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## Background

Patients >70 years of age make up 25% of newly diagnosed HNSCC.<sup>1</sup> An increasingly older population presents an obstacle in prognosticating overall survival in HNSCC, as unique characteristics exist among older populations and there is a paucity of data related to outcomes in older populations with HNSCC.<sup>2</sup>

Chronological age has historically influenced cancer-related treatment outcomes and clinical decision-making. The benefits of chemotherapy decrease as age increases for most cancers, due to accompanying toxicities that impact quality of life and survival.<sup>3,4</sup> Despite these differences, current research shows similar tolerance to surgical and radiotherapy treatment in younger and older patient populations.<sup>5,6</sup>

As life expectancy continues to increase in developed countries, it is important to understand the prognostic factors that impact HNSCC survival in older populations. The studies purpose is to answer the following clinical question: Among patients older than 70 years of age with HNSCC, which prognostic factors have the greatest impact on overall survival?

## Methods

Retrospective cohort study of patients 70 years of age and older with HNSCC treated at Cooper University Hospital in Camden, NJ between 2005 and 2017 were identified through an institutional head and neck cancer database.

Treatment was divided into no treatment, radiation, surgery, and radiation and surgery. No treatment was defined as patients that did not receive curative treatments (surgery or radiation). Non-curative treatments included palliative radiation, chemotherapy, and immunotherapy.

Overall survival (OS) rates were calculated from date of diagnoses using the Kaplan-Meier method and compared by the log-rank test. Univariate and multivariate analyses for prognostic factors affecting OS were done with the Cox proportional hazards regression model.

## Results

The study population consisted of 139 patients; 54 patients ages 70-74, 37 patients ages 75-79, 29 patients ages 80-84, 16 patients ages 85-89, and 3 patients age ≥90. More patients underwent curative treatment for their cancer (114 of 139 [82%]) than non-curative treatment (25 of 139 [18%]). The most common curative treatment used was radiation without surgery (69 of 114 [60%]). Three-year overall survival for patients with HNSCC age 70 and older was 33% with a median survival of 22 months. The median survival for radiation (22 months [14.50-29.50]), surgery (51 months [8.40-93.59]), and radiation and surgery (26 months [16.49-27.51]) were all greater than the non-curative group (p=<.001).

| Table 1: Cox regression analysis in patients age 70+ with HNSCC. |                     |        |                       |        |
|------------------------------------------------------------------|---------------------|--------|-----------------------|--------|
| Group                                                            | Overall Survival    |        |                       |        |
|                                                                  | Univariate Analysis |        | Multivariate Analysis |        |
|                                                                  | HR (95% CI)         | P      | HR (95% CI)           | P      |
| Age                                                              |                     |        |                       |        |
| ≥80                                                              | 1.57 (1.05-2.35)    | 0.03   | 1.72 (1.13-2.60)      | 0.01   |
| Clinical Stage                                                   |                     |        |                       |        |
| I                                                                | Reference           | -      | Reference             | -      |
| II                                                               | 2.08 (1.02-4.26)    | 0.04   | 1.77 (0.85-3.68)      | 0.13   |
| III                                                              | 2.27 (1.14-45.29)   | 0.02   | 2.19 (1.06-4.54)      | 0.04   |
| IV                                                               | 2.94 (1.64-5.28)    | <0.001 | 2.62 (1.39-4.96)      | 0.003  |
| Treatment                                                        |                     |        |                       |        |
| No Treatment                                                     | Reference           | -      | Reference             | -      |
| Radiation                                                        | 0.45 (0.27-0.75)    | 0.002  | 0.44 (0.26-0.75)      | 0.002  |
| Surgery                                                          | 0.26 (0.12-0.55)    | <0.001 | 0.40 (0.18-0.89)      | 0.03   |
| Radiation + Surgery                                              | 0.27 (0.13-0.54)    | <0.001 | 0.25 (0.12-0.51)      | <0.001 |

Patients that received radiation and surgery had the greatest association with increased OS (HR=0.25 [95% CI,0.12-0.51]). When treatment type was stratified by ages 70-79 and ≥80 years of age, patients 70-79 years of age had increased survival when treated with radiation, surgery, or radiation and surgery (median [95% CI], 28 [17.2-38.8], 97 [15.8-178.1], 25 [17.5-32.5]) compared to patients who did not get curative treatment (13 [3.1-22.9]) (p=<0.001-0.008). Patients ≥80 years of age also showed improved survival when treated with radiation, surgery, or radiation and surgery (median [95% CI], 13 [3.6-22.4], 16 [0.0-44.2], 33 [0.0-75.3]) compared to patients that did not receive curative treatment (6 [0.0-12]), though radiation and surgery had a statistically significant difference in log-rank comparison (p = 0.01)

## Discussion

The objective of this study was to assess outcomes for elderly patients with HNSCC and understand predictors of survival. Our study suggests that while age alone has a negative association with overall survival exploration of additional health indices beyond age are needed to offer the optimal HNSCC treatment in elderly patients.

In our cohort, we found that patients who received curative treatment had statistically significant improved survival compared to those not receiving curative treatment. When stratified by ≥80 years of age, these results remained significant. Our findings align with Michal et al. who found that adults >70 years of age undergoing chemo-radiation had almost identical 5-year disease specific survival as their younger counterparts, suggesting that more aggressive therapy regimens provide significant benefit in older populations.<sup>5</sup>

The benefits of aggressive treatment in older populations is important as patients 45-60, 70-79, and ≥80 years of age receiving standard treatment for HNSCC in patients was found to be 89%, 75,% 35% respectively; no treatment was given to 4%, 13%, and 18%.<sup>7</sup> While older populations are currently less likely to be offered curative treatment for HNSCC, our findings suggest that age alone should not be the sole factor in this decision.

## Conclusion

We found that elderly HNSCC patients can have favorable outcomes with aggressive therapy and that age alone should not prohibit patients from receiving curative intent treatment. Further studies are needed to explore the impact of additional clinical prognostic factors to best understand the risks and benefits of HNSCC treatment in elderly populations.

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