Anticoagulant therapy beyond primary treatment among active cancer and non-cancer patients with venous thromboembolism in the United States


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Background: European Society of Cardiology (ESC) and American Society of Hematology (ASH) guidelines recommend anticoagulant (AC) therapy for $\geq$ 3 months among patients with major persistent risk factors such as cancer to prevent recurrent venous thromboembolism (VTE).

Purpose: To describe AC use beyond the primary treatment period (3 months) among Active Cancer and non-Cancer patients with VTE. Demographics and clinical profiles were also evaluated for these patients.

Methods: This retrospective observational study included VTE patients $\geq$ 18 years from a US large administrative claims database (01/01/2017 – 04/30/2022). Patients who initiated AC treatment (apixaban, dabigatran, rivaroxaban, warfarin, or low molecular weight heparin [LMWH]) within 30 days of index VTE event were selected and the treatment start date was defined as the AC initiation date. Active Cancer and non-Cancer cohorts were created based on the presence or absence of cancer diagnosis or cancer treatment 6 months before or 30 days after the index VTE event. Patients were required to have continuous health plan enrollment (CE) 6 months prior and $\geq$ 3 months after the AC initiation date. The end of 3 months after the AC initiation was defined as index date. Patients with evidence of recurrent VTE and switch to a new AC during the primary treatment period were excluded. Continuous use of initial AC treatment for $\geq$ 3 months and baseline patient characteristics were assessed. The primary AC treatment duration was expanded to $\geq$ 6 months in a scenario analysis.

Results: The initial study population included 434,523 patients who initiated primary AC treatment within 30 days of index VTE; 19% (n = 83,050) in the Active Cancer and 81% (n = 351,473) in the non-Cancer cohorts. After the selection criteria were met, the Active Cancer cohort included 52,409 patients; of these, overall, 49.1% of patients received continuous primary AC treatment for $\geq$ 3 months (apixaban = 55.6%, dabigatran = 41.7%, rivaroxaban = 55.9%, LMWH = 26.9%, warfarin = 46.7%). Among patients in non-Cancer cohort (n = 254,913), overall, 56.7% received continuous primary AC treatment for $\geq$ 3 months (apixaban = 59.0%, dabigatran = 49.2%, rivaroxaban = 57.7%, LMWH = 20.1%, warfarin = 54.2%). For primary AC treatment duration of $\geq$ 6 months, type of AC use was consistent; however, the treatment rates were lower, for both Active Cancer (29.8%) and non-Cancer (34.8%) cohorts. (Figure 1). Patients in the Active Cancer cohort were older, had a higher comorbidity burden and higher % of patients with a history of bleeding compared to the non-Cancer cohort. (Figure 2).

Conclusion: About one-half (49.1%) of VTE patients with Active Cancer received $\geq$ 3 months of primary AC treatment; this proportion was higher (56.7%) in the non-Cancer cohort. Apixaban and rivaroxaban were the most prescribed anticoagulants. The study highlights potential gaps in guideline-recommended anticoagulation treatment among VTE patients in an extended treatment setting.

![Figure 1](https://academic.oup.com/eurheartj/article/44/Supplement_2/ehad655.2851/7392327)
## Figure 2. Baseline Patient Characteristics Among Active Cancer and Non-Cancer VTE Patients who Received ≥3 months of Primary Anticoagulant treatment

<table>
<thead>
<tr>
<th></th>
<th>Active Cancer Patients with VTE</th>
<th>Non-Cancer Patients with VTE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% Male (ESMO)</td>
<td>% Male (ESMO)</td>
</tr>
<tr>
<td>Age (years, median)</td>
<td>63.6</td>
<td>55.6</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>52.7%</td>
<td>54.3%</td>
</tr>
<tr>
<td>Male</td>
<td>47.3%</td>
<td>45.7%</td>
</tr>
<tr>
<td>Geographic Region (%)</td>
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<tr>
<td>North America</td>
<td>5.7%</td>
<td>23.8%</td>
</tr>
<tr>
<td>South America</td>
<td>4.9%</td>
<td>15.0%</td>
</tr>
<tr>
<td>Europe</td>
<td>47.3%</td>
<td>54.3%</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>10.4%</td>
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</tr>
<tr>
<td>Africa</td>
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</tr>
<tr>
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<td>35.0%</td>
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<tr>
<td>Setting of Index (ESMO) (%)</td>
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<td></td>
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<tr>
<td>Hospital</td>
<td>56.3%</td>
<td>58.4%</td>
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<tr>
<td>Emergency</td>
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<tr>
<td>Outpatient</td>
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<tr>
<td>VTE Exposure ($)</td>
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<tr>
<td>refill</td>
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<tr>
<td>admission</td>
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<tr>
<td>Age (years, median)</td>
<td>64.5</td>
<td>54.3</td>
</tr>
<tr>
<td>Age (years, IQR)</td>
<td>58.5, 70.5</td>
<td>53.7, 63.3</td>
</tr>
<tr>
<td>Age (years, mean)</td>
<td>63.6</td>
<td>55.6</td>
</tr>
<tr>
<td>Age (years, SD)</td>
<td>10.0</td>
<td>10.3</td>
</tr>
<tr>
<td>Age (years, IQR)</td>
<td>58.5, 70.5</td>
<td>53.7, 63.3</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
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<tr>
<td>Male</td>
<td>52.7%</td>
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<tr>
<td>Female</td>
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<tr>
<td>Education</td>
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<td>&lt; High School</td>
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<tr>
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<td>&lt;$30,000</td>
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<td>$30,000 - $49,999</td>
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<td>18.7%</td>
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<td>20.4%</td>
<td>19.1%</td>
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<td>$115,000+</td>
<td>24.8%</td>
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<tr>
<td>Comorbidities</td>
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<tr>
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<tr>
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<td>12.8%</td>
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<td>COPD</td>
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<td>2.9%</td>
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<tr>
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<td>12.4%</td>
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<tr>
<td>Initial Treatment</td>
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<tr>
<td>Warfarin</td>
<td>69.8%</td>
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<tr>
<td>Total Mortality (%)</td>
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<tr>
<td>90-day</td>
<td>7.8%</td>
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</tr>
</tbody>
</table>

*Note: ESMO = European Society of Medical Oncology, SD = Standard Deviation, VTE = Venous Thromboembolism, LMWH = Low Molecular Weight Heparin*, UFH = Unfractionated Heparin, MI = Myocardial Infarction, COPD = Chronic Obstructive Pulmonary Disease, IQR = Interquartile Range*