

## **Salvage surgery and Intraoperative electron beam radiotherapy for locoregionally persistent or recurrent head and neck cancer: single institute study.**

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**Background:** Patients with recurrent head and neck squamous cell carcinoma (rSCCHN) typically have poor survival outcomes. Salvage surgery with or without adjuvant external beam radiotherapy +/- chemotherapy remains the primary treatment approach but is associated with high rates of toxicity. Intraoperative radiation therapy (IORT) delivers precise doses of radiation to the tumour bed and minimizes exposure of radiation to normal tissues.

**Objective:** In this study, we aimed to assess the efficacy and safety of IORT in rSCCHN, through this retrospective single institute study.

**Methods:** We performed a single institution retrospective study of patients who had recurrent head and neck squamous cell carcinoma and underwent salvage surgery and electron IORT from May 2001 to June 2024 (n=130). All patients previously received external beam radiotherapy (EBRT) as a component of their definitive therapy. Clinical outcomes were retrospectively reviewed, and univariate analysis was performed using log-rank tests to correlate clinical outcomes with clinic-pathologic characteristics. Kaplan Meier survival analysis was used to assess progression free survival (PFS), overall survival (OS), and local control (LC).

**Results:** The median-follow up was 15 months. The median IORT dose was 12.5 Gy (7.5-17.5 Gy) and median EBRT dose was 44 Gy (range 20-66 Gy). Of 123 patients who had margins assessed, 60 (49%) had positive margins. Extra-nodal extension (ENE) was identified in 13 of 56 patients (23%) who were assessed. The median PFS, OS, and LC were 9.9, 18.1, and 24.3 months. The 1-year PFS and LC was 40% and 68%, respectively. Patients with ENE had an inferior one-year OS compared to those without ENE (67% vs 38%, p=0.01). The one-year PFS was also significantly lower for patients with positive margins (50% vs 30%, p=0.02) and ENE (55% vs 22%, p=0.02). The rate of acute CTCAE Grade  $\leq 3$  toxicity was 7.6%, with 5 (3.8%) patients who had G3 dysphagia, 4 (3%) had localized fistula, 1 patient had open neck wound, and 1 had tracheitis. The rate of Grade 5 toxicity was 0.7%, and was a carotid blow out (this patient had a skin graft instead of a flap).

**Conclusions:** The combination of surgical salvage with IORT is associated with good local control outcomes and minimal toxicity. Importantly, treatment related death was low in our series compared to prior EBRT series. Patients with ENE and positive margins have adverse outcomes, and prospective studies are needed to evaluate novel systemic therapy strategies such as immunotherapy to address distant disease.

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