Background: Cancer of unknown primary (CUP) make-up 2-7% of patients who present with head and neck squamous cell carcinoma. Overall, these patients have increased morbidity, mortality, and cost of work-up compared to those with known primary sites. Hypothesis: Objective measurements on CT will allow the primary site to be predicted preoperatively.

Methods: Retrospective chart review of sequential patients who initially presented as CUP but subsequently had their primary site identified as tonsil or base of tongue (BOT) after directed biopsy at the time of neck dissection. Pre-operative CT scans were reviewed by 2 radiologists blinded to the final diagnosis. The following measurements were made for the tumor and non-tumor side: parapharyngeal mucosal thickness (PPMT), axial and coronal parapharyngeal space area (PPSA), parapharyngeal space volume (PPSV). A presumed diagnosis of the primary site (BOT vs tonsil) was also made based on radiologic findings. Pooled data and subpopulations based on BMI and primary site were analyzed using Fisher’s Exact Test and multivariate analysis.

Results: Nineteen subjects were included. There was no significant difference between any of the four measurements between the tumor and non-tumor side. Radiologists were significantly better at predicting tumor site when the tumor axial PPSA was below the median value (165 mm²). Patients with CUP have increased morbidity from more procedures and less targeted and more toxic treatment. They also have a higher mortality with a lower 5 year survival compared to patients with a known primary site. Additionally, their work-up is more costly with PET/CT becoming standard of care. We wanted to determine if subtle findings on CT scans could improve primary site detection and ultimately decrease the morbidity, mortality, and cost of diagnosis for CUP.

Conclusions

Most patients who present with head and neck CUP have a primary site ultimately identified in the oropharynx. We performed this study to determine if measurements on standard CT of the neck could aid in correctly identifying the primary site as tonsil vs BOT. Although no significant differences were found in the tumor vs non-tumor side in any of the measurements, we did find a significant difference in the ability of our radiologist team to predict the primary site in patients with lower than median axial PPSA, even when controlling for the confounders of PPSV and obesity. We suspect that in patients with a lower axial PPSA, subtle abnormalities in mucosal architecture may be more apparent, allowing for more accurate diagnosis. We hope to expand these findings in a prospective trial.