

Oral Care and Prevention of Pneumonia in Hospitalized Patients With Psychiatric Disorders in Japan

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ABSTRACT

PURPOSE: Oral care in hospitalized patients with psychiatric disorders is important. However, some patients with psychiatric disorders cannot undergo oral care because of psychiatric symptoms and cognitive decline. The effect of a standardized oral hygiene intervention on the prevention of pneumonia in hospitalized patients with psychiatric disorders was investigated.

METHOD: Patients were divided into 2 groups: control group (N = 259), patients without standardized intervention who were enrolled on April 2014 as the time point of baseline, and intervention group (N = 263), patients with standardized intervention who were enrolled on April 2015 as the time point of baseline. Two end points were evaluated: (1) pneumonia onset within 1 year after the enrollment and (2) no pneumonia for 1 year after the enrollment. The following parameters were compared between the groups: sex, age, psychiatric disorders, past history of diseases of the respiratory system, hypertension, diabetes, hyperlipidemia, heart impairment, and pneumonia.

RESULTS: No statistically significant differences were found between the 2 groups in the distributions of characteristics except pneumonia by univariate analysis. The presence of pneumonia was significantly associated with age and the absence of the standardized oral hygiene intervention by multivariate logistic regression analysis.

CONCLUSIONS: The standardized oral hygiene intervention appears to be effective for preventing pneumonia in patients with psychiatric disorders.

KEYWORDS: Hospitalized patients, oral care, pneumonia, psychiatric disorders

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Introduction

Presently, Japanese people live longer than any other people in the world with average life spans of 80.79 years for men and 87.55 years for women. In Japan, pneumonia is the third leading cause of death, and about 95% of cases occur in individuals aged 65 years old or older.¹ Hospitalized patients are older, with the prevalence of pneumonia. To prevent pneumonia, oral care is very important. In general, common tests, such as videofluoroscopic examination of swallowing, videoendoscopic evaluation of swallowing, the repetitive saliva swallowing test,² and the modified water swallowing test,³ are performed. However, some patients with psychiatric disorders cannot undergo these tests because of psychiatric symptoms and cognitive decline. There are patients in whom these factors lead to pneumonia relapse and prolonged hospitalization. The effect of a standardized oral hygiene intervention on the prevention of pneumonia in hospitalized patients with psychiatric disorders was investigated.

Methods

Study design

This study is a retrospective, nonrandomized controlled trial that set intervention for research.

Subjects

Of the patients who were hospitalized in the Department of Psychiatry, Yuzuriha Hospital, 2 groups were compared: control group (N = 259), patients without standardized intervention who were enrolled on April 2014 as the time point of baseline, and intervention group (N = 263), patients with standardized intervention who were enrolled on April 2015 as the time point of baseline. Two end points were evaluated: (1) pneumonia onset within 1 year after the enrollment and (2) no pneumonia for 1 year after the enrollment. The flowchart of study participants and the exclusion criteria is shown in Figure 1. The psychiatric disorders included schizophrenia, dementia, mental retardation, and other psychiatric disorders. All patients met the criteria of the *International Classification of Diseases, Tenth revision* for their respective disorders.

Intervention method

The standardized intervention was oral care based on the status in the oral cavity (Table 1) and swallowing training including turning the neck and shoulder, moving the cheek, lip protrusion, tongue movement, pronunciation, and massage. Massage included massaging the parotid, submandibular, and



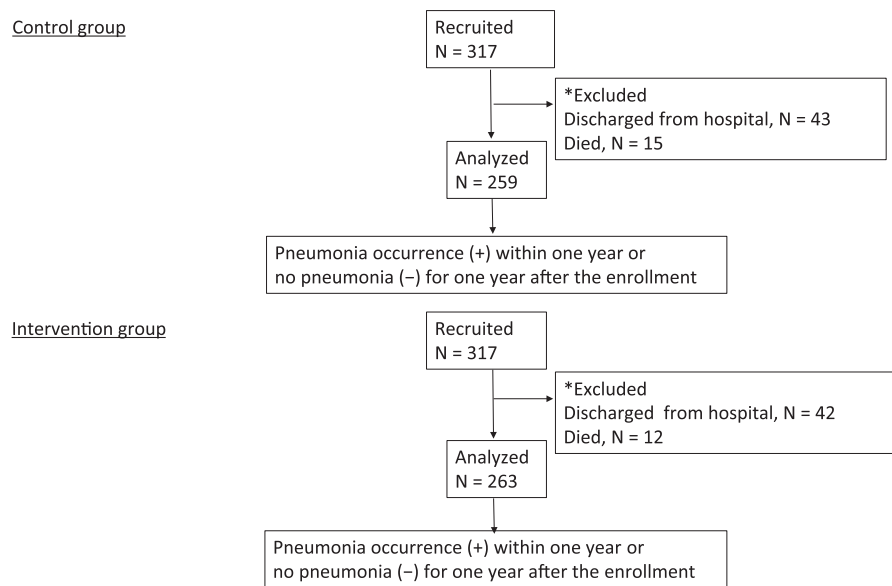


Figure 1. Flowchart of study participants. *The reason for exclusion was not pneumonia.

Table 1. Standardized oral care intervention in Yuzuriha Hospital.

STATUS IN THE ORAL CAVITY	NO DENTURES	TOTAL DENTURES	PARTIAL DENTURE	EDENTULOUS JAW
Cleaning method				
Dentifrice	+	-	+	-
Denture cleaning	-	+	+	-
Wiping in the oral cavity	+	+	+	+

Use gauze or sponge brush for wiping in the oral cavity. When mouth dryness is remarkable, apply petrolatum to the lips.

sublingual glands and brushing the soft palate and back of the tongue using swabs.

Outcome

The following parameters were compared between the 2 groups: sex, age, psychiatric disorders, past history of diseases of the respiratory system, hypertension, diabetes, hyperlipidemia, heart impairment, and pneumonia. The presence of pneumonia was defined as follows: (1) development of new progressive infiltrates on chest X-rays, (2) C-reactive protein >0.3 mg/dL, and (3) diagnosis of pneumonia by 2 physicians. These methods were discussed, and training was provided to the nurses and caregivers by 1 geriatric psychiatrist, 3 dental professionals, and members of the Nutrition Dysphagia Rehabilitation Committee of Yuzuriha Hospital.

Statistical analysis

Statistical analysis was conducted using the χ^2 test and the t test for each categorical variable of sex, age, psychiatric disorders, past history of diseases of the respiratory system and hypertension, diabetes, hyperlipidemia, heart impairment, and

pneumonia. Taking into account confounding factors, multivariate logistic regression analysis was performed. The presence of pneumonia was taken as a dependent variable. Significance was identified at the $P < .05$ level. The IBM SPSS Statistics Version 24 for Windows was used to conduct all analyses.

Ethical issue

This study was approved by the Yuzuriha Hospital ethics committee.

Results

Table 2 shows the characteristics of sex, age, psychiatric disorders, past history of diseases of the respiratory system, hypertension, diabetes, hyperlipidemia, heart impairment, and the findings in each group. The χ^2 test demonstrated a significant difference in the presence of pneumonia between the 2 groups (Table 3). To consider factors significantly related to the presence or absence of pneumonia using the likelihood ratio test, an optimal model was obtained. Sex, age, psychiatric disorders, past history of diseases of the respiratory system, hypertension, diabetes, hyperlipidemia, and the oral hygiene intervention were selected as independent variables.

Table 2. Characteristics of sex, age, psychiatric disorders, past history of disease of the respiratory system, and complications at the baseline.

CHARACTERISTICS	CONTROL GROUP (N=259)	INTERVENTION GROUP (N=263)	P
Sex (M/F), N	116/143	120/143	.85
Age, y (mean±SD)	68.78±13.44	68.03±14.61	.54
Psychiatric disorder			
Schizophrenia, No. (%)	160 (61.78)	162 (61.60)	.97
Dementia, No. (%)	53 (20.46)	53 (20.15)	.93
Mental retardation, No. (%)	14 (5.41)	14 (5.32)	.97
Other psychiatric disorders, No. (%)	32 (12.36)	34 (12.93)	.84
Past history of diseases of the respiratory system, No. (%)	9(3.47)	11(4.18)	.67
Hypertension, No. (%)	109(42.08)	107(40.68)	.75
Diabetes, No. (%)	43 (16.60)	43 (16.35)	.94
Hyperlipidemia, No. (%)	67 (25.87)	50 (19.01)	.06
Heart impairment, No. (%)	106 (40.93)	98 (37.26)	.39

Statistical analysis was conducted using the χ^2 test and the *t* test for each categorical variable of sex, age, other psychiatric disorders, past history of disease of the respiratory system, and complications.

Table 3. Data analysis (pneumonia).

CHARACTERISTICS	CONTROL GROUP (N=259)	INTERVENTION GROUP (N=263)	P
Univariate analysis ^a			
Pneumonia, No. (%)	65 (25.10)	33 (12.55)	<.001*
	OR	95% CI	P
Multivariate logistic regression analysis ^b			
Age	1.097	1.069–1.127	<.001*
Absence of standardized oral hygiene intervention	3.024	1.779–5.140	<.001*

Abbreviations: CI, confidence interval; OR, odds ratio.

^aStatistical analysis was conducted using the χ^2 test for the groups independent of the presence or absence of pneumonia.

^bFactors associated with the presence of pneumonia.

**P* < .05, *df* = 1.

It was found that the presence of pneumonia was significantly associated with age and the absence of the standardized oral hygiene intervention (Table 3).

Discussion

The presence of pneumonia was significantly associated with age and the absence of the standardized oral hygiene intervention.

Aging, oral care, and pneumonia

As age increases, changes in gastrointestinal flora due to decreased gastric acid secretion, increased aspiration, loss of appetite, reduced salivation, and increased use of dentures lead to pneumonia.^{4,5}

Adequate oral care promotes secretion of saliva, promotes self-cleaning actions in oral hygiene, and suppresses growth of oral microbial flora.⁶

The present findings may be in agreement with previous reports.

Swallowing training

Turning the neck and shoulder stretches the sternocleidomastoid, scalene, trapezius, and hyoid bone muscles. Movements of the cheek, lip protrusion, and tongue movement stretch the orbicularis, buccinator, and mentalis muscles. The massage used in the study strengthened the masseter, orbicularis oris, and tongue muscles. Pronunciation includes vocalization of “pa, ta, ka, ra,” because the vocalization provides conscious stimulation of the lips and tongue muscles.⁷ Occupational therapists in our hospital perform these movements in front of the patients at the same time to make it easier for the patients to exercise.

Many studies have reported that the oral care provided by nurses or caregivers reduced the incidence of mortality from pneumonia.⁸ However, maintaining adequate oral hygiene in old age or dementia is extremely difficult.⁹ In particular, some patients with psychiatric disorders, including schizophrenia, mental retardation, and dementia, often react with difficult behavior when receiving assistance^{10,11} and cannot understand the instructions necessary for examinations, such as “frequently swallow your saliva for 30 seconds.” Therefore, the number of articles on oral hygiene is few; to the best of our knowledge, no data on oral care among patients with psychiatric disorders have been published.¹²

In this study, a standardized intervention was performed without contrast drugs, or endoscopes, taking into account the patients’ psychiatric symptoms and cognitive decline. In addition, members of the Nutrition Dysphagia Rehabilitation Committee of Yuzuriha Hospital provided education and comments to the nurses, caregivers, and occupational therapists.

The standardized oral hygiene intervention consisted of oral care, swallowing training, and educating the staff.

The limitations of this study were that the patients were recruited from one facility.

Conclusions

The standardized oral hygiene intervention appears to be effective for preventing pneumonia in patients with psychiatric disorders.

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Author Contributions

AH designed the study and wrote the manuscript. AH, HK, KY, MH followed up the patients. AH collected and analyzed data. RT supervised the whole study process. All authors read and approved the final manuscript.

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