



Pre-Radiation Dental Treatment in the Head and Neck Cancer Patient

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Abstract

Objectives:

Assess factors associated with recommended full-mouth extraction (FME) for HNC pre-RT compared to HNC patients that are recommended to maintain teeth pre-RT.

Methods:

We compared 60 patients with a FME recommendation (cases) to 60 patients with a recommendation to save teeth before RT (controls). Control patients were all enrolled in the study, "Clinical Registry of Dental Outcomes in H&N Cancer Patients (OraRad; 1UO1DE022939)."

Results:

Cases were mean age (SE)=61(1.3) years, 68% male, and 95% diagnosed with squamous cell carcinoma (SCC); controls were 57(1.3) years, 75% male, and 87% SCC. Approximately 90% of cases did not have dental insurance vs. 53% controls (p<0.0001). More cases had not seen a dentist for routine care in over 10 years vs. controls (41% versus 10%, respectively; p<0.0001). Cases brushed less frequently (<4x/week) than controls (64% vs. 3%, respectively; p<0.0001) and flossed less frequently (<1x/week; 95% vs. 20%, respectively; p<0.0001). Cases had more dental disease than controls: number of teeth with periapical lesions (1.3(0.2) vs. 0.42(0.2), p=0.0007), caries extending to dentin or pulp (4.2(2.5) vs. 2.5(0.4), p=0.006), pulpal exposure (1.8(0.3) vs. 0.5(0.3), p=0.0005), and percent of radiographic bone loss (46%(1.5) vs 22%(1.4), p<0.0001), all respectively.

Conclusions:

In the present study, cases and controls differed on many measures. Decision-making surrounding a pre-RT FME recommendation appears to be related to oral hygiene history, accessibility to care, and level of dental disease.

Enrollment Criteria

- Diagnosed with head and neck (HNC) squamous cell carcinoma (SCC) OR Salivary Gland Cancer OR other HNC
- Curative RT
- Controls: recommended to maintain teeth pre-RT.
- Cases: must have received a pre-RT dental evaluation and full-mouth extraction (FME) recommendation.

Introduction

- High dose radiation therapy (RT) in the Head and Neck cancer (HNC) patient causes adverse complications in the oral and maxillofacial tissues such as; tooth loss, osteoradionecrosis, and caries.
- Removal of at-risk teeth is frequently recommended as pre – RT dental management in order to reduce the risk of developing adverse oral complications in HNC patients.
- No current standard of care exists for HNC pre – RT dental treatment.

Objectives

1. Determine factors involved in full-mouth extraction for head and neck cancer patients prior to radiation therapy.

Methods

- The OraRad Supplement Study is a retrospective, case-control study comparing 60 patients seen at Carolinas Medical Center in Charlotte, North Carolina from 1/2014 – 9/2016 that received a pre – RT dental evaluation and treatment and received a recommendation for full-mouth extraction (cases) compared to a cohort of 60 patients enrolled in the prospective observational cohort study, "Clinical Registry of Dental Outcomes in Head and Neck Cancer Patients (ORARAD)" (1UO1DE022939).
- Study Variables:**
 1. Demographics, Social history
 2. Head and neck cancer diagnosis
 3. Oral hygiene/history, level of caries, periodontal measures, DMFT, Schei ruler/bone loss
 4. Peri-operative data, number of dental extractions completed and recommended

Results

- A total of 120 patients were retrospectively observed (60 cases, 60 controls).
- Cases were mean age (SE) = 61 (1.3) years, 68% male, and 95% diagnosed with squamous cell carcinoma (SCC).
- Controls were mean age (SE) = 57(1.3) years, 75% male, and 87% SCC.
- Most common sites of SCC = Tonsil (22.5%), Base of tongue (14.2%), Oral tongue (12.5%), Larynx (10.0%), Parotid gland (5.8%), Nasopharynx (5.0%).
- 90% of cases were not covered by dental insurance versus 53% in controls (p<0.0001).

Results: Radiographic Findings

- Radiographic evaluations determined less mean incidence of endodontic treatment, pulpal exposure, periapical lesions, calculus and deep pockets as identified at baseline visit in control group.

(N) Teeth with pulpal exposure	Mean (SE)	P-value
Cases (FME)	1.77 (0.29)	0.0028
Controls	0.53 (0.29)	
(N) Teeth with periapical lesions		
Cases	1.32 (0.18)	0.0007
Controls	0.43 (0.18)	
(N) Teeth with Calculus		
Cases	6.18 (0.77)	0.0229
Controls	3.67 (0.77)	
(N) Teeth with at least one deep pocket (≥ 5mm)		
Cases	7.59 (1.12)	0.0076
Controls	3.72 (0.85)	

- Cases presented poor oral hygiene (98.3%), poor history of dental care (96.6%), and low motivation to save existing teeth (78.0%) as presented at baseline.
- Radiographically, presence of dental caries, advanced periodontal disease and non-functional teeth for removable dentures influenced pre-RT dental recommendation.
- Schei ruler findings indicated three times the number of missing teeth at baseline in cases, as well as a significant difference in bone loss; cases with a mean bone loss of 45.9% versus 19.0% bone loss in controls.

Group	Number of Teeth (N) Extracted/Recommended	DMFT
Cases, Mean(SE)	15.2 (0.92)	21.1 (0.80)
Controls	3.80 (0.92)	13.7 (0.80)

Results: Oral Hygiene and Social History

- Smoking (cigarette) history was reported for cases at 51.7% for current use and 10.0% for former use. Controls reported current use at 1.7% and former use at 50.0%. Incidence for alcohol use for cases was measured at 55.0% (Current), 20.0% (Former), and 25.0% (Never/Denies) and found to be 61.7% (Current), 30.0% (Former), 8.3% (Never/Denies) for controls.

Last Dental Check-Up/Cleaning	< 1 year	1 – 5 years	6 – 10 years	> 10 years	Unknown	Total
Cases, FME (Count, Row %)	11 (22.5%)	9 (18.4%)	5 (10.2%)	20 (40.8%)	4 (8.2%)	49
Controls (Count, Row %)	31 (51.7%)	18 (30.0%)	5 (8.3%)	6 (10.0%)	0 (0.0%)	60
Total	42	27	10	26	4	109
Brushing Frequency						
	> 1 x per day	1x per day	1-3x per week	<1x per week		Total
Cases (Count, Row %)	4 (6.9%)	17 (29.3%)	19 (32.8%)	18 (31.0%)		58
Controls (Count, Row %)	47 (78.3%)	11 (18.3%)	2 (3.3%)	0 (0.0%)		60
Total	51	28	21	18		118
Flossing Frequency						
	> 1x per day	1x per day	4-6x per week	1-3x per week	<1x per week	Total
Cases (Count, Row %)	1 (1.7%)	0 (0.0%)	1 (1.7%)	1 (1.7%)	56 (94.9%)	59
Controls (Count, Row %)	18 (30.0%)	14 (23.3%)	2 (3.3%)	14 (23.3%)	12 (20.0%)	60
Total	19	14	3	15	68	119

P-Value: < 0.0001

References

- Lalla RV, Brennan MT and Schubert MM. Oral Complications of Cancer Therapy. In Pharmacology and Therapeutics for Dentistry, 6th Edition, edited by J. Yagiela, F. Dowd, B. Johnson, A. Mariotti and E. Neidle. Mosby/Elsevier, St. Louis, MO, 2010.
- Lalla RV, Peterson DE, Brennan MT and Schubert MM; Oral Toxicity. In the Chemotherapy Sourcebook, 4th edition, edited by Michael C. Perry, MD. Lippincott Williams and Wilkins, Baltimore, MD, 2007.
- Brennan MT, von Bültzingslöwen I. Multicenter Study on the Burden of Illness of Oral Side Effects from Conditioning Therapy (Chemo – and Radiotherapy) and Hemopoietic Stem Cell Transplantation (HSCT) "Ora-Stem Study." 2016; 1.6.
- Schuurhuis JM, Stokman MA, Witjes MJ, Dijkstra PU, Vissink A, Spijkervet FK. Evidence supporting pre-radiation elimination of oral foci of infection in head and neck cancer patients to prevent oral sequelae. A systematic review. Oral Oncol. 2015 Mar;51(3):212-20.
- Hong CH, Napeñas JJ, Hodgson BD, Stokman MA, Mathers VM, Elting LS, Spijkervet FKL, Brennan MT. Dental Disease Section, Oral Care Study Group, Multi-national Association of Supportive Care in Cancer (MASCC)/International Society of Oral Oncology (ISOO). A systematic review of dental disease in patients undergoing cancer therapy. Support Care Cancer. 2010; 18(8):1007-1021.

Main Conclusions

- Decision-making surrounding a pre – RT FME recommendation was found to be related to oral hygiene history, accessibility to care, and level of dental disease.
- Patients presented with a recommendation for FME (cases) were observed to have a higher incidence of smoking history, a decreased incidence of routine dental care and lower levels of brushing/flossing.