The Comparison of the Effects of Chlorhexidine Mouthwash Alone and Chlorhexidine Mouthwash Followed By Oral Suctioning on Oral Hygiene of Critically Ill Patients

Kritik Hastaların Ağız Hijyeninde Tek Başına Klorheksidin Gargara ve Klorheksidin Gargarayı Takiben Ağız Sekresyonlarının Vakumla Çekilmesinin Etkilerinin Karşılaştırması

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Abstract

Aim: Oral hygiene is one of the main issues in nursing care, being especially important among patients admitted to intensive care units (ICU). The aim of the study was to assess the effect of Chlorhexidine mouthwash alone and 0.2% Chlorhexidine mouthwash followed by oral suctioning on oral hygiene in ICU patients.
Material and Methods: In a semi-experimental research design, 90 patients who were admitted to the ICUs were selected. Patients were randomly divided into two groups. In group I, 0.2% chlorhexidine mouthwash alone was applied and in group 2, 0.2% chlorhexidine mouthwash was followed by oral suctioning. These procedures were repeated for 7 consecutive days. The oral hygiene status of patients was assessed by using a Beck checklist on the 1st and 7th days of ICU admission.
Results: Oral hygiene scores of group I on the 1st and 7th days were 12.4 and 14.3 respectively. In group II, the scores of the 1st and 7th days were 11.8 and 10.5 respectively. Oral hygiene status of group I was poorer on the 7th day, but in group II oral hygiene had improved on the 7th day of application.
Conclusion: We found that using a 0.2% chlorhexidine solution alone is not enough for oral care of patients in the ICU and suctioning of the oral secretions after 0.2% chlorhexidine mouthwash will improve oral hygiene in critically ill patients.
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Key words: Oral hygiene, mouthwash, chlorhexidine, oral suction, critically ill patients
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Özet

Amaç: Ağız hijyeni, hasta bakımında ana konulardan biridir ve yoğun bakım ünitesi (YBÜ)'ne kabul edilen hastalarda özellikle önemlidir. Çalışmanın amacı YBÜ hastalarının ağız hijyeninde tek başına klorheksidin gargara ve %0.2 klorheksidin gargarayı takiben ağız sekresyonlarının vakumla çekilmesinin etkilerinin değerlendirilmesidir.
Gereç ve Yöntemler: Yarı deneysel bir araştırma tasarımında, YBÜ'ne kabul edilmiş 90 hasta seçildi. Hastalar rastlantısal olarak iki gruba bölündü. Grup 1'de, tek başına %0.2 klorheksidin gargara uygulandı ve grup 2'de %0.2 klorheksidin gargarayı ağız sekresyonlarının vakumla çekilmesi takip etti. Bu işlemler aralıksız 7 gün boyunca tekrarlandı. Hastaların ağız hijyen durumu YBÜ'ne yatışın 1. ve 7. gününde Beck kontrol listesi kullanılarak değerlendirildi.
Bulgular: Grup 1'in 1. ve 7. gün ağız hijyen skorları sırasıyla 12.4 ve 14.3 idi. Grup 2'de, 1. ve 7. gün skorları sırasıyla 11.8 ve 10.5 idi. Grup 1'in ağız hijyen durumu 7. günde daha kötüydü, buna karşın grup 2'de ağız hijyeni uygulamanın 7. gününde düzelmişti.
Sonuç: YBÜ'ndeki hastaların ağız bakımı için tek başına %0.2 klorheksidin solüsyonu kullanılmasının yeterli olmadığını ve %0.2 klorheksidin gargaradan sonra ağız sekresyonlarının vakumla çekilmesinin kritik hastalarda ağız hijyenini düzelteceğini bulduk.
(Yoğun Bakım Derg 2012; 1: 13-6)

Anahtar sözcükler: Ağız hijyeni, gargara, klorheksidin, ağız sekresyonlarının vakumla çekilmesi, kritik hastalar
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Introduction

Oral hygiene-including mouth, teeth, gums and tongue cleaning-will remove mouth secretions and therefore, provide a good feeling of oral cleanliness and refreshment for patients (1, 2). Due to salivary gland secretion impairment, critically ill patients with a low level of consciousness and intubated patients on mechanical ventilation need extra oral care. Since saliva is an important factor in oral hygiene (3-6), decrease in saliva and inappropriate oral hygiene may cause many health problems among critically ill patients (2, 7). Oral bacterial colonization is related to many diseases such as cardiovascular disorders, chronic obstructive pulmonary disease, and in the ICUs, ventilator associated pneumonia (2, 8). Ventilator associated pneumonia is a life-threatening condition which can be related to aspiration of colonized oropharyngeal secretions or their leakage around the endotracheal tube cuff (8-10).

As one of the most important responsibilities of nurses in intensive care units, oral hygiene has been maintained routinely using mouthwashes, mainly antiseptic solutions for years (8, 9). Mouthwashes are used to reduce dental plaques and microorganisms which are involved in tooth decay, to eliminate bad breath odor, to create a feeling of freshness in mouth, and to treat gingivitis (5, 6, 9). Chlorhexidine has a broad antibacterial spectrum and has gained more popularity than other mouthwashes because of its antibacterial power (9).

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There are different techniques for oral health care of patients in the ICUs. Suctioning out of the secretions alone in the patients' throat, mouthwashes alone, and using tooth brushing are the main common techniques for oral care of patients in the ICUs. Suctioning of the secretions alone, throat/ mouthwashes alone, and using tooth brushing are the main common techniques. There are controversies regarding the effectiveness of these techniques. Fields et al. (11) reported that brushing the teeth of critically ill patients every 8 hour, could decrease the incidence of ventilator associated pneumonia to zero. Ranjbar et al. in Iran (8) reported that the main method for mouth hygiene should be to use 0.2% chlorhexidine solution for ICU patients. In another research, the results showed that the most important factor in mouth hygiene was to brush the patient's teeth, not the type of applied mouthwash solution (12). In a randomized control trial, Panchabhai et al. (13), compared oropharyngeal cleansing with 0.2% Chlorhexidine and potassium permanganate, and reported that oropharyngeal cleansing with 0.2% Chlorhexidine solution was not superior to oral cleansing with potassium permanganate for decreasing nosocomial pneumonia. Finally, in a study carried out in 2004 by Jones et al. (14), it was concluded that more education on oral health care was needed and they emphasized the need for the design and use of instruments for mouth hygiene assessment.

Unfortunately, there is evidence that oral hygiene attracts less attention than other care attributes by the nurses in Iran; possibly because of the laborious work and stressful environment of the ICUs (8). In addition, previous studies mostly focused on the use of mouthwash to reduce respiratory infections rather than on providing oral health. The aim of this study was to compare the two ways of using mouthwashes and their influences on the oral health of patients in the ICUs.

Material and Methods

This semi-experimental research was designed with authorities in three parts of Shahid Bahonar's ICU in Kerman, Iran during the first 7 months of 2011. This hospital has 33 mixed ICU beds that admitted approximately 1104 patients in 2010 (15). Inclusions criteria of the study were: being on mechanical ventilation, having an endotracheal tube, staying in the ICU for at least seven days and having natural teeth. Patients with surgery and fractures involving the jaw and mouth, and patients with periodontal lesions were excluded. The patients'demographic information including age, sex, and cause of admission were registered at the time of admission. Patients in both groups received similar care in other aspects of nursing care and medical treatment such as endotheracheal suctioning, use of inhibitors of gastric acid secretion, sedation, body position (head of bed elevated 30'), timing of ventilator circuit changes (48 hour), and route of nutrition. Because of the coma status of the patients in this study, all written consents were obtained from patients' families. Ninety patients were randomly divided into two equal groups. After admission of a patient in the unit he was randomly allocated into one of the groups, and oral hygiene of the patient was examined and scored by a trained nurse using the Beck's checklist (16). Patients in group I received oral care with 0.2% chlorhexidine alone while patients in group II received chlorhexidine followed by oral suction every six hours (four times a day). This procedure was followed for seven days. In group II, extra care was given to control suction pressure, proper use of suction catheter, suction time and use of sterile tips. On the seventh day, oral health status was rescored using the Beck's checklist.

I. The lips: pink, scores 1; a little dry, scores 2; a little oedematose, scores 3; dry and oedematose, scores 4.
II. The mucosa: pink scores 1; a little dry scores 2; a little oedematose, scores 3; very red scores 4.
III. The tongue: pink, scores 1; a little dry, scores 2; tongue's red mucosal, scores 3; covered with particles, scores 4.
IV. The teeth: Being clean scores 1; A little dirt scores 2; Moderate dirt scores 3; Completely dirty scores 4.
V. Saliva: abundant and diluted, scores 1; plentiful, scores 2; low, scores 3; dense and low, scores 4.

Patients' score could be between 5 and 20. Fewer score the patient gets, the mouth hygiene he/she has is better. Validity of checklist was assessed with content validity method by 10 faculty members of Kerman University of Medical Sciences. Reliability was checked by the inter-rater reliability method and the Cronbach's alpha was 0.81. The data were analyzed by SPSS (version 17) and descriptive statistics and paired t-test with consideration of $p<0.05$ were applied.

Results

Out of 90 subjects in the study, 71.7% were men. The mean age for the subjects was 39.2 years (range of 18-45). The admission diagnoses of the patients are listed in Table 1. The mean oral hygiene score for group I was 12.4±3.1 on the first day. In this group, on the first day, the highest score was for saliva 2.36 (the worst component in the checklist) and the lowest score was for teeth with 1.36 (the best component in the checklist). The mean score for the oral hygiene for group I on the seventh day increased to 14.3 ±2.8. On day seven the patients in the first group reached the highest score for the mucosa with 3.20 (the worst component in the checklist) and the lowest score was for the teeth (the best component in the checklist) with 2.27. In group II the mean score for the oral hygiene was 11.8±2.6 on the first day. In this group, on the first day, the highest score was for saliva 3.2 (the worst component in the checklist) and the lowest was for lips with 1.91 (the best component in the checklist). The mean hygiene score decreased to 10.5±2.1 for the second group on day seven. The patients in this group achieved the highest score of 3.70 for saliva (the worst component in the checklist) and the least score of 1.62 for teeth (the best component in the checklist). Tables 2 and 3 show the results of oral hygiene scores for both groups. The results for the paired t-test indicates a significant difference in mean of oral hygiene scores for group I between the 1st day and 7th day ($P<0.05$). This mean difference was positive, which shows the deterioration of oral hygiene on the seventh day compared to the first day they had been assessed. The result of this test also showed a significant difference in mean oral hygiene score for the group II patients

Table 1. Admission diagnosis of patients

Diagnosis	Group II (N=45)	Group I (N=45)
Brain tumor	7 (15.5)	8 (17.7)
Multiple trauma	11 (24.4)	4(8.8)
Cerebral contusion	7 (15.5)	5 (11.1)
Diffuse axonal injury	2 (4.4)	8 (17.7)
Laparatomy	2 (4.4)	6 (13.3)
Subdural hemorrhage	7 (15.5)	9 (20)
Others	9 (20)	5 (11.1)

Group I: Oral care given with 0.2% chlorhexidine only, Group II: oral care given with 0.2% chlorhexidine and suctioning

Table 2. Oral hygiene scores on day one

Parts for scoring	Group I (N=45)				Group II (N=45)			
	Score 4	Score 3	Score 2	Score 1	Score 4	Score 3	Score 2	Score 1
Lip	19	9	12	5	1	6	26	12
Mucosa	18	8	12	7	3	6	26	10
Tongue	15	10	9	11	12	13	15	5
Dental	0	2	23	20	0	17	19	9
Saliva	2	17	21	5	18	19	7	1
Group I: Oral care given with 0.2% chlorhexidine only, Group II: oral care given with 0.2% chlorhexidine and suctioning								

Table 3. Oral hygiene scores on day seven

Parts for scoring	Group I (N=45)				Group II (N=45)			
	Score 4	Score 3	Score 2	Score 1	Score 4	Score 3	Score 2	Score 1
Lip	26	2	12	5	1	2	25	17
Mucosa	26	7	7	5	2	3	25	15
Tongue	26	7	7	5	10	9	16	10
Dental	2	20	11	12	1	1	23	20
Saliva	5	19	19	2	16	17	11	1
Group I: Oral care given with %0.2 chlorhexidine only, Group II: oral care given with 0.2% chlorhexidine and suctioning								

on the 1st day and 7th ((P<0.05). This mean difference was negative, which shows an improvement in oral hygiene on day 7 compared to the first day (Table 4).

Discussion

The main objective in oral care is to provide a good level of oral hygiene in order to reduce oral bacterial colonization, to prevent dental plaque formation and to prevent aspiration of oropharyngeal secretions. The results of the current research, which compared two methods of oral hygiene care in critically ill patients, suctioning of the oral secretions after mouth washing with 0.2% chlorhexidine solution caused an improvement in dental and oral hygiene status for these patients.

Ranjbar et al. (8) studied the factors affecting care routines by nurses in ICUs. They found that the majority of Iranian nurses used swab and 0.2% chlorhexidine solution in order to provide a good level of oral hygiene for their patients (8). Furthermore, Feider et al. (12) reported that about 97 percent of nurses used swab brush with 0.2% chlorhexidine. We found that the application of 0.2% chlorhexidine alone could not improve the oral hygiene status and it is better to use oral suction followed by 0.2% chlorhexidine mouthwash. This finding is consistent with the results of the study by Bellissimo-Rodrigues et al. (17) from Brazil who reported that use of a 0.12% solution of chlorhexidine alone for oral cleaning does not prevent respiratory tract infections among critically ill patients who are admitted to ICUs. For an effective cleaning of the teeth and the oral cavity of critically ill patients, some studies have recommended the use of a tooth brush as a valid method, but the benefits of this method in intubated patients is questionable. Also, it seems that the combination of 0.2% chlorhexidine mouthwash with oral suctioning may not only be useful to improve oral hygiene, but also may be more readily adapted by the nurses as it is an easier method. Likewise, Feider et al. (12) have reported that the nurses would prefer to use oral suction rather than a tooth brush for providing oral care.

Table 4. Comparison of oral hygiene scores on day one and seven

Groups	Score of oral hygiene in1st	Score of oral hygiene in7th	Differences in mean of total score between 1st and 7th
Group I	12.4±2.1	14.3±2.7	+1.9 (P<0.05).
Group II	11.8±2.4	10.5±2.1	- 1.3 (P<0.05).
Group I: Oral care given with 0.2% chlorhexidine only, Group II: oral care given with 0.2% chlorhexidine and suctioning			

The results of our study revealed that, although our patients were middle-aged, most did not have a good oral hygiene on the first day of admission to the intensive care unit. Therefore, it is important to consider the oral hygiene and devise a care plan on the first day of admission; otherwise, serious adverse effects such as pneumonia may result.

Conclusion

Oral care is a key component of nursing care; however, it is often considered as an intervention primarily for the patient's comfort, a notion that may affect its priority, and thus,hamper its provision. Nurses employed in the ICUs, who are responsible for oral health care of these patients, should pay more attention to this issue and should not consider oral care as only an issue for the patient's comfort. Since oral health care of patients in the ICUs is very important, it seems that developing appropriate protocols in this respect is a basic requirement. This study showed that using a 0.2% Chlorhexidine solution alone is not adequate for the oral health care of patients in the ICU, and suctioning throat secretions after carrying out a mouthwash with 0.2% chlorhexidine can provide better results. In addition, this method is probably more applicable and easier to adapt than brushing the patient's teeth.

Conflict of Interest

No conflict of interest was declared by the authors.

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