

## Supplementary Online Content

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**eTable 1.** Univariable logistic regression analysis of local control among all patients

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

eTable 1: Univariable logistic regression analysis of local control among all patients.

		<b>Local Control (Reference = Yes, 53 Local Failures)</b>		
<b>Variable</b>	<b>Level</b>	<b>N</b>	<b>Odds Ratio (95% CI)</b>	<b>OR P-value</b>
<i>Patient Characteristics</i>				
Age at Diagnosis (years)	>44	138	0.95 (0.44-2.03)	0.89
	≤44	42	-	-
Sex	Male	78	1.24 (0.65-2.38)	0.52
	Female	102	-	-
Race	White	144	0.79 (0.27-2.28)	0.66
	African American	15	0.36 (0.09-1.49)	0.16
	Other	21	-	-
<i>Tumor Characteristics</i>				
T-stage	1	126	0.45 (0.05-3.88)	0.47
	2	37	0.22 (0.02-2.00)	0.18
	3	10	0.67 (0.05-9.19)	0.76
	4a	7	-	-
Histological Grade	Well differentiated	64	2.00 (0.62-6.50)	0.25
	Moderately differentiated	101	1.51 (0.49-4.60)	0.47
	Poorly differentiated	15	-	-
Perineural invasion	Positive	55	0.80 (0.40-1.59)	0.52
	Negative	125	-	-
Lymphovascular Space Invasion	Positive	36	0.26 (0.12-0.56)	<b>&lt;0.01</b>
	Negative	141	-	-
Depth of invasion	≥3mm	113	0.82 (0.38-1.77)	0.61
	<3mm	46	-	-
Margins	Positive	7	0.25 (0.05-1.19)	0.08
	Close (within 5mm)	50	0.60 (0.30-1.21)	0.16
	Negative	123	-	-
<i>Treatment Characteristics</i>				
Adjuvant Therapy	Radiation Alone	41	2.09 (0.89-4.90)	0.09
	Concurrent Chemotherapy & Radiation	8	3.54 (0.42-29.67)	0.24
	None	131	-	-

Use of Elective Neck Dissection	Yes	112	1.40 (0.73-2.69)	0.32
	No	68	-	-

eTable 2: Multivariable analysis\*\* among patient, tumor, and treatment factors and their association with local control.

		<b>Local Control (Reference = Yes)</b>	
<b>Covariate</b>	<b>Level</b>	<b>Odds Ratio (95% CI)</b>	<b>OR P-value</b>
Race	White	0.78 (0.20-3.02)	0.72
	African-American	0.19 (0.03-1.16)	0.07
	Other	-	-
Perineural invasion	Positive	0.41 (0.16-1.05)	0.06
	Negative	-	-
Lymphovascular Space Invasion	Positive	0.24 (0.10-0.59)	<b>&lt;0.01</b>
	Negative	-	-
Adjuvant Therapy	Radiation Alone	4.30 (1.40-13.22)	<b>0.01</b>
	Concurrent Chemotherapy & Radiation	5.26 (0.41-67.89)	0.20
	None	-	-
<p>* Number of observations in the original data set = 180. Number of observations used = 156.  ** Backward selection with an alpha level of removal of 0.2 was used. The following variables were removed from the model: Age, Histological grade, Depth of invasion, Margins, use of elective neck dissection, Sex, and T-stage.</p>			

eTable 3: Univariable Logistic Regression analysis of patient, tumor, and treatment factors and their association with locoregional control.

		Locoregional Control (Reference = Yes, 71 Locoregional Failures)		
Variable	Level	N	Odds Ratio (95% CI)	OR P-value
<i>Patient Characteristics</i>				
Age at Diagnosis (Years)	>44	138	1.06 (0.52-2.14)	0.88
	≤44	42	-	-
Sex	Male	78	1.18 (0.65-2.17)	0.59
	Female	102	-	-
Race	White	144	1.00 (0.39-2.56)	0.99
	African American	15	0.54 (0.14-2.06)	0.37
	Other	21	-	-
<i>Tumor Characteristics</i>				
T-stage	1	126	0.63 (0.12-3.37)	0.59
	2	37	0.42 (0.07-2.46)	0.34
	3	10	1.60 (0.17-15.27)	0.68
	4a	7	-	-
Histological grade	Well differentiated	64	4.74 (1.43-15.72)	<b>0.01</b>
	Moderately differentiated	101	2.81 (0.89-8.82)	0.08
	Poorly differentiated	15	-	-
Perineural invasion	Positive	55	0.78 (0.41-1.48)	0.45
	Negative	125	-	-
Lymphovascular Space Invasion	Positive	36	0.12 (0.05-0.28)	<b>&lt;0.01</b>
	Negative	141	-	-

Depth of Invasion	≥ 3 mm	113	0.66 (0.32-1.35)	0.25
	< 3mm	46	-	-
Margins	Positive	7	0.22 (0.04-1.15)	0.07
	Close (within 5 mm)	50	0.63 (0.32-1.23)	0.18
	Negative	123	-	-
<i>Treatment Characteristics</i>				
Adjuvant Therapy	Radiation Alone	41	2.46 (1.12-5.44)	<b>0.03</b>
	Concurrent Chemotherapy & Radiation	8	1.32 (0.30-5.77)	0.71
	None	131	-	-
Use of Elective Neck Dissection	Yes	112	1.84 (0.99-3.40)	0.06
	No	68	-	-

eTable 4: Univariable analysis of patient, tumor, and treatment characteristics associated with ultimate locoregional control.

		Ultimate Locoregional Control (Reference = Yes)		
Variable	Level	N	Odds Ratio (95% CI)	OR P-value
<i>Patient Characteristics</i>				
Age at diagnosis (years)	>44	138	0.50 (0.17-1.45)	0.20
	≤44	42	-	-
Sex	Male	78	1.16 (0.53-2.57)	0.70
	Female	102	-	-
Race	White	144	0.11 (0.01-1.98)	0.13
	African American	15	0.04 (0.00-0.95)	<b>0.04</b>
	Other	21	-	-
<i>Tumor Characteristics</i>				
T-stage	1	126	1.27 (0.18-9.02)	0.81
	2	37	0.69 (0.09-5.32)	0.72
	3	10	1.46 (0.11-20.08)	0.78
	4a	7	-	-
Histological Grade	Well differentiated	64	2.15 (0.51-9.10)	0.30
	Moderately differentiated	101	1.11 (0.30-4.16)	0.87
	Poorly differentiated	15	-	-
Perineural invasion	Positive	55	0.71 (0.31-1.60)	0.41
	Negative	125	-	-
Lymphovascular Space Invasion	Positive	36	0.28 (0.12-0.65)	<b>&lt;0.01</b>
	Negative	141	-	-
Depth of invasion	≥3 mm	113	0.69 (0.26-1.80)	0.45
	<3 mm	46	-	-
Margins	Positive	7	0.57 (0.08-4.14)	0.58
	Close (within 5 mm)	50	0.30 (0.13-0.69)	<b>&lt;0.01</b>
	Negative	123	-	-
<i>Treatment Characteristics</i>				
Adjuvant Therapy	Radiation Alone	41	1.00 (0.40-2.49)	0.99
	Concurrent Chemotherapy & Radiation	8	3.69 (0.17-78.58)	0.40
	Surgery alone	131	-	-

Use of Elective Neck Dissection	Yes	112	2.14 (0.97-4.68)	0.06
	No	68	-	-



eTable 5: Univariable Cox proportional hazard analysis of patient, tumor, and treatment variables and their association with overall survival.

Variable	Level	Overall Survival		
		N	Hazard Ratio (95% CI)	HR P-value
<i>Patient Characteristics</i>				
Age at diagnosis (years)	>44	138	6.15 (1.92-19.68)	<0.01
	≤44	42	-	-
Sex	Male	78	0.86 (0.51-1.46)	0.58
	Female	102	-	-
Race	White	144	1.81 (0.65-5.04)	0.26
	African American	15	1.69 (0.48-5.98)	0.42
	Other	21	-	-
<i>Tumor Characteristics</i>				
T-stage	1	126	0.43 (0.10-1.80)	0.25
	2	37	0.61 (0.14-2.74)	0.52
	3	10	0.72 (0.12-4.34)	0.72
	4a	7	-	-
Histological grade	Well differentiated	64	0.59 (0.23-1.47)	0.25
	Moderately differentiated	101	0.54 (0.23-1.30)	0.17
	Poorly differentiated	15	-	-
Perineural invasion	Positive	55	1.15 (0.65-2.03)	0.63
	Negative	125	-	-
Lymphovascular Space Invasion	Positive	36	1.96 (1.10-3.47)	<b>0.02</b>
	Negative	141	-	-
Depth of invasion	≥3 mm	113	1.98 (1.01-3.87)	<b>0.04</b>
	<3 mm	46	-	-
Margins	Positive	7	1.21 (0.29-5.05)	0.79
	Close (within 5 mm)	50	1.78 (1.03-3.06)	<b>0.04</b>
	Negative	123	-	-
<i>Treatment Characteristics</i>				
Adjuvant Therapy	Radiation Alone	41	1.04 (0.52-2.08)	0.90
	Concurrent Chemotherapy & Radiation	8	0.48 (0.07-3.50)	0.47
	None	131	-	-
Use of Elective Neck Dissection	Yes	112	0.72 (0.43-1.22)	0.22
	No	68	-	-

eTable 6: Summary of patient demographic, tumor, and treatment characteristics for patients with and without the pathological presence of lymphovascular space invasion (LVSI).

Variable		LVSI		P-value*
		Negative (N=141) (%)	Positive (N=36) (%)	
<i>Patient Characteristics</i>				
Age at Diagnosis (years)	≤44	33 (78.6)	9 (21.4)	0.84
	>44	108 (80)	27 (20)	
Sex	Female	77 (77.8)	22 (22.2)	0.48
	Male	64 (82.1)	14 (18.0)	
Race	White	112 (79.4)	29 (20.6)	1.00
	African-American	12 (80)	3 (20)	
	Other	17 (81.0)	4 (19.1)	
<i>Tumor Characteristics</i>				
T-stage	1	103 (83.1)	21 (16.9)	0.22
	2	25 (69.4)	11 (30.6)	
	3	7 (70)	3 (30)	
	4a	6 (85.7)	1 (14.3)	
Histological grade	Well differentiated	54 (85.7)	9 (14.3)	0.06
	Moderately differentiated	79 (79)	21 (21)	
	Poorly differentiated	8 (57.1)	6 (42.9)	
Perineural invasion	Negative	101 (81.5)	23 (18.6)	0.36
	Positive	40 (75.5)	13 (24.5)	
Margins	Negative	99 (81.8)	22 (18.2)	0.26
	< 5 mm	38 (77.6)	11 (22.5)	
	Positive	4 (57.1)	3 (42.9)	
Depth of Invasion	<3mm	41 (89.1)	5 (10.9)	0.07
	≥3mm	84 (76.4)	26 (23.6)	
<i>Treatment Characteristics</i>				
Use of elective neck dissection	No	53 (80.3)	13 (19.7)	0.87
	Yes	88 (79.3)	23 (20.7)	
Adjuvant Therapy	None	105 (80.8)	25 (19.2)	0.16
	Chemotherapy & Radiation	8 (100)	0 (0)	
	Radiation Alone	28 (71.8)	11 (28.2)	
* The p-value is calculated by chi-square test or Fisher's exact, where appropriate.				