

Biochemical, Histological And Histochemical Studies On The Effect Of Sodium Barbitol On The Renal Tissue Of Albino Mice

Samia M. Sakr*, Shadia Ali Radwan*, Aziza M. El Wessemy*
and Samira E El-Harras**

*Department of Biological Sciences, Faculty of Education, Ain Shams University,

**High Institution of Applied Arts, 6th October City, Cairo, Egypt.

Abstract

Introduction: Anaesthetic drugs are nowadays used on a large scale in surgical operations as well as in other various medical purposes. Sodium barbitol is a derivative of barbituric acid and is widely used on short surgical operations and other various medication. However, such anaesthetic drug has been reported to evoke many serious alterations as a result of its application.

Materials and Methods: The experimental animals (30 mice-weighing 25-30 g) were divided into 3 groups (10/group), the first group served as a control group (i.e. injection with saline), while the other two groups were treated daily with the therapeutic dose of 60 mg/kg.b.wt sodium barbitol (i.p.) for 7 days (short-term group) and 21 days (long-term group) as repeated daily doses. Blood sera and kidney samples were collected for physiological, histological and histochemical studies.

Results: The results obtained showed a significant increase in urea, blood urea nitrogen, uric acid and creatinine levels in all treated groups. On the other hand serum total protein and albumin levels showed a significant decrease in both treated groups, while the globulin showed a significant decrease only in the long term group. The applied dose of sodium barbitol caused histopathological alterations in the renal tissue mainly in the cortex such as damage and shrinkage of the Malpighian corpuscles, cloudy swelling and necrosis of the cells of the proximal convoluted tubules. Also, distal convoluted tubules exhibited degenerated features. In the histochemical studies, polysaccharides were progressively reduced in both short and long-term groups, while the total proteins showed a reduction in the short term group and considerably increase in the long term group.

Conclusion: So these results came to conclusion that barbiturates should be prohibited and carefully used specially when prescribed as tranquilizer.

Key words: Barbitol sodium, kidney function, histopathology, histochemical (protein-polysaccharides.- Albino mice.

Introduction

Many authors reported that anaesthetic, sedative and narcotic drugs affect kidney functions according to the duration and period of drug administration (El- Banhawy *et al.*, 1989; Abdel Baset *et al.*, 1993; El Negmy *et al.*, 1994, Abdel Moneim, 2001 and El-Sherif *et al.*, 2002). Neugarten *et al.*, (1986) revealed that renal tubular dysfunction, diabetes inspidus, progressive renal insufficiency and systemic amyloidosis occur in subcutaneous heroin abusers.

According to the results of El-Negmy *et al.*, (1994), injection of heroin (diacetyl morphine) at dose levels 0.5 and 1.0 mg/kg for 10, 20 and 30 days caused a significant reduction in serum creatinine, urine creatinine and creatinine clearance rates in both treated groups of adult female rabbits. The authors also added that both serum and renal uric acid concentrations were significantly decreased in both heroin-treated groups all over the experimental periods. Besides, Labib and Zahran (1995)

studied the effect of daily intraperitoneal injection of heroin at dose levels of 0.3 and 0.6 mg/kg from the 5th to 20th day of gestation of albino rats. The results obtained showed moderate to marked elevations in serum total proteins which was more obvious in pregnant rats other than the maternally-treated fetuses. In contrast Khalil (2000) stated that the administration of phenobarbital to albino rats at dose levels of 68.18 and 136.36 mg/kg for various periods resulted in a decrease of serum total protein level.

Histopathological studies of Rashwan *et al.* (1981) showed that rats treated with Ketalar (10mg/kg) for one week and three weeks, the kidney exhibited deformed glomeruli which almost were replaced by empty spaces, the cells of the proximal convoluted tubules exhibited malformation and deteriorated brush borders. Also, the effect of morphine on the kidneys of newborn and young rats aging 3, 12 and 30 days was studied by Abdel Moniem (2001). Morphine was intramuscular administration at dose level of 0.9 mg/kg for 10 days. The author revealed renal tissue malformation specially in corpuscular structure and glomerular tuft which was more prominent in 2nd day of treatment. Cellular changes in renal tubules, condensation of connective tissue fibres and haemolysis in renal vessels were also observed. El-Sherif *et al.* (2002) investigated the effects of different doses (single-double & triple) of morphine sulfate (0.9, 1.8 and 2.7 mg/kg) for 1, 7, 14 and 21 days on the kidney of male albino rats. Renal tissues exhibited histological changes including vacuolation, degeneration, congestion in the glomeruli, in addition to tubular dilatation and peritubular fibrosis.

Different doses and durations of morphine sulphate administration exhibited an extreme ATP-ase activity. These findings were partly attributed to the effects of morphine on the metabolic mechanisms and to change of electrolyte balance in the renal tubules and glomeruli which may lead to renal failure. Also, depletion of protein in the renal tissue was recorded. According to Rusafa-Neto *et al.* (2006), pentobarbital and S (+) ketamine induced higher score of histological changes of renal tissue. Also,

Carta *et al.*, (2007) concluded that antiepileptic drugs (Phenobarbital and carbamazepine) should be used at the lowest dosage during pregnancy. So, these results concluded that barbiturates should be prohibited and carefully used specially when prescribed as tranquillizer. Thus, the present work was planned to assess and evaluate some physiological parameters, histopathological and histochemical impacts of sodium barbital on the renal tissue of adult male albino mice.

Material and Methods

Barbital sodium (C₈H₁₁N₂NaO₃) with trade name veronal was used in this study. The effective therapeutic dose for mice was calculated relevant to the human therapeutic dose (60 mg/kg.b.wt) and according to the body weight and body surface area (Gilman *et al.*, 2000). Thirty male albino-mice weighing 25-30gm were used in the present study, the animals were divided into 3 groups, 10 animals for each, assigned as follows :

Control group – Animals were intraperitoneal with 0.9% sodium chloride NaCl.

Short term group – Each animal was i.p. injected with daily dose of 60 mg/kg.b.wt. of sodium barbital for 7 successive days.

Long-term group – Each animal was i.p. injected with daily dose of 60 mg/kg.b.wt. of sodium barbital for 21 successive days.

After the end periods of treatment, the animals of each group were decapitated. Blood sera and kidney samples were collected for physiological, histological and histochemical preparations. Serum creatinine was determined according to Bartels *et al.*, (1971) by using the kit obtained from human company, measured at 492 nm and expressed as g/100 ml serum. Serum urea was determined according to Tietz (1990) by enzymatic colorimetric method using the kit of Diamond diagnostics company, measured at 578 nm and expressed as mg/100ml serum. Serum urea nitrogen was determined according to Tietz (1990) by urease – colorimetric method using the kit of

spectrum diagnostics. Serum uric acid was determined according to Barham & Trinder (1972) by enzymatic colorimetric method using the kit of spinreact (Germany), measured at 520 nm and expressed as mg/100ml serum. The level of serum total protein was determined colorimetrically following the principle of Biuret reaction using the kit of Diamond diagnostic company, measured at 546 nm and expressed as g/ml serum according to Doumas (1975). Colorimetric determination of serum albumin according to Webstern (1977) using the bromocresol green dye binding procedure was applied using the kits obtained from Diamond Diagnostics company, measured at 578 nm and expressed as g/100ml serum. The globulin concentration in serum was calculated mathematically by subtracting the total albumin concentration from serum total protein concentration according to Hawk *et al.*, (1947).

For histological and histochemical preparations, specimens of kidney were fixed in Bouin's (polysaccharides preparations) or Carnoy's fixative (total proteins preparations). The specimens were then dehydrated, cleared, embedded in paraffin wax, sectioning and stained with haematoxylin and eosin. For demonstration of polysaccharides, PAS technique using periodic acid and Schiff's reagent (Pearse, 1972) was applied and the positive result was indicated by the appearance of a pink or magenta color. For demonstration of total proteins, mercury bromophenol technique (Mazia *et al.*, 1953) was applied and the presence of total proteins was indicated by the appearance of bluish coloration.

The obtained data were statistically analysed using primer of Biostatistics (A computer program specialized in performing statistical analysis), in which the equation of the hypothesis test, including standard deviation, t-statistics value and probability (P) were used. Significant results were considered at $P < 0.05$, highly significant at $P < 0.01$ and very highly significant at $P < 0.001$ according to Glantz (1992).

Results

The results of the effect of i.p. injection with sodium barbital at repeated doses (60mg/kg.b.wt.) on the levels of serum creatinine, urea, blood urea nitrogen and uric acid for 7 and 21 days are presented in table (1) and Fig. (1). The data revealed that the serum creatinine content was non significantly changed in short term group and very highly significantly increased ($P < 0.001$) to 99.33% in long term treatment. The results also showed that the urea concentration exhibited a significant increase ($P < 0.01$) reaching 47.33% in short term group and a very highly significant ($P < 0.001$) increase in long term group (88.85%) compared to the control group. The blood urea nitrogen concentration recorded a highly significant ($P < 0.01$) increase reaching 47.20% in the short term group. Also, the long term group showed a very highly significant ($P < 0.001$) increase of blood urea nitrogen concentration reaching 88.81%. The effect of barbital on the uric acid concentration revealed a significant increase ($P < 0.05$) after administration of repeated doses (13.97%) in short term group, and a very highly significant ($P < 0.001$) increase (70.60%) in long term group. Inspection of the table (2) and figure (2) showed the effect of i.p. injection of sodium barbital (60 mg/kg) in repeated doses for short and long term on serum total protein, albumin and globulin contents. The total protein content recorded a significant decrease ($P < 0.05$) with a change of - 10.37% in short term group and a very highly significant ($P < 0.001$) decrease in long term group (- 35.33%). Concerning the albumin content, the repeated doses of sodium barbital caused a very highly significant decrease ($P < 0.001$) in the short and long term treated groups (- 29.63% and - 40.40% respectively) compared to the control group. The results also showed that the globulin content recorded non significant change in short term group, whereas the globulin content was significantly decreased ($P < 0.05$) in long term group (- 24.75%).

Table (1): The effect of sodium barbital 60mg/kg b.wt. for 7 & 21 successive days on serum creatinine (mg/dl), urea (mg/dl), blood urea nitrogen (mg/dl) and uric acid (mg/dl) of mice.

Groups	Creatinine (mg/dl)		Urea (mg/dl)		BUN (mg/dl)		Uric acid (mg/dl)	
	Mean±SD	% Change	Mean±SD	% Change	Mean±SD	% Change	Mean±SD	% Change
Control	2.55±0.48		34.5±4.505		16.1±2.09		5.41±0.735	
Short term 1 st W. group	2.7±0.814	5.882	50.83±10.0 68	47.33 **	23.7±4.704	47.20 **	6.166±0.258	13.97 *
Long term 3 rd W. group	5.083±0.4956	99.33 ***	65.16±3.92 5	88.86 ***	30.4±1.825	88.81 ***	9.23±0.94	70.60 ***

* Significant (P<0.05)

** Highly significant (P<0.01)

*** Very highly significant (P<0.001)

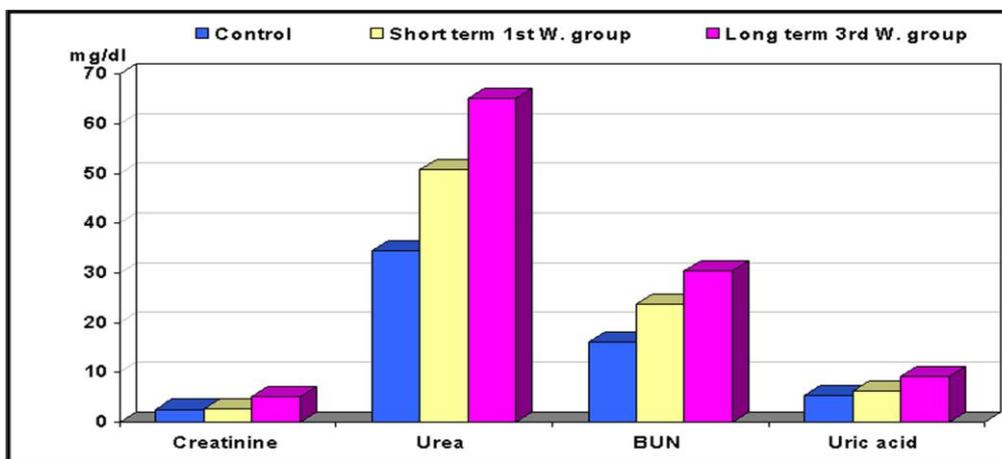


Figure (1): The effect of sodium barbital 60mg/kg b.wt. for 7 & 21 successive days on serum creatinine (mg/dl), urea (mg/dl), blood urea nitrogen (mg/dl) and uric acid (mg/dl) of mice.

Table (2): The effect of sodium barbital 60mg/kg b.wt. for 7 & 21 successive days on the serum total protein (g/100ml), albumin (g/100ml) and globulin (g/100ml) of mice.

Groups	Total protein (g/ml)		Albumin (g/ml)		Globulin (g/ml)	
	Mean±SD	% Change	Mean±SD	% Change	Mean±SD	% Change
Control	7.23±0.515		3.88±0.172		3.03±0.686	
Short term 1 st W. group	6.48±0.395	-10.37*	2.73±0.149	-29.63***	3.76±0.491	24.09
Long term 3 rd W. group	4.675±0.523	-35.33***	2.31±0.507	-40.46***	2.28±0.30	-24.75*

* Significant (P<0.05)

** Highly significant (P<0.01)

*** Very highly significant (P<0.001)

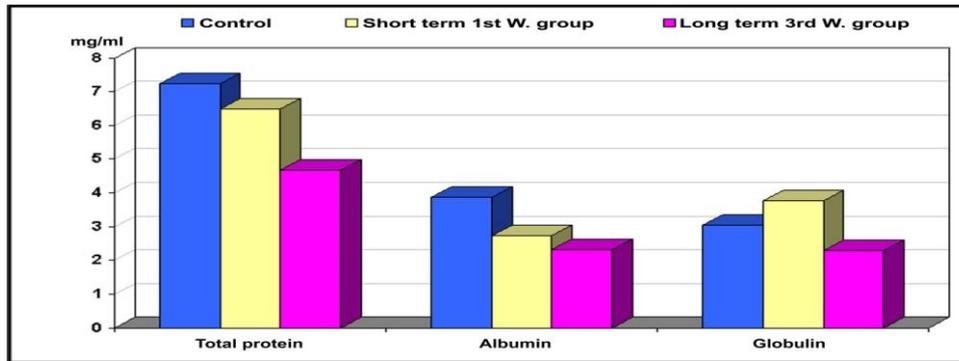


Figure (2): The effect of sodium barbital 60mg/kg b.wt. for 7 & 21 successive days on serum creatinine (mg/dl), urea (mg/dl), blood urea nitrogen (mg/dl) and uric acid (mg/dl) of mice.

Microscopic examination of the kidney of sodium barbital-treated mice (plate 1, Figs. 5-8) revealed many histopathological alterations (which are directly correlated with the increase of treatment) when compared with the control group (plate 1, Figs. 3 & 4). Examination of the kidney sections of sodium barbital – treated mice (60 mg/kg) for one week showed shrinkage of the Malpighian corpuscles. Both constituents of Malpighian corpuscles, the glomerulus and Bowman's capsule, were affected after short-term treatment. Shrinkage of the glomerular tufts which were packed with blood corpuscles in addition to widening of the urinary space was clearly obvious (plate 1, Figs. 5 & 6). Also, congestion of the blood vessels with intact and haemolysed blood cells was detected. Examination of the sections of kidney of mice treated with 60 mg/kg of sodium barbital for three weeks (long term) showed that Malpighian corpuscles exhibited collapsed appearance and degenerated glomeruli. The urinary spaces were rather more widened than the normal conditions and congestion of the glomerular capillaries was noticed. The lining epithelial cells of the proximal convoluted tubules showed marked cloudy swelling that lead to narrowing of the lumina. The nuclei of some deteriorated cells displayed obvious signs of pyknosis or even karyorrhexis while a few of these nuclei were markedly karyolysed (Plate 1, Fig. 7). Intertubular haemorrhage was detected by the numerous extravasted blood cells (plate 1, Fig. 8).

Forth histochemical studies of polysaccharides, Plate 2, Figs. 9-11 revealed a slight diminution of the PAS +ve

reactivity in the various kidney tissue-components compared to normal control (Fig. 9). Figure 10 reveals the existence of considerable PAS-reactivity in the luminal borders of the proximal convoluted tubules. The distal convoluted tubules showed more reduction in PAS +ve stainability and their basement membranes than the other cortical components of the kidney (Plate.2, Fig. 10). Plate 2 Fig. 11 reveals that daily treatment with sodium barbital (60 mg/kg) for three weeks caused more evacuation of the tubular epithelia from carbohydrate material accompanied by reduction of PAS +ve reactivity in the various kidney tissue-components. It was noticed that the brush border of the proximal convoluted tubules lost a considerable proportion of their PAS +ve reactivity. Also, PAS +ve stainability was very weak in the distal convoluted tubules.

For histochemical detection of total proteins content (plate 2 Figs. 12-14), kidney sections of sodium barbital treated mouse showed a decrease in total protein constituents after one week of treatment as represented in plate 2, Fig. 13. This figure reveals the presence of irregular positively stained fibrillar element within the lumens of some convoluted tubules, especially in the proximal one. The distal convoluted tubules exhibited moderate protein reactivity. Long-term group treated with 60 mg/kg of sodium barbital showed an increase in protein-inclusions in some convoluted tubules compared to the control specimens, while the distal convoluted ones exhibited reduction in the proteinic-reactivity (plate 2, Fig. 14)

Plate (1)

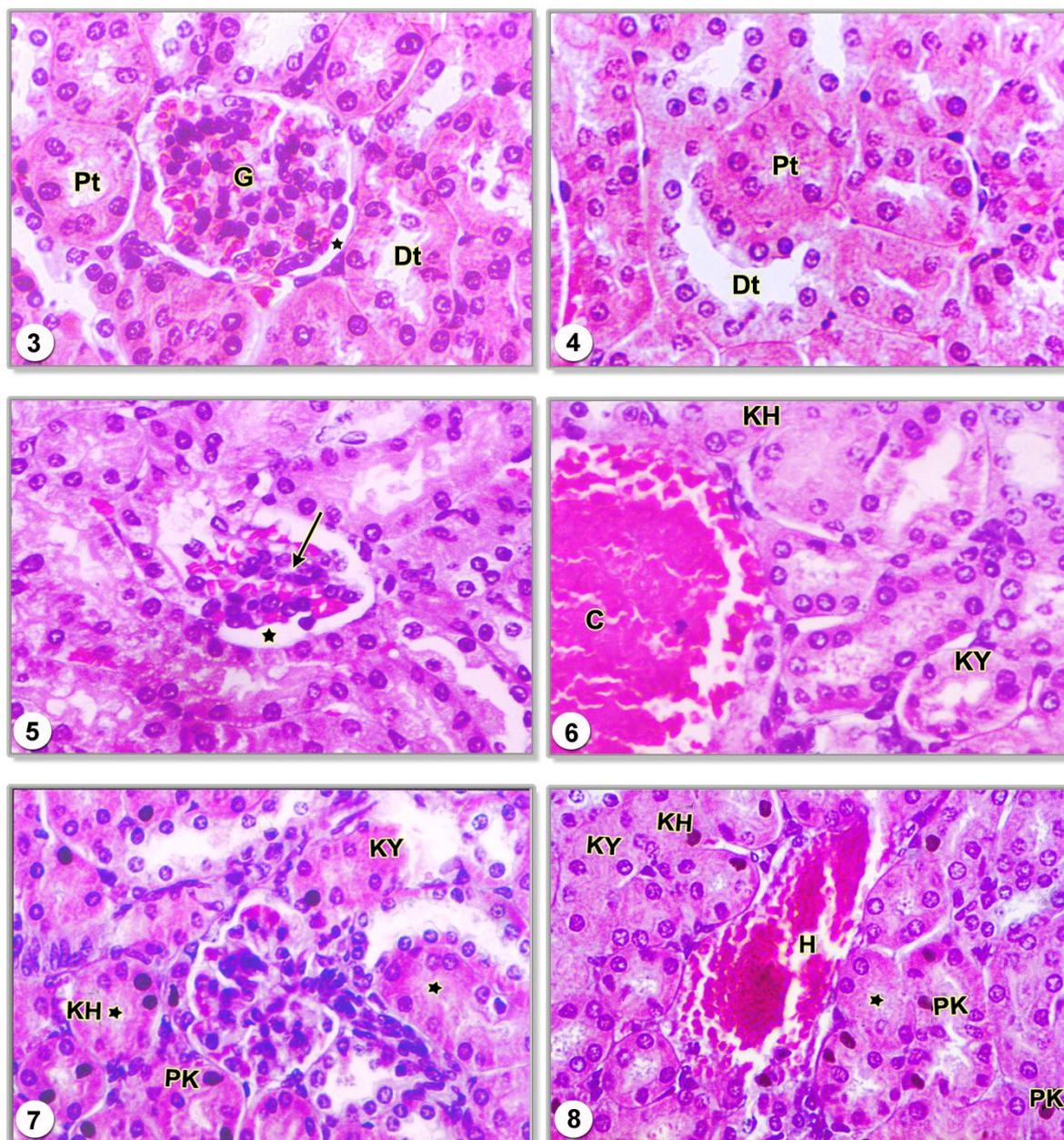


Plate (1):Aqueous Bouin's fixed paraffin sections of the kidney of mice, stained with haematoxylin and eosin.

Fig. (3): Photomicrograph of a section of the kidney of a control mice, showing the glomerulus (G), two layers of Bowman's capsule; outer parietal and inner visceral layers and the urinary space(*). Notice the proximal (Pt) and distal (Dt) convoluted tubules. X:400.

Fig (4): Photomicrograph of a section of the kidney of a control mice, showing proximal convoluted tubules (Pt) and distal convoluted tubules (Dt). X:660.

Fig. (5): Photomicrograph of a section of the kidney of mice, treated with 60mg/kg b.wt. of sodium barbital for one week, showing contraction of the glomerular capillaries (arrow) and the urinary space become wide(*). X:660

Fig. (6): Photomicrograph of a section of the kidney of mice, treated with 60mg/kg b.wt. of sodium barbital for one week, showing congestion (C) of the blood vessel with intact and haemolysed red blood cells and karyorrhexed (KH) or karyolysed (KY) nuclei were observed, X:660.

Fig. (7): Photomicrograph of a section of the kidney of mice, treated with 60mg/kg b.wt. of sodium barbital for three weeks, revealing cloudy swelling of proximal convoluted tubules(*) and their lumina contain cellular debris, pyknotic (PK), karyorrhexis (KH) and Karyolysis (KY) nuclei were observed. X:660.

Fig. (8): Photomicrograph of a section of the kidney of mice, treated with 60mg/kg b.wt. of sodium barbital for three weeks, showing cloudy swelling of the proximal convoluted tubules(*) and their nuclei showed pyknosis (PK), karyorrhexis (KH) and karyolysis (KY) nuclei and haemorrhagic area (H). X:660.

Plate (2)

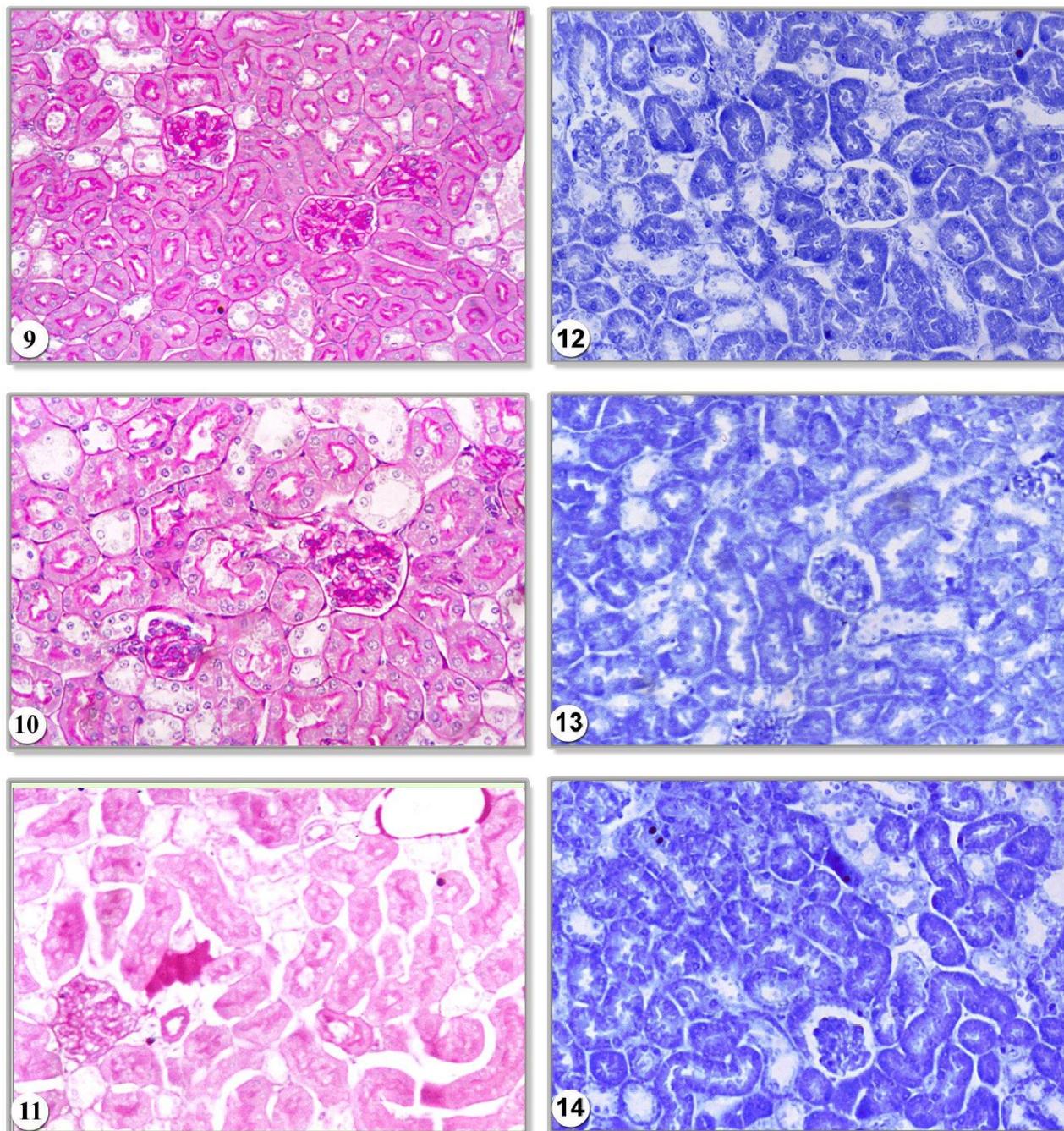


Plate (2): Boun's fixed paraffin sections of kidney of mice, stained in PAS for the demonstration of polysaccharides.

Fig. (9): Photomicrograph of a section of the kidney of a control mice, showing Malpighian corpuscle, parietal and visceral cells and brush borders of the proximal convoluted tubules revealing a pronounced activity of PAS +ve reaction. Notice the distal convoluted tubules have slight PAS +ve reaction. X: 225.

Fig. (10): Photomicrograph of a section of the kidney of mice, treated with 60mg/kg b.wt. of sodium barbital for one week, revealing a slight reduction in PAS +ve reaction in the cortical components of the kidney. X:400.

Fig. (11): Photomicrograph of a section of the kidney of mice, treated with 60mg/kg b.wt. of sodium barbital for three weeks, revealing a marked depletion in PAS +ve reaction in the elements of the cortical region. X:225.

Carnoy fixed paraffin sections of kidney of mice, stained with bromophenol blue stain for general proteins.

Fig. (12): Photomicrograph of a section of the kidney of a control mice, showing a prominent protein reactivity in the cortical kidney tissue especially in the glomerulus and epithelial lining of proximal convoluted tubules. X:225.

Fig. (13): Photomicrograph of a section of the kidney of mice, treated with 60mg/kg b.wt. of sodium barbital for one week, revealing decline in proteinic inclusion of the cortical elements of the kidney. X:225.

Fig. (14): Photomicrograph of a section of the kidney of mice, treated with 60mg/kg b.wt. of sodium barbital for three weeks, displaying more increase in protein reactivity in the glomeruli and renal tubules. X:255.

Discussion

In the present study serum creatinine level showed non significant change in the short term group while in the long term group, serum creatinine level showed very highly significant increase. These results are in agreement with many studies (Abdel-baset *et al.*, 1993; El-Negmy *et al.*, 1994) after treatment with several hypnotic drugs. Also, serum urea level showed highly significant increase in the short term group and very highly significant in the long term group. Serum creatinine, urea, blood urea nitrogen and uric acid levels are considered as markers for altered renal functions and were measured in the present work to evaluate the change in the kidney functions under the effect of sodium barbital. Creatinine is a waste product of creatine metabolism, when it is formed, it diffuses passively into the blood stream, where it is removed by the glomerular filtration action of the kidney. It passes through the tubular system, where only a very small additional amount of creatinine is added by the tubular secretion (Bleiler and Schedle, 1962).

According to Robbins *et al.*, (1981); McLauchian, (1988) the elevation of serum urea and creatinine may be due to the retention of nitrogenous wastes through inability of the kidneys to excrete these nitrogenous wastes or through the failure of these wastes to be delivered to the kidneys as a result of either decrease in cardiac output with consequent reduction in renal blood flow or any causes of circulatory failure. Also, Al-Muslemany, (2000) and Mohseen, (2001) concluded that the increase in serum urea and creatinine concentration might be the outcome of the kidney damage and renal dysfunction.

In the present study a significant decrease in the total protein content was recorded following treatment with sodium barbital. Ali (1983) stated that as urea is the end product of protein catabolism and is produced by the liver, an increase in its level don't arise solely from kidney dysfunction but also from increased protein catabolism, which reflects the contribution of liver in the increased serum urea concentration due to liver injury. And this suggestion was in agreement with the

significant decrease in the total protein levels in the present study.

In the present study, the results revealed a significant increase and very highly significant increase in the serum uric acid level in the short and long term groups of sodium barbital treated mice respectively. Treskes *et al.* (1992), reported that the increase in the level of serum uric acid may indicate an acute tubular necrosis and impaired renal tubular reabsorption. In addition, Ceron *et al.* (1996), suggested that the accelerated rate of protein catabolism would result in an increase of amino groups released from amino acids, these amino groups are converted firstly to uric acid and secondly to urea in detoxification process that take place in liver. The total protein and their fractions were related to the physiological state, to the protein reserves and to the health of animals (Zammov, 1970).

The present study showed that the administration of sodium barbital for short and long periods induced a significant and very significant decrease in serum total protein respectively. Khalil (2000), examined the effect of PB administration in albino rats and found that this sedative hypnotic drug reduced the pituitary-thyroid axis and thyroid function. These reduction in the thyroid function interpreted significant decline in the synthesis of total protein. In the present study the decrease of total protein in serum of treated mice may be due to the inhibited oxidative phosphorylation processes which lead to decrease of protein synthesis, increase in the catabolic processes and reduction of protein absorption (Agrawal *et al.*, 1995).

Mansour *et al.*, (2002), Mansour and Al-Shabanah (2003) and Gomma (2000) revealed that acute tubular necrosis is a prominent feature of cisplatin nephrotoxicity and also impaired renal tubular reabsorption, dysfunction of proximal tubules are clinically manifested by elevated protein urea.

Histopathological and histochemical studies

The obtained results of increased levels of serum creatinine, serum urea,

serum blood urea nitrogen and serum uric acid were confirmed by the present histopathological studies of the kidney which showed necrosis, damage of glomerular and other renal tissues. The present study demonstrated that the treatment with sodium barbital induced prominent lesions in the renal tissue of adult albino mice. The severity of these changes increased with increasing the time of administration.

In Maruta *et al.*, 1997 stated that the degree of histopathological damage become more serious with increasing the time of morphine administration. This may be also explained that morphine inhibits the proliferation rate of renal cells (Singhal *et al.*, 1998). Beside the obvious impairment of the Malpighian corpuscles, the pathological disorders observed in the kidney tissues could be allocated into two categories; intratubular and intertubular changes. The intratubular changes include cloudy swelling, degeneration and necrosis of some tubular cells as well as erosion of their apical borders. However, intertubular lesions include the occurrence of areas of oedema and haemorrhagic foci with inflammatory infiltrative invasion by various kinds of leucocytes, beside the clear atrophy of the majority of the renal tubules. Also, the present work showed extensive destruction or damage of the glomerular tufts.

The results of Abdel-Moniem (2001) revealed that morphine has been enhancement glomerulosclerosis which may lead to glomerular damage. The shrinkage of the renal corpuscles resulted in processors of degeneration. The widening of the urinary spaces may be attributed to the atrophy and retraction of the glomerular capillaries.

In the present study, the treatment with sodium barbital caused a cloudy swelling and necrosis of the epithelial cells of the proximal convoluted tubules. According to El-Banhawy and El-Attar, (1993) after chloromephenicol administration, cloudy swelling was attributed to the decreasing of the energy production due to mitochondrial damage within the cells. The energy production is necessary for regulating the ionic concentration. Thus, the cell losses K^+ and Na^+ which accumulates inside. This leads to emission of water into

the cells where they swell up and exhibit a homogeneous stainability but the nuclei appeared normal. The cells may be return back to their normal status, if the drug impacts were mild or stopped, other wise, this lesion will proceed into vacuolar degeneration or even complete death of the cell.

In the present study, sodium barbital treatment resulted in intratubular inflammation with leucocytes infiltration, these histopathological lesions may be attributed to the defense mechanism to the drug toxicity. Population of lymphocytes and fibroblasts indicating granuloma have been detected by El-Sherif *et al.*, (2002) after morphine sulphate administration in male albino rat. Gomaa (2000) attributed these haemorrhagic areas to the damage of the muscular contractility of the renal blood vessels which may lead to an anoxic response of the renal tissues.

Recent study of Rusafa-Neto *et al.*, (2006) influenced the effect of S(+) ketamine on histology of renal tissue of male Wistar rates. They came to conclusion that the rise in catecholamine blood concentration probably was the cause of S (+) ketamine-induced higher score of histological changes.

Also Carta *et al.*, (2007) found that the prenatal exposure to antiepileptic drugs, carbamazepine and phenobarbital, increases the risk of major congenital malformation in the fetus. So, they concluded that the reduction, or even suspension, of drug dosage should be achieved from the periconceptional period to the first 8 weeks of gestation to avoid any interference with organogenesis.

The decline in carbohydrate material in the present study matches the results previously obtained by Radosevich *et al.*, (1983) and Labib and Zahran (1995) after treatment with opiate and heroin respectively. Zahran (1994) attributed the depletion in tissue-total glycogen content to the inhibitory effect of marcotics on phosphodiesterase enzyme, stimulation of phosphorylase enzyme and hence stimulation of glycogenolysis and glycogen degradation. Besides, Abdel-Moniem (2001) noticed decreasing in tubular cell components of polysaccharides and Golgi bodies indicating pathological effect of morphine on rat kidney.

The mammalian kidney is also believed by many authors to be closely implicated in the protein metabolism in both normal and abnormal condition. The present study examines the histochemical preparations of proteins in the kidney of mice post treatment with sodium barbital which exhibited reduction of protein reactivities in the short term group. While in the long term group, protein exhibited elevation in the kidney tissue. Sorensen *et al.*, (1983) stated that the reduction in the proteinic material could be resulted from the reduction of rough endoplasmic reticulum and thus leading to reduction of protein synthesis.

Al-Thani (1993) elucidated that in many kidney diseases, the permeability of the glomerular capillaries increase levels of excreted proteins relative to the normal cases. Besides, any necrotic lesions cause dysfunction in transport mechanism to – and from the renal epithelium, thus disturbing protein excretion. Also, Sakr (2000) attributed this reduction to the damage of epithelial cells of both proximal and distal convoluted tubules. While, the elevation in kidney total protein may be due to the increased conversion of carbohydrates into proteins or it may be as a result of modification in the synthesis and metabolism of proteins (Zahran, 1994).

So these results came to camclusiam that barbiturates should be prohibited and carefully used specially whenprescribed as tramgvilizer.

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دراسات بيوكيميائية و نسيجية و كيمونسجية عن تأثير استخدام باربيتال الصوديوم على أنسجة كلية الفئران البيضاء

سامية محمد صقر*، شادية على رضوان*، عزيزة محمد الوسيمي*،
سميرة السيد الهراس**

* قسم العلوم البيولوجية والجيولوجية – كلية التربية - جامعة عين شمس
** المعهد العالى للفنون التطبيقية بمدينة 6 أكتوبر

تناول هذا البحث دراسة الآثار الناتجة عن استخدام عقار باربيتال الصوديوم (المستخدم فى التخدير للعمليات الجراحية أو كأحد مكونات الأدوية المهدئة والمنومة والمضادة للتشنجات والصرع) على ذكر الفأر الأبيض البالغ الصغير. حيث تمت دراسة آثار العقار على بعض المعايير الفسيولوجية وكذا التغيرات النسيجية والكيمونسجية لأنسجة الكلى وإستخدم لهذا الغرض 30 حيوان تتراوح أوزانهم بين 25-30 جرام قسمت إلى ثلاث مجموعات (10 فئران لكل مجموعة) حقنت حيوانات المجموعة الضابطة بمحلول ملهى متعادل واعتبرت مجموعة ضابطة بينما حقنت كل من المجموعة الثانية والثالثة بالجرعة العلاجية للعقار (60 مجم / كجم من وزن الجسم) لمدة 7 أيام (مجموعة قصيرة المدى) و 21 يوم (مجموعة طويلة المدى)، وقد تم الحقن يومياً فى التجويف البروتينى للحيوان، وقد أسفرت الدراسة عن بعض التغيرات الفسيولوجية فى كلية الفأر وأوضحت النتائج زيادة ذات دلالة إحصائية فى كل من اليوريا واليوريا النيتروجينية وحمض اليوريك ومستوى الكرياتين فى المصل للمجموعات المعاملة، كما أوضحت أيضاً نقصاً ذو دلالة إحصائية فى محتوى البروتين الكلى والألبومين فى كل من المجموعتين قصيرة المدى وطويلة المدى، بينما نقص الجلوبيولين نقصاً ذو دلالة إحصائية فى المجموعة طويلة المدى فقط..

التغيرات النسيجية والكيمونسجية

أظهر الفحص المجهرى لنسيج الكلى (منطقة القشرة) احتقان الكلب الكلوية بجانب خلل غشائى فى محفظة بومان بالإضافة إلى الإنتفاخات السحابية والتحلل والتكثرت فى بعض الخلايا المبطنة للأنيبيبات الملتفة الكلوية بنوعها (القريبة والبعيدة)، كما أظهرت أنوية بعض الخلايا الطلائية مظاهر مختلفة من التحلل، ومن الناحية الكيمونسجية فقد حدث نقص للمواد الكربوهيدراتية بشكل واضح وتدرجى بزيادة فترة المعاملة فى أنسجة الكلى بينما نقص المحتوى البروتينى بشكل واضح بنسج الكلى فى المجموعة قصيرة المدى فى حين زاد زيادة واضحة فى المجموعة طويلة المدى.