Treatment Patterns among Elderly Stage IV Breast Cancer Patients Treated with Human Epidermal Growth Factor Receptor 2-Targeted Therapy: An Analysis of 2006-2010 US National Registry Data

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Disclosures

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• Yanni Hao and Jaqueline Willemann Rogerio are both employees of and own stock in the sponsor, Novartis Pharmaceuticals Corporation
• The authors have no other financial or non-financial competing interests to disclose
Background & Objectives

• Breast cancer is the second leading cause of death from cancer among women in the US\(^1\)
• HER2-positive breast cancer is associated with worse survival outcomes\(^2\), however targeted therapies improve both pathological response and survival\(^2-4\)
• NCCN guidelines do not include recommendations for the optimal duration of HER-2 targeted therapy\(^5\), but rather acknowledge the need for further research concerning timing and duration\(^6\)
• Thus, the objective of this study was to evaluate real-world practice patterns among a Medicare population of women with Stage IV breast cancer receiving HER2-targeted therapy
Study Overview

- Retrospective analysis of 2006-2010 SEER-Medicare data
- Study population of women with diagnosis of stage IV BC and receipt of HER2-targeted therapy
- Key study measures included:
  - Types and sequence of treatment regimens
  - Duration of therapy
  - Types of adjunctive chemotherapy
Data Source

• The linked Surveillance, Epidemiology, and End Results (SEER)-Medicare database is a collaborative effort of the National Cancer Institute, the SEER registries, and the Centers for Medicare and Medicaid Services (CMS)

• Study dataset included:
  • Cancer cases diagnosed from 2007-2009
    • *Cancer cases diagnosed before 2007 were excluded as Part D prescription data were only available from 2007 forward*
  • Medicare claims from 2006-2010
Patient Selection Criteria

- Females with incident diagnosis of Stage IV breast cancer (index date)
- No history of any other (non-breast) cancer
- Entitlement for both Part A and B benefits during study period
- Age 66 years or older at diagnosis
- Continuous Part D coverage from index through end of follow-up
- Medicare entitlement not based on end stage renal disease or disability
- Diagnosis of BC was not at the time of death or autopsy
- Receipt of trastuzumab or lapatinib following BC diagnosis

- Of special note, despite the receipt of therapy indicated for those who are HER-2 positive, HER-2 status cannot be definitively known in the years of SEER-Medicare used in this analysis (HER-2 status was not added to SEER-Medicare data until 2010).


**Study Period**

- The index date was the date of BC diagnosis
- All patients were followed from 12 months pre-index (baseline period) through the end of the available data (12/31/2010), disenrollment, or until death, whichever occurred first

![Study Period Diagram](image)
Study Measures: Patient Characteristics

• Baseline demographic characteristics
  • Age
  • Race/Ethnicity
  • Geographic region
  • Urban location

• Baseline clinical characteristics
  • Progesterone Receptor (PR) status
  • Estrogen receptor (ER) status
  • Duration of follow-up
  • Charlson comorbidities and Charlson score
Study Measures: Treatment Patterns

• Assessed among patients with ≥2 months of follow-up
• Treatments included the following, consistent with the NCCN Guidelines for Breast Cancer⁵
  • HER2-targeted therapy
  • Surgery
  • Radiation
  • Chemotherapy
  • Hormonal therapy
  • Other (non-HER2) targeted biologic agents (lemtuzumab, bortezomib, cetuximab)
• The proportion of patients receiving each treatment listed above anytime during follow-up was assessed
Study Measures: Treatment Patterns, continued

• Exploratory analyses were conducted to identify “lines of therapy”, including “initial” and “subsequent” regimens

• A gap in treatment or the addition of a new biologic therapy was used as a marker for a change from the initial to a subsequent treatment regimen

• Gap lengths of 30, 42, and 90 days were explored
  • A 42-day gap was based on a previous study of treatment patterns among a cohort of Medicare patients with metastatic breast cancer (MBC)\(^7\)
  • The 30 and 90 day lengths were evaluated as lower and upper bounds, respectively
Study Measures: Treatment Patterns, continued

- Average duration of initial and subsequent treatment regimens was evaluated.
- Among patients who discontinued the initial treatment regimen, the reason associated with the discontinuation was evaluated, including:
  - Switched to different therapy
  - Death
  - End of Medicare eligibility
  - End of the study period
Results: Baseline Characteristics

• 174 patients meeting all patient selection criteria were identified among 92,210 women with an incident diagnosis of breast cancer
• Mean (SD) age of study patients was 73.9 (6.7) years
• The majority of patients were White (82.2%), with the greatest proportion residing in the West (36.2%) followed by the South (28.2%)
• Approximately two-fifths of patients had PR+ disease (39.1%), while 58.3% were ER+
• The most commonly diagnosed comorbidities during baseline included diabetes without chronic complications and chronic pulmonary disease
Results: Overall Treatment Patterns

- 173 out of 174 patients had ≥ 2 months of follow-up, therefore allowing for observation of treatment patterns
- Over 93% received trastuzumab and 9.8% received lapatinib
  - *Patients may have received both therapy types*
- The majority of patients received trastuzumab in combination with chemotherapy (42.2%)
- Less common therapies included trastuzumab + chemotherapy + hormone therapy, and trastuzumab alone (Table 1)
- Mean number of weeks with evidence of any therapy was 65.1
Table 1. Overall Treatment Patterns

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>N with treatment regimen</td>
<td>173</td>
</tr>
<tr>
<td>Distribution of treatment combinations for Stage IV patients (%)</td>
<td></td>
</tr>
<tr>
<td>No treatment</td>
<td>6.4%</td>
</tr>
<tr>
<td>Trastuzumab and chemo</td>
<td>42.2%</td>
</tr>
<tr>
<td>Trastuzumab, chemo, and hormonal</td>
<td>14.5%</td>
</tr>
<tr>
<td>Trastuzumab alone</td>
<td>13.9%</td>
</tr>
<tr>
<td>Trastuzumab and hormonal</td>
<td>9.2%</td>
</tr>
<tr>
<td>Trastuzumab, other targeted, and chemo</td>
<td>4.0%</td>
</tr>
<tr>
<td>Trastuzumab, lapatinib, hormonal, and chemo</td>
<td>3.5%</td>
</tr>
<tr>
<td>Trastuzumab, lapatinib, and chemo</td>
<td>2.3%</td>
</tr>
<tr>
<td>Duration of any therapy (weeks)</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>65.1</td>
</tr>
<tr>
<td>SD</td>
<td>48.3</td>
</tr>
<tr>
<td>Median</td>
<td>55.2</td>
</tr>
<tr>
<td>IQR</td>
<td>27.7 - 96.4</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.3</td>
</tr>
<tr>
<td>Maximum</td>
<td>196.3</td>
</tr>
</tbody>
</table>
Results: Treatment Regimens By Gap in Therapy

- The distribution of initial treatment regimens was nearly identical across gap definitions, with trastuzumab in combination with chemotherapy being the most common initial therapy (Table 2).
- 19-28% had evidence of a subsequent regimen following the initial regimen depending on the gap definition.
- The average duration of any individual treatment regimen was just under 1 year (44.9-52.5 weeks).
## Table 2. Treatment Patterns

<table>
<thead>
<tr>
<th>New line of therapy definitions: Gap of 30, 42, or 90 days with no treatment or with new biologic added</th>
<th>30 days</th>
<th>42 days</th>
<th>90 days</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N with initial therapy</strong></td>
<td>173</td>
<td>173</td>
<td>173</td>
</tr>
<tr>
<td><strong>Initial regimens (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No treatment</td>
<td>6.4%</td>
<td>6.4%</td>
<td>6.4%</td>
</tr>
<tr>
<td>Trastuzumab and chemo</td>
<td>43.9%</td>
<td>43.9%</td>
<td>43.9%</td>
</tr>
<tr>
<td>Trastuzumab alone</td>
<td>17.3%</td>
<td>17.3%</td>
<td>17.3%</td>
</tr>
<tr>
<td>Trastuzumab, chemo, and hormonal</td>
<td>13.3%</td>
<td>13.3%</td>
<td>11.6%</td>
</tr>
<tr>
<td>Trastuzumab and hormonal</td>
<td>11.6%</td>
<td>11.6%</td>
<td>13.9%</td>
</tr>
<tr>
<td><strong>Reason for end of initial therapy (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch to second-line therapy</td>
<td>29.6%</td>
<td>29.6%</td>
<td>20.4%</td>
</tr>
<tr>
<td>Death</td>
<td>27.2%</td>
<td>27.2%</td>
<td>29.6%</td>
</tr>
<tr>
<td>End of study period or of Medicare eligibility</td>
<td>43.2%</td>
<td>43.2%</td>
<td>50.0%</td>
</tr>
<tr>
<td><strong>N with a subsequent regimen</strong></td>
<td>48</td>
<td>48</td>
<td>33</td>
</tr>
<tr>
<td><strong>Subsequent regimens (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemo alone</td>
<td>25.0%</td>
<td>22.9%</td>
<td>24.2%</td>
</tr>
<tr>
<td>Trastuzumab alone</td>
<td>22.9%</td>
<td>22.9%</td>
<td>12.1%</td>
</tr>
<tr>
<td>Trastuzumab and chemo</td>
<td>14.6%</td>
<td>14.6%</td>
<td>12.1%</td>
</tr>
<tr>
<td>Trastuzumab and other non-HER2 therapy</td>
<td>N/A</td>
<td>N/A</td>
<td>9.1%</td>
</tr>
<tr>
<td>Lapatinib, chemo, and hormonal</td>
<td>N/A</td>
<td>N/A</td>
<td>9.1%</td>
</tr>
<tr>
<td>Trastuzumab, other non-HER2 therapy, and chemo</td>
<td>N/A</td>
<td>N/A</td>
<td>9.1%</td>
</tr>
<tr>
<td>Other regimen combinations</td>
<td>37.5%</td>
<td>39.6%</td>
<td>24.2%</td>
</tr>
</tbody>
</table>

Note: N/A is listed for cells with less than 11 patients.
Results: Treatment Patterns – Chemotherapy Use

• Types of chemotherapy were evaluated based on the percentage of all chemotherapy claims among the patients receiving chemotherapy (Figure 1a), and among patients who received trastuzumab and chemotherapy in combination as their first regimen (Figure 1b)
• Overall, the majority of claims were for a taxane-based chemotherapy (51.4 – 60.7%)
• Less common agents included antimetabolites (10.0 – 16.1%), vinca alkaloid (13.6 – 14.4%) and platinum-based chemotherapy (11.2 – 12.7%)
Figure 1a: Distribution of chemotherapy agents among patients with Stage IV BC treated with HER2-targeted therapy and chemotherapy

Percent of claims among all patients receiving chemotherapy; regardless of use of trastuzumab
Figure 1b: Distribution of chemotherapy agents among patients with Stage IV BC treated with HER2-targeted therapy and chemotherapy

Percent of claims among patients with trastuzumab plus chemotherapy combination as initial regimen
Limitations

- Restricted to cancer cases diagnosed from 2007 forward due to Part D data availability
- Treatment lines were identified based on assumptions about switches or gaps in therapy
- The SEER-Medicare database is not representative of all patients in the United States and does not capture those with other forms of health insurance
- True HER2 status was not available in the years of data evaluated
- Finally, this study is subject to the limitations of retrospective claims-based analyses, such as coding errors and/or incomplete data
Conclusions

• The majority of patients received trastuzumab in combination with a taxane-based chemotherapy
• Results are indicative of practices consistent with NCCN guidelines with regards to combinations of therapies
• On average, patients were treated for 65 weeks, with approximately a quarter of patients having multiple treatment regimens during the follow up period
• Further studies linking treatment patterns to survival and other outcomes in this population are warranted, particularly as data on HER2 status become available
References


