To the editor:

The implementation of electronic hematology consults at a VA hospital

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The widespread implementation of electronic medical records (EMR) allow providers ready access to large amounts of patient information, and for some specialties much of the data needed to provide recommendations can be gathered electronically.¹ Electronic consultation (e-consult) is a health care delivery method in which a consultant provides recommendations by reviewing the EMR without a face-to-face (FTF) encounter with the patient.²⁻⁴ e-consult may improve timeliness of care, save cost, prevent unnecessary visits, and address a shortage of specialists.²⁻⁴ e-consult was initially implemented in radiology and pathology, but it is now in broader use, including internal medicine subspecialties.²⁻⁴⁻⁸ Diagnostic accuracy of the electronic review of blood and bone marrow samples has been reported, but there is no published data regarding the effectiveness of other hematology e-consults.⁹,¹⁰

The Veterans Affairs Connecticut Healthcare System (VACT) initiated hematology e-consult in 2011 as part of a national initiative to improve access to care. Referring providers are given the choice between an e-consult and an FTF clinic visit, and make this decision in coordination with the patient. The majority of referrals to our service come from primary care clinicians, and guidelines called “service agreements” were developed with the primary care leadership to help referring clinicians determine which clinical issues were appropriate for each type of consult. Board-certified/eligible attending hematologists review the EMR, peripheral blood smear, and imaging when appropriate, and document recommendations in the chart. Although the majority of Veterans Affairs (VA) patients are older with multiple morbidities, the VA EMR is comprehensive and it includes readily accessible problem lists, pharmacy records, laboratory data, imaging, and all provider visits, thus allowing efficient review of relevant information. For e-consults that come from outside the West Haven VA, the peripheral smear slides are courier-delivered to the West Haven VA hematology laboratory from community-based sites. The hematologist may recommend additional testing and/or a referral for an FTF visit as appropriate, and the referring clinician communicates the recommendations to the patient. Workload credit is provided in proportion to the time spent completing the consult.

Data on FTF and e-consults between the years 2009 and 2013 at VACT were abstracted from the EMR. We randomly selected for review 302 e-consults, 305 FTF consults before e-consult implementation, and 302 FTF consults after the implementation of e-consult. Patient and provider satisfaction with e-consults was evaluated by mailed anonymous patient surveys and e-mail surveys, respectively. The time to completion of e-consults was prospectively measured by one of the authors (M.G.R.) for 142 cases completed during the first year after implementation of an e-consult. SPSS version 22 was used for all statistical analysis with continuous variables compared by analysis of variance, whereas categorical variables were compared by the Pearson χ² test. Our hospital’s institutional review board approved this study.

The annual number of FTF hematology consults at VACT decreased from 391 prior to the e-consult implementation, to 319 in the second year after implementation, whereas the overall patient population enrolled at VACT remained constant. More than 85% of consults originated from primary care providers in all 3 groups. e-consults were converted to FTF consults in 17% of cases. e-consult patients received a more timely evaluation and lived further from our clinic than patients seen in FTF consults (Table 1).

The most common reason for consultation in all 3 groups was anemia, and the etiology of the anemia in the majority of the cases was benign disease (micronutrient deficiency, chronic kidney disease, and chronic disease) or presumed early myelodysplastic syndrome. The majority of coagulation-related e-consults were related to the management of venous thromboembolism, with few cases of atrial fibrillation management and von Willebrand disease. The mean time to complete an e-consult by one of our authors, who is a board-certified hematologist with more than 10 years of experience, was 14.5 minutes (standard deviation, 7.3). In comparison, we allot 30 to 60 minutes for FTF consults depending on the anticipated complexity of the clinical problems.

Table 1. The most common clinical characteristics of patients who received e-consults, and those who received FTF consults both before and after e-consults were implemented at VACT

<table>
<thead>
<tr>
<th></th>
<th>e-consults (N = 302)</th>
<th>FTF consults before e-consult implementation (N = 305)</th>
<th>FTF consults after e-consult implementation (N = 302)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median age (y)</td>
<td>64</td>
<td>69.3</td>
<td>65.92</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Diagnosis, no. (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anemia</td>
<td>64 (21%)</td>
<td>103 (34%)</td>
<td>63 (21%)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Thrombocytopenia</td>
<td>28 (9%)</td>
<td>34 (11%)</td>
<td>38 (13%)</td>
<td>.419</td>
</tr>
<tr>
<td>Leukocytosis</td>
<td>31 (10%)</td>
<td>19 (6%)</td>
<td>28 (9%)</td>
<td>.183</td>
</tr>
<tr>
<td>Neutropenia</td>
<td>18 (6%)</td>
<td>11 (4%)</td>
<td>14 (5%)</td>
<td>.397</td>
</tr>
<tr>
<td>Paraprotein</td>
<td>23 (8%)</td>
<td>26 (9%)</td>
<td>15 (5%)</td>
<td>.231</td>
</tr>
<tr>
<td>VTE</td>
<td>38 (13%)</td>
<td>17 (6%)</td>
<td>36 (12%)</td>
<td>.005</td>
</tr>
<tr>
<td>Time to completion (d)</td>
<td>13.25</td>
<td>29.36</td>
<td>31.39</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Distance from clinic (miles)</td>
<td>37.56</td>
<td>33.04</td>
<td>33.77</td>
<td>.017</td>
</tr>
</tbody>
</table>

VTE, venous thromboembolism.
question. Among the 50 e-consult patients who were sent satisfaction surveys, 17 responded, of which 65% stated that they preferred an e-consult to an FTF visit. Among the 61 providers that received surveys, 15 responded, of which 100% were “satisfied” or “very satisfied” with e-consults.

To our knowledge, this is the first report on the effectiveness of an e-consult in clinical hematology. The majority of e-consults were able to be resolved electronically, which suggests that referring providers were able to triage consults appropriately, and effectively communicate results to the patients. As expected, e-consults were completed in a more timely fashion than FTF visits, and were preferentially used in patients who lived further from the specialty clinic. Faster processing of e-consults compared with FTF, and high patient and provider satisfaction, has been demonstrated for other medical and surgical subspecialties.1,2

We observed an 18% drop in FTF visits within 2 years after the implementation of e-consults. We did not observe any delays in care, missed diagnosis, or other negative clinical outcomes as a result of the e-consult mechanism. However, the total number of hematology consults (FTF plus e-consults) increased significantly over the study period, from 391 in 2010 to 704 in 2013. This suggests that referring providers were more likely to request a hematology consult if it did not require an FTF visit. Thus, although our data suggests that e-consults may gain traction.

We conclude that in an integrated health care system with a comprehensive EMR, e-consults offer a timely and patient-centered option for providing hematology specialist input for select patients. Further studies are necessary to determine the role of this method of delivering hematologic care can play in our health care system, how virtual care workload should be compensated, its impact on the workload of hematologists, and the quality of care delivered.

**References**


**To the editor:**

**Clinical impact of MYD88 mutations in chronic lymphocytic leukemia**

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We have read with interest the letter by Baliakas et al1 on the impact of MYD88 mutation in IGHV mutated (M-IGHV) chronic lymphocytic leukemia (CLL) patients. They reported a frequency of MYD88-mutated patients of 4% in a series of 558 M-IGHV CLL, and found that M-IGHV CLL patients with mutated MYD88 were predominantly male, had a similar age at diagnosis, and presented in a more advanced clinical stage, with mainly favorable cytogenetic abnormalities and a lower frequency of TP53, SF3B1, or NOTCH1 mutations than

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