Assessment of Some Coagulation Parameters in GI Bleeding Patients in a Sudanese Center for GI.

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ABSTRACT:

This study was conducted at Mohammed Salih Idres Center for gastrointestinal bleeding at Khartoum, Sudan. Prothrombin time (PT), activated partial thromboplastin time (APTT) and platelet count were measured in 50 gastrointestinal bleeding patients (43 males (86\%) and 7 females (14\%) with a mean age of 47 years) compared to corresponding parameters in 30 healthy individuals used as a control group. Blood samples were analyzed to determine the effect of GI bleeding on coagulation and correlate coagulation parameters investigated to age, gender and causes of GI bleeding. The results obtained showed that PT and APTT were significantly prolonged in patients than in control (P=0.00), while platelets count was significantly decreased in patients than in control (P=0.00). The results also indicated that, patients of GI bleeding due to esophageal varices (OV) were of higher prevalence but with normal coagulation pathways and platelets count. Furthermore, patients with portal hypertension (PHT) have been found to have a decreased platelets count. The results of the present work concluded that, patients with other causes of GIT bleeding found to have a defect in the intrinsic and extrinsic pathways associated with reduced platelet count. Also this work concluded that no statistically significant correlation was found between coagulation parameters investigated and gender or age in the study population.

KEYWORDS: gastric bleeding, hemostatic parameters, coagulation disorders, PT and aPTT

INTRODUCTION: Coagulation in GI Bleeding:

GI bleeding, is not a disease it is a symptom, may be associated with almost any type of hemorrhagic diathesis particularly associated with anticoagulant therapy, hereditary hemorrhagic telangiectasia, thrombocytopenia, von willebran's disease, pseudoxanthoma elasticum and uremia\textsuperscript{(1,2,3)}. For all these abnormal cases the possible causes may include ingestion of aspirin and related anti-inflammatory drugs, impaired platelet function, malformation in blood vessels and decreased platelets count\textsuperscript{(4)}. GI bleeding may also occur in Hermansky-Pudlak Syndrome (HPS) in such case bleeding condition was attributed to deficiency of platelets dense bodies\textsuperscript{(5)}. It was also suggested that mal-absorption syndromes and other chronic gastrointestinal disorders may give rise to vitamin K deficiency. Vitamin K deficiency may lead to impairment in production of many coagulation factors (V, VII, IX, X) and consequently impaired coagulation mechanism and hence GI bleeding\textsuperscript{(6,7,8)}. Hemostatic mechanism within GI bleeding has been investigated by a number of workers else where other than Sudan. This work has been conducted to reveal coagulation disorders in GI patient in Sudan through investigation of PT, APTT and...
platelets count in patients in addition to assess the correlation between these parameters and age of patients, gender and/or causes of GI bleeding.

MATERIALS and METHODS:

Study population:

This study included 100 individuals (50 were selected randomly from patients with GIT bleeding who were referred to Mohammed Saleh Idres center for GI bleeding at Ibn Seena Hospital, Khartoum Sudan the other 50 were healthy individuals, matched in age and sex with patients, were used as control). All participants were investigated for dependent study variables (prothrombin time (PT), activated partial thromboplastin time (APTT) and platelets count) and independent variables (cause, history of GI bleeding, age and gender) using automated coagulometer.

Ethical consideration:

Informed consents from Mohammed Salih Idres centre as well as from patients were obtained before collection of blood samples and the participants were informed about the research and the study outcomes.

Procedure and data analysis

A blood sample (2.5 ml) was withdrawn from each participant, prepared for automated coagulomerter (Diamed CD4) to determine PT and APTT following the instructions set by the manufacturer (Diamond Diagnostics - USA333 Fiske Street Holliston, MA 01746). Platelets were counted by automated hematology cell counters (Sysmex KX21N) following the instructions set by the manufacturer.

RESULTS:

Among the study population there were 43(86%) males and 7 (14%) females from different regions of Sudan with an age from 20-80 years. Twenty (40%) of patients were diagnosed with oesophageal varices (OV), 3 (6%) with portal hypertension (PHT) and 27 (54%) with other causes (peptic ulcer, duodenal ulcer, preportal fibrosis and combination between OV and PHT), 15 (30%) patient have previous history of bleeding.

The results of this work showed that, PT and aPTT were prolonged in patients compared to control (Table 1). The prolongation was more prevalent in males than in females (Table 1). PT was slightly prolonged in patients in age group 20-60 years but normal in patients above 60 years. Comparatively, aPTT was slightly prolonged in patients below 20 years and age group 80-100years but normal in patients between 20-80 years (Table 2). Prolongation of both parameters has been found to be correlated with GI bleeding causes other than OV and PHT. Mean platelet count was found lower in patients than in controls, the decrease was slightly prevalent in females. Patients below 60 years have low platelets count while those above 60 years have normal platelets count (Table 1). Also platelets count was normal in patients with OV but decreased in patients with manifestation other than OV (Table 3). Paradoxical correlation (Kendall’s tau-1 and Pearson correlations) results were found between tested hemostatic parameters and clinical manifestation associated with GI bleeding on one hand and hemostatic parameters and age groups on the other (Tables 2 and 3).
**Table 1. Hemostatic parameters in GI patients (males and females) and control.**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Patients</th>
<th>Control</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT</td>
<td>19.5</td>
<td>11.3</td>
<td>13.28</td>
<td>15.43</td>
</tr>
<tr>
<td>aPTT</td>
<td>42.3</td>
<td>31.8</td>
<td>42.12</td>
<td>39.96</td>
</tr>
<tr>
<td>Platelets count</td>
<td>149</td>
<td>244.9</td>
<td>152.47</td>
<td>134.39</td>
</tr>
</tbody>
</table>

**Table 2. Hemostatic parameters among different age groups of patients**

<table>
<thead>
<tr>
<th>Age in years</th>
<th>PT seconds</th>
<th>aPTT seconds</th>
<th>Platelets count cmm</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 20</td>
<td>16*</td>
<td>41*</td>
<td>84***</td>
</tr>
<tr>
<td>21-40</td>
<td>17*</td>
<td>38**</td>
<td>117**</td>
</tr>
<tr>
<td>41-60</td>
<td>16*</td>
<td>38**</td>
<td>175**</td>
</tr>
<tr>
<td>&gt;61</td>
<td>15*</td>
<td>54***</td>
<td>215***</td>
</tr>
</tbody>
</table>

* No correlation, ** Correlation, *** High correlation

**Table 3. Hemostatic parameters in association to different clinical manifestations**

<table>
<thead>
<tr>
<th>Clinical manifestations</th>
<th>PT* seconds</th>
<th>APTT* seconds</th>
<th>Platelets count*</th>
</tr>
</thead>
<tbody>
<tr>
<td>OV</td>
<td>16</td>
<td>40</td>
<td>162</td>
</tr>
<tr>
<td>PHT</td>
<td>15</td>
<td>40</td>
<td>82</td>
</tr>
<tr>
<td>Others</td>
<td>17</td>
<td>43</td>
<td>145</td>
</tr>
<tr>
<td>Control</td>
<td>13</td>
<td>34</td>
<td>241</td>
</tr>
</tbody>
</table>

* No correlation between the parameter and the clinical manifestation
DISCUSSION:

This was an analytical, hospital based study conducted at Mohammed Salih Idres center for GI bleeding. The study aimed at verifying changes in PT, aPTT and/or platelets cont during GI bleeding and to correlate GI bleeding to age or sex of study population. In our study, the upper GI bleeding was found to be common in males which was similar to studies reported earlier from Sudan \(^9\). The main cause of acute upper GI bleeding in this study was oesophageal varices. This observation was similar to an observation reported in Sudan but in contrast to the fact that peptic ulcer was the main cause of bleeding as reported in studies undertaken in Germany and USA \(^9,10\). This might be due to bilharzias is which is an endemic disease in Sudan \(^9\). In referring to control, the results of the present study showed that patients with GI bleeding have significantly prolonged PT and PT but significantly decreased platelets count (p. value < 0.01 for each). Since APTT and PT were associated with intrinsic and extrinsic pathways respectively \(^11,12\), it was suggested that those pathways were impaired in GI bleeding. It has also been reported by many authors that prolongation of these parameters was associated with vitamin K deficiency and can be corrected by administration of the vitamin \(^13\). Prolongation of PT and APTT reported in this study predisposed hemophilia type A and B. This situation might be augmented by low platelets count reported among GI patients of this study. Those three parameters were called evidence of severe bleeding. However, prolongation of both APTT and PT has been reported to be a suggestion of a deficiency or an inhibition of the common pathway coagulation factors (factor X, V, and II), or a qualitative or quantitative fibrinogen defect \(^11\).

The results of the present study have been supported by results of many studies conducted with GI bleeding \(^11,12\). In relation to sex our results revealed that PT and APTT prolongation was prevalent in males rather than females. However, no obvious interpretation was found for these findings but might be due to the observation that most of patients were males (86%). Platelets count was within normal range in males and slightly decreased in females. In this study the mean age of patients was 47 years which was similar to what has been reported before in Sudan \(^2\). The result of the present work indicated that GI bleeding was of OV types and people of various ages suffered from GI bleeding. These observations were supported by previous work in Sudan \(^13,14\) and other countries \(^15\). This is also comparable to that reported in North Ireland where mean age of GI bleeding patients was reported to be 59 years \(^3\).

CONCLUSION:

This study concludes that, most GI bleeding in Sudan are of OV type, in those patients coagulation pathway was compromised as indicated by prolongation of PT, APTT and reduced platelets count. GI affected people in all regardless of their age although the elders were most affected.

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REFERENCES:


