Postoperative Outcomes Following Salvage Surgery with Intraoperative Radiation for Recurrent Head and Neck Cancer

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Bottom line: IORT during salvage free-flap surgery adds nearly two hours of operative time without a significant increase in wound complications, flap failure, reoperation, readmission, or length of stay.

INTRODUCTION

Recurrent head and neck squamous cell carcinoma (rHNSCC) carries high morbidity and poor survival, and salvage surgery is typically performed in a previously irradiated field.

Intraoperative radiation therapy (IORT) delivers a single, precisely targeted dose to high-risk margins at the time of resection while sparing adjacent tissue--but its effect on wound healing and free flap outcomes after re-irradiation is not well characterized.

Objective: Compare postoperative outcomes of salvage surgery with free flap reconstruction (SSwFF) performed with versus without IORT.

METHODS

Design: Single-institution retrospective chart review, 2012–2023

Population: Adults with rHNSCC after prior radiation undergoing SSwFF, with or without IORT delivered at the salvage resection/reconstruction

Primary outcomes: Wound complications, partial and complete flap failure

Secondary outcomes: Operative time, length of stay (LOS), return to OR, 30-day readmission

Analysis: Fisher's exact test with odds ratios (OR, 95% CI); Mann–Whitney U for operative time and LOS; multivariable logistic regression for wound complications adjusted for age, prior free flap, bone-containing flap, and smoking

148 patients with rHNSCC underwent SSwFF after prior radiation

40 IORT (27.0%)	**108** No IORT (73.0%)

Groups were similar in age, sex, smoking, and comorbidity. IORT patients were more often HPV+ (43% vs 21%), re-do fields (prior free flap 30% vs 15%), and double flaps (13% vs 3%).

RESULTS

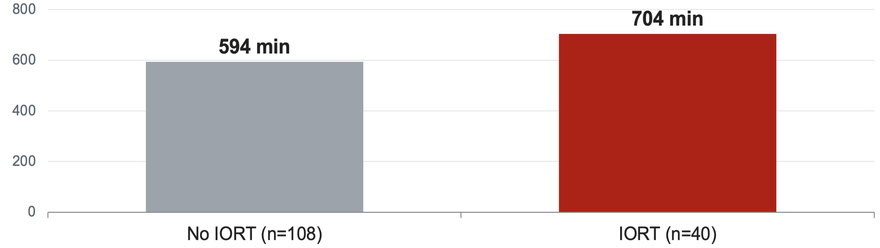
32.4% wound complications overall (48/148)

4.1% partial flap failure overall (6/148)

3.4% complete flap failure overall (5/148)

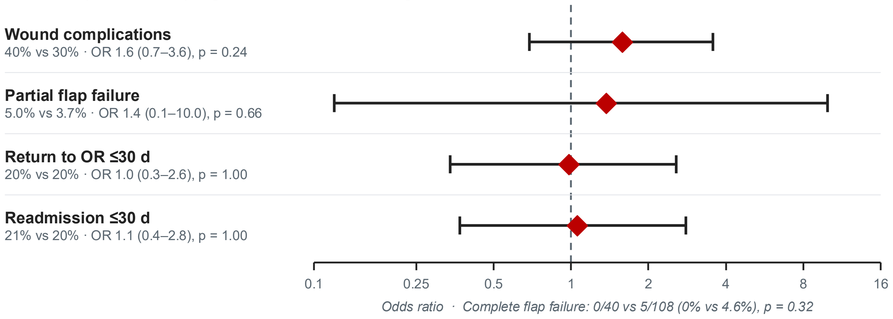
Operative time was significantly longer with IORT

Mean operative time (minutes); median 692 vs 594, p < 0.001 (Mann–Whitney U)



Odds of complications with IORT vs. no IORT

Odds ratio (exact 95% CI), log scale — OR > 1 favors higher risk with IORT



OUTCOMES BY GROUP

Outcome	IORT vs. no IORT
Operative time	**↑ Longer: 704 vs 594 min, p < 0.001**
Wound complications	40% vs 30%, OR 1.6, p = 0.24
Partial flap failure	5.0% vs 3.7%, p = 0.66
Complete flap failure	0% vs 4.6%, p = 0.32
Return to OR	20% vs 20%, p = 1.00
Length of stay	Median 8 vs 9 days, p = 0.19
Readmission	21% vs 20%, p = 1.00

CONCLUSION

Patients with rHNSCC undergoing SSwFF after prior radiation are at **high baseline risk for wound complications** (nearly 1 in 3).

IORT was **not associated with a significant increase in wound complications, flap failure, return to OR, LOS, or readmission** (adjusted OR for wound complications 1.6, 95% CI 0.7–3.4). A modest increase cannot be excluded at this sample size.

IORT added nearly two hours of operative time. IORT cases were more often re-do fields and double flaps, which likely contributes to case length and should be weighed alongside the oncologic rationale when counseling patients.

Clinical takeaway

IORT can be incorporated into salvage free-flap surgery without compromising flap survival or increasing perioperative morbidity, at the cost of a longer operation.

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