INTRODUCTION

Radiation therapy has been shown to improve locoregional control in patients with head and neck squamous cell carcinoma (HNSCC) as both a primary and adjunctive therapy. However, this therapy is associated with the altering toxicity to surrounding tissues including the spinal cord, brainstem, parotid glands, lacrimal glands, auditory structures, eyes and optic tracts.

Intensity-modulated radiation therapy (IMRT) was developed within the last decade to reduce these toxic effects by the precision and modulation of the radiation beam to sculpt the dose away from these vital structures. While it is traditionally believed that these toxicities are reduced with IMRT, a literature review of retrospective studies demonstrates a paucity of data for a clear consensus regarding improved outcomes in IMRT. (Jellema, A. P., B. J. Slotman, et al. (2007). “Impact of radiation fractionation for IMRT may not lead to a significant change in the IMRT code for delivery (p = .164); however, there was a correlation between the reimbursement for planning of IMRT and then usage of the modality (p = .013). As IMRT reimbursements have increased, the use of IMRT use has also increased. Fig 5

RESULTS

• We identified 10,689 patients in the SEER-Medicare database from 2002 to 2007 who were treated for HNSCC. Of these patients 8176, 76.5% were treated with Radiation, and of that subset, 2512 (23.5%) were treated with IMRT.

• Change in use over time: IMRT has seen a steady increase in its use since its adoption in early 2000. Our analysis shows only 2% of patients in our cohort being treated with IMRT during the first year when the reimbursement was available from Medicare. By 2002 this increased to 10%. In 2005 this increased to 35.4% and in the latest data set available 2007, a majority of patients were being treated with IMRT, 53.9%. See Fig 1

• We further examined the use of IMRT for each HNSCC subsite and for the socioeconomic status of each patient. Fig 2-4

• A correlation analysis revealed that there was no significant correlation between the change in the IMRT code for delivery (p = .164); however, there was a correlation between the reimbursement for planning of IMRT and then usage of the modality (p = .013). As IMRT reimbursements have increased, the use of IMRT use has also increased. Fig 5

DISCUSSION

There have been no randomized trials assessing whether newer treatments such as IMRT have any clinical benefit including loco-regional control or a survival benefit over traditional radiation treatments (Weideman, Madani et al. 2008). There have been a number of retrospective studies demonstrating a reduction in long-term toxicity including damage to the salivary gland tissue, mandible and mucosal surfaces (Elsbruch, Sibb et al. 2003; Studies; St John et al. 2006). However, the cost of IMRT is estimated to be 4x that of standard radiation treatments (Mell, Mehrotra et al. 2005). In the Urologic literature, the role of physician reimbursement driving health care practices has been explored in the clinical journals (Nguyen et al 2011) as well as in major publications such as the Wall Street Journal. A survey of radiation oncologists has also shown that economic competition was a primary motivator for the use of IMRT (Mell, Mehrotra et al. 2005). Our study shows that IMRT technology has been rapidly adopted in the last decade for treatment of HNSCC. While there was a significant correlation between the reimbursements of one of the CPT codes associated with IMRT use, there are many confounding factors that may have led to this finding.

Our study brings into discussion the current model of assimilation of new technology: where newer expensive technology becomes available and is reimbursed by health plans, it is quickly implemented before there is adequate data on its clinical benefits and cost effectiveness. In the evolving landscape of American healthcare the model may no longer be feasible. Our current study does not demonstrate a shift in usage of IMRT with a change in Medicare reimbursement (figure 4). However, a small change in the reimbursement pattern for IMRT may not lead to a significant change in usage since the overall reimbursement is so much greater when compared to that of standard radiation.

Limitations

Our study has limitations inherent in a large retrospective administrative database analysis. Our findings also only apply to patients over 65 years old and the outcomes may differ in a younger population cohort. SEER-Medicare does not provide characteristics information regarding technology available to the individual office, so we cannot determine how availability in each region affected the usage of IMRT.

REFERENCES


SEER Cancer Registry, a National Cancer Institute-supported database, records incident cancer cases from 16 separate registries, which cover 26% of the US population. The Medicare program then links patients in the SEER database with their Medicare payments for hospital, physician and outpatient medical services.

Our study was approved by the UCLA Institutional review board and a data-use agreement was in place with the Centers for Medicare and Medicaid Services; patient data was de-identified and the requirement for consent was waived. All patients diagnosed with HNSCC within the SEER-Medicare database were included. These included patients with cancers in one of the following sites lip, tongue, floor of mouth, gum or other mouth, oropharynx, nasopharynx, hypopharynx, and salivary gland.

Once this initial cohort was identified we further refined the group by selecting all patients who were treated with radiation as part of their treatment plan, either as primary surgery or as a part of a multimodality treatment plan. These patients were identified using the Medicare claims for radiotherapy.

Using CPT/ICD9 codes and the Medicare Billing data, we then further stratified our data for those patients who were treated with IMRT by using the Medicare billing including the CPT code for either Planning or Delivery of IMRT (CPT codes 77418 or 77301). Other characteristics examined during this study include: Age, Gender, Race, Socioeconomic Status, subsite of cancer (as above).

Medicare reimbursement data was obtained from the CMS.gov website for each of the CPT codes associated with IMRT treatment. The reimbursement amount will vary from region to region, and so a low, high, and mean value was used in our calculations.

Statistical Analysis: A correlation analysis was then performed between the reimbursement for delivery and planning for IMRT and IMRT usage/age.

METHODOLOGY

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