Impact of the COVID-19 Pandemic on Head and Neck Microvascular Reconstruction Outcomes

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Abstract

Importance: The COVID-19 pandemic challenged healthcare worldwide, including head and neck surgery and reconstruction. How these changes influenced surgical practices and outcomes remains incompletely understood.

Objective: Compare perioperative management and outcomes of patients undergoing head and neck free flap reconstruction before and during the COVID-19 pandemic.

Measured outcomes: Intraoperative practices, including tracheostomy and PEG, and postoperative outcomes, including length of stay, wound infection, two-year survival, cancer recurrence, and 30-day readmission.

Study design and methods: Retrospective cohort study of 220 patients who underwent microvascular free flap reconstruction by a single surgeon at a tertiary academic medical center.

Results: Demographic and baseline characteristics were similar between cohorts. During the pandemic, patients were less likely to undergo intraoperative tracheostomy and PEG placement. Additionally, the pandemic period was independently associated with increased wound infection risk and reduced recurrence.

Conclusions: Head and neck free flap reconstruction during the COVID-19 pandemic demonstrated stable cancer outcomes despite perioperative practice shifts. However, the higher risk of wound infection highlights the need for further investigation and targeted preventive strategies.

Introduction

- **COVID-19 strained healthcare systems**, complicating delivery of surgical care that was challenged by the need to balance urgency of interventions with infection control.
- **Microvascular free flap reconstruction** is resource-intensive, requiring significant post-operative monitoring. These operations are common in patients with head and neck cancer, making these procedures more vulnerable to pandemic-related changes and resource challenges.[1]
- **Hypothesis:** pandemic cases would demonstrate increased postoperative complications due to altered perioperative protocols and resource constraints.

Methods

Study population

- Retrospective analysis of 220 patients who underwent head and neck microvascular reconstruction performed by a single surgeon at the University of Cincinnati Medical Center between 2018 and 2021.
- Pre-pandemic cohort: operations between March 9, 2018 – June 18, 2019.
- Pandemic cohort: operations between March 9, 2020 – June 18, 2021.

Variables

- Intraoperative practices: flap type, laryngectomy, neck dissection, PEG tube, and tracheostomy.
- Postoperative outcomes: length of stay, 30-day readmission, reoperation during admission, myocardial infarction, pulmonary embolism, pneumonia, two-year survival, two-year cancer recurrence, discharge destination, fistula formation, and post-operative radiation.

Analysis

- Differences between cohorts calculated using t-tests or rank-sum tests for continuous variables and chi-square or Fisher's tests for categorical variables.
- Associations between the pandemic period and intraoperative practices and postoperative outcomes measured using Poisson regression analysis, controlling for covariates.

Results

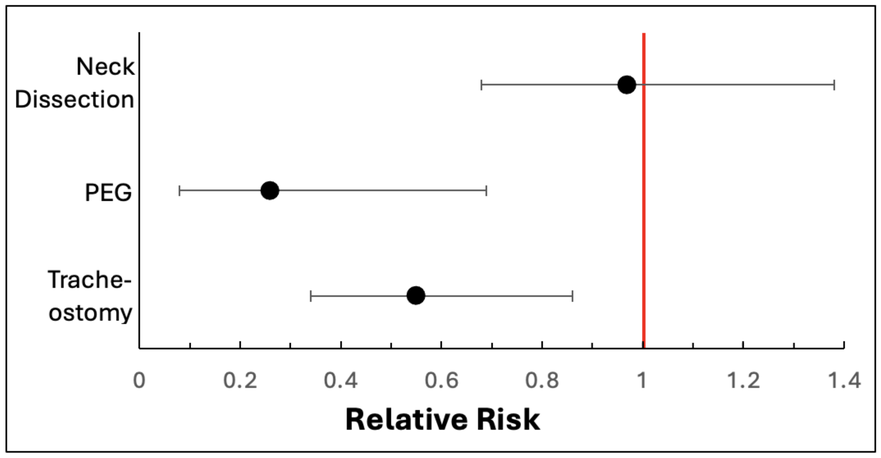

Figure 1. Relative risk of intra-operative practices in the pandemic cohort, compared to the pre-pandemic cohort.

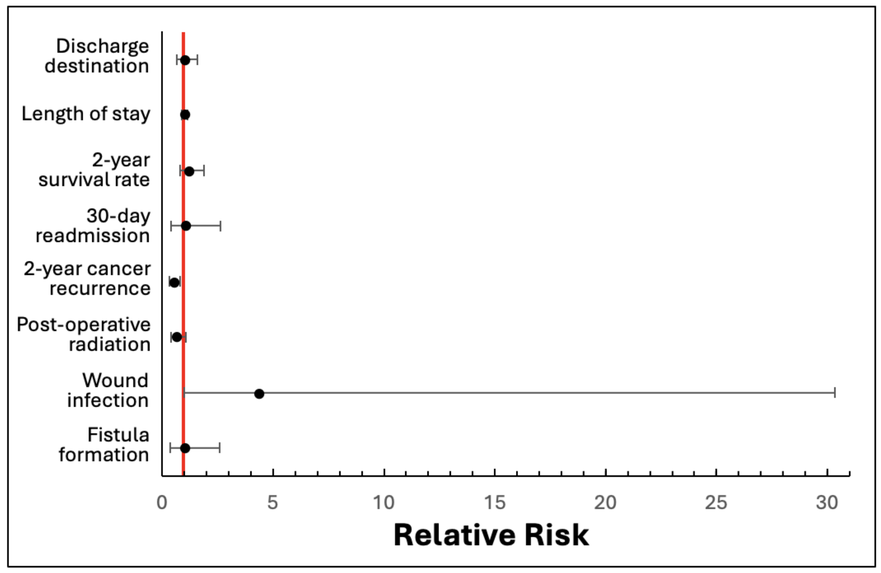

Figure 2. Relative risk of postoperative outcomes in the pandemic cohort, compared to the pre-pandemic cohort.

Discussion

- **Decreased intraoperative PEG and tracheostomy frequency** during the pandemic, aligning with previously described shifts away from intraoperative and toward pre-induction tracheostomies to minimize aerosolization.[2]
- **Increased wound infection rate** during the pandemic despite fewer PEG/tracheostomies which are associated with greater risk for surgical site infections.[3,4] Interpretation of this result is limited by wide 95% CI [0.99–30.32].
- **Lower 2-year cancer recurrence rate** among patients with head and neck malignancies in the pandemic cohort, possibly reflecting inadequate surveillance and logistical access to providers during the pandemic.[5]
- **Limitations:** lack of COVID-19 infection status at surgery, which may have influenced outcomes in the pandemic cohort, particularly the increased wound infection rate.

Conclusion

- In head and neck microvascular reconstructions by one surgeon at a single institution, the COVID-19 pandemic period was associated with fewer intraoperative PEG placements and tracheostomies, higher wound infection rates, and lower 2-year cancer recurrence. These findings suggest a potential need for targeted perioperative infection prevention and ongoing cancer surveillance.

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