Assessment of some coagulation parameters in chronic kidney disease patients attending Specialist Hospital in Sokoto, Nigeria

Imoru Momodu PhD1, Janga Abdulrahman Dahiru PhD2, Hamidu M. Liman PhD3

BACKGROUND: Chronic kidney disease (CKD) has become a major health concern in developing countries while the risk of bleeding episodes has been reported to be in fold in patients with renal failure. The aim of this study was to assess coagulation parameters in CKD patients.

MATERIAL AND METHODS: Fifty patients with CKD and 50, apparently healthy subjects were recruited and studied for prothrombin time (PT), activated partial thromboplastin time (APTT) and fibrinogen level using standard techniques.

RESULTS: The study showed significantly higher mean values for PT and APTT in CKD patients compared to the control groups (P<0.05). Age and stages of CKD showed no significant effects on PT, APTT and fibrinogen level (P>0.05). Gender showed no significant influence on PT and APTT values (P>0.05) but revealed significant impact on fibrinogen level (P<0.05).

CONCLUSION: Changes in coagulation parameters in CKD patients are associated with prolonged PT and APTT while gender, age and stages of CKD had little or no influences on PT, APTT and fibrinogen level. These findings will serve as guide to the physicians in the management and monitoring of CKD patients.

Key Words: Chronic kidney disease; Haemodialysis;

MATERIALS AND METHODS

Chronic kidney disease (CKD) has become a major health concern globally, especially in developing countries with a marked burden in sub-Saharan Africa (1). In Nigeria, (2) reported that renal failure constituted 8% of the hospital admissions while (3) reported a prevalence of 19.9% of undetected disease in a rural populace in Nigeria. (4) reported an incidence of 45.3% of impaired kidney function among hospitalized hypertensive patients in Maiduguri. Bleeding has been reported in 60-50% of patients with chronic renal failure or on haemodialysis (5,6) while another study reported bleeding events in 24% of patients on haemodialysis (7). However, a hospital based study showed that risk of bleeding episodes is increased in approximately fold in patients with renal failure (8). Apart from the patients with renal failure being prone to episodes of prolonged bleeding, they may also develop excessive formation of thromb (9). Bleeding disorders have been attributed to insufficient function of platelets, the coagulation cascade and/or activation of the fibrinolytic system while hypercoagulability could be due to disorders of the coagulation regulatory factors as well as platelet hyperactivity (9,10). Several haemostatic abnormalities have been described in patients with even mild CKD in addition to platelet activity (11). In CKD, increased concentrations of fibrinogen, coagulation factors X, and VIIa as well as activated protein C complex and thrombin-antithrombin complexes have been reported by earlier authors (12-16) while reduced activity of antithrombin has been documented by another researcher (12). The aim of this study was to assess the levels of prothrombin time (PT), activated partial thromboplastin time (APTT) and fibrinogen of patients with chronic kidney disease in Sokoto.

RESULTS

Table 1 shows coagulation parameters in CKD patients and control group. The differences between the mean values for PT, APTT and fibrinogen concentration of 19.4 ± 8.2 seconds, 46.2 ± 9.0 seconds and 1.96 ± 0.6 g/L, respectively compared to control values of 14.8 ± 2.1 seconds, 32.8 ± 3.5 seconds and 1.86 ± 0.6 g/L, respectively, showed P-values of 0.0002, 0.0001 and 0.0066, respectively.

Table 2 reveals coagulation parameters in CKD patients according to gender. The mean values for PT, APTT and fibrinogen concentration of 20.5 ± 9.1 seconds, 47.6 ± 8.3 seconds and 1.79 ± 0.6 g/L, respectively in

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Control (n=50)</th>
<th>CKD patients (n=50)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT (seconds)</td>
<td>14.8 ± 2.1</td>
<td>19.4 ± 8.2</td>
<td>0.0002</td>
</tr>
<tr>
<td>APTT (seconds)</td>
<td>32.8 ± 3.5</td>
<td>46.2 ± 9.0</td>
<td>0.0001</td>
</tr>
<tr>
<td>Fibrinogen level(g/L)</td>
<td>1.86 ± 0.6</td>
<td>1.94 ± 0.6</td>
<td>0.5066</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Males (n=54)</th>
<th>Females (n=16)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT (seconds)</td>
<td>20.5 ± 9.1</td>
<td>17.9 ± 6.6</td>
<td>0.3123</td>
</tr>
<tr>
<td>APTT (seconds)</td>
<td>47.6 ± 8.3</td>
<td>44.1 ± 9.9</td>
<td>0.1974</td>
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<tr>
<td>Fibrinogen level(g/L)</td>
<td>1.79 ± 0.6</td>
<td>2.16 ± 0.6</td>
<td>0.0475</td>
</tr>
</tbody>
</table>

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TABLE 3
Blood coagulation parameters for stages of CKD

<table>
<thead>
<tr>
<th>Parameters</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT (s)</td>
<td>17.4±6.9</td>
<td>18.8±5.0</td>
<td>15.3±3.1</td>
<td>15.6±5.9</td>
<td>23.5±9.9</td>
<td>0.074</td>
</tr>
<tr>
<td>APTT (s)</td>
<td>46.1±9.1</td>
<td>50.6±8.0</td>
<td>42.7±8.8</td>
<td>42.0±9.2</td>
<td>47.3±9.0</td>
<td>0.496</td>
</tr>
<tr>
<td>Fibrinogen level (g/L)</td>
<td>1.98±0.6</td>
<td>2.16±0.7</td>
<td>1.95±0.6</td>
<td>1.99±0.6</td>
<td>1.83±0.6</td>
<td>0.857</td>
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</tbody>
</table>

TABLE 4
Coagulation parameters in CKD patients according to age

<table>
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<tr>
<th>Parameters</th>
<th>15-24yrs</th>
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<th>55-64yrs</th>
<th>P-value</th>
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<tbody>
<tr>
<td>Number</td>
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<td>11</td>
<td>14</td>
<td>9</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>PT (s)</td>
<td>17.2±2.9</td>
<td>20.4±7.4</td>
<td>20.1±9.5</td>
<td>21.3±11.2</td>
<td>17.2±6.2</td>
<td>0.7668</td>
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<tr>
<td>APTT (s)</td>
<td>48.2±11.9</td>
<td>48.3±7.6</td>
<td>44.4±8.7</td>
<td>44.4±10.2</td>
<td>46.9±9.3</td>
<td>0.7815</td>
</tr>
<tr>
<td>Fibrinogen level (g/L)</td>
<td>2.70±0.8</td>
<td>1.75±0.5</td>
<td>2.02±0.7</td>
<td>2.08±0.7</td>
<td>1.85±0.5</td>
<td>0.7162</td>
</tr>
</tbody>
</table>

REFERENCES

15. Takagi M, Wada H, Mukai K, et al. Increased activated protein C: protein C inhibitor complex and decreased protein C inhibitor levels in


