Effects of Nephropathy disease Gender and ochratoxin A in some Biochemical Blood Parameters

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Abstract

The results associated with the presence of Ochratoxin A showed an increase in the level of urea in male patients to 115 ml/dL, while the level in females reached (99.1) ml/dL, while the levels in both healthy females and males were within the normal level.

The average creatine level in patients with chronic kidney disease, whether female or male, increased to 4.645 ml/dL, 3.73 ml/dL, respectively, with a significant difference from its levels in healthy person.

Also, the level of Aspartate Aminotransferase enzyme was affected in female patients, reaching a ratio of 19.26 ml/dL international units / liter, while its level reached 15.4 ml/dL international units / liter in healthy patients, with a significant difference at the level of P<0.05.

On the other hand, the Alkaline phosphatase enzyme was affected for female patients, reaching a rate of 125.54 IU/L, while for healthy females it reached 44.86 IU/L.
1- Materials and Methods

a- Blood Collection sample

For all participants, 5ml of blood was taken from the vein by sterile syringe and transported in a gel tube container to the central lab. Samples were settled for 15 minutes and then centrifuged for 15 minutes at 3000 rpm to separate serum. The serum was then transported by micropipette to the sterile container (Eppendorf1.5ml tube) for storage which was conducted by divided each serum into two parts and then stored at -20c until analyses. stored serum samples then used to measure the following:

1. Qualitative and Quantitative detection of serum Ochratoxin A
2. Renal Function Test (s.creatinine, s.urea,)
3. Liver Function Test Aspartate Aminotransferase (AST), (Alkaline phosphatase)

b- Method for Quantitation Serum

1- Urea level

Measurement of Urea, by Using Urea Kit (C4000) The analysis was carried out according to the instructions of the Japanese company Abbott.

2- Creatinine Level

Measurement of Creatinine by Using Creatinine Kit (C4000) The analysis was carried out according to the instructions of the Japanese company Abbott.

3- quantitation serum (AST), quantitation serum (ALP)
Measur ment of Aspartate Aminotransferase by Using (AST)Kit(C4000), Measur ment of (Alkaline phosphatase) by Using (ALP )Kit (C4000) The analysis was carried out according to the instructions of the Japanese company Abbott.

Introduction

Nephrotoxicity is defining as rapid deterioration in the kidney function due to toxic effect of medications and chemicals.( Ma et al., 2019).

Because of the high binding of this toxin to albumin, the first demonstration mechanism of OTA nephrotoxicity indicated that tubular secretion is the primary mode of OTA excretion. Its clearance via glomerular filtration is minimal, and greater levels in proximal tubular cells might be due to the reabsorption of tubular toxins. In the latter, OTA raised the concentration of reactive oxygen species (ROS), which resulted in an increase in the production of 8-oxoguanine (Tao et al., 2018).

After inhibiting the erythroid oxidative stress response pathway 2-like 2 (Nrf2) and its Keap-1 inhibitor, glutathione production, oxidized glutathione recycling, and oxidoreductase activity are all reduced, making cells and tissues more susceptible to oxidative stress (Limonciel et al., 2014).

in Loboda et al., (2017) found that OTA causes nephrotoxicity in porcine tubular epithelial cells after Nrf2 inhibition, with increased expression of profibrotic, proinflammatory, and proapoptotic factors and decreased levels of claudin-2 and vascular endothelial growth factor, as well as decreased claudin-2 levels and vascular endothelial growth factor.

Results and Discussion

1. Effect neohropathy and Gender in level of OTA in blood of human.
Extraction of Ochratoxin A in serum samples

Serum samples in the size of 500uL were taken in a sterile test tube and added to each one of them 50uL from proteinase K solution and left to react for 10 minutes. After that the mixture was exposed to Centrifugation for 15 minute at 3000rpm, then from each sample the failtarte was taken and the precipitate was neglected.

Chloroform (1ml) was added to each filtrate (twice its size ) and shake vigorously in the electric shaker device, where it formed two layers(chloroform layer and serum layer ), chloroform layer was separated by separating funnel and put in sterile other glass tube and let to evaporate.

2.Effect of neohipathy ,Gender and OTA in levels of some biochemical parameters.

Urea

Urea concentration in Females blood serum of patients with nephropathy and borne OTA group was 99.1 mg\dl while the concentration in blood serum of control group (healthy) was 26.72 mg\dl with a high significant difference from the levels in  Blood serum of patients

Also, the level of urea in Males  Blood serum of patients with nephropathy was 115 mg\dl with a high significant difference from the levels 27.76 mg\dl of urea in Blood serum of control group (Table 1)

This results agreement with the results of (Sharma  et al., 2011) who found the creatinine and urea concentration change inversely

They are valuable in determining the degree of renal impairment because they correlate with variations in glomerular filtration rate. blood Urea levels become
increased when renal function declines to about 25-50 percent of normal, which is a very sensitive indication of renal failure (Sharma et al., 2011).

Urine levels in the blood were considerably higher, indicating serious kidney damage. The findings are compatible with histopathological sections of the kidney. Biochemically, blood levels of urea are considerably greater, whereas protein levels are significantly lower than in the control group, indicating that kidney function is impaired (Lippoldl et al., 1992). Increased urea levels in the blood are a significant indication of kidney impairment and toxicity (Mir and Dwivedi, 2011).

Table 1. Effect of Nephropathy and Gender in the level of Urea mg/dL Blood Serum
<table>
<thead>
<tr>
<th>Sex</th>
<th>Control (Mean ± SD)</th>
<th>Patients (Mean ± SD)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>26.72 ± 10.581</td>
<td>99.1 ± 47.690</td>
<td>0.0001 **</td>
</tr>
<tr>
<td>Male</td>
<td>27.76 ± 9.312</td>
<td>115 ± 56.779</td>
<td>0.0001 **</td>
</tr>
<tr>
<td>Total</td>
<td>27.24 ± 9.930</td>
<td>107.05 ± 52.774</td>
<td>0.0001 **</td>
</tr>
</tbody>
</table>

* means significance differences (P <0.05)  ** means high significances differences (P <0.001)
Creatinine

The results showed that Creatinine level in Females serum of patients was 3.73 mg\(\text{dl}\) but in Females serum of control (healthy) was 0.571 mg\(\text{dl}\) with high significant difference between them. Other hand found in blood serum of males patients the Creatinine level was 4.645 mg\(\text{dl}\) while the concentration in males serum control group was 0.526 mg\(\text{dl}\) with high significant at \(p <0.001\) between them (Table 2).

This results is consistent with the fact that creatinine levels in the blood was considerably elevated, indicating serious renal damage. The results also are congruent with kidney histological sections and biochemically, where serum creatinine level is considerably higher and protein level is significantly lower than in the control group, indicating kidney and liver function impairment (Stoev et al., 2012).

Experiments reveal that the concentration of OTA is greater in the kidneys, (Persi et al., 2014). Increased creatinine level in the blood is a significant indication of kidney impairment and toxicity (Mir and Dwivedi, 2010).
Table (2). Effect of nephropathy and Gender in level of Creatinine mg/dL blood serum

<table>
<thead>
<tr>
<th>Sex</th>
<th>Control (Mean ± SD)</th>
<th>Patients (Mean ± SD)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>0.571 ± 0.240</td>
<td>3.73 ± 1.795</td>
<td><strong>0.0001</strong></td>
</tr>
<tr>
<td>Male</td>
<td>0.526 ± 0.232</td>
<td>4.645 ± 2.940</td>
<td><strong>0.0001</strong></td>
</tr>
<tr>
<td>Total</td>
<td>0.548 ± 0.236</td>
<td>4.187 ± 2.466</td>
<td><strong>0.0001</strong></td>
</tr>
</tbody>
</table>

* means significance differences (P <0.05)   ** means high significances differences (P <0.001)

Aspartat aminotransferase (AST)

The results showed AST increased level in blood serum of patients reached to 19.26 U/L with significance differences of level the same enzyme in blood serum of control group (15.4 U/L)

Other hand the same enzyme decreased in the blood serum of males Patients and borne OTA reached to18.8 U/L (Table3).

The outcome is consistent with in terms of biochemistry, blood AST levels are considerably higher, whereas protein levels are much lower than in the control group, indicating impaired kidney function (Zhang et al., 2016)

AST is a plasma enzyme that is typically found inside the cells of the liver. The presence of this substance in the blood plasma implies tissue damage or organ
malfunction (Wells et al., 1986). that inhibiting AST activity in the liver resulted in OTA poisoning

Abdel-Tawab et al., (2001) found Rej et al., (1973) who found there was The enzyme AST in the blood was shown to be significantly lower in individuals with chronic renal disease, according to the study. Against a healthy control group. A low enzyme level can be caused by a variety of factors. The usual amount of AST activity is confirmed. Several studies have been conducted. A potential vitamin B6 deficiency is thought to be the cause (pyridoxal). Phosphate is a cofactor for enzymes.
Table (3) Effect of nephropathy and Gender in level of AST U/L blood serum

<table>
<thead>
<tr>
<th>Sex</th>
<th>Control (Mean ± SD)</th>
<th>Patients (Mean ± SD)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>15.4 ± 8.359</td>
<td>19.26 ± 10.495</td>
<td>0.0446  *</td>
</tr>
<tr>
<td>Male</td>
<td>15.26 ± 7.520</td>
<td>18.8 ± 10.815</td>
<td>0.0603</td>
</tr>
<tr>
<td>Total</td>
<td>15.33 ± 7.911</td>
<td>19.03 ± 10.605</td>
<td>0.0057  *</td>
</tr>
</tbody>
</table>

* means significance differences (P <0.05)  ** means high significances differences (P <0.001)
Effect of Nephropathy and Gender in level of Alkaline phosphatase (ALP) blood Serum

This study proved that ALP enzyme in the blood serum of the healthy Females control group got 44.86 U/L, while the enzyme increased among the Females patients with nephropathy, and carriers of OTA toxin, reached to 125.54 U/L with significant difference from control group (Table 4).

Also, the level enzyme was normed in the blood serum of the healthy males control group, while the level ALP enzyme increased in the group of males patients with nephropathy and toxin carriers OTA showed a statistically significant difference of high value less than \( P < 0.001 \), and this results agrees with Zhang et al., (2012) who found that serum of ALP increased in blood serum of patients with nephropathy as result of impairment of kidney function.

Alkaline phosphatase is derived from more than one tissue including bone, where one of the bone metabolites, abnormalities such as chronic kidney disease causes increased osteogenic differentiation which leads to increased transit of many bound protein compounds such as alkaline phosphatase leads to a significant increase in its level from the enzyme ALP in the blood (Torres, 2002; Rej et al., 1973) The study showed that there was a significant increase in the activity of ALP enzyme in the blood, Among patients with chronic kidney disease Compared to the healthy control group.
Table (4) Effect of Nephropathy and Gender in level of ALP  UL/L blood Serum

<table>
<thead>
<tr>
<th></th>
<th>Control (Mean ± SD)</th>
<th>Patients (Mean ± SD)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>44.86 ± 26.140</td>
<td>125.54 ± 71.491</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>48.48 ± 29.591</td>
<td>135.62 ± 71.339</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>46.67 ± 27.837</td>
<td>130.58 ± 71.234</td>
</tr>
</tbody>
</table>

* means significance differences (P <0.05)  ** means high significances differences (P <0.001)
References


• Jalil, A. A. T. EPIDEMIOLOGY OF CERVICAL CANCER AND HIGH RISK OF HUMAN PAPILLOMA VIRUS IN PATIENT. ББК 28.6 3, 85(7).