

Supplemental Online Content

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

eTable 1: Tumor Characteristics:

	Overall (n=590)
Tumor Stage* †	
High (stage 3-4)	390 (66.1%)
Low (stage 1-2)	149 (25.2%)
Tumor location*	
Oral cavity	419 (71%)
Skin	48 (8.1%)
Paranasal sinus	35 (5.9%)
Salivary gland	27 (4.5%)
Oropharynx	21 (3.5%)
Larynx	14 (2.3%)
Hypopharynx	12 (2%)
Thyroid	5 (0.8%)
Others	6 (1.1%)

* Indicates some missing data: Tumor stage and severity 51 (8.6%), Tumor location 3 (0.5%)

† Staging at the time of surgery according to the American Joint Committee on Cancer (AJCC). Low (stage 1-2), High (stage 3-4)

eTable 2: Patients characteristics before and after implementation of standardized nursing team

	Before Standardized nursing team 2007-2009	After Standardized nursing team 2009-2020	<i>p</i>-value
Gender			
Male	37 (69.8%)	372 (69.3%)	1
Female	16 (30.2%)	165 (30.7%)	
Age			
Mean (SD)	62.8 (13.0)	60.8 (12.8)	0.271
Median (Min. Max)	62.0 (22.0, 84.0)	62.0 (19.0, 89.0)	
Smoking*			
Current	19 (35.8%)	169 (31.5%)	0.901
Ex-smoker	19 (35.8%)	195 (36.3%)	
Never	14 (26%)	142 (26.4%)	
Alcohol intake*			
Heavy	10 (18.9%)	120 (22.3%)	0.419
Moderate	4 (7.5%)	33 (6.1%)	
Light	12 (22.6%)	152 (28.3%)	
Previous	12 (22.6%)	71 (13.2%)	
Never	12 (22.6%)	111 (20.7%)	
Tumor Stage			0.796
0	0 (0%)	7 (1.3%)	
1	3 (5.7%)	47 (8.8%)	
2	10 (18.9%)	82 (15.3%)	
3	8 (15.1%)	73 (13.6%)	
4	29 (54.7%)	280 (52.1%)	
Missing data	3 (5.7%)	48 (8.9%)	

Tumor Severity			
High	37 (69.8%)	353 (65.7%)	0.915
Low	13 (24.5%)	136 (25.3%)	
Tumor location			0.36
Oral cavity	44 (83.0%)	375 (69.8%)	
Skin	1 (1.9%)	47 (8.8%)	
Paranasal sinus	1 (1.9%)	34 (6.3%)	
Salivary gland	3 (5.7%)	24 (4.5%)	
Oropharynx	3 (5.7%)	18 (3.4%)	
Larynx	1 (1.9%)	14 (2.6%)	
Hypopharynx	0 (0%)	12 (2.2%)	
Thyroid	0 (0%)	5 (0.9%)	
Others	0 (0%)	6 (1.1%)	
Missing data	0 (0%)	2 (0.4%)	

* Indicates some missing data: Smoking: 1 (1.9%) before and 31 (5.8%) after implementation of standardized nursing team, Alcohol intake: 17 (7.7%) before and 36 (9.8%) after implementation of standardized nursing team.

eTable 3: Patients characteristics before and after implementation of treatment centralization

	Before treatment centralization 2007-2013	After treatment centralization 2013-2020	<i>p</i>-value
Gender			
Male	152 (68.8%)	257 (69.6%)	0.897
Female	69 (31.2%)	112 (30.4%)	
Age			
Mean (SD)	61.7 (13.2)	60.5 (12.6)	0.277
Median (Min. Max)	63.0 [19.0, 89.0]	62.0 [21.0, 88.0]	
Smoking*			
Current	81 (36.7%)	107 (29.0%)	0.236
Ex-smoker	79 (35.7%)	135 (36.6%)	
Never	54 (24.4%)	102 (27.6%)	
Alcohol intake*			
Heavy	57 (25.8%)	73 (19.8%)	0.335
Moderate	11 (5.0%)	26 (7.0%)	
Light	57 (25.8%)	107 (29.0%)	
Previous	35 (15.8%)	48 (13.0%)	
Never	44 (19.9%)	79 (21.4%)	
Tumor Stage			0.93
0	3 (1.4%)	4 (1.1%)	
1	22 (10.0%)	28 (7.6%)	
2	34 (15.4%)	58 (15.7%)	
3	30 (13.6%)	51 (13.8%)	
4	121 (54.8%)	188 (50.9%)	
Missing data	11 (5.0%)	40 (10.8%)	

Tumor Severity			
High	151 (68.3%)	239 (64.8%)	0.915
Low	59 (26.7%)	90 (24.4%)	
Tumor location			0.258
Oral cavity	168 (76.0%)	251 (68.0%)	
Skin	15 (6.8%)	33 (8.9%)	
Paranasal sinus	9 (4.1%)	26 (7.0%)	
Salivary gland	11 (5.0%)	16 (4.3%)	
Oropharynx	5 (2.3%)	16 (4.3%)	
Larynx	7 (3.2%)	8 (2.2%)	
Hypopharynx	4 (1.8%)	8 (2.2%)	
Thyroid	2 (0.9%)	3 (0.8%)	
Others	0 (0%)	6 (1.6%)	
Missing data	0 (0%)	2 (0.5%)	

* Indicates some missing data: Smoking: 7 (3.2%) before and 25 (6.8%) after treatment centralization, Alcohol intake: 17 (7.7%) before and 36 (9.8%) after treatment centralization

eTable 4: The effect of plating techniques on operative time (OR)

Plating technique comparison	Estimate (minutes)	Standard Error (SE)	P value
Pre bent to hand bent	-61.6	24.3	0.0271
3D Plate to pre bent	-72	27.6	0.0332
3D Plate to hand bent	-133.7	16.5	<0.0001

eTable 5: Secondary outcomes; length of stay (LOS), return to ED within 30 days, readmission rate.

Outcome	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Overall
Number of procedures	(N=18)	(N=21)	(N=43)	(N=44)	(N=34)	(N=47)	(N=48)	(N=41)	(N=38)	(N=57)	(N=48)	(N=70)	(N=67)	(N=14)	(N=590)
Readmission rate within 30 days	0 (0%)	0 (0%)	5 (11.6%)	5 (11.4%)	1 (2.9%)	1 (2.1%)	4 (8.3%)	3 (7.3%)	4 (10.5%)	8 (14.0%)	6 (12.5%)	11 (15.7%)	7 (10.4%)	0 (0%)	55 (9.3%)
Return to ED within 30 days	1 (5.6%)	3 (14.3%)	6 (14.0%)	11 (25.0%)	4 (11.8%)	4 (8.5%)	9 (18.8%)	7 (17.1%)	7 (18.4%)	11 (19.3%)	10 (20.8%)	15 (21.4%)	12 (17.9%)	2 (14.3%)	102 (17.3%)
LOS mean (SD)	14.3 (5.09)	30.1 (25.9)	19.2 (14.5)	21.1 (33.7)	16.5 (15.3)	22.4 (53.4)	15.9 (16.0)	14.2 (6.87)	11.3 (4.87)	18.4 (18.8)	13.0 (6.93)	13.2 (14.1)	12.9 (8.81)	9.57 (2.38)	16.3 (21.7)

eTable 6: effect of treatment centralization and standardized nursing team on length of stay LOS, return to ED within 30 days and readmission rate:

	Before centralization (n=221)	After centralization (n=369)	p-value
Readmission to hospital	16 (7.2%)	42 (11.4%)	0.135
Return to ED within 30 days	34 (15.4%)	71 (19.2%)	0.283
LOS mean (SD)	20.3 (31.3)	13.9 (12.4)	0.00374

	Before standardized nursing team (n=53)	Before standardized nursing team (n=537)	
Readmission to hospital	1 (1.9%)	57 (10.9%)	0.0728
Return to ED within 30 days	5 (9.4%)	100 (18.6)	0.139
LOS mean (SD)	23.7 (21.3)	15.6 (18.6)	0.0104

eTable 7: 2 years and 5 years disease specific survival 2007-2020

	2 year survived	5 years survived	Total	2yrs	5years
2009	30	23	44	68%	52%
2010	28	19	46	61%	41%
2011	27	23	37	73%	62%
2012	32	28	47	68%	60%
2013	39	35	49	80%	71%
2014	29	25	42	69%	60%
2015	32	28	39	82%	72%
2016	38	34	58	66%	59%
2017	35	- na -	51	69%	- na -
2018	60	- na -	73	82%	- na -
2019	55	- na -	68	81%	- na -
2020	- na -	- na -	14	- na -	- na -
Total	405	215	568*		

-na-: not applicable

* Missing data on 10 patients

eFigure: Secondary outcomes (30 days readmission rate, 30 days return to ER) and mean length of stay:

