Prospective Cohort Study of Oral Health Promotion Program for Head and Neck Cancer Patients Receiving Radiotherapy

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Intoduction

- Head and neck cancer (HNC) patients not only have to face a life-threatening disease, but also have to deal with the impact of the disease and its treatment.
  - ✓ eg. oral pain, xerostomia, dysgeusia, osteoradionecrosis, trismus
- Treatment strategies are aimed
  - ✓ Increasing the chances of cure
  - ✓ Maintaining health-related quality of life
- Previous studies on oral health care program for HNC patients receiving radiotherapy (RT)
  - ✓ Chlorhexidine mouth rinse (USA, 1990)
  - ✓ Oral care analgesic treatment (USA, 1992)
  - ✓ Antibiotic pastile (UK,1996)
  - ✓ Tantum mouth rinse (Iran, 2009)
  - ✓ **Fluoride varnish (India, 2013)**
    - ➢ **Topically applied fluorides buffers pH of saliva and remineralizes tooth structure.**

Purpose

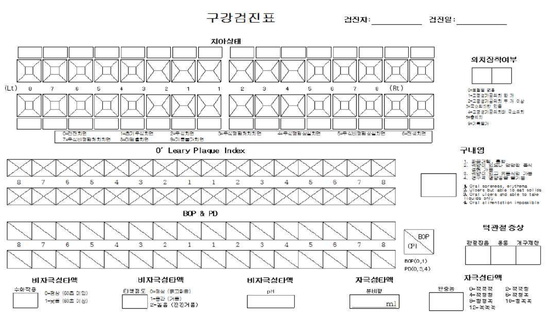
- To develop and evaluate oral health promotion program to improve the quality of life of the HNC patients receiving RT

Methods

- **Open-label, non-randomized, prospective study**
- Accrual period: Jan. 2014 - June. 2015
- Inclusion criteria
  - ✓ Written informed consent
  - ✓ Pathologically confirmed HNC
  - ✓ Major salivary glands and oral mucosa included in the high-dose radiation field
- Exclusion criteria
  - ✓ Moderate-severe dental disease
  - ✓ Medication such as anticholinergics, steroids and antihistamines

	Pre & during RT	Post-RT	3-month f/u	6-month f/u
Control group	Exam Questionnaire	Questionnaire	Questionnaire	Exam Questionnaire
Experimental group	Exam Questionnaire Education	Questionnaire	Questionnaire	Exam Questionnaire Education
	Fluoride varnish	Fluoride varnish	Fluoride varnish	
	Fluoride gargle			

Fluoride gargle and varnish



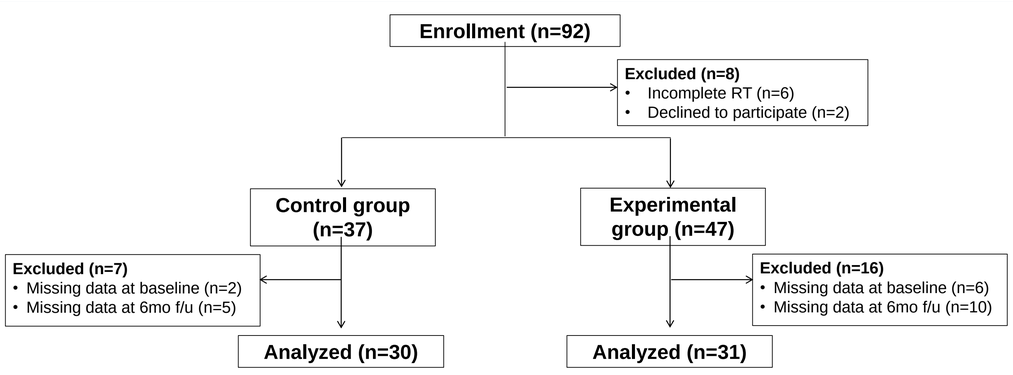
Oral examination

환자들은 때때로 다음과 같은 증상이나 문제들을 호소합니다. 지난 일주일 동안 이 증상들이나 문제들을 어느 정도 경험했는지 해당사항에 동그라미 표시를 해 주시기 바랍니다.

지난 일주일 동안에		전혀 아니다	약간 그렇다	꽤 그렇다	매우 그렇다
8	입안에 통증을 느낀 적이 있습니까?	1	2	3	4
9	턱에 통증을 느낀 적이 있습니까?	1	2	3	4
10	입안이 헌 적이 있습니까?	1	2	3	4
11	목구멍이 아픈 적이 있습니까?	1	2	3	4
12	음료를 삼키는데 어려운 적이 있습니까?	1	2	3	4
13	부드러운 음식을 삼키는데 어려운 적이 있습니까?	1	2	3	4
14	딱딱한 음식을 삼키는데 어려운 적이 있습니까?	1	2	3	4
15	삼킬 때 숨이 막힌 적이 있습니까?	1	2	3	4
16	치아에 문제가 있었습니까?	1	2	3	4
17	입을 크게 벌리는데 어려운 적이 있습니까?	1	2	3	4
18	입이 마른 적이 있습니까?	1	2	3	4
19	침이 끈적끈적한 적이 있습니까?	1	2	3	4
20	냄새를 맡는데 어려운 적이 있습니까?	1	2	3	4
21	맛을 느끼는데 어려운 적이 있습니까?	1	2	3	4
22	기침을 한 적이 있습니까?	1	2	3	4
23	목이 쉰 적이 있습니까?	1	2	3	4
24	입 또는 목구멍 외에 아프다고 느낀 적이 있습니까?	1	2	3	4
25	지금 가지고 있는 병으로 인한 외모때문에 괴로운 적이 있습니까?	1	2	3	4
26	먹는데 곤란한 적이 있습니까?	1	2	3	4
27	가족들 앞에서 식사하는데 당황한 적이 있습니까?	1	2	3	4
28	다른 사람 앞에서 식사하는데 곤란 또는 당황한 적이 있습니까?	1	2	3	4
29	식사를 즐기는데 곤란 또는 당황한 적이 있습니까?	1	2	3	4
30	다른 사람들에게 말하는데 곤란 또는 당황한 적이 있습니까?	1	2	3	4
31	전화로 말하는데 곤란 또는 당황한 적이 있습니까?	1	2	3	4
32	가족들과 사회적 접촉을 하는데 곤란한 적이 있습니까?	1	2	3	4
33	친구들과 사회적 접촉을 하는데 곤란한 적이 있습니까?	1	2	3	4
34	사람들 앞에 나가는데 곤란 또는 당황한 적이 있습니까?	1	2	3	4
35	가족이나 친구들과 신체적 접촉을 하는데 곤란한 적이 있습니까?	1	2	3	4
36	성에 대한 관심을 덜 느낀 적이 있습니까?	1	2	3	4
37	성적 즐거움을 덜 느낀 적이 있습니까?	1	2	3	4
		아니오	예		
38	진통제를 사용한 적이 있습니까?	1	2		
39	영양보조제(비타민 제외)를 먹은 적이 있습니까?	1	2		
40	영양을 공급하는 관을 사용한 적이 있습니까?	1	2		
41	체중이 줄었습니까?	1	2		
42	체중이 늘었습니까?	1	2		

EORTC QLQ-H&N35, OH17 questionnaire

Results



Results: patient characteristics

Characteristics		Control (n=30)	Experimental (n=31)	P
Age (years, range)		60 (21-79)	58 (18-81)	
Gender	Male	17(56.7)	19(61.3)	0.797
	Female	13(43.3)	12(38.7)	
Education	≤ Middle school	9(30.0)	6(19.4)	0.194
	Highschool	14(46.7)	11(35.5)	
	≥ College	7(23.3)	14(45.2)	
Occupation	Unemployed	15(50.0)	14(45.2)	0.736
	White collar	7(26.7)	10(32.3)	
	Blue collar	8(23.3)	7(22.6)	
Smoking history	Non-smoker	15(50.0)	16(51.6)	0.337
	Ex-smoker	14(46.7)	11(35.5)	
	Smoker	1(3.3)	4(12.9)	
Tumor site	Oropharynx	8(26.7)	9(29.0)	0.868
	Nasopharynx	4(13.3)	6(19.4)	
	Oral cavity	6(20.0)	5(16.1)	
	Hypopharynx	4(13.3)	2(6.5)	
	Others	8(26.7)	9(29.0)	
AJCC stage	I,II	3(10.0)	7(24.1)	0.338
	III	10(33.3)	9(31.0)	
	IV	17(56.7)	13(44.8)	
RT aim	Radical	16(53.3)	15(48.4)	0.800
	Postoperative	14(46.7)	16(51.6)	
RT dose (Gy, range)		67.5 (54-67.5)	63 (58.5-72)	
CCRT	Yes	20(66.7)	15(48.4)	0.198
	No	10(33.3)	16(51.6)	

➢ **There was no difference in patient characteristics between two groups.**

Changes of EORTC QLQ-H&N35, OH17

EORTC QLQ-H&N 35 indices		Control Before	Control 6month f/u	Experimental Before	Experimental 6month f/u	P
Total		24.09(13.18)	31.64(19.51)	25.99(15.34)	24.11(14.45)	0.075
Scales	Pain	18.52(13.82)	26.07(26.76)	20.29(18.14)	17.47(13.15)	0.093
	Swallowing	12.04(15.80)	21.77(25.28)	20.53(24.26)	16.93(19.61)	0.054
	Senses	13.89(24.07)	27.96(28.67)	14.82(23.09)	17.74(21.49)	0.606
	Speech	18.83(20.71)	27.60(27.79)	17.63(21.41)	12.54(17.52)	0.179
	Social eating	19.44(25.59)	34.94(32.59)	26.14(31.55)	22.31(24.00)	0.065
	Social contact	19.63(23.25)	23.65(30.25)	15.80(20.97)	13.98(23.75)	0.263
	Sexuality	12.38(17.78)	28.16(32.76)	23.33(33.97)	20.43(27.12)	**0.045**
Single items	Teeth problems	37.14(36.84)	35.55(34.94)	28.26(31.40)	21.50(30.48)	0.517
	Open mouth	25.92(32.96)	45.55(34.44)	25.36(34.56)	26.88(31.53)	0.129
	Dry mouth	33.33(29.81)	51.61(32.01)	34.81(32.53)	54.83(31.68)	0.201
	Sticky saliva	22.22(26.42)	38.71(32.31)	22.96(30.00)	41.11(33.54)	0.857
	Cough	19.44(18.47)	18.28(25.58)	20.29(22.75)	20.00(27.12)	0.980
	Weight loss	41.18(49.96)	45.16(50.59)	50.00(50.55)	38.71(49.51)	0.303
	Weight gain	14.29(35.50)	25.81(44.48)	13.04(34.05)	29.03(46.14)	0.168
	Nutritional supplements	34.29(48.16)	32.26(47.52)	36.96(48.80)	41.94(50.16)	0.636
	Use of feeding tube	17.14(38.24)	12.90(34.08)	17.39(38.32)	6.45(24.97)	0.775
	Use of pain killers	60.00(49.71)	45.16(50.59)	56.52(50.12)	16.13(37.39)	**0.049**
	Feeling ill	16.67(23.23)	27.95(33.44)	21.48(29.43)	13.98(20.68)	0.188

EORTC QLQ-OH 17 indices		Control Before	Control 6month f/u	Control P	Experimental Before	Experimental 6month f/u	Experimental P
Total		23.62(14.48)	29.25(12.57)	**0.017**	23.71(11.09)	15.13(13.50)	**<0.001**
Scales	Pain/discomport	17.03(18.03)	18.75(20.14)	0.606	8.00(7.97)	8.25(13.11)	0.907
	Xerostomia	26.44(22.94)	46.55(27.95)	**0.005**	23.33(24.60)	48.33(31.36)	**<0.001**
	Eating	24.19(20.68)	31.72(28.00)	0.144	20.96(21.66)	18.94(22.37)	0.654
	Information	56.54(15.93)	61.90(17.48)	0.248	60.21(17.57)	62.36(14.25)	0.619
Single-item questions	Worm dentures	3.45(10.33)	3.45(10.33)	1.000	1.39(6.73)	0.69(4.81)	0.569
	Ill-fitting denture	8.05(22.98)	10.34(28.31)	0.489	5.56(19.85)	1.39(6.73)	0.159
	Worried about future	36.78(43.04)	34.48(39.32)	1.745	38.19(35.72)	11.80(22.27)	**<0.001**

➢ **Total score of OH17 indices was significantly improved in experimental group.**

Subgroup analysis: EORTC H&N 35

		Swallowing	Senses	Speech	Social eating	Social contact	Sexuality	Teeth problems	Dry mouth	Use of pain killers
Age	< 60 yr	0.384	0.888	0.114	0.874	0.526	0.118	0.922	0.237	0.893
	≥ 60 yr	0.138	0.092	0.357	**0.040**	0.170	**0.015**	0.272	0.397	**0.037**
Stage	I-III	0.582	0.910	0.753	0.434	0.932	0.458	0.587	0.747	0.960
	IV	0.069	0.346	**0.054**	0.099	0.359	**0.001**	0.377	0.710	**0.030**
CCRT	CCRT	0.150	0.955	0.093	0.094	0.482	0.032	**0.047**	0.808	0.127
	RT alone	0.089	**0.033**	0.613	0.554	0.660	0.193	0.346	0.879	0.398
RT aim	**Radical**	**0.037**	0.804	0.190	0.270	0.404	**0.033**	**0.037**	0.668	0.354
	Postoperative	0.878	0.094	0.188	0.096	0.889	**0.048**	0.407	0.458	0.174

➢ Patients with old age, stage IV, and radical radiotherapy showed improved quality of life by oral health care program.

Change of oral health status (Before RT vs. 6mo f/u)

	Control (n=30) Before	Control 6mo f/u	Control P	Experimental (n=31) Before	Experimental 6mo f/u	Experimental P
Caries experience	6.60 (8.11)	9.27 (9.11)	**0.002**	5.87 (6.13)	6.00 (6.15)	0.829
Root caries	0.00 (0.00)	0.37 (1.16)	0.094	0.00 (0.00)	0.16 (0.73)	0.231
Plaque score	17.27 (13.28)	24.43 (23.64)	0.084	26.93 (25.56)	6.73 (5.58)	**<0.001**
Bleeding on probe	2.60 (3.19)	2.90 (3.71)	0.568	2.35 (3.38)	0.71 (1.22)	**0.004**
Salivary flow rate	1.29 (0.72)	0.65(0.42)	**0.001**	1.18 (0.56)	0.88 (0.41)	**0.027**

➢ **Plaque score and bleeding tendency were improved in experimental groups.**

Conclusions

- **Oral health promotion program including oral exam, education, and fluoride application was effective in decreasing dental problems and improving patients' quality of life.**
- **In subgroup analysis, patients with old age (≥ 60 yr), stage IV, and radical radiation showed improved quality of life by dental care program.**
- **We recommend administration of the dental care program for HNC patients receiving RT.**