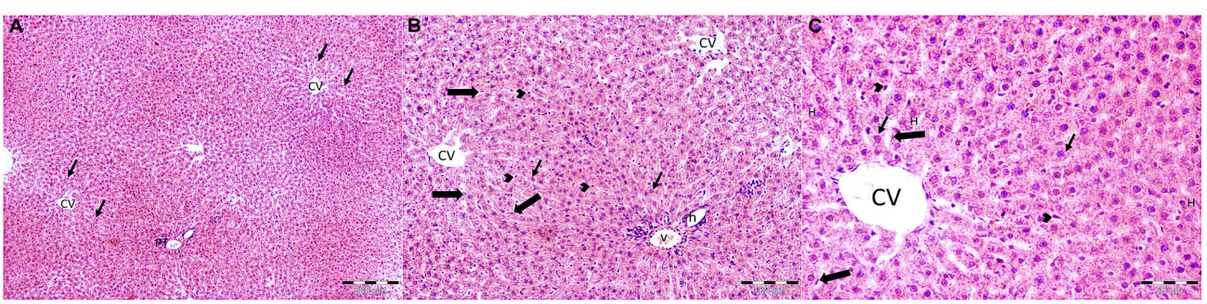

Fig. 1: Photomicrographs of control group, revealing the hepatocytes' plates (thin black arrow) that radiate from central veins (CV). Endothelial cells (thick black arrow) and Von Kupffer cells (black arrowhead) lining the blood sinusoids. Branches of the portal vein (v) and the hepatic artery (h) are noticed in the portal tract (PT). Binucleated hepatocytes are revealed (H). (H&E stain, A: ×100, B: ×200, C: ×400).

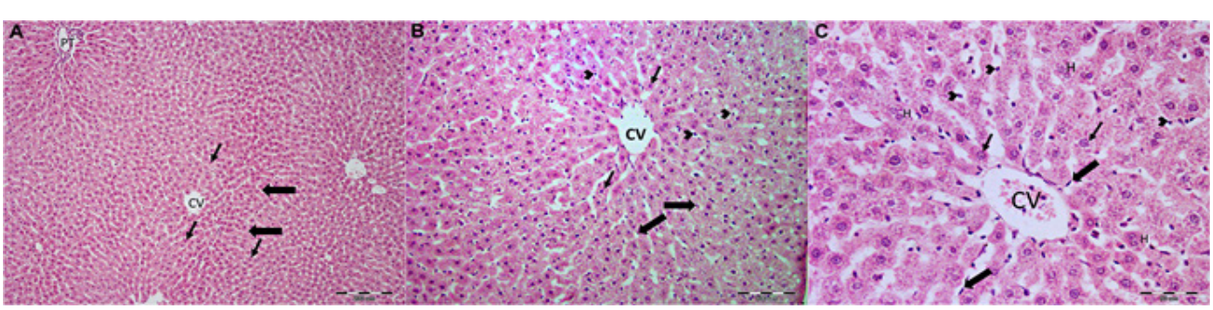

Fig. 2: Photomicrographs of PRP group, revealing almost normal liver. Hepatocytes' plates (thin black arrow) radiate from central veins (CV). Endothelial cells (thick black arrow) and Von Kupffer cells (black arrowhead) lining the blood sinusoids. Portal tract (PT), and some binucleated hepatocytes are revealed (H). (H&E stain, A: ×100, B: ×200, C: ×400).

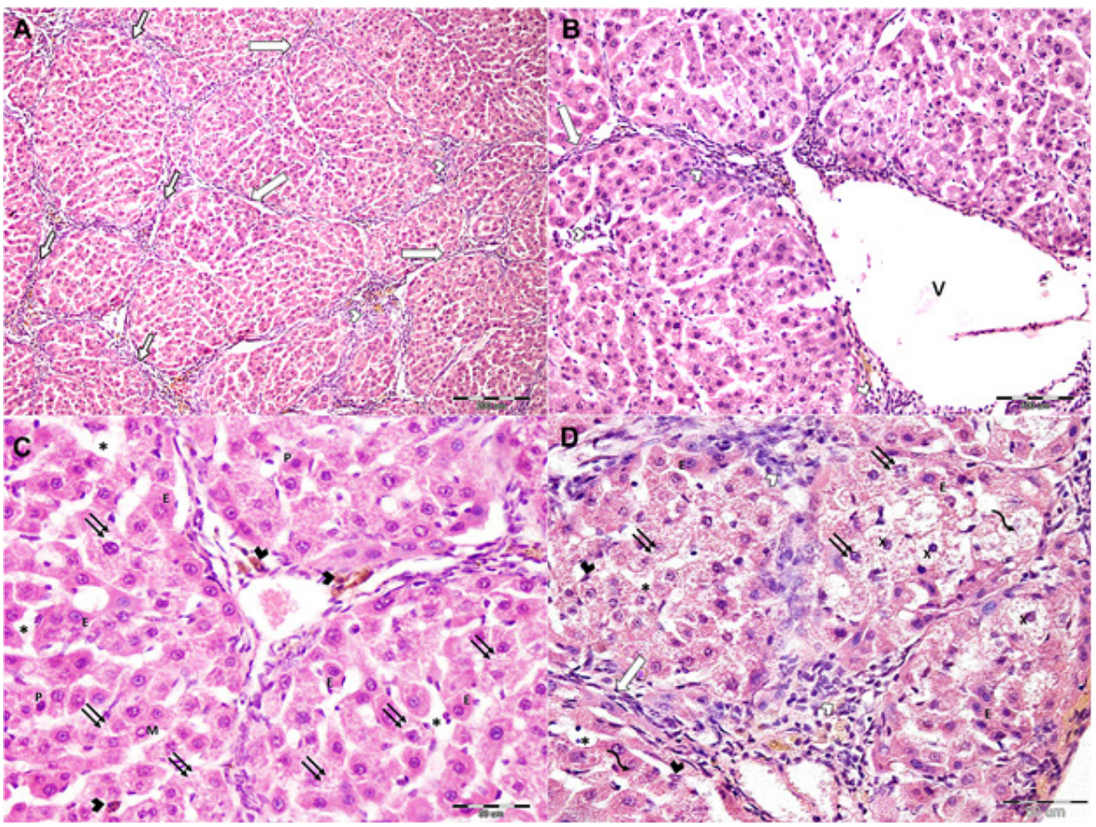

Fig. 3: Photomicrographs of TAA group, revealing disturbed hepatic architecture with formation of lobules separated by thickened CT septa (thick white arrow). Mononuclear cellular infiltrations are seen in the CT septa and around the portal areas (thin white arrow) and in between the hepatocytes (white arrowhead). Dilated branch of portal blood vein (v) is observed. Hepatocytes show changes in the cytoplasm; some revealed hypereosinophilic (E), and others show vacuolated cytoplasm (double black arrow). Nuclear changes are observed, as margination of the nuclear chromatin (M), karyolytic (curved arrow) and pyknotic nuclei (P). Ballooning of hepatocytes is also observed (X). Notice dilated blood sinusoids (*). Phagocytic Von Kupffer cells could be revealed (black arrowhead). (H&E stain, A: ×100, B: ×200, C: ×400, D: ×400).

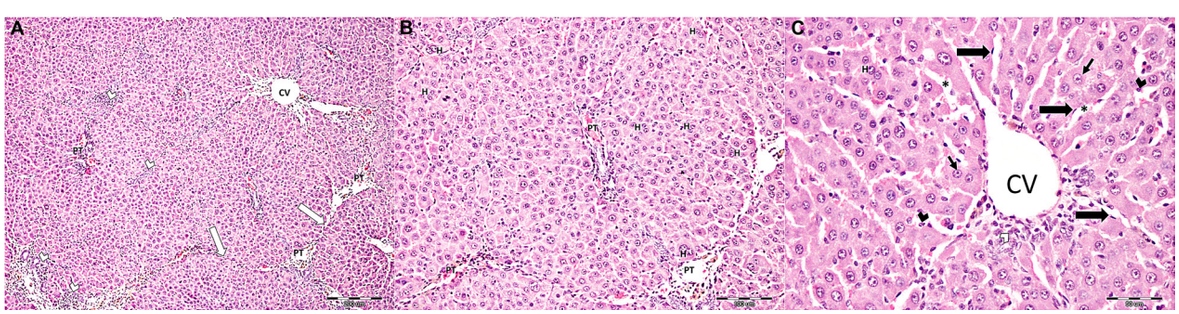

Fig. 4: Photomicrograph of TAA+PRP group, revealing preserved architecture of hepatic lobules. Plates of normal hepatocytes (thin black arrow) radiate from central veins (CV) are observed. Binucleated hepatocytes are seen (H). Thin CT septa are noticed (thick white arrow). The portal tract blood vessels are slightly dilated and congested (PT). Mononuclear cellular infiltrations are seen around the portal areas, in thin CT septa and in between the hepatocytes (white arrowhead). Dilated blood sinusoids (*) are observed. Thick black arrow; endothelial cells. black arrowhead; Von Kupffer cells. (H&E stain, A: ×100, B: ×200, C: ×400).

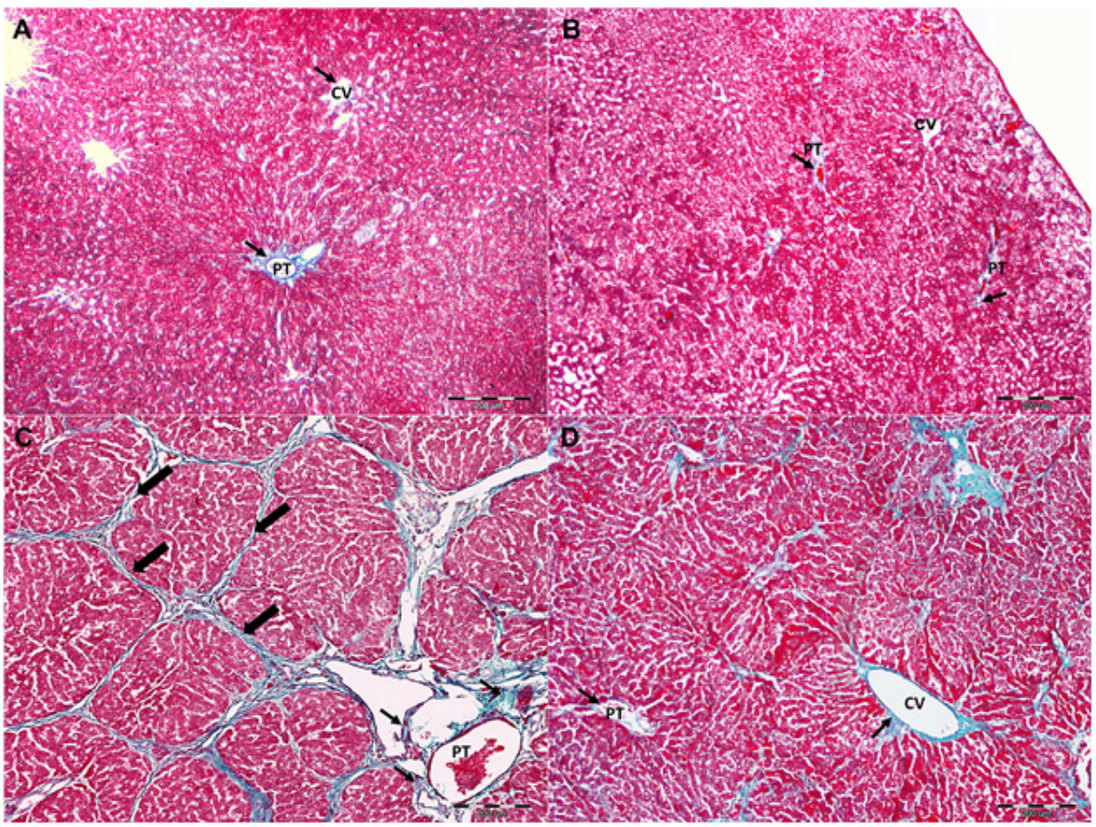

Fig. 5: (A,B); Control and PRP group respectively, revealing normal deposition of collagen fibers, as scanty amount of collagen (thin black arrow) around portal tracts (PT) and central veins (CV) is revealed. (C); TAA group revealing, considerable amount of collagen (thin black arrow) around portal tracts (PT) and thickened CT septa (thick black arrow) forming hepatic lobulations. (D); TAA+PRP group IV, revealing less collagen deposition (thin black arrow) around the portal tract (PT) and the central vein (CV) as compared to TAA group. (Masson trichrome stain, ×100).

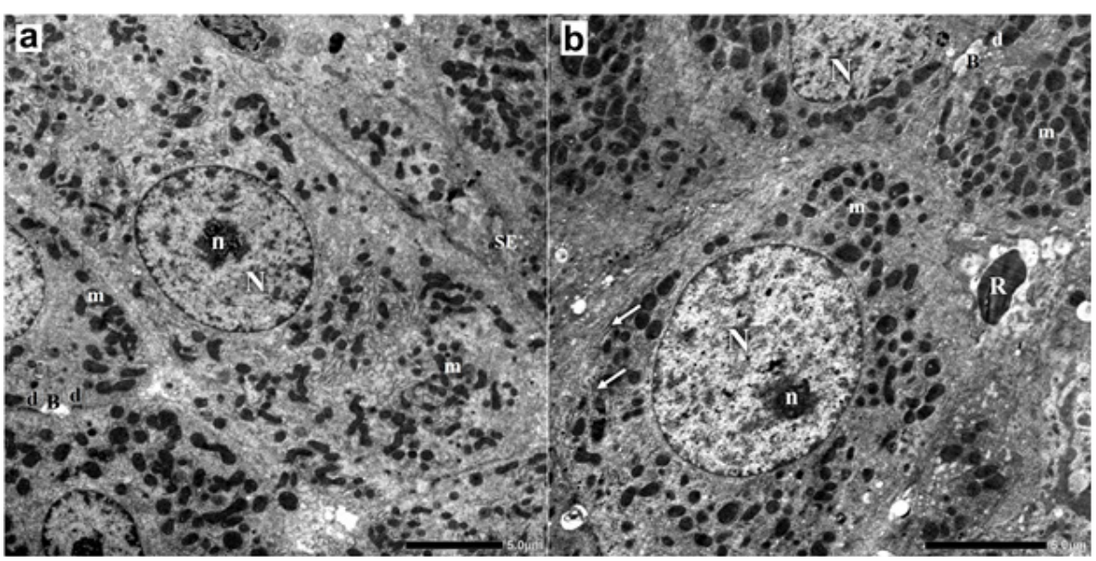

Fig. 6: (a); control group, (b); PRP group, revealing normal hepatocytes with euchromatic nuclei having regular outline (N) with prominent nucleoli (n). Mitochondria (m), sER (SE) and rER (white thin arrow) are revealed in the cytoplasm. B; Bile canaliculi. d; desmosomes. (a: × 1200. b: × 1500).

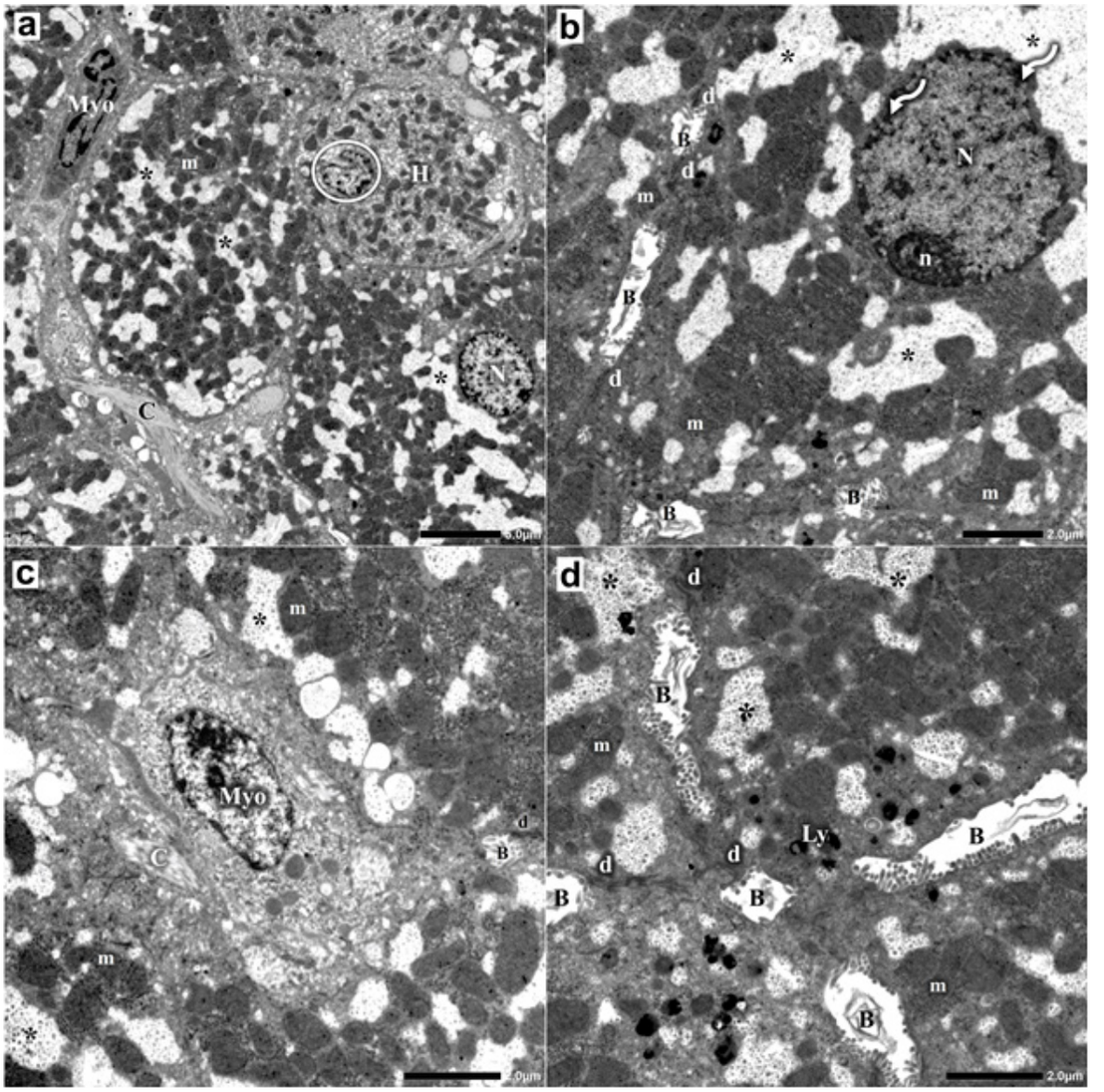

Fig. 7: TAA group revealing (a); hepatocytes having small nucleus with fragmented chromatin (N). A shrunken hepatocyte (H) with irregularly shaped, peripherally located nucleus (Circle). A myofibroblast cell (Myo) between hepatocytes. Notice collagen fibrils (C). (b); a hepatocyte with an irregular nucleus (N), margination of the heterochromatin (curved arrow), and marginated nucleolus (n) is observed. The cytoplasm shows cytoplasmic rarefaction (*), and mitochondria having a dense matrix (m). Proliferated and dilated bile canaliculi (B) can be noticed. (c); a myofibroblast cell (Myo) between hepatocytes and surrounded by collagen fibrils (C). (d); Proliferation and dilatation of bile canaliculi (B) with few and short microvilli in their lumina are noticed. Mitochondria with dense matrix (m), and rarefaction of the cytoplasm (*) are revealed . d: desmosome. Ly: lysosomes. (a: × 1000, b: × 2500, c: × 3000, d: × 3000).

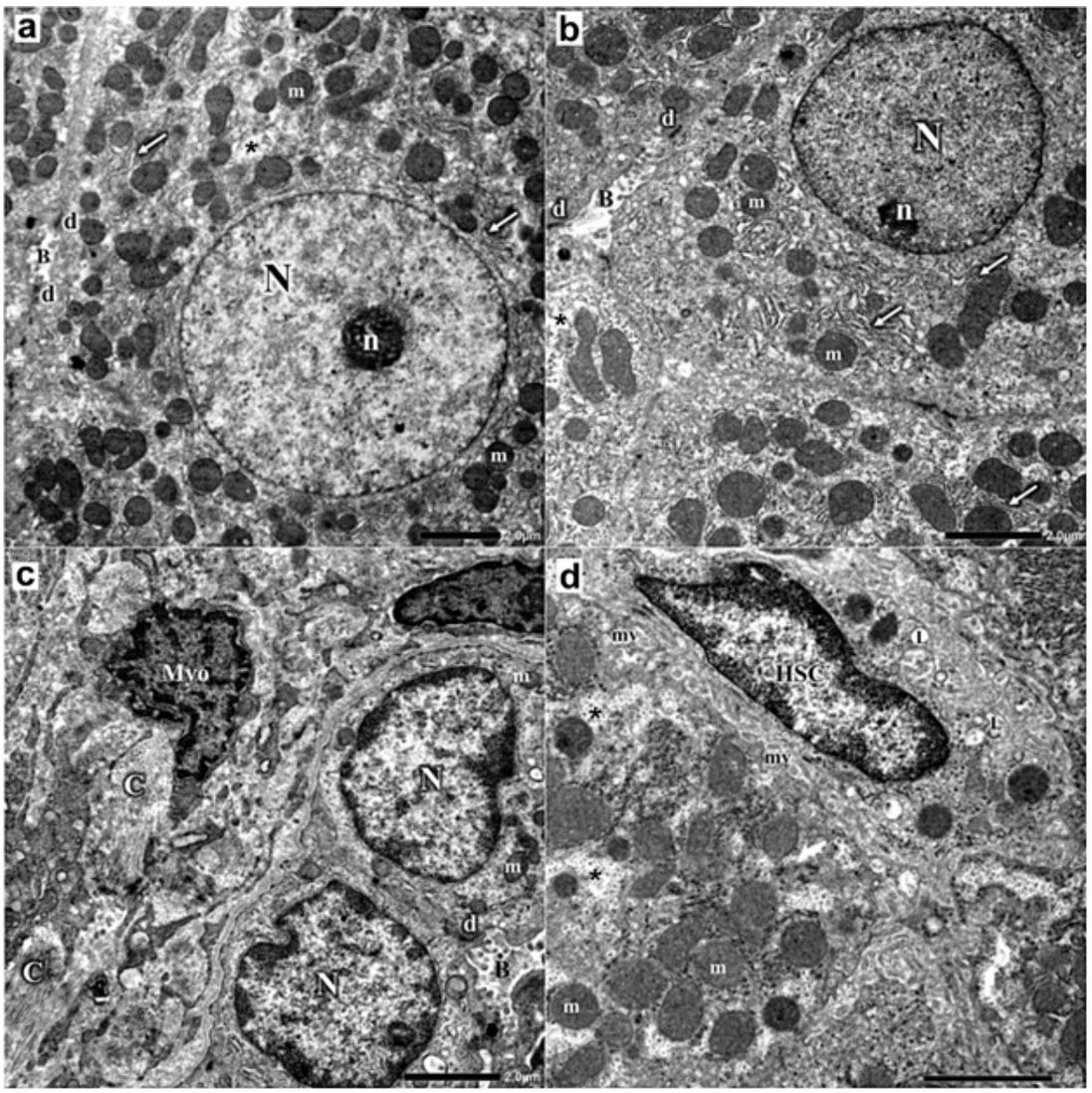

Fig. 8: TAA+PRP group, revealing areas of normal and other abnormal liver ultrastructure. (a, b); revealing normal hepatocytes with euchromatic nuclei having regular outline (N) with prominent nucleoli (n). Rarefaction of a few areas of the cytoplasm is revealed (*). (b); Notice dilated bile canaliculi. (c); Hepatocytes with irregular nuclei (N) and a dilated bile canaliculus are observed. Notice a myofibroblast cell (Myo) surrounded by collagen fibrils (C). (d); A hepatic stellate cell (HSC) with lipid droplets (L) in the cytoplasm can be observed. m: mitochondria. white thin arrow: rER, mv: hepatocyte microvilli. (a: × 2500, b: × 3000, c: × 3000, d: × 4000)

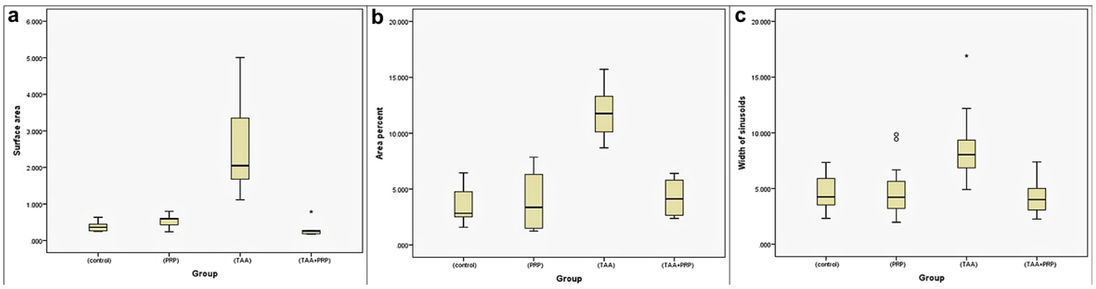

Fig. 9: Morphometric assessment. (a) Box plot - Comparison between the four groups according to area percent of collagen. (b) Box plot - Comparison between the four groups according to the surface area of bile canaliculi. (c) Box plot - Comparison between the four groups according to the width of the sinusoids.

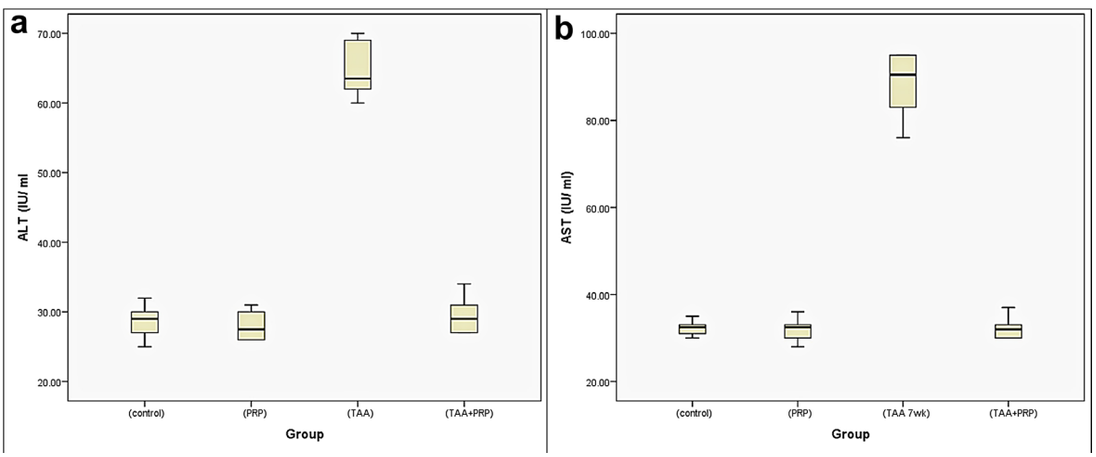

Fig. 10: Biochemical assessment of liver function tests. Box plot - Comparison between the four study groups according to (ALT) IU/ml. Blot box - Comparison between the four study groups according to (AST) IU/ml.

DISCUSSION

There are many factors that are implied in the development of liver diseases, including some metabolic diseases and viral infections.[19] Liver diseases are responsible for two million deaths every year. Deaths are greatly assigned to the complications of liver fibrosis, as hepatocellular carcinoma and cirrhosis.[1] Thus they cause a great danger to human health. Until now no considerable cure has been proved for liver fibrosis. Even though a lot of clinical trials were done to investigate different treatments for liver fibrosis. But the Food and Drug Administration did not approve any of these treatments. Thus, a lot of consideration is being offered trying to find alternative treatments for treating liver fibrosis.[20]

Thioacetamide (TAA) is one of the most frequently applied substances for the induction of liver fibrosis that mimics human disease as it is found to be associated with rapid development of fibrosis starting from periportal fibrosis and reaching a full picture resembling human cirrhosis.[21]

This study aimed to assess the potential protective impact of platelet rich plasma (PRP) on hepatic fibrosis induced by TAA administration in male adult albino rat model. PRP was chosen in this study because of its wide use these days in regenerative and therapeutic medicine,[22] because of its healing and anti-inflammatory effects.[23]

Most of the research works that investigated the PRP effect on liver fibrosis mainly measured biochemical serum markers. However, there is no sufficient data regarding the histopathological changes especially ultrastructural ones regarding this issue. Thus, we led our work to investigate these histopathological changes using the light and the electron microscopes.

In our study, the examination of light microscopic (LM) and electron microscopic (EM) sections of PRP group showed normal liver architecture similar to the histological appearance of the control group. While TAA group showed classic picture of hepatic fibrosis with increased deposition of collaged fibers, surrounding central veins and portal tracts and forming thickening of connective tissue (CT) septa and formation of complete lobules. In addition, myofibroblast cells were noticed with collagen fibrils deposition around, in the ultrastructural examination. These findings were proven by morphometric analysis of the area percent (%) of collagen in trichrome stained sections. Agreed with our findings, Abdul-Hamid M *et al*.[24] reported that TAA administration resulted in

alteration of the normal hepatic architecture and formation of lobules with thickening of CT septa. Moreover, other studies also reported the same pattern of collagen deposition upon chronic TAA use.[25] Sections of TAA group stained by H&E, showed hepatocytes having a hypereosinophilic cytoplasm and others were ballooned and their cytoplasm was vacuolated. Also, changes concerning the nucleus were observed as karyolisis and margination of chromatin. In addition, cells with pyknotic nuclei were also revealed. This was confirmed by ultrastructural findings which revealed rarefaction of the cytoplasm of most cells. Mitochondria with dense matrix were observed. Also, cells with nuclear changes were revealed, as some hepatocytes showed small nuclei and others showed irregularly shaped nuclei. While some nuclei showed margination of the heterochromatin and the nucleoli. These findings are due to the inflammatory degenerative changes occur in the liver due to TAA administration.[26,27,28]

Thioacetamide (TAA) liver toxicity caused by TAA administration, which leads to excessive intracellular reactive oxygen species (ROS). ROS prompts peroxidation of lipids in the hepatocyte's membranes. Lipid peroxidation release reactive intermediates, causing liver insults. TAA also targets mitochondria which also causes intracellular ROS accumulation in the hepatocytes. This causes activation of caspase 3 which induces apoptosis. ROS accumulation affects several cellular macromolecules other than lipids, such as DNA and proteins. Moreover, the major affection of the mitochondria caused by TAA administration leads also to ATP depletion with impairment of ion transport across the cell membrane. Those changes may result in cell swelling, organelles damage and eventually cell necrosis[26]

Moreover, dilatation and proliferation of the bile canaliculi were noticed with few and short microvilli protruding into their lumina. This was confirmed by a morphometric study of the surface area of bile canaliculi. Mononuclear cellular infiltration was also observed at the portal areas and between hepatocytes. Both these findings are part of ductular reaction to hepatic injury. The ductular reaction is defined by bile duct proliferation as well as other reactions including inflammatory cellular infiltration in the portal regions.[29] These findings were reported with other hepatic fibrosis models.[30] Besides, increased number of phagocytic Von Kupffer cells were detected in the space of Disse, they promote inflammation and also contribute to the initiation and progression of fibrosis, where they release growth factors that stimulate proliferation of hepatic stellate cells (HSCs) changing them into myofibroblasts which produce collagen.[24] These findings were in accordance with another study which reported that Von Kupffer cells are activated during hepatocellular injury, and they can affect the disease progression.[31]

In addition, dilatation of the portal tract vessels and the blood sinusoids was observed. Sinusoidal dilatation was confirmed by morphometric measurement of the width of blood sinusoids. Sinusoidal dilatation can be related to a non-specific inflammatory response or because of obstruction of the portal outflow leading to back pressure[32].

For TAA+PRP group a preserved liver architecture with only minimal histological changes were revealed. In comparison to TAA group, collagen deposition was reduced around central veins and portal tracts. Connective tissue septa appeared thin and incomplete. Thus, PRP markedly attenuated the severity of the fibrosis and inflammation even when TAA administration is continued. The findings agreed with other studies that reported a regression of liver fibrosis upon PRP administration.[33,34]

Biochemical results went hand in hand with the previously mentioned results. Hepatocellular damage in liver specimens of TAA group was confirmed by the significant elevations of liver enzymes ALT and AST. Other researchers also reported the same results of ALT and AST levels after chronic TAA administration.[35] On the contrary, ALT and AST levels were markedly decreased in PRP+TAA group, with results similar to the control groups. Our results agreed with others who reported a similar decline in ALT and AST levels with PRP use.[13]

The possible mechanism of PRP to attenuate the TAA-induced effects on liver may be attributed to the secretion of many growth factors that help in liver regeneration. It was reported that PRP down-regulates some inflammatory cytokines such as TNF-α, thus excessive inflammation during the early healing stages could be avoided.[36] As regards liver regeneration, it was suggested that growth factors released from platelets such as: hepatocyte growth factor (HGF), insulin-like growth factor 1 (IGF-1), and vascular endothelial growth factor (VEGF) have a direct impact on hepatocytes proliferation.[37] Another study stated that platelets indirectly affect liver regeneration by the interaction with other cells. Activated platelets interact with liver sinusoidal endothelial cells (LSECs) to increase IL-6 secretion from LSECs. Nevertheless, IL-6 alone is not enough to enhance hepatocytes proliferation. In fact, IL-6 secreted from those LSECs that interacted with the activated platelets enhances the release of HGF from HSCs and this what leads to hepatocytes proliferation.[38] Moreover, Salem *et al*. stated that PRP helps in resolving of liver fibrosis. As they reported that PRP significantly decreased the level of hydroxyl proline and IL-8 which are important inflammatory mediators.[33] PRP also decreased gene expression for TGF-β that is considered a fibrosis-related gene, and decreased gene expression for NF-κB which is also an important inflammatory mediator that aids in liver fibrosis. They also reported that PRP groups showed an increase in B-cell lymphoma 2 (BCL-2) which is a valuable anti-apoptotic marker. While Hesami *et al*.[11] reported that PRP decreased liver lipid peroxidation and oxidative stress in groups treated with PRP as compared to CCl4 groups.

CONCLUSION

After the accomplishment of the current work, it could be concluded that, in TAA induced hepatic fibrosis, PRP succeeded in reversing hepatocellular damage and fibrosis in addition to the improvement of liver functions, even with continuous TAA administration.

CONFLICT OF INTERESTS

There are no conflicts of interest.

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الملخص العربى

التأثير التحسيني المحتمل للبلازما الغنية بالصفائح الدموية على التليف الكبدي في الجرذان البيضاء: دراسة هستومورفية و كيميائية حيوية

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المقدمة: أمراض الكبد هي واحدة من الأسباب الأكثر شيوعا للوفاة في جميع أنحاء العالم. تليف الكبد الناتج عن إصابات الكبد، إذا لم يتم علاجه، يؤدي إلى تشمع الكبد. وقد يؤدي تليف الكبد إلى فشل الكبد وارتفاع ضغط الدم البابي وسرطان الكبد. ثيواسيتاميد (TAA) هو دواء سام للكبد يستخدم لتحفيز تليف الكبد الذي يشبه ما يحدث عند البشر. يعد استخدام البلازما الغنية بالصفائح الدموية (PRP) في علاج العديد من الأمراض في الوقت الحاضر مجالًا ذا أهمية علمية كبيرة. كونها غنية بالصفائح الدموية وعوامل النمو والبروتينات الإفرازية التي قد تعزز عملية الشفاء في حالة تليف الكبد.
الهدف من العمل: دراسة التأثير التحسيني المحتمل لـ PRP على التليف الكبدي الناجم عن TAA في نموذج الجرذان البيضاء البالغين من الذكور.
الطريقة وخطة العمل: تم تقسيم اربعة واربعين من الجرذان البيضاء البالغين من الذكور بشكل عشوائي إلى أربع مجموعات؛ المجموعة الضابطة؛ تم حقن الغشاء البريتوني(I.P) محلولا ملحيا مرتين أسبوعيا. مجموعة (PRP)؛ تلقت (PRP) (I.P) مرتين أسبوعيًا. مجموعة (TAA)؛ تلقت (TAA) (I.P) مرتين أسبوعيًا. مجموعة (TAA+PRP)؛ تلقت (TAA) (I.P) مرتين أسبوعيًا، بالإضافة إلى PRP بدءًا من الأسبوع الرابع من اعطاء TAA حتى نهاية التجربة.
وقد أعطيت جميع العلاجات لمدة ٧ أسابيع. بعد ٢٤ ساعة من الحقن الأخير لجرعات TAA و PRP ، تم ذبح الحيوانات. وتم أخذ العينات للتحليل الكيميائي الحيوي والنسيجي.
النتائج: أظهرت مجموعة TAA النتائج النسيجية لتليف الكبد. أظهر اعطاء PRP تحسنا ملحوظا في بنية نسيج الكبد والنتائج الكيميائية الحيوية.
الخلاصة: PRP حسن الخلايا الكبدية والتليف الكبدي الناتج عن إعطاء TAA بالإضافة إلى تحسين اختبارات وظائف الكبد.