



Aspiration Pneumonia and Perioperative Antibiotic Use in Transoral Robotic and Laser Microsurgery

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INTRODUCTION

Aspiration pneumonia following transoral surgery for head and neck cancer represents a post-operative complication due to abnormal swallowing function. Reported rates following transoral robotic surgery (TORS) and transoral laser microsurgery (TLMS) vary between 0-10%, but they can be as high as 20%^{1,2,3,4}.

Few studies exist which examine the factors that make patients more susceptible to developing aspiration pneumonia. The first objective of this study is to 1) determine which demographic and post-operative factors are associated with increased aspiration pneumonia rates.

As a part of their treatment, many patients are prescribed post-operative antibiotics. While prophylactic post-operative antibiotics may decrease the incidence of this complication, excessive antibiotic use can be costly, and lead to adverse reactions as well as antibiotic resistance. Additional objectives of this study are to 2) determine if the use post-op antibiotics prevent aspiration pneumonia. 3) Identify any complications related to the use of antibiotics.

PATIENTS AND METHODS

One hundred fifty-five patients who underwent transoral surgery for squamous cell carcinoma between 2008 and 2014. Demographic data, the location of resection, and post-operative antibiotics usage were collected; the MD Anderson Dysphagia Inventory (MDADI) was analyzed to assess swallowing function.

RESULTS

Sixteen of 122 patients that received postoperative antibiotics (13.1%) developed pneumonia, compared to 4/32(12.5%) patients who did not receive antibiotics ($p=0.925$). Average length of time antibiotics were given was 39.2 days (median=23). Average time to infection was 290 days (median=217, range=11-979) with only one patient in the antibiotic group developing pneumonia in the perioperative period, defined as within 30 days of surgery (Chart 1). Univariate analysis showed a correlation between pneumonia and tracheostomy placement, higher T-stage and days post-op of PEG placement (Table 1, Chart 2). Multivariate analysis showed a correlation with tracheostomy placement (Table 2). Antibiotic use did not correlate with better functional outcomes as measured by PEG placement, tracheostomy or MDADI (Table 3). No patients contracted *Clostridium difficile* infection or had other complications attributable to antibiotics. No significant trend was observed in post-operative MDADI scores (Chart 3).

Table 1. Univariate Analysis (vs. Aspiration Pneumonia)

Variable	P-Value ^a	Variable	P-Value ^a
Antibiotics Given	1.0000*	Sex	0.4913*
Peridex Given	0.4277*	ASA Comorbidity Score	0.5327
Nystatin Given	0.4277*	Location of Tumor	0.1642*
Age at Diagnosis	0.8409§	PEG	0.2541
Alcohol Use	0.3514	PEG at Last Follow-up	0.1152*
Tobacco Use	0.6328	# Days PEG use	0.9703§
Tumor Stage	0.1599*	# Days Post-Op of PEG Placement ¹	0.0297§
T Stage	0.0357*	Tracheostomy	0.0316*
N Stage	0.5323*	Maximum Weight Loss	.6329§
M Stage	1.0000*	Months Post-Op of Max Weight Loss	.4503§

Note: ^a § by t-test, * by Fisher's Exact Test, Otherwise by Chi-Square Test

¹Mean number of days for PEG placement in aspiration pneumonia(164.25±237.94) and no aspiration pneumonia(62.63±73.18) patients

Chart 1. Post-Operative Timeline of Aspiration Pneumonia Patients

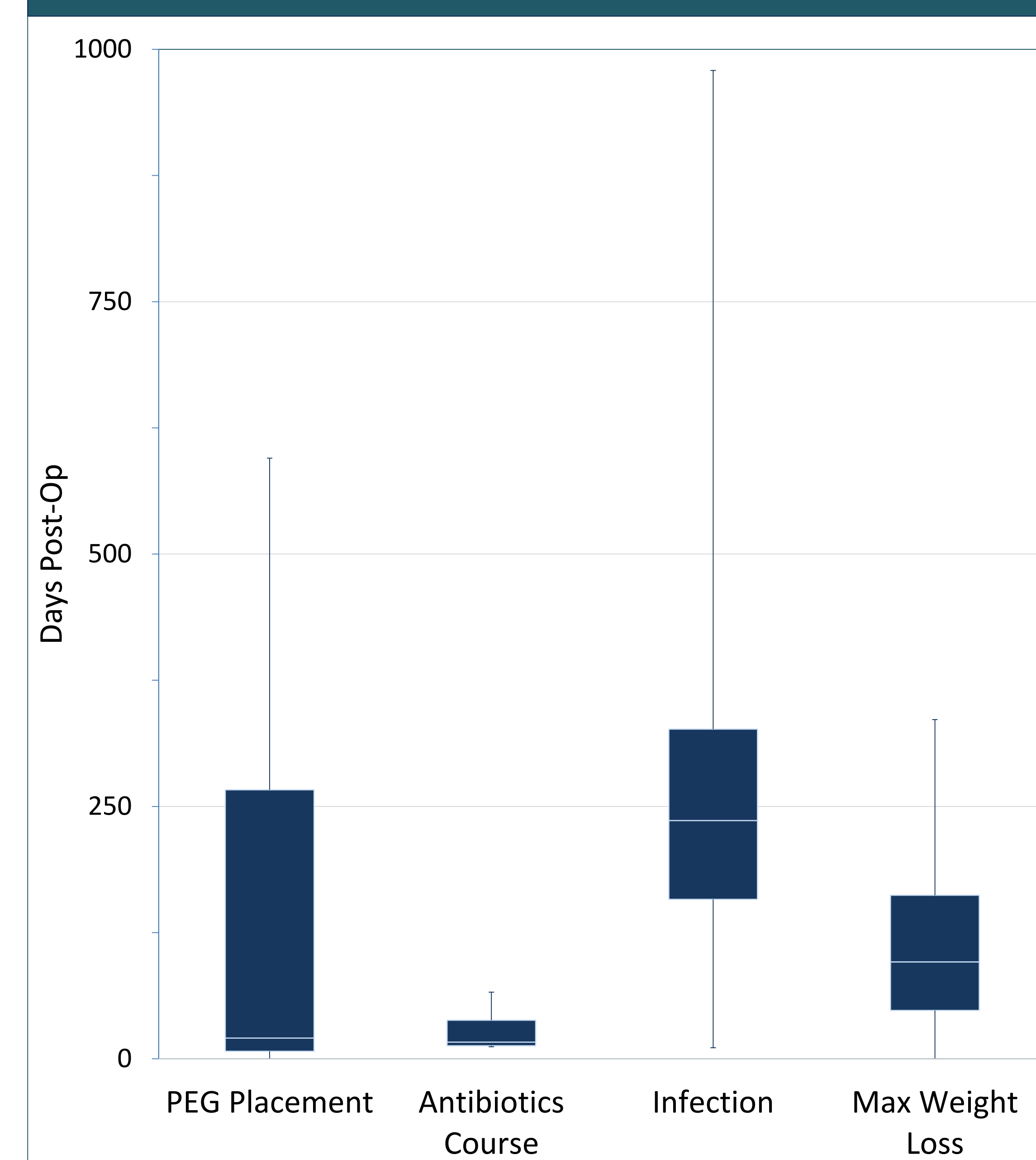


Table 2. Multivariate Analysis (vs. Aspiration Pneumonia)

Variable	P-Value	Odds Ratio
Tracheostomy	.0236	4.00

Note: variables with univariate p-values<0.2 were entered as candidate variables for stepwise logistic regression

Table 3. Univariate Analysis (vs. Antibiotic Use)

Variable	P-Value ^a
PEG Placement	.8268
Tracheostomy	.5018
MDADI Score at Last Follow-up	.4647

Note: ^a § by t-test, * by Fisher's Exact Test, Otherwise by Chi-Square Test

Chart 2. Percent Aspiration Pneumonia by T stage

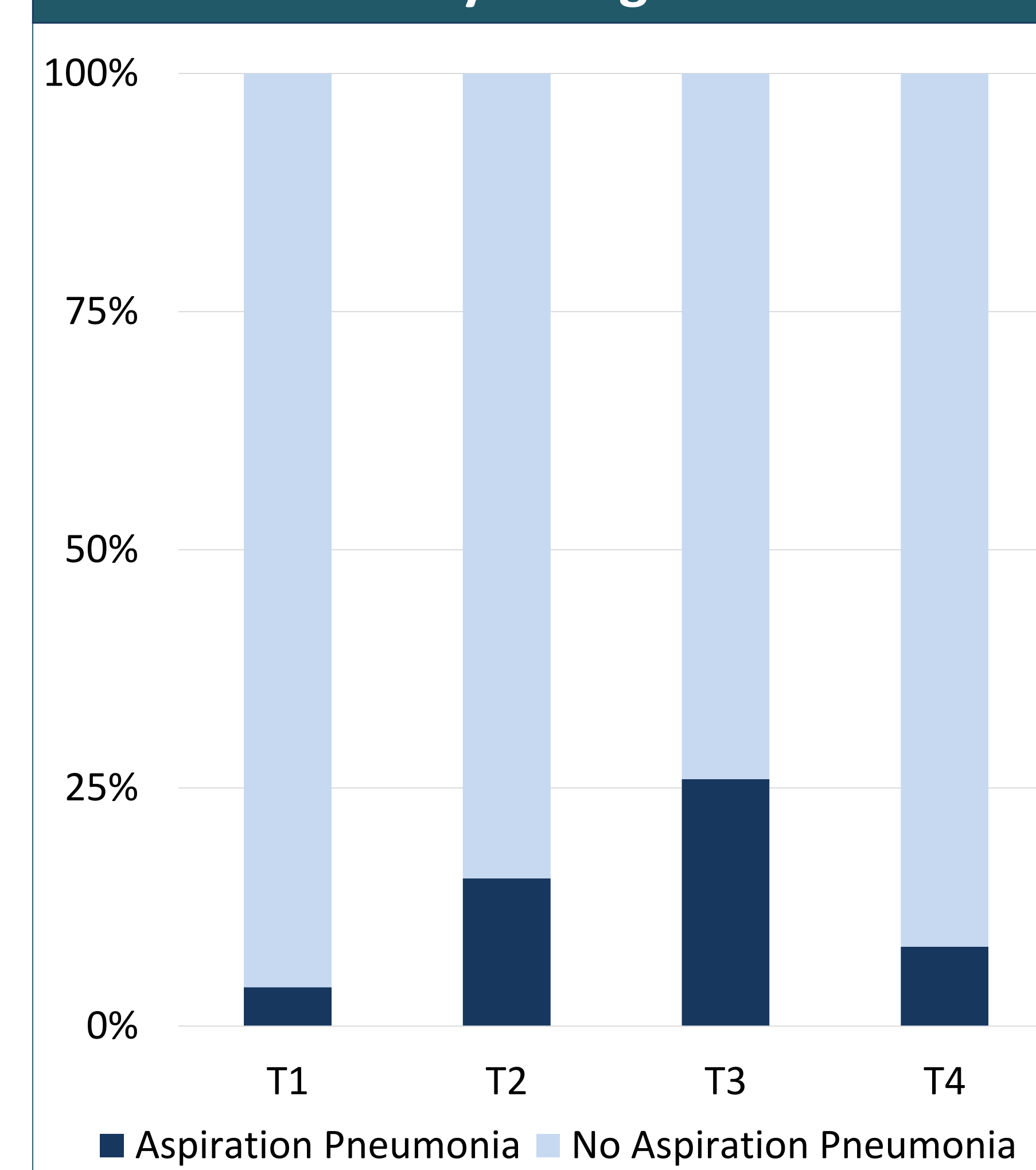
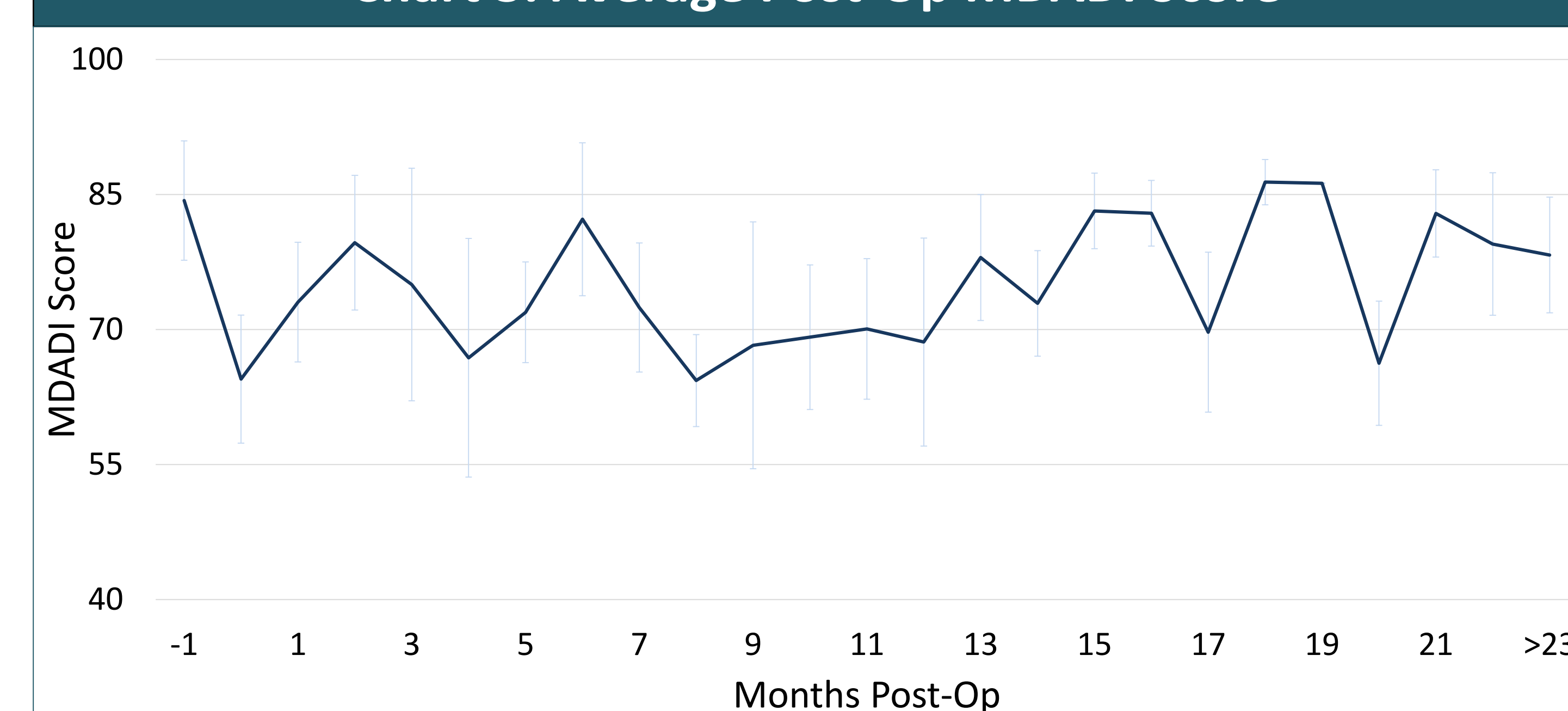


Chart 3. Average Post-Op MDADI Score



DISCUSSION

With the increased use of transoral surgery for SCCA, patients and physicians face a risk of aspiration pneumonia as a complication. In this study, we explored factors that correlated with aspiration pneumonia development, the effectiveness of antibiotic use in preventing aspiration pneumonia, and complications that may arise from the antibiotic use.

Routine use of post-operative prophylactic antibiotic does not correlate with a decreased rate of pneumonia or improved functional outcomes. This is supported by the finding that the median time to infection was long after the antibiotic course was finished. Pneumonia generally developed outside of the perioperative period and likely reflects chronic swallowing dysfunction, with acute pneumonia immediately after transoral surgery being very rare. There were, however, no reports of complications from the antibiotic use.

Tracheostomy use, number of days before PEG was placed, and T stage did correlate with development of aspiration. Patients with tracheostomies were four times as likely to have aspiration pneumonia based on multivariate analysis. Given that tracheostomies are performed mainly for pulmonary toilet, and a larger T stage results in larger resections, these results were expected. In patients with aspiration pneumonia, PEG placement was significantly later than patients with no aspiration pneumonia, but before median time to infection. This supports the idea that aspiration pneumonia development reflects a chronic worsening swallowing dysfunction.

CONCLUSION

Dysphagia immediately after surgery is probably not a significant risk factor for developing aspiration pneumonia and routine post-operative antibiotic use for pneumonia prevention is not indicated after transoral surgery.

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