Impact of Progression on Resource Utilization in the Treatment of Advanced Neuroendocrine Tumors

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ABSTRACT

Background: Advanced neuroendocrine tumors (NETs) are associated with high morbidity and mortality; however, literature on resource utilization upon disease progression is scarce. This study aims to compare resource use in advanced NET patients at diagnosis versus post-progression.

Methods: An online survey was administered to physicians across the US, UK, Germany, France, Brazil and Italy. The survey collected resource utilization during the baseline (time-post-diagnosis but pre-progression), 1st, and 2nd progression periods. Progression was defined as measurable/radiographic evidence of tumor progression.

Results: 193 physicians participated, providing data on 304 patients. Average durations in baseline, 1st and 2nd progression were 12.8, 9.7 and 12 months, respectively. Advanced NET subtypes included gastrointestinal (9%), lung (24%), and pancreas (31%). Resource utilization consistently increased from baseline through progression.

Conclusions: It is important to characterize the burden posed by disease progression in advanced NET. Findings suggest that progression results in increased use of chemotherapy, PRRT, targeted therapies, and hospitalization rates.

BACKGROUND

• Neuroendocrine tumors (NETs) are a group of diverse but related malignancies originating from neuroendocrine cells.
• Patients are often diagnosed at a progressive stage of NET, and in spite of progression, typically undergo an extensive and exhaustive treatment regimen that may diminish their quality of life and impose substantial economic burden on the payers as well as the society.
• Few studies have evaluated precise patterns and quantified resource utilization among NET patients, particularly after progression.

OBJECTIVE

• To compare health care resource utilization in patients with advanced NET at diagnosis versus post-progression.

METHODS

Study Design

• Data for health care resource utilization was collected through an in-depth online survey of physicians in the United States (US), United Kingdom (UK), France, Italy, Germany and Brazil from December 2010 to January 2011.
• A survey invitation was sent to 4100 physicians with the objective to stop the study once 300 patients included were collected.

Exclusion criteria

• Physicians who had not diagnosed a second documented second progression, physicians were asked to consider a hypothetical second progression and to estimate resource utilization over a 1-year period following that progression. This method was applied due to the expectations that only a small sample of patients would have experienced an actual second progression (17.5% in this case) and these patients were likely to have had their follow-up period censored at different points.

RESULTS

Patient Data Collection Period

• Data on resource utilization were collected during 3 distinct time periods (Figure 1) — Baseline period (time-post-diagnosis but pre-progression), 1st progression period (time during which the patient is diagnosed with and treated for first progression), 2nd progression period (time during which the patient is diagnosed with and treated for second progression following treatment for NET progression).

• Progression was defined as measurable tumor progression by radiographic evidence or increase in tumor burden.

• Resource use for this study is reported for “baseline period” and “any patient progression” where “any patient progression” includes both first progression and assumed second progression for all patients; therefore, any patient may be analyzed up to 2 progressions.

Table 1. Table 1. Resource Utilization: Baseline Versus Any Progression

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<thead>
<tr>
<th></th>
<th>Baseline, %</th>
<th>Any Progression, %</th>
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<tbody>
<tr>
<td>All NET (%)</td>
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<tr>
<td>GI/Lung (%)</td>
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<td>Pancreas (%)</td>
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<td>Chemotherapy</td>
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<td>PRRT</td>
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<td>Other treatment (val)</td>
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<td>Biomarkers</td>
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<td>Laboratory tests (%)</td>
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<tr>
<td>Surgeries (%)</td>
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<td>Targeted therapy (%)</td>
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• Average duration of the baseline stage was 12.8 months and that of the first progression stage was 8.7 months.

• Chemotherapy use showed an upward trend from baseline to any progression event (Table 1). However, data broken down by different disease status (i.e., baseline, first progression, and second progression) suggest that chemotherapy use may decline from first progression to second progression among pancreatic NET patients (31.2% vs. 24.0%) but may actually increase among GI/Lung NET patients (28.4% vs. 31.4%).

• More patients were hospitalized during progression than at baseline (Table 1).

• It was also observed that the use of targeted therapy trended higher from baseline to any progression (Table 1).

• Patients were treated with PRRT during any progression nearly 3 times more frequently than during baseline (Table 1).

• The number of patients undergoing surgery, however, decreased during progression compared with baseline (Table 1).

• Proportions of resource uses found were found to vary by tumor type. Use of chemotherapy and PRRT was higher among GI/Lung NET patients, whereas use of targeted therapy and surgery was higher among pancreatic NET patients (Table 1).

• However, resource utilization patterns from baseline to any progression event were observed to be consistent across different types of tumors (Table 1).

DISCUSSION

• An upward trend was observed in the utilization of chemotherapy, PRRT (mostly octreotide), targeted therapy and patients undergoing hospitalization from baseline to any progression event.

• However, results suggest that rates of chemotherapy use may decline from first to second progression among pancreatic NET patients, perhaps due to their limited treatment efficacy for these patients.

• Although use of targeted therapy appeared to increase during progression compared with baseline, point estimates of usage rates remained lower than the use of chemotherapy during progression, likely due to lack of targeted therapies being approved at the time of this study.

• Targeted therapy use was also projected to increase in second progression versus first progression.

• A decrease in surgeries observed with progression may be attributed to the fact that in an advanced stage, metastasis is observed and the tumor is often deemed nonsurgical.

• Texts (e.g. imaging scans and laboratory tests) were performed at a higher rate at baseline, likely due to their use during the initial stages of diagnosis.

LIMTATIONS

• By accepting the survey invitation, physicians self-selected themselves to participate in the survey; therefore, the study results are vulnerable to selection bias.

• Although, use of data screening criteria of physicians and inclusion/exclusion criteria of patients might have excluded certain physicians and patients who would be part of the real-world NET population (e.g. patients treated by physicians with less than 2 years of experience), thereby affecting generalizability of the study results.

• A total of 17 patients included in the study were deemed to have already entered into their first disease progression upon diagnosis of NET; therefore, information was not available for these patients at baseline. This could have resulted in understimating resource use and survival data for baseline progression of the tumors.

• Resource use data for patients in second progression were collected over a hypothetical scenario of 12 months and, hence, the reported results may not reflect actual resource utilization in second progression.

• Targeted therapy use was not included as an explicit option in the survey and was assessed using an “other treatment” category for all nonspecified therapies, which might have underestimated actual targeted therapy.

• Statistical comparisons were not conducted for this study; thus, results should only be interpreted as trends in resource use and practice patterns.

CONCLUSIONS

• Recent recommendations propose that progression-free survival should be the primary endpoint in clinical trials in NET to be therefore important to characterize the impact of progression in the real world.

• This study suggests that progression may result in increased use of chemotherapy, targeted therapy and PRRT as well as increased rates of hospitalization, and it confirms the overall high level of resource utilization as disease progresses.

• Targeted therapy was reported to be relatively low, likely due to the limited availability of disease agents at the time of this study.

• Resource utilization was found to follow a consistent pattern across NET tumor types as the disease progresses, suggesting that progression has a greater impact on resource utilization rather than tumor type.

REFERENCES


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