Background

- Pembrolizumab and nivolumab are immunomodulating agents that work by blocking ligand activation of the programmed cell death receptor-1 (PD-1) or activated T cells.¹ ²
- This activates and utilizes a patient’s own immune system to target and fight cancer cells.
- Pembrolizumab and nivolumab were added to the Duke University Health System (DUHS) formulary in November 2014 and March 2015, respectively.
- DUHS Pharmacy and Therapeutics Committee’s formulary restrictions for these agents are:
  - Outpatient setting
  - Authorized chemotherapy prescribers
  - FDA-approved indications

Endpoints

The objective of this study is to characterize the overall use of pembrolizumab and nivolumab within DUHS.

Primary Endpoint
- Overall accordance of pembrolizumab and nivolumab use within DUHS Pharmacy and Therapeutics Committee’s formulary restrictions

Secondary Endpoints
- Documented significant adverse events or hospital admissions related to pembrolizumab or nivolumab
- Percent insurance approvals and denials for pembrolizumab or nivolumab use
- Number of doses prior to disease progression, or if no disease progression, number of doses
- Percent insurance approvals and denials for pembrolizumab or nivolumab use
- Adverse effects requiring: Lung (n=57), Melanoma (n=72)

Methods

Study Design: This study is a retrospective medication use evaluation within DUHS designed to evaluate prescribing patterns following addition of pembrolizumab and nivolumab to the DUHS formulary in November 2014 and March 2015, respectively.

Results

Baseline Characteristics (N = 133)

<table>
<thead>
<tr>
<th></th>
<th>Pembrolizumab (n=62)</th>
<th>Nivolumab (n=71)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Age, y/ (range)</td>
<td>58 (21-88)</td>
<td>63 (33-89)</td>
</tr>
<tr>
<td>Male, No. (%)</td>
<td>30 (48.4%)</td>
<td>42 (59.2%)</td>
</tr>
<tr>
<td>Metastatic Disease, No. (%)</td>
<td>55 (88.7%)</td>
<td>61 (85.9%)</td>
</tr>
</tbody>
</table>

Cancer Type, No. (%)

- Melanoma: 62 (100%)
- Lung (squamous): --
- Lung (adenocarcinoma): --
- Lung (small cell): --
- Renal: --
- Hodgkin’s Lymphoma: --
- Melanoma: 55 (88.7%)
- Lung (squamous): 10 (14.1%)
- Lung (adenocarcinoma): 22 (30.9%)
- Lung (small cell): 32 (45.1%)
- Renal: 8 (11.3%)

Median number of doses, No. (range)

- Pembrolizumab: 4 (1-12)
- Nivolumab: 4 (1-12)

Prior chemotherapy regimens, No. (%)

- Pembrolizumab: 0 (0)
- Nivolumab: 1 (1.4%)

Prior treatment with ipilimumab, No. (%)

- Pembrolizumab: 0 (0)
- Nivolumab: 0 (0)

Adverse Effects by Cancer Type**

- Lung (squamous): 6 (8.5%)
- Lung (adenocarcinoma): 30 (42.4%)
- Lung (small cell): 20 (28.7%)
- Renal: 0 (0)
- Hodgkin’s Lymphoma: 2 (2.8%)

Primary Endpoint Results (N = 133)

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<th>Pembrolizumab (n=62)</th>
<th>Nivolumab (n=71)</th>
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<tbody>
<tr>
<td>Outpatient setting, No (%)</td>
<td>62 (100%)</td>
<td>71 (100%)</td>
</tr>
<tr>
<td>Prescribed by authorized provider, No (%)</td>
<td>62 (100%)</td>
<td>71 (100%)</td>
</tr>
<tr>
<td>FDA-approved indication*, No (%)</td>
<td>44 (71.2%)</td>
<td>25 (35.3%)</td>
</tr>
<tr>
<td>Off-label use*, No. (%)</td>
<td>18 (29%)</td>
<td>45 (63.4%)</td>
</tr>
</tbody>
</table>

Adverse effects requiring:

- Lung (n=57): 3 (6%)
- Melanoma (n=72): 6 (8%)

Conclusions

- Utilization of pembrolizumab and nivolumab was restricted to outpatient use and prescribed by authorized chemotherapy providers in all cases, while accordance to FDA-approved indications was more common with pembrolizumab (71%) compared to nivolumab (35.3%).
- Most common reason for off-label pembrolizumab use was first-line melanoma therapy.
- Adverse effects were more frequent in patients with melanoma.
- Reimbursement ranged greatly but commonly fell within the 10% to 30% range, with Medicaid and Medicare patients having lower average reimbursement.

References