



# Effects of oral care for oral mucositis and nutritional status in tongue cancer patients during chemo-radiotherapy

Sachiyo Mitsunaga <sup>1,2)</sup>, Senri Oguri <sup>2)</sup>, Iwai Tohna <sup>2)</sup>

1) Department of Oral and Maxillofacial Surgery, Kanagawa Cancer Center

2) Department of Oral and Maxillofacial Surgery, Yokohama City University Graduate School of Medicine

## Abstract

**Purpose:** The purpose of this study was to evaluate the effects of oral care for oral mucositis (OM) and nutritional status in patients receiving chemo-radiotherapy for tongue cancer.

**Methods:** This study included 26 patients who received radical chemo-radiotherapy for tongue cancer between 2011 and 2016 at the Department of Head and Neck Surgery at Kanagawa Cancer Center, Japan. During chemo-radiotherapy, 16 patients received systematic dental care and oral hygiene instruction by dentists and dental hygienists (oral hygiene group). Overall, 10 patients received standard dental care (standard medication group). We investigated the severity of OM (CTCAE ver3.0), inflammatory responses, and nutritional status, based on clinical records.

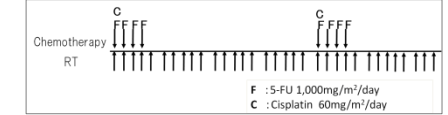
**Results:** At the end of chemo-radiotherapy, there was no significant difference of the severity of OM between both groups. In oral hygiene group, inflammatory responses were lower and nutritional status was better than standard medication group.

**Conclusion:** Oral care is effective to prevent inflammatory responses and to improve nutritional status during chemo-radiotherapy for tongue cancer.

## Patients and Methods

We retrospectively studied 26 patients who received superselective intra-arterial chemotherapy with concurrent radiotherapy (IACRT) for tongue cancer between 2011 and 2016 at the Department of Head and Neck Surgery at Kanagawa Cancer Center, Japan (Fig 1). In 2014, our hospital created an oral management team, consisting of dentists and dental hygienists. Of the 26 subjects, 10 patients who underwent IACRT between 2011 and 2013 received systematic dental care (standard group). Overall, 16 patients received systematic dental care and oral hygiene instruction by dentists and dental hygienists (oral hygiene group; Table1,2).

Table1 IACRT: treatment for tongue cancer



Radiotherapy(RT): 2 Gy per fraction, 5 times a week for a total dose of 60-70 Gy.  
Superselective intra-arterial infusion of cisplatin(C): Cisplatin 60mg/m<sup>2</sup>/day (Seldinger techniques)  
Intra-venous infusion of 5-FU(F) : 5FU 1,000mg/m<sup>2</sup>/day

Table1 Patients and characteristics

	Standard group	Oral hygiene group
Number of patients	10	16
Demographics		
mean age	55.0±13.3	57.8±13.1
Male(n,%)	7(70.0%)	13(81.3%)
T classification		
T2	7	5
T3	0	2
T4a/b	3	9
Radiation dose		
mean(Gy)	65.6±2.95	65.4±2.03

### Evaluation items

- Severity of OM in CTCAE version 3.0 (clinical exam)
- Interruption of IACRT due to OM
- Duration of hospitalization
- Nutritional status: interruption of oral intake, BMI (before and after IACRT), Serum albumin (before, after, and three months post-IACRT)
- Inflammatory responses: Fever, C-Reactive Protein (before, after, and three months post-IACRT)

Statistical analyses were performed using SPSS version 12.0J statistical software (SPSS, Chicago, IL, USA). Values of *P* < 0.05 were considered statistically significant.

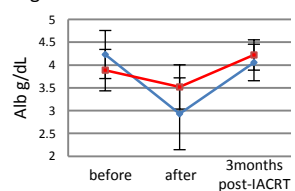
Table2 Procedure of oral care in this study  
Systematic dental care and oral hygiene instruction

- ✓ Before treatment
    1. Teeth extraction and restorative procedure if indicated.
    2. Scaling and PMTC
    3. Instruction to keep moisture in oral mucosa
    4. Instruction of oral self-care: brushing, rubbing the oral mucosa avoid the cancer lesion, and cleaning the dentures.
  - ✓ During IACRT (Once or twice in two weeks)
    1. Tooth brushing instruction by dentist or dental hygienist.
    2. P(M)TC by dentist or dental hygienist according to the medical condition and oral mucositis.
    3. Confirmation and instruction of oral self-care (including to keep moisture in oral mucosa )
- Benzylamine is not approved in Japan.  
•Pain control was performed by attending physicians.

## Results

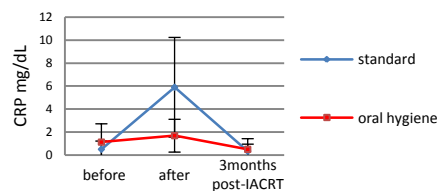
- At the end of chemo-radiotherapy, there were no significant differences in OM severity, between both groups.
- The frequency of IACRT interruption and duration of hospitalization were significantly less in the oral hygiene group compared with the standard group (Table 3).
- Although there was no significant difference in interruption of oral intake frequency, in either group, there was a tendency toward reduced duration of no oral intake in both groups (Table 4). According to OM symptoms, meal contents and form were modified as easy to eat.
- There were no differences in BMI, before and after IACRT, for both groups (Table 4).
- Serum albumin, after IACRT, was significantly less in the oral hygiene group than the standard group (Fig 2). The amount of decrease, before and after IACRT, was less in the oral hygiene group. Increase in serum albumin, before and three months after IACRT, was higher in the oral hygiene group (Table 4).
- C-relative protein after IACRT was significantly less in the oral hygiene group than the standard group (Fig 3).
- The oral hygiene group had less fever than the standard group during IACRT (Table 5).

Fig2. Serum albumin



	Alb (g/dL)	before	after	3months post-IACRT
standard		4.2±0.5	2.9±0.8	4.1±0.4
oral hygiene		3.9±0.4	3.5±0.5	4.2±0.3
<i>P</i>		0.091	0.026	0.288

Fig3. C-relative protein



	CRP (mg/dL)	before	end	3months post-IACRT
standard		0.49±0.71	5.90±4.34	0.33±0.49
oral hygiene		1.11±1.59	1.67±1.42	0.49±0.93
<i>P</i>		0.257	0.014	0.652

Table3 OM and IACRT

	Standard group	Oral hygiene group	<i>P</i>
Severity of OM(n,%)			
Gr2	3(30.0%)	1(6%)	
Gr3/4	7(70.0%)	15(94%)	0.264
Interruption of IACRT (n,%)	5(50.0%)	1(6.3%)	0.018
Duration of hospitalization mean(days)	81.6±10.0	71.3±13.1	0.043

Table4 Nutritional status

	Standard group	Oral hygiene group	<i>P</i>
Interruption of oral intake (n,%)	5(50.0%)	3(18.8%)	0.189
mean(days)	27.0±31.1	4.87±11.7	0.055
BMI			
before IACRT	21.8±3.3	22.7±4.4	0.599
after IACRT	19.9±2.7	20.5±3.2	0.578
ΔAlb(before/after) mean(g/dL)	-1.3±0.7	-0.4±0.5	0.001
ΔAlb(before/3ms post-IACRT) mean(g/dL)	-0.1±0.4	0.3±0.5	0.032
ΔAlb(before/after) = Alb[after IACRT] - Alb[before IACRT] (g/dL)			
ΔAlb(before/3ms post-IACRT) = Alb[three months post-IACRT] - Alb[before IACRT] (g/dL)			

Table5 Inflammatory responses

	Standard group	Oral hygiene group	<i>P</i>
fever (above38°C) (n,%)	6(60%)	2(12.5%)	0.026
Duration of fever mean(days)	4.9±11.7	0.6±1.5	0.079

## Discussion

OM side effects are painful and debilitating and may adversely affect the patients' nutritional status. In response to recently issued OM guidelines, dental interventions are increasingly included as an essential component of cancer therapy. Although many studies confirm that oral care prevents severe OM, induced by chemo-radiotherapy for head and neck cancer, effects on nutritional status are not verified. In this study, professional oral care did not prevent OM-induced IACRT in patients with tongue cancer. However, it did reduce inflammatory responses (e.g., frequency of fever and CRP increases). This reduced pain and helped maintain functional oral intake. This approach appears to assist in maintaining and improving nutritional status. This may occur secondary to reduced catabolism due to inflammation. If nutritional status is maintained, it may be possible to reduce IACRT interruptions, thus shortening hospitalization. Professional oral care was useful during IACRT for tongue cancer. Study limitations include the small sample size, and further study is needed to establish methods and efficacy of oral care.

## Conclusion

The professional oral care, including systematic dental care and oral hygiene instruction by dentists and dental hygienists, is effective for preventing OM, potentially reducing inflammation and improving nutrition for patients undergoing radical chemo-radiotherapy for tongue cancer.

Conflict of interest statement: None declared

## References

1. Linda S. E, Catherine D. C, Mark S.C, and Adam S.G(2007) Risk, outcome, and costs of radiation-induced oral mucositis among patients with head-and-neck malignancies. *Int. J. Radiation Oncol*68(4):1110-1120
2. Kubota K, Kobayashi W, Sasaki H, Nakagawa H, Kon T, Mimura M, Ito R, Furudate K, Kimura H(2015) Professional oral health care reduces oral mucositis pain in patients treated by superselective intra-arterial chemotherapy concurrent with radiotherapy for oral cancer. *Support Care Cancer*23:3323-3329