Revisiting the Issue of VTE in the Setting of Chronic Liver Disease

An Examination of National Surgical Quality Improvement Program Data

To the Editor:

In an article in CHEST (May 2010), Dabbagh and colleagues examined the rate of VTE in patients with chronic liver disease (CLD), as stratified by international normalized ratio (INR) levels. Specifically, the authors retrospectively examined the rate of inpatient VTE occurring over a 7-year period. Of 190 patients with CLD, the authors noted a VTE incidence of 6.3%, with no significant differences in the incidence of VTE between INR quartiles. The majority of patients with documented VTE were classified as Child-Pugh stage C. From this, the authors concluded that an elevated INR in the setting of CLD does not appear to protect against the development of hospital-acquired VTE. As the cause of VTE is often multifactorial and early initiating factors are still not fully understood, we agree that an elevated INR, in and of itself, is not protective against VTE in the population of patients with CLD.

Like the authors, we were also curious regarding the rate of VTE in patients with CLD, particularly after major hepatic resection. After obtaining the appropriate approval from the University of Utah institutional review board (IRB_00030671), we queried the National Surgical Quality Improvement Program (NSQUIP) database to collect data on the number and type of liver resections performed nationally during the years 2004 to 2009 (Current Procedural Terminology codes 47120, 47122, 47125, and 47130). The incidence of inpatient VTE (International Classification of Diseases, Ninth Revision, codes 453.4 and 453.8) and PE (International Classification of Diseases, Ninth Revision, codes 415.9 and 415.11) were examined retrospectively. During the 5-year study period, 6,084 liver resections were performed among 268 NSQUIP institutions nationwide. During this time, the annualized incidence rate remained relatively constant, with VTE and PE occurring at a rate of 1.97% and 1.36%, respectively (Tables 1, 2). This is not only considerably lower than that experienced by the authors, but also below the estimates typically cited for patients with known malignancies. Nevertheless, according to criteria set forth by Bahl et al,

Table 1—Rate of DVT and PE Nationally, 2004-2009

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>8</td>
<td>13</td>
<td>22</td>
</tr>
<tr>
<td>DVT</td>
<td>8</td>
<td>7</td>
<td>25</td>
<td>275</td>
<td>771</td>
<td>1,283</td>
</tr>
<tr>
<td>Patients with liver resections, No.</td>
<td>248</td>
<td>248</td>
<td>275</td>
<td>275</td>
<td>771</td>
<td>1,283</td>
</tr>
<tr>
<td>Cases per total No. of patients with liver resections, %</td>
<td>1.61</td>
<td>2.02</td>
<td>1.09</td>
<td>2.91</td>
<td>1.69</td>
<td>2.85</td>
</tr>
<tr>
<td>Incidence rate ratio</td>
<td>2.67; P = 0.13;</td>
<td>1.69; P = 0.13;</td>
<td>95; P = 0.88;</td>
<td>1.72; P = 0.06;</td>
<td>1.42; P = 0.19;</td>
<td></td>
</tr>
</tbody>
</table>

Table 2—Rate of DVT and PE Nationally, All Years Combined (2004-2009), Incidence Proportions, and Incidence Rates

<table>
<thead>
<tr>
<th></th>
<th>PE</th>
<th>DVT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases of DVT and PE, No.</td>
<td>83</td>
<td>120</td>
</tr>
<tr>
<td>Patients with liver resections, No.</td>
<td>6,084</td>
<td>6,084</td>
</tr>
<tr>
<td>Cases per total No. of patients with liver resections, %</td>
<td>1.36</td>
<td>1.97</td>
</tr>
<tr>
<td>Incidence rate ratio</td>
<td>1.45; P = 0.009</td>
<td></td>
</tr>
</tbody>
</table>

Table based on NSQUIP data. Data include year-specific incidence proportions (incidence rates) for codes of liver resection, DVT, and PE from ICD-9 as follows: Hepatectomy, resection of the liver, partial lobectomy, 47120; trisegmentectomy, 47122; total left lobectomy, 47125; total right lobectomy, 47130; DVT, 453.4 (0,1,2); embolism of vein, 453.8 (1-9); PE (other), 415.19; PE and infarction, 415.11. See Table 1 for expansion of abbreviations.

"aIncidence rate ratio (DVT relative to PE).
"bMcNemar test.
our data clearly show that patients with CLD undergoing major hepatic resection fall under a high-risk designation. With the decision to use prophylactic methods against VTE frequently predicated on an assessment of individual patient risk, this information may prove valuable when used in conjunction with the American College of Chest Physicians’ Evidence-Based Clinical Practice Guidelines.\(^4\)

\[ \text{References} \]


\[ \text{In Table 1, the authors described the characteristics of patients with A(H1N1) and cardiac dysfunction. However, if we look carefully at the table, the following points merit attention. All the patients had some underlying comorbidity that directly or indirectly affects the cardiac function. The baseline ejection fraction of case 4 was 40%, which might decrease not only because of A(H1N1) infection per se but also because of associated bacterial pneumonia/sepsis (which was not clearly described in the article). Cases 5 and 6 were pregnant patients in their third trimester. There is a possibility that these two cases may represent peripartum cardiomyopathy (criteria for diagnosis: cardiac failure within last months of pregnancy or within 5 months postpartum, no determinable cause for failure, no previous heart diseases, left ventricular dysfunction with ejection fraction <45%) that improved with treatment. More importantly, the PaO2/FIO2 fraction in all except case 5 (PaO2/FIO2 >300) fulfilled the criteria for ARDS (PaO2/FIO2 ≤200). ARDS is a reasonably well-characterized cause of acute cor pulmonale. Whether A(H1N1) virus induces disproportionate pulmonary vascular disease is not known, although preliminary autopsy results may be compatible with this finding. The thin-walled right side of the heart is particularly susceptible to ischemia and failure in the face of acute increases in afterload. Right-sided heart dysfunction has direct effects on left ventricular diastolic and systolic function. Except in cases 3 and 5, the APACHE (Acute Physiology And Chronic Health Evaluation) II score in the other four cases varied from 20 to 28, indicating that these patients were severely ill. In severely ill patients, multiple factors contribute to myocardial dysfunction, including sepsis, pneumonia, ARDS, and associated other organ dysfunction (as described in case 1, the dose of oseltamivir was reduced because of associated severe renal impairment). The rapid downhill course of case 1 (being intubated within 24 h of hospitalization) and partial response to diuretics and inotropes suggests the above possibilities rather than reversible cardiac dysfunction alone.} \]

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\[ \text{REFERENCES} \]


4. Centers for Disease Control and Prevention (CDC). Intensive-care patients with severe novel influenza A (H1N1) virus

2009 Influenza A(H1N1) Infection and Associated Myocardial Dysfunction

To the Editor:

I read with great interest the article by Martin et al1 in a recent issue of CHEST (May 2010). The authors, in their description of echocardiography findings in six patients, concluded that potentially reversible cardiac dysfunction is a relatively common complication associated with hospitalized patients with 2009 influenza A(H1N1) (A[H1N1]).

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