HISTOPATHOLOGICAL CHANGES IN KIDNEY OF NORWAY RAT TREATED WITH ETHANOLIC OSHAR LEAVES EXTRACT

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Abstract

The effect of 16 LBM (23.15 mg/kg b.w.) oral administration of ethanolic Oshar leaves extract for 2, 4, 6 and 8 days on body weight and hematological parameters of Norway rat Rattus norvegicus including red blood cell R. B. Cs, white blood cell W. B. Cs and hemoglobin were investigated. The Oshar extract caused a significant decrease in body weight and a significantly increase in white blood cell W. B. Cs, while red blood cells R. B. Cs and hemoglobin significantly decreased. Histological changes of kidney were shown in the form of Hyperemia in the glomerulus tuft of the glomeruli and intertubular blood vessels. While focal extravasation of red blood cells R. B. Cs and hemosiderin pigments between the degenerated renal tubules at the Corticomedullary junction, Inaddition Mononuclear leucocytes inflammatory cells infiltration in the perivascular area surrounding the diluted blood vessels in between the degenerated renal tubules at the cortex.

However, it was found that the use of sublethal doses of ethanolic Oshar leaves extract has greatly affected the blood picture and kidney tissue of rats.

INTRODUCTION

Man has been combating pests across much on the earth for many years. His controls efforts have taken numerous forms of synthetic pesticides, and many have been the attempts to get a better way for controlling pests. However, Egypt government has been exerting great efforts and a lot of money to get several synthetic pesticides which soon became more commonly used for controlling the different pests which have become resistant to it. So, the natural products has been recently attracting the attention of many scientists, to avoid the synthetic compounds. They have deeply interested in their chemical constituents and biological properties.

MATERIALS AND METHODS

Plant Material:

Oshar leaves Calotropis procera were collected from plants growing widely in fields. Identification were based mainly on the taxonomic characters detailed by Tochholm (1956).

Preparation of the crude extract:

The used of 150 grn. of Oshar leaves, was air dried (which were) ground and sieved through 400μ sieve. Leaves ground separately macerated consecutively in two
solvents varied in their polarity hexane and ethanol at rate of 5 ml solvent/ gm plant material. After 72 hours the extracts were filtered through Buchner funnel to remove debris. Solvents were evaporated under vacuum at 50°C. The crude extract was then weighed and adjusted to 10 ml with the solvent used and kept in a refrigerator until testing (Freedmen et al, 1979).

Tested animals:

A group of Norway rat, Rattus norvegicus were housed under normal conditions. Five rats served as controls while the rest were orally administered 1/4 LD_50 Oshar leaves ethanol extract (23.15 mg/k. b.w) as a single dose. The treated rats were sacrificed after 2, 4, 6 and 8 days post-treatment. The collected samples of rat blood from control and treated were processed for carrying out different hematological studies. Red blood cell count (R. B. Cs), white blood cell count (W. B. Cs) and hemoglobin content were determined according to Miller (1960) and Levinson and Mac Fate (1956), respectively. Pieces of examined kidney were fixed in Bouin’s for histological study. They were then processed in paraffin wax for microtomy in sections of 5μ thick and staining was carried out using haematoxylin and eosin method. (Conn and Darrow 1960). Statistical analysis was done according to Snedecor and Cochran (1967).

RESULTS AND DISCUSSION

Table (1) revealed that the body weight of treated animals was significantly decreased than that of untreated ones (184.4, 183.9, 181.3 and 175.6 g) at 2, 4, 6, and 8 days post-treatment compared to untreated animals (200.0 g). Also, a significant increase occurred in the weight of kidney following Oshar leaves ethanol extract treatment at 2, 4 and 8 day post-treatment, while at 6 days there was a non-significant increase in kidney weight. It was clear from the present results that the losses in body weight of rats after administration.
Table 1. Effect of Oshar leaves ethanol extract on body and kidney weight of *R. norvegicus* treated with 1/4 LD₅₀.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>untreated mean ±S.E</th>
<th>days post-treatment mean ±S.E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Body Weight (g)</td>
<td>200.0 ± 1.45</td>
<td>184.4** ± 1.61</td>
</tr>
<tr>
<td>Kidney (g)</td>
<td>1.96 ± 0.04</td>
<td>2.80** ± 0.09</td>
</tr>
</tbody>
</table>

* Significant at p > 0.05
** Significant at p > 0.01

Of Oshar leaves extract may be due to the loss of appetite. The same observation was noticed by Sebail (1996) and Gabr et al (2004) who found that Oshar ethanol extract reduced body weight of treated animals. Concerning the haematological pattern, data present in Table (2) revealed significant decreases in red blood cell count of, *Rattus norvegicus* giving 1/4 LD₅₀ of Oshar leaves ethanol extract where 4.84, 4.14, 4.76 and 5.1 million/mm³ blood at 2, 4, 6 and 8 days post-treatment, respectively. At the same time, white blood cell W. B. C. count showed a significant increase above the tested periods where 10.0, 10.6, 10.8 and 9.7 thousand /mm³ blood. The same trend was observed in Hb content indicating significant changes where 16.1, 16.2, 16.35 and 16.42 when measured at 2, 4, 6 and 8 days post-treatment, respectively. The observed decrease in red blood counts of rat after oral administration of 1/4 LD₅₀ Oshar leaves extract may be attributed either to the depressive action of Oshar extract on the haemopoietic system or to direct destructive effect on red blood cells. Also, the decrease in red blood cells (R. B. C. ) count recorded in the present study is similar to the results reported by Kumar and Saxena (1991), Hiriashi et al (1988) Sebail (1996), Fatma, Khidr (2003) and El-Mahrouky et al (2003).
Table 2. Effect of Oshar leaves ethanol extract on blood picture in rat treated with 1/4 LD_{50}.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Un-treated mean ± S.E.</th>
<th>Days post-treatment</th>
<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean ± S.E.</td>
<td>% diff.</td>
<td>Mean ± S.E.</td>
<td>% diff.</td>
<td>Mean ± S.E.</td>
<td>% diff.</td>
</tr>
<tr>
<td>R. B. Cs million/ml^2 blood</td>
<td>5.48 ± 0.04</td>
<td>4.84 ± 0.05</td>
<td>-11.7**</td>
<td>4.14 ± 0.05</td>
<td>-24.7**</td>
<td>4.76 ± 0.05</td>
<td>-13.5**</td>
</tr>
<tr>
<td>W. B. Cs thousand/ml^2 blood</td>
<td>9.30 ± 0.06</td>
<td>10.0 ± 0.06</td>
<td>7.5*</td>
<td>10.60 ± 0.11</td>
<td>14.0**</td>
<td>10.80 ± 0.07</td>
<td>16.0**</td>
</tr>
<tr>
<td>Hb (gm/100ml blood)</td>
<td>17.20 ± 0.15</td>
<td>16.1 ± 0.20</td>
<td>-6.4**</td>
<td>16.2 ± 0.07</td>
<td>-5.8**</td>
<td>16.35 ± 0.03</td>
<td>-4.9*</td>
</tr>
</tbody>
</table>

* Significant at p > 0.05
** Significant at p > 0.01
Fig 1. Kidney of rat in control gp showing the normal histological structure of the glomeruli and renal tubules.

Fig 2. Kidney of rat two days after treatment showing hyperemia glomerular tufts of the glomeruli and intertubular blood vessels in the cortical portion.
Fig 3. Kidney of rat four days post-treatment showing hyperemia in the glomerular tufts of the glomeruli and in the intertubular blood vessels of the cortex.

Fig 4. Kidney of rat four days post-treatment showing focal extravasation with hemosiderosis in the corticomedullary portion in between the degenerated renal tubules.
Fig 5. Kidney of rat six days post-treatment showing perivascular mononuclear leucocytes inflammatory cells infiltration with degeneration in the renal tubules and dilation in the blood vessels in the cortex.

Fig 6. Kidney of rat eight days post-treatment showing hyperemia in the glomerular tufts of the glomeruli as well as the intertubular blood vessels in the cortical portion.
Histopathological changes in kidney tissue after two days post-treatment with \( \frac{1}{4} \) LD\(_{50}\) ethanolic Oshar extract are shown in Fig (2) and revealed that the hyperemia was observed in the glomerular tuft of the glomeruli and intertubular blood vessels. While after four days post-treatment Fig (3) revealed that the hyperemia in the glomerular tufts of the glomeruli as well as in the intertubular blood vessels at the cortical portion. Also, focal extravasation of red blood cells and hemosiderin pigments were detected in between the degenerated renal tubules at the corticomedullary junction (Fig 4).

In addition (Fig 5) illustrated Mononuclear leucocytes inflammatory cells infiltration was observed in the perivascular area surrounding the dilated blood vessels as well as in between the degenerated renal tubules at the cortex when observed six days post-treatment while after treatment with 8 days marked hyperemia in the glomerular tufts of the glomeruli as well as in the intertubular blood vessels at the cortical portion (Fig. 6) was noticed. Focal extravasation of red blood cells was detected surrounding the Bowmans capsule of the glomeruli (7). These findings are in agreement with, That of Kumar’ and Saxena (1991), Hiriashi et al (1988), Sebail (1996), El-Deeb, et al(2003) and El-Mahrouky et al(2003).
REFERENCES


التغيرات الهيستوپاتولوجية في نسيج كلاية الفناك النروجي المعامل

بمستخلص أوراق العشار الإبنثولوي

إبراهيم قطب إبراهيم

معهد بحوث وقاية النباتات - مركز البحوث الزراعية - الدفي - الجيزة - مصر

أجري هذا البحث بهدف دراسة تأثير 1/4 الجرعة لصف ميزة (15،15 ملجم/كم سم
وزن الجسم) من مستخلص أوراق العشار الإبنثولوي عن طريق الفم لمدة 2، 3، 4، 4، 8، 15 أيام على كل
وزن الجسم وبعض القياسات كمستويات الـ فناك النروجي والتي تشمل كرات الدم الحمراء وكرات الدم
البيضاء وقد وجد أن هناك تأثيرات ملحوظة في أعداد كرات الدم الحمراء والبيضوية.
أما بالنسبة للتغيرات الهيستوپاتولوجية في الكلاية كما أوضح النتيجة أيضا وجود احتقان في
الأوعية الدموية في الجزء الخارجي من الكلاية أما بالنسبة للخلايا الطلائية المنطقة للألياف الكثيفة
فقد لوحظ وجود تغيرات إنكاسية مع وجود ارتفاع والتهابات في الخلايا البورية وحيدية للسواء
والتفاعلات كاذبة.Ö