High-grade histology, T stage, N stage, lymphovascular invasion (LVI), and perineural invasion (PNI) predict recurrence after surgical resection of major salivary gland tumors (MSGTs). Consequently, they are often indications for postoperative radiation therapy (RT), which has been shown to improve locoregional control. However, predictors for recurrence and survival after RT are not as clear. We analyzed our institutional experience with MSGTs to identify predictors of outcomes after RT.

**METHODS**

- We performed retrospective review of MSGT patients treated with definitive oncologic resection and adjuvant photon IMRT at Memorial Sloan Kettering Cancer Center from 2010 to 2019. No patients had prior head/neck radiation.
- The prognostic significance of LVI, recurrent disease, metastatic disease, grade, T3/T4 stage, node-positive, PNI, close/positive margin, PNI, node-positive (N+), extracapsular/extranodal extension, multiple risk factors, age, and gender was analyzed.
- The Kaplan-Meier method was used to estimate time-to-event outcomes and the Cox proportional hazards model was used to determine the effects of covariates. Toxicity was graded as per CTCAE version 5.0.
- Median follow up time was 44 months (range 2-114) and median dose of RT delivered was 66 Gy (50-4.7).

**RESULTS**

- The parotid was the most common site (74%) and the most common histology was adenoid cystic carcinoma (23%).
- Multiple risk factors (MRF) was defined as two or more of the following: T3/T4 stage, high-grade, LVI, PNI, close/positive margins, or node-positive (N+).
- Table 2 summarizes results. Shaded yellow box = significant on univariate analysis (UVA).
- Red outlined box = significant on multivariate analysis (MVA).
- OS was worse if: metastatic at the time of RT, +LVI, and male gender. No covariates were significant on MVA.
- DMFS was worse if: metastatic at the time of RT, high-grade, T3-T4, N+, +LVI, +PNI, +ECE, male gender, and multiple risk factors. Only metastatic disease at time of RT was significant on MVA (p<0.01).
- OS was worse if: metastatic at the time of RT, high-grade, T3-T4, N+, +LVI, +ECE, male gender, and multiple risk factors. Only metastatic disease at time of RT was significant on MVA (p<0.01).

**CONCLUSIONS**

- Adjuvant RT offers excellent local control and neutralizes risk factors of high grade, T3/T4, N+, close/+ margins, PNI, and ECE.
- Recurrence after multiple prior surgeries and LVI predict local progression after RT and could be investigated as possible indications for dose-escalation.
- LVI, high-grade, T3-T4, N+, PNI, ECE, and MRF predict DM after RT and may warrant consideration of concurrent chemotherapy.
- Toxicity is low and 5-year locoregional control exceeds 95% with adjuvant RT in high-risk postop patients.