Intraoperative Radiation Therapy: A Systematic Review and Meta-Analysis

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Background

Intraoperative radiation therapy (IORT) is a treatment modality for head and neck cancer, typically used for local recurrence or gross residual disease. We completed a systematic review and meta-analysis to examine treatment patterns and patient outcomes for IORT administered to treat head and neck cancers.

Methods

- Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines were followed.
- We extracted survival probabilities and percent complications and performed a meta-analysis of proportions.
- Heterogeneity was assessed using I2.
- The random effects model was used to pool proportions from included studies.

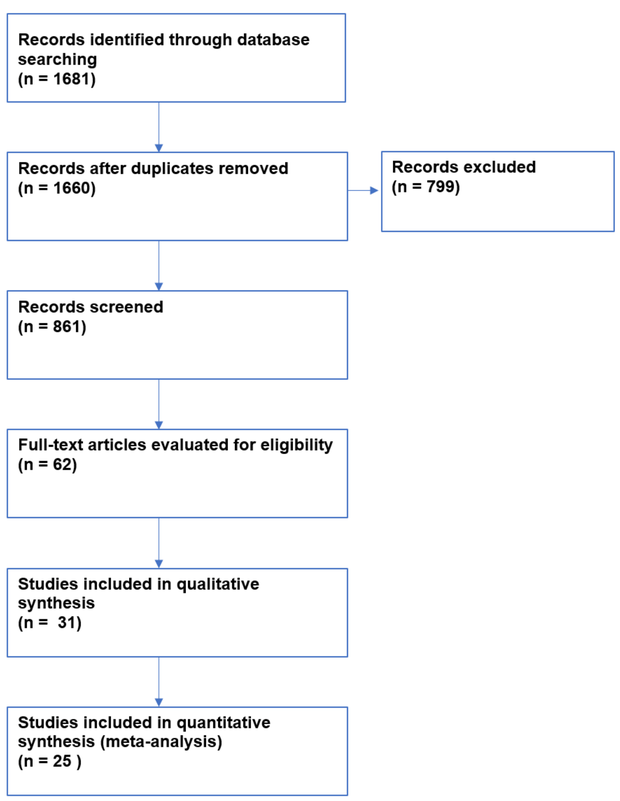


Figure 1. PRISMA flow diagram showing records searched and included

Results

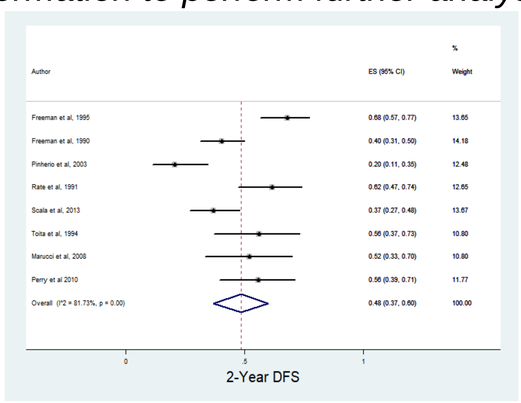
Disease Free Survival and Overall Survival

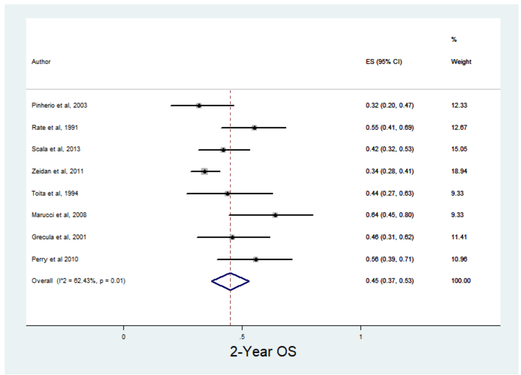
- Eight studies reported 2-year disease free survival (DFS) and overall survival (OS)
- The pooled 2-year DFS was 48% (95% CI=0.37-0.60)
- The pooled 2-year OS was 45% (95% CI=0.37-0.53)
- There was significant heterogeneity noted, I2=81.73% and I2=62.43%, respectively.

Complication Rates

- Twelve studies reported percent complications.
- The pooled proportion of complications for patients undergoing IORT was 23% (95% CI=0.17-0.30).
- There was significant heterogeneity noted as well, I2=78.81%.

The source of heterogeneity could not be further investigated given the paucity of information to perform further analysis.





Figures 2 and 3. Meta analysis of 2-year DFS and OS

Conclusions

- The 2-year OS found in our study is less than what is reported in the literature for squamous cell carcinoma, the most common histology in our review and analysis.
- The patient population receiving IORT typically has advanced and invasive disease, making it difficult to conclude what benefit IORT truly had on their outcomes.
- There is no consensus in the literature on the extent of benefits from IORT.
- The significant heterogeneity in our systematic review is evidence that there are conflicting results on the impacts of IORT.
- While there is potential for IORT to create local control and help lead to DFS, further studies are needed to clarify how IORT can be most beneficial for patients.

References

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