

Does timing of neck dissection and transoral robotic surgery for oropharyngeal cancer affect fistula and bleed rates?

A systematic review and meta-analysis.

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ABSTRACT

Objectives:

Transoral robotic surgery (TORS) is seeing increased use for resectable oropharyngeal cancers. However, post-operative fistula (POF) and post-operative bleeding can be major and catastrophic complications from surgery. Some institutions stage their neck dissections (ND) after primary excision to prevent these outcomes, whereas others perform ND concurrently. A systematic review and meta-analysis of proportions was performed to investigate whether ND timing has significantly different complication rates.

Data Sources

PubMed, Scopus

Review Methods

Two independent reviewers searched PubMed and Scopus for studies on TORS for oropharyngeal cancers that utilized ND and reported fistula and/or bleeding complications.

Results

Out of 266 articles screened, 19 (n = 933 patients) were included and analyzed where applicable. A majority overall (83.0%) had concurrent ND. Fifteen and eleven articles were analyzed for POF and bleed rates in concurrent ND, compared to five and four articles in staged ND, respectively. When comparing ND timing with comparison of proportions tests, no significant difference was found comparing rate of postoperative fistulas (POF) [$\Delta 0.80\%$ (95%CI -1.96 - 1.98%), $p = 0.64$] or post-operative bleeds [$\Delta 3.59\%$ (-0.70 - 6.75%), $p = 0.12$]. Weighted proportions for POF and bleed were 1.34 (0.67-2.39) and 5.78 (3.79-8.42) for concurrent ND and 0.54 (0.01-3.17) and 2.20 (0.53-5.90) for staged ND, respectively.

Conclusion

There is insufficient evidence to find a significant difference between post-operative fistula and bleed rates between concurrent and staged neck dissections for transoral robotic surgery in oropharyngeal cancer resection. This conclusion should be interpreted in the light of publication biases and heterogeneity of reported outcomes

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INTRODUCTION

Transoral robotic surgery (TORS) is increasingly used for resectable oropharyngeal squamous cell carcinoma (OPSCC). Surgical treatment of OPSCC often includes neck dissection (ND), which can result in communication between the oropharynx and neck. Additionally, catastrophic post-operative bleeding can also occur after surgery. For these and other reasons, some surgeons elect to perform neck dissection (ND) and primary resection in a “staged” fashion at different time points. There is limited published data regarding the optimal timing of neck dissection with regards to risk of post-operative fistula (POF) and major bleeding. A systematic review of available literature and meta-analysis of proportions were performed to investigate whether ND timing plays a significant role in complication rates.

METHODS

Two independent reviewers searched PubMed and Scopus for English language studies on TORS for oropharyngeal cancers that utilized ND and reported fistula and/or bleeding complications. The keywords “TORS” OR “Transoral Robotic Surgery” were paired with “Oropharynx” as search terms in both databases and duplicates were removed. Additional inclusion criteria included Age ≥ 18 , N ≥ 10 , and OPSCC pathology. Studies that did not specify whether neck dissections were staged were excluded. Meta-analysis of proportions was performed to calculate pooled risks. Both neck hematoma formation and primary site bleeding were considered bleeds.

RESULTS / DISCUSSION

From a total of 266 articles related to OPSCC and/or TORS, 247 were excluded, resulting in 19 articles (N=1005 patients) meeting inclusion criteria for the study (Figure 1). Demographic and clinical staging distributions are shown in Table 1. The vast majority of patients in these studies were previously untreated, males with T1-T2, node-positive OPSCC.

Pooled risks for POF and bleeding were 1.34%, (95% CI 0.67-2.39) and 5.78% (3.79-8.42) for concurrent ND and 0.54% (0.01-3.17) and 2.20% (0.53-5.90) for staged ND, respectively. No significant difference between concurrent and staged cohorts was found ($p > 0.10$). Luckily, incidence of both POF and bleeding is very rare. Given such rare outcomes, detecting significant differences between concurrent and staged cohorts may require significant power for an ideal study. These numbers should be interpreted with some degree of caution, as our study is subject to both publication bias and heterogeneous reporting. For bleeding, some articles only reported “no major complications,” without specific mention to minor bleeds or other potential complications. Secondly, 12 excluded articles regarding oropharyngeal TORS resection did not report either bleeding or POF. There were far more included studies with concurrent neck dissection than available literature on staged. Decision-making regarding ND timing was rarely explained in detail. Moreover, the vast majority of staged neck dissection literature is from one institution. We did not find any studies that met our criteria that performed ND prior to primary resection.

Aside from this study, only one small study (Möckelmann et al) specifically compares timing of neck dissection. The authors compared the surgical outcomes of OPSCC resections from concurrent (N=19) vs. staged neck dissections (N=14, performed after primary resection) and found no significant differences in complication rates.

RESULTS

Author & Year	N	N (Concurrent)	N (Staged)	%ND	N (Intra-Op Fistula)	N (Post-Op Fistula)	N (Bleed)	Age	Gender	T1-T2 (%)	N+ (%)	Previously Untreated	%
de Almeida 2014	92	79	0	86%	10	1	5	60.8 (mean)	82% Male	84%	61%	100%	
Dziegielewski 2013	81	79	0	98%	2	0	3	58.3 (mean)	80% Male	90%	89%	100%	
Genden 2009	16	14	0	82%	1	0	0	58.4 (mean)	80% Male	100%	62%	100%	
Genden 2011	31	29	0	94%	0	0	1	61 (mean)	81% Male	87.10%	83.80%	81%	
Kucur 2014	73	70	0	96%	2	0	6	58.6 (mean)	78.1% Male	90.40%	90%	NR	
Kucur 2015	113	113	0	100%	6	0	NR	58 (mean)	81% Male	90.60%	89.40%	NR	
Lee 2014	27	26	0	96%	0	0	0	57.7 (mean)	77.8% Male	81.40%	NR	NR	
Möckelmann 2015	14	0	14	100%	1	0	0	66.9 (median)	75% Male	80%	75%	100%	
Möckelmann 2015	19	19	0	100%	2	0	3	63.9 (median)	76.2% Male	100%	57.10%	100%	
Moore 2009	45	43	0	96%	18	3	1	57 (mean)	89% Male	73%	84.40%	100%	
Moore 2011	148	148	0	100%	42	6	NR	NR	NR	78.50%	NR	NR	
Olsen 2013	18	17	0	94%	0	0	0	60.6 (mean)	66.7% Male	94.40%	27.80%	100%	
Park 2013	39	39	0	100%	0	0	NR	57 (mean)	71.9% Male	87.20%	66%	100%	
Sinclair 2011	42	0	39	93%	NR	0	0	55 (mean)	69% Male	100%	76%	100%	
Sumer 2013	17	17	0	100%	0	0	0	57 (mean)	82% Male	88%	NR	100%	
Van Abel 2012	30	30	0	100%	11	0	5	57.7 (mean)	93% Male	80%	87%	100%	
Weinstein 2007	27	0	26	96%	NR	NR	1	58.2 (mean)	93% Male	77.80%	85%	100%	
Weinstein 2010	47	0	46	98%	NR	NR	0	56.7 (mean)	91% Male	76%	97.80%	100%	
Weinstein 2012	30	0	27	90%	0	0	2	59 (mean)	70% Male	83%	50%	100%	
Weinstein 2012	153	45	85	85%	0	0	NR	59 (mean)	81% Male	81.10%	76%	99%	

Table 1. All Final Articles Analyzed

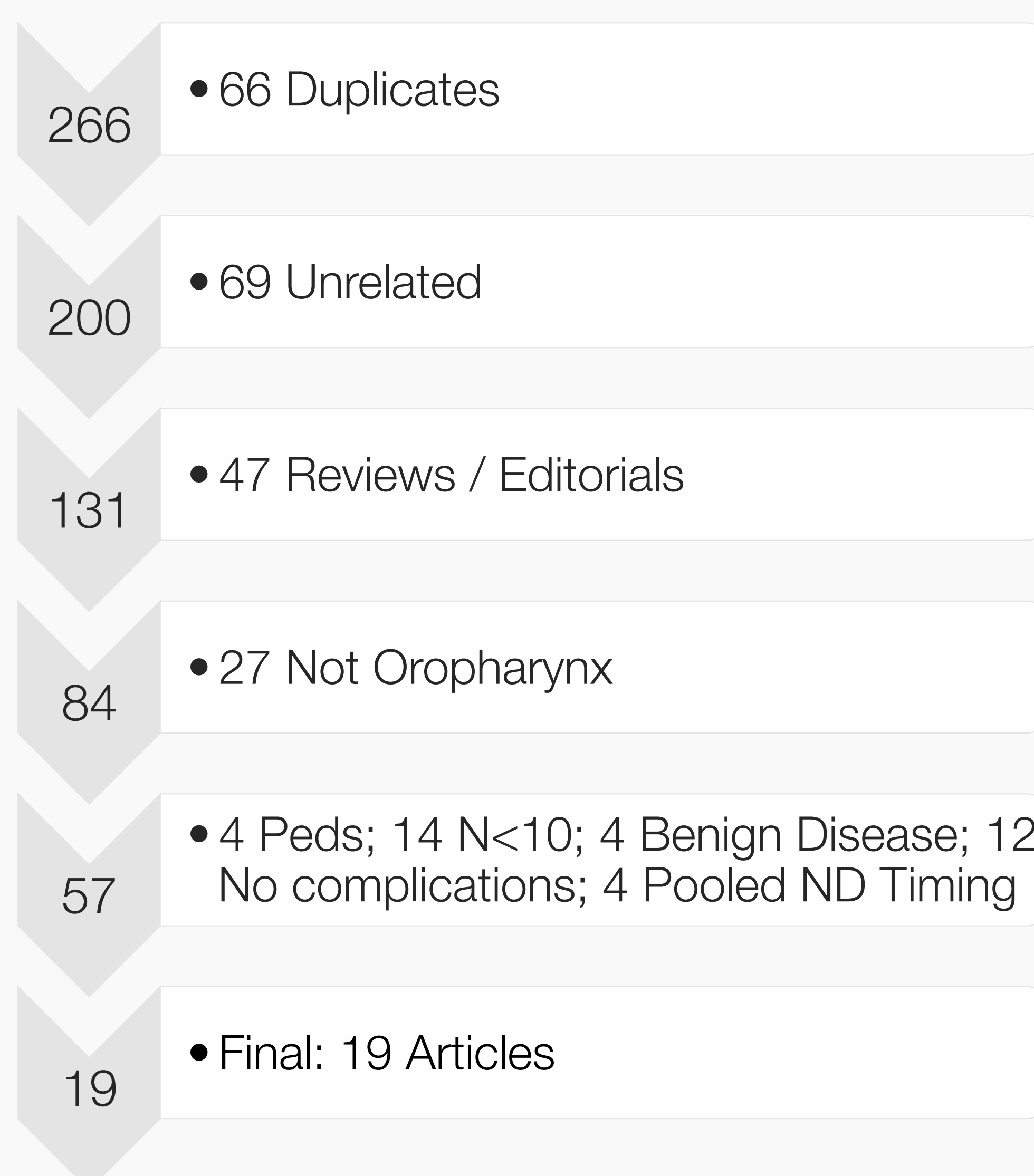


Figure 1. Article Inclusion Flowchart

CONCLUSIONS

There is insufficient evidence to find a significant difference in complication rates between concurrent and staged neck dissections for TORS in early T-stage OPSCC. Institutions vary in their approach to timing of neck dissection. Fortunately, the incidence of both POF and bleeding are rare after surgical resection in this meta-analysis. This conclusion should be interpreted in the light of publication biases and heterogeneity of reported outcomes.

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