Impact of the American Taxpayer Relief Act on Stereotactic Radiosurgery Utilization in the United States

Shearwood McClelland III MD1, Catherine Degnin PhD MS2, Yiyi Chen PhD2, Gordon A Watson MD PhD1, Jerry J Jaboin MD PhD3

1Department of Radiation Oncology, Indiana University School of Medicine, Indianapolis, IN; 2Biostatistics Shared Resource, Oregon Health and Science University, Portland, OR; 3Department of Radiation Medicine, Oregon Health & Science University, Portland, OR

BACKGROUND

- The impact of public policy on treatment intervention has been long understood, but relatively sparsely examined, particularly in the realm of central nervous system (CNS) disease.

- For patients with metastatic brain disease, stereotactic radiosurgery (SRS) spares appropriately chosen patients from the invasiveness of operative intervention and the often permanent cognitive morbidity of whole brain radiation, in addition to being more than 40% less expensive than open surgery. (Brown et al., JAMA 2016; Caruso et al., J Clin Neurosci 2015)

- SRS is delivered predominantly via two modalities: Gamma Knife radiosurgery (GKRS), and linear accelerator (LINAC); the former usually in a single-fraction setting, and the latter ranging from one to five fractions. (Andrews et al., Surg Neurol 2006)

- The implementation of the American Tax Payer Relief Act (ATRA) in 2013 represented the first time that limitations specifically targeting SRS reimbursement were introduced into federal law.

- The subsequent impact of the ATRA on SRS utilization in the United States (US) has yet to be examined.

RESULTS

- From 2012 to 2013, there was a substantial decrease of LINAC SRS in favor of GKRS overall (37% to 28%) and individually in both academic and non-academic centers.

- Over the three-year span immediately preceding ATRA implementation, 65.8% received GKRS and the remaining 34.2% receiving LINAC.

- In the four years immediately following ATRA implementation 68.0% received GKRS compared with 32% receiving LINAC; these differences were not statistically significant.

Table 1: Utilization of LINAC versus Gamma Knife SRS before (2010-2012), during (2012-2014), and after (2015-2015) implementation of the ATRA

<table>
<thead>
<tr>
<th>Year</th>
<th>LINAC</th>
<th>Gamma Knife</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-2012</td>
<td>73.5%</td>
<td>26.5%</td>
<td></td>
</tr>
<tr>
<td>2012-2014</td>
<td>51.4%</td>
<td>48.6%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>2015-2016</td>
<td>32.0%</td>
<td>68.0%</td>
<td></td>
</tr>
</tbody>
</table>

CONCLUSIONS

- ATRA implementation in 2013 caused an initial spike in Gamma Knife SRS utilization, followed by a steady decline towards rates prior to implementation.

- These findings are indicative that the ATRA provision mandating Medicare reduction of outpatient payments for Gamma Knife to be equivalent with those of LINAC SRS had a significant short-term impact on the radiosurgical treatment of metastatic brain disease throughout the US.

- Such findings should serve as a reminder of the importance and impact of public policy on treatment modality utilization by physicians and hospitals.

MATERIALS AND METHODS

- The National Cancer Data Base (NCDB) from 2010-2016 identified brain metastases patients from non-small cell lung cancer (NSCLC) throughout the US having undergone SRS.

- Utilization between GKRS and LINAC was assessed before (2010-2012) versus after (2013-2016) ATRA implementation.

- Utilization was adjusted for several variables, including patient demographics and healthcare system characteristics. Significance was defined as a two-sided P value < 0.05.

DISCLOSURES

McClelland, Degnin, Chen, Watson, Jaboin – nothing to disclose

Corresponding Author: Shearwood McClelland III, M.D. (drwood@post.harvard.edu)