

Supplementary Online Content

Awad MI, Palmer FL, Kou L, et al. Individualized risk estimation for postoperative complications after surgery for oral cavity cancer. Published online October 15, 2015. *JAMA Otolaryngol Head Neck Surg*. doi:10.1001/jamaoto.2015.2200.

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This supplementary material has been provided by the authors to give readers additional information about their work.

eTABLE 1. Prescreening Univariate Analysis of Potential Predictors of Developing Complications

FACTOR	P VALUE	
	Preoperative Time Point	Postoperative Time Point
Age	0.011	0.011
Gender	0.654	0.654
Smoking	0.277	0.277
Alcohol	0.608	0.608
Body Mass Index	0.08	0.08
WUHNCI Score	0.006	0.006
Severe Comorbidity (WUHNCI \geq 1)	0.055	0.055
Karnofsky Performance Status	0.036	0.036
ASA Physical Status	0.006	0.006
Clinical T Classification	<0.001	<0.001
Clinical N Classification	0.28	0.28
Overall TNM Stage	0.008	0.008
White Blood Cell	0.001	0.001
Hemoglobin	0.001	0.001
Hematocrit	0.001	0.001
Platelet	0.543	0.062
International Normalized Ratio	0.821	0.967
Activated Partial Thromboplastin Time	0.609	0.508
Sodium	0.021	0.021
Potassium	0.775	0.787
Serum Creatinine	0.057	0.022
Albumin	0.242	0.229
Total Bilirubin	0.325	0.318
Aspartate Aminotransferase	0.503	0.49
Alkaline Phosphatase	0.108	0.116
Neck Dissection	0.006	0.007
Bone Resection‡	<0.001	<0.001
Neck Dissection Laterality	0.006	0.002
Neck Dissection Extent	0.001	0.001
Reconstruction§	<0.001	<0.001
Tracheotomy	<0.001	<0.001
Time Under Anesthesia	N/A	<0.001
Volume of Colloid Transfused	N/A	0.001
Fluid Balance	N/A	<0.001
Estimated Blood Loss	N/A	<0.001
Perioperative Antibiotics	N/A	0.763

‡Includes partial maxillectomy, marginal mandibulectomy, segmental mandibulectomy

§Includes split and full thickness skin grafts, AlloDerm, local and regional flaps, and microvascular free tissue transfer

ASA: American Society of Anesthesiologists, WUHNCI: Washington University Head and Neck Comorbidity Index

eTABLE 2. Factors Predictive of Developing Complications Requiring Invasive Intervention After Multivariate Analysis

PREOPERATIVE TIME POINT		
Factor	Odds Ratio (95% Confidence Interval)	p Value
Body Mass Index (BMI)*	0.679 (0.396 – 1.163)	0.158
WUHNCI*	1.464 (1.155 – 1.857)	0.002
White Blood Count*	1.800 (1.301 – 2.490)	<0.001
Hematocrit*	0.581 (0.345 – 0.979)	0.041
Planned Neck Dissection†	4.270 (0.882 – 20.670)	0.071
Planned Tracheotomy†	4.384 (1.822 – 10.546)	0.001
POSTOPERATIVE TIME POINT		
Factor	Odds Ratio (95% Confidence Interval)	p Value
WUHNCI*	1.406 (1.127 – 1.754)	0.003
White Blood Count*	1.626 (1.207 – 2.189)	0.001
Hematocrit*	0.523 (0.315 – 0.869)	0.012
Time Under Anesthesia*	2.856 (1.934 – 4.216)	<0.001

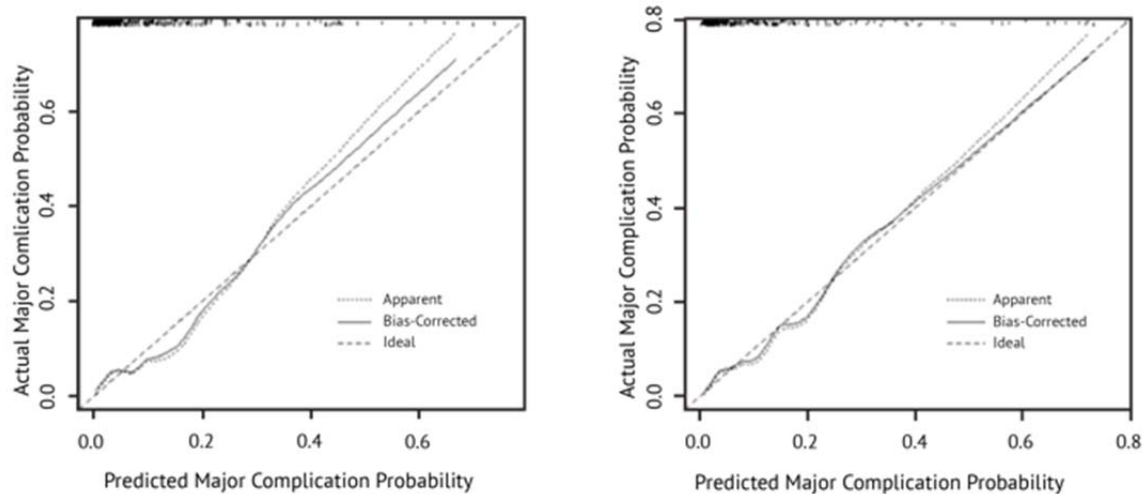
*Odds ratio for continuous variables calculated based on contrast of Q3 versus Q1

†Odds ratio calculated with “Yes” being the reference

WUHNCI: Washington University Head and Neck Comorbidity Index

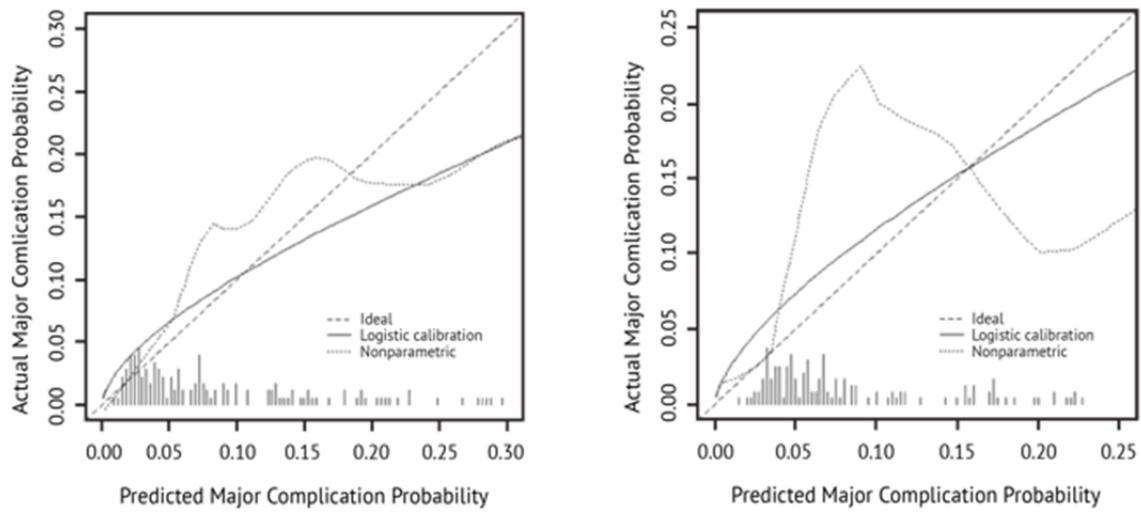
eTABLE 3. Comparison of Variables Predictive of Developing Complications in Both Cohorts (n = 506)			
VARIABLE	Modeling Cohort (n=354)	Validation Cohort (n=152)	p Value
Age (years)			
Mean	62.2	63.7	0.307
Standard Deviation	14.0	15.3	
BMI (kg/m ²)			
Mean	27.7	27.2	0.343
Standard Deviation	5.9	5.1	
WUHNCI Score			
Mean	0.7	1.4	0.696
Standard Deviation	0.7	1.3	
Severe Comorbidity (WUHNCI ≥1)			
Yes (%)	116 (32.8)	47 (30.9)	0.684
No (%)	238 (67.2)	105 (69.1)	
Clinical T Classification			
T1 & T2 (%)	273 (77.1)	117 (78.0)	0.829
T3 & T4a (%)	81 (22.9)	33 (22.0)	
Tx	0	2	
White Blood Cell (x 10 ³ /μL)			
Mean	7.3	7.5	0.344
Standard Deviation	2.5	2.2	
Hematocrit (%)			
Mean	40.7	40.1	0.080
Standard Deviation	3.8	3.7	
Sodium (mEq/L)			
Mean	140.3	140.3	0.827
Standard Deviation	2.8	3.0	
Alkaline Phosphatase (U/L)			
Mean	82.4	78.2	0.342
Standard Deviation	40.4	46.7	
Neck Dissection			
Yes (%)	248 (70.1)	109 (71.7)	0.708
No (%)	106 (29.9)	43 (28.3)	
Bone Resection*			
Yes (%)	125 (35.3)	60 (39.5)	0.373
No (%)	229 (64.7)	92 (60.5)	
Tracheotomy			
Yes (%)	93 (26.3)	46 (30.3)	0.356
No (%)	261 (73.7)	106 (69.7)	
Time Under Anesthesia (min)			
Mean	322.9	313.7	0.689
Standard Deviation	261.3	225.4	
Estimated Blood Loss (mL)			
Mean	145.2	189.1	0.026
Standard Deviation	180.3	209.9	
No. of Complications (%)			
Requiring Invasive Intervention	36 (10.2)	16 (10.5)	0.904

*Includes partial maxillectomy, marginal mandibulectomy, segmental mandibulectomy
 BMI: Body Mass Index, WUHNCI: Washington University Head and Neck Comorbidity Index



eFigure 1. Calibration for Major Complication Nomograms

Nomogram calibration demonstrated by plotting the expected against the observed probabilities of developing a complication requiring invasive intervention in the preoperative setting (left) and postoperative setting (right). Bootstrapping was employed to correct for overfitting bias.



eFigure 2. Calibration of Validated Major Complication Nomograms

Calibration of the validation of the nomogram used in the preoperative setting (left) and postoperative setting (right), demonstrated by plotting the expected against the observed probabilities of developing a complication requiring invasive intervention.