

A patient centric model in treatment of HNC

**Efficiency of Treatment of Head and Neck Cancer
Utilizing a Patient Centric Navigation Model**

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Abstract

Objective/hypothesis:

Specific temporal goals for timeliness of treatment of head and neck cancer (HNC) are common in Europe, but are uncommon in the United States. At our institution, we implemented a patient centric navigation model with an aspirational goal that all patients will receive treatment recommendations within two weeks of presentation. The objective of this study was to determine the efficacy of this model and to identify the factors that delay initiation of treatment.

Study Design:

Retrospective study

Methods:

We identified 100 consecutive patients treated for squamous cell HNC at a specialty clinic between 2011 and 2014. A patient-centered navigation system with an aspirational goal of treatment recommendation within two weeks was in place during this time period. Outcome measures analyzed were the interval between presentation to clinic and definitive treatment recommendations, as well as, factors associated with delay.

Results:

50.5% of the patients received treatment recommendations within the two-week period with median and mode values of 15 and 14 days respectively. The vast majority were seen within 17 days of presentation. Outliers include patients with synchronous lung nodules and patients with psychosocial barriers.

Conclusions:

The use of a patient-centered navigation model proved somewhat effective in reaching our targeted two-week interval from time of referral to HNC clinic to treatment discussion. While not all of our patients fell within this time period, our aspirational goal was shown to be reasonable

and attainable. Two subsets of outliers were identified: patients with psychosocial barriers and those with lung nodules. Further studies should address these outliers; as well as, find out what modifications to our system will afford more efficacious care.

Key words:

Head and neck cancer, HNC, patient centric health navigation, time delays, health care delivery

Levels of evidence:

2b, Individual cohort study

INTRODUCTION:

Practice patterns for the management of head and neck cancer (HNC) are undergoing significant change; a recent study documented that from 2002 to 2010, the percentage of patients treated in an academic medical center increased from 61.7% to 79.8%. Factors contributing to this shift include the complexity of care rendered, the comorbidities of the patients, and the funding source for these patients.¹⁻³ Concentration of care within well-defined systems affords the opportunity of improved efficiency through standardization of delivery approaches.

Effective management of HNC patients poses a significant challenge for the health care system. Patients often present with advanced disease, significant medical comorbidities, and a lower socioeconomic status. Particular high-risk groups have been identified and include African Americans and those of a lower socioeconomic status. Management of these patient populations is both labor intensive and resource consumptive, with these groups at an increased risk for poor outcomes.¹

Patient navigation has been proposed as one strategy to improve the outcomes for at risk populations. Pioneered by Harold Freeman, patient navigation was initially a community-based initiative in which volunteers would help marginalized patients navigate the health care

system. The premise was that even the most health care literate patient would have difficulty navigating the complex diagnostic, treatment, and surveillance algorithms inherent in cancer care and that this effect would be further compounded in the health care illiterate patient.

In the aftermath of Hurricane Katrina, we noted that a large proportion of our HNC patients were coming from high-risk groups and were presenting with advanced disease. We formed a faith and community based partnership (*Healing Hands Across the Divide*) with a focus on early detection, prevention, and effective management of HNC. Through a series of forums, the community identified the need for efficient patient-centric care. This approach to patient-centric care would involve efficient diagnosis and treatment planning as soon as the patient entered the health care system.⁴

In 2011, we re-designed our HNC system utilizing a patient-centric navigation model. Our team had an aspirational goal that all patients with head and neck tumors would have diagnosis and treatment recommendations within a two-week period. We developed a platform with a nurse coordinator serving as an intake nurse, as well as, patient navigator. The patient navigator would work with the head and neck service to coordinate imaging studies, referrals, and surgery. We instituted a weekly multidisciplinary treatment planning conference in which all new patients and patients under active treatment were discussed. We hypothesized that such a system would improve our efficiency in terms of health care delivery. This retrospective study tests this hypothesis.

Materials and Methods

Study population and data collection:

We identified 100 consecutive patients with a diagnosis of primary squamous cell HNC who presented to the Tulane University School of Medicine Head and Neck Clinic between 2011 and 2014. Relevant demographic information including: insurance type, race, age, sex, and tobacco use, as well as, site and stage data were collected.

Seven patients were excluded from the original sample population, leaving a final study population of 93 patients. Three were lost to follow up, three were found to be recurrent cases and one was found to be benign upon staging. Time intervals between their first symptoms, presentation, biopsy, treatment recommendation and treatment start dates were then determined. In this study, *treatment recommendation* is defined as the date the physician discussed the diagnosis and treatment options with the patient. Treatment recommendation occurs after the patient and biopsy results are discussed at tumor board. *Treatment start date* is defined as the date either the patient received surgery or when a chemo and/or radiation therapy regime was initiated. All patient information and data was collected and protected following guidelines set forth by the Tulane Institutional Review Board and HIPPA regulations.

Patient Centric Navigation Model:

The model that we used involves the assignment of a nurse who acts as a patient navigator to each patient that is sent to the head and neck clinic. Once referred, the patient's navigator makes an appointment at the clinic within two days. If the patient does not yet have a definitive diagnosis, one is made using the various modalities available: imaging, fine needle aspirate, or panendoscopy with biopsy. Pending this diagnosis, the patient is discussed at a multidisciplinary tumor board meeting that convenes every Thursday. Here, the HNC specialists, radiation oncologists, medical oncologists, and speech pathologists determine the formal treatment recommendation that will be offered to the patient. The following day, the patient returns to clinic to have a discussion of their treatment options. Ideally, this entire process occurs within two weeks of the initial referral. (Figure 1)

Data Analysis:

Data and statistic analysis was preformed using SAS 9.4(SAS Institute, Cary, NC) and Prism 6 (Graphpad Software, San Diego, CA).

Results:

Study population demographics:

Analysis revealed that the study population presenting to the Tulane Head and Neck Clinic was quite homogenous. The majority of the cases were white (87%) males (79.6%) with an average age of 63.4 ± 10.8 years insured by Medicare (68.8%). Tobacco use was also particularly prevalent with 78% of the cases reporting a history of cigarette smoking. Cases were found to present at an advanced stage, with the majority (80.7%) of biopsies presenting with Stage III or Stage IV disease. Additionally, cancer of the oral cavity/oropharynx was the most common tumor site – 70% of patients. (Table 1)

Time Intervals encountered from symptom to presentation to clinic:

There was marked variation in the time from patient symptom to presentation to our head and neck clinic: 129 ± 164.7 days.

Time Interval for Tissue Diagnosis of Cancer:

The majority of patients who required biopsy received tissue diagnosis within 7 days of their original office visit. Marked variations were seen in the time to biopsy: average in 12.1 ± 13.4 days, with a mode of 5 days.

Time Interval from Presentation to Clinic to Treatment Recommendation:

Forty-seven patients (50.5%) treated achieved the aspirational goal of treatment recommendation within two weeks of presentation. The average time interval was 18.8 ± 18.6 days with a median interval of 15 days. (Table 2) Upon visualization of the individual time points, it was observed that 47 cases below the 14-day goal and 46 cases fell above. Additionally, of the 93 cases, 83 were within one standard deviation and 89 were within two standard

deviations. Four outliers were identified that were affected by either psychosocial barriers or lung nodules. (Figure 2)

Time Interval from Treatment Recommendation to Initiation of Therapy:

Following treatment disposition, the intervals between treatment recommendation and the initiation of treatment was found to be on average 33.7 ± 49.5 days. Taken as a whole, the time interval from first presentation to the head and neck clinic to the initiation of treatment was on average 45 days ± 29.5 days with a median interval of 36 days. The overall time from first symptom to the initiation of treatment was found to be 172.3 ± 167.1 days. (Table 2)

Outliers:

Out of our study population of 93 patients, we identified 4 that fell outside of 2 standard deviations from our mean time from ENT to treatment recommendation. Upon further investigation we found that two of these patients had psychosocial barriers that prevented them from achieving care in a timely manner, and the other two were also diagnosed with lung nodules which extended their treatment course.

Discussion:

In the United States, patients afflicted with head and neck cancer often present with advanced disease with disparate outcomes. From the perspective of stage, 60% of patients with cancer of the oropharynx are detected at an advanced stage (III or IV) with a five-year survival rate of 50%.^{5,6} In stark contrast to patients diagnosed with early stage disease who have an 80% five year survival rate.⁶ From the perspective of disparity in the United States, African American patients are twice as likely to die of HNC as their non-African American counterparts, and uninsured or individuals with Medicaid insurance are three times as likely to die of cancer.

Despite intense efforts, advanced stage at presentation and relatively low survival rates for those with marked disparities have remained constant.

A resounding question exists: what changes can be made in the health care system to improve patient outcomes? One meta-analysis suggests that diagnostic delay (the time between a patient's first symptom and their definitive diagnosis) may be a contributing factor. Patients with oral cancer with diagnostic delay were found to have a significantly higher chance of presentation with advanced disease.⁵ A system-based approach that decreases diagnostic delay—and, reasonably, any delays standing prior to definitive treatment—might significantly improve HNC patient outcomes.

At present, there are limited studies in the United States defining the temporal spectrum encompassing the time from a patient's first sign or symptom through diagnosis and through the eventual start of therapy. The majority of these studies are comprised of European and Asian investigations.

In the United States, patients with HNC are treated through a variety of healthcare delivery systems. These vary from treatment by a solo-practitioner, through community based cancer centers, regional health systems, or national health systems. Little is known about patient and provider delays outside of the Academic Medical Center. Perhaps the clearest picture emerges from a retrospective study of patients afflicted with oral cancer treated by the OMFS service at UCSF. Peacock *et al* found that the mean time from symptom to treatment initiation was 206 days. Patient delay was the largest contributing factor: mean of 104.7 days. Provider delay was also lengthy: the average delay for patients undergoing a biopsy or being referred to a specialist (35.9 days), actually visiting a specialist (17.7 days), undergoing additional appropriate tests (10.1 days), being presented at head and neck tumor board (20.7 days), and commencing treatment (16.6 days).⁷ Patel *et al* reported data concerning the efficiency of health care delivery at an inner city hospital, reporting a mean time from presentation to treatment recommendations of 23 days. Patients with early stage tumors were

noted to have decreased times of treatment planning when compared to those with later stage tumors.⁸ This is in contrast to our data, where we showed a time interval of 18 days, with the large majority of cases presenting at an advanced stage.

While the concept of patient delay has illuminated areas for intervention such as increasing awareness and providing screening programs, provider delay arguably deserves more attention.⁹ Health systems in Europe have developed aspirational goals to reduce provider delay. In the United Kingdom, a two-week referral route was developed that allows efficient referral from primary care physician to sub-specialist. Although this route exists, only 21.4% of head and neck cancer patients diagnosed between 2004 and 2006 utilized this pathway.¹⁰ In 2004, the Netherlands established an aspirational goal of 30 days from first visit to a specialist to the initiation of treatment. The platform introduced is a health system in which nearly all patients diagnosed with a head and neck cancer are referred to a head and neck clinic for management. Despite this mature system, only 7% of patients with laryngeal cancer, 13% of patients with pharyngeal cancer, and 41% of patients with oral carcinomas were able to obtain this aspirational goal.¹¹ Health systems in the United States have not developed similar aspirational goals.

In this study, we present data concerning our ability to achieve a self-determined aspirational goal of delivering multi-disciplinary treatment recommendations within 14 days of patient presentation to the health care system. We were only able to achieve this goal in a slight majority of our patients. Nevertheless, the resounding majority of our patients were within one standard deviation of this aspirational goal. This indicates that while we have not achieved our aspirational goal entirely, most of our patients received timely care.

In this study, a subset analysis revealed that there were two groups of outliers: those with significant psychosocial needs and those with lung malignancies. Psychosocial needs, including mental illness and lack of social support, contributed both to patient and provider

delay. The presence of synchronous lung nodules added complexity to patient care and contributed to provider delay.

Future studies investigating both the potential and factors contributing to treatment delay for these two patient populations are necessary. Identification of specific psychosocial barriers that contribute to patient delay may allow for effective management strategies using mental health professionals. Choreography of care with existing resources including thoracic oncologists may allow for more efficient care in patients with synchronous lung nodules. System-based solutions that change health care delivery may positively impact outliers identified in this study.

Conclusion:

At our institution, the use of a patient-centric navigation model in a head and neck cancer clinic allowed us to achieve our aspirational goal of rendering treatment recommendations within two weeks of presentation in half of the patients. Marked variations of timeliness of treatment were seen in this patient population. The vast majority of patients had treatment recommendations within three weeks of presentation. Sub-groups identified with significant delay include those with synchronous lung lesions and those with psychosocial barriers to care. Further effort is needed to address the needs of the outliers.

Acknowledgements:

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Appendix

Results:

Head and Neck Study Quality Figures- Reported November 2014 TCC Cancer Committee

	Total	Mean	STDev
Age	93	63.4	10.8
Tobacco use	72 (78.3%)		
<i>Gender:</i>			
Male	74 (79.6%)		
Female	19 (20.4%)		
<i>Race:</i>			
Black	12 (13%)		
White	81 (87%)		
<i>Stage:</i>			
1	5 (6.0%)		
2	11 (13.3%)		
3	15 (18.0%)		
4	52 (62.7%)		
<i>Insurance type:</i>			
Private	29 (31.2%)		
Medicare/Medicaid	64 (68.8%)		
<i>Cancer site:</i>			
Oral/Oropharynx	63 (70%)		
Hypopharynx	10 (11.1%)		
Laryngeal	17 (18.9%)		

Table 1: Study population demographics. Data collected from the cases was analyzed to provide information on our study population. Variables that were of collected were: age, gender, sex, race, history of tobacco use, cancer staging (1-4), insurance type, and primary cancer site (oropharynx, hypopharynx or laryngeal).

Time Period	Mean	Median	Mode	STDev
Symptom to ENT	129.0	73	31	164.7
ENT to Bx	12.1	7	5	13.4
ENT to TR	18.8	15	14	18.6
TR to Tx	33.7	24	7	49.5
ENT to Tx	45.0	36	34	29.5
Symptom to Tx	172.3	114	98	167.1

Bx=Biopsy, TR=treatment recommendation, Tx=treatment

Table 2: Time Intervals encountered from symptom to treatment of head and neck cancer. Dates of first symptom, presentation to clinic, biopsy, treatment disposition, and treatment initiation were recorded and analyzed. Data for each time interval in the starting with first symptom and ending with the initiation of treatment was presented as mean with standard

deviation, median, and mode values for all cases. Median and mode values were included to highlight outliers' effects on mean values.

Nurse Coordinator



Figure 1: Patient-centric navigation model to HNC diagnosis and treatment. The model that we used involves the assignment of a nurse coordinator to each patient that is sent to the head and neck clinic. Once referred, the patient's coordinator makes an appointment at the clinic within two days. If the patient does not yet have a definitive diagnosis, one is made using the various modalities available: imaging, fine needle aspirate, or panendoscopy with biopsy. Pending this diagnosis, the patient is discussed at a multidisciplinary tumor board meeting that convenes every Thursday. Here, the head and neck cancer specialists, radiation oncologists, medical oncologists, and speech pathologists determine the formal treatment recommendation that will be offered to the patient. The following day, the patient returns to clinic to have a discussion of their treatment options. Ideally, this entire process occurs within two weeks of the initial referral.

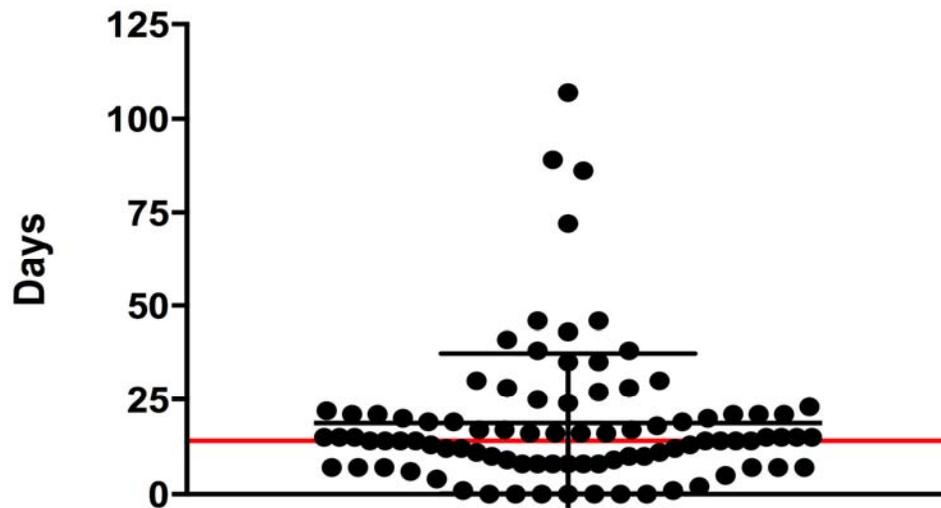


Figure 2: Distribution of time from presentation to treatment disposition. The time interval from first presentation to the head and neck clinic to treatment disposition was plotted as a scatter plot showing the distribution of each individual case. A red line was included at 14 days, which marks our aspirational goal of presentation to treatment disposition within 14 days. 47 cases were observed to be below the 14 day cut off, and 46 were observed to be above. Additionally, 83 cases were within one standard deviation of the mean and 89 were within two standard deviations of the mean.