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Ich bedanke mich bei den unten aufgeführten Kolleginnen und Kollegen für ihre wertvolle Mitarbeit, die sie in den vergangenen zwei Jahren geleistet haben.

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Survey on Oral Hygiene Measures for Intubated Patients in Swiss Intensive Care Units

Keywords: Intensive care unit, aspiration, nosocomial infections, plaque, pneumonia

Summary Five to ten percent of all hospitalized patients are treated in intensive care units. The risk of nosocomial infections is inherent in the latter, especially in cases of intubation. In this context, impaired oral hygiene may play a pivotal role. Therefore, the purpose of this survey among representative Swiss intensive care units was to assess the standards and measures taken in this patient collective with reduced oral hygiene.

To this end, a questionnaire was sent to 25 institutions which represented all A- and University hospitals in Switzerland as well as all accredited intensive care units in the canton of Zurich according to the register of the Swiss Society of Intensive Medicine. Intensive care units from pediatric departments were excluded.

Twenty-one questionnaires were received and evaluated (84%). Only one quarter of all respondents reported having protocols available for preventing ventilation-associated pneumonia (VAP). Systemic antibiotic regimens were never performed. Ninety percent reported cleaning the patients' teeth mechanically with a toothbrush. Sixty-seven percent used chlorhexidine as a disinfectant (81% in liquid form). Seventy-five percent of the responding hospitals performed routine oral cleaning procedures three times a day (90% immediately after intubation).

In summary, oral prophylaxis was neither standardized nor consistently implemented in the evaluated Swiss intensive care units of the responding hospitals. Only a small proportion had protocols available for preventing VAP, which is in accordance with similar surveys conducted in the US and Europe. Additional and improved measures have to be determined to confirm or optimize prophylactic oral strategies and to create standards and guidelines for this at-risk patient collective.

Introduction

The monitoring and care of critically ill patients takes place in variously specialized intensive care units (ICU) of a hospital. Intensive monitoring is required for patients whose vital functions are at risk, and intensive care is required for patients whose vital functions are impaired and must be artificially maintained. It is estimated that 5–10% of all hospital patients need treatment at an intensive care unit (Vincent et al. 1995).

Besides the critical illnesses and direct complications already present, time spent at an ICU bears the risk of acquiring a nosocomial infection (Sten Artz 2008). These are infections which were not present upon admission to the hospital or were still incubating at that point. The chief risk factors for acquiring a nosocomial infection are spending more than 48 hours at the ICU, mechanical ventilation, a central vein catheter, or a urinary-tract catheter. The most common pathogens are *Staphylococcus aureus, Pseudomonas aeruginosa* and *Escherichia coli* (Gastmeier 2005, Sten Artz 2008).

Not every intensive-care patient needs to be ventilated and not every ventilated patient requires intubation to secure respiratory tract function. A distinction is made between non-invasive ventilation with a mask and invasive ventilation with an endotracheal tube. One of the special problems inherent to intubated patients is that they cannot perform oral hygiene by themselves. These patients are partially or completely dependent on the nursing staff for oral hygiene.

In a Europe-wide survey on oral hygiene practices at ICUs, 68% of intensive-care givers reported finding it difficult to clean the oral cavity (Rello et al. 2007). Those surveyed also observed that despite their efforts, the condition of intubated patients often worsened over time. Reduced oral hygiene led above all to increased plaque accumulation. A study showed that even the colonization of dental plaque by pathogenic aerobic early colonizers can be a specific source of nosocomial infections in ICUs (Fourrier et al. 1998). Via microaspiration along the air tubes and past the tube cuff, ventilator-associated pneumonia (VAP) can arise. According to the US Center for Infectious Disease Control and Prevention (CDC), every case of nosocomial pneumonia following intubation is classified as VAP. VAP includes an early-onset (<5 days) and a late-onset form (>5 days). Gram-positive bacteria are often found in the early-onset form and gram-negative bacteria are more often found in the late-onset form. The diagnosis of VAP is also reached using the Clinical Pulmonary Infection Score (CPIS). The CPIS is based on the following criteria: temperature, leukocytes, tracheal secretion, oxygenation (PaO2/FiO2 > 240 = ARDS), thorax radiograph, progression of lung infiltrates, and proof of microorganisms in tracheal secretions. These criteria are individually rated, then added to yield one value or score (0–10). A score of >6 represents a high clinical probability of VAP (Schurink et al. 2004).

After a ventilation period of over 24 hours, the risk of pneumonia increases to 30%, and after 10 days to over 80% (Guggenbichler 2004).

Tab. I CDC categorization of recommendations

Category IA	Strongly recommended for implementation and strongly supported by well-designed experimental, clinical, or epidemiological studies.
Category IB	Strongly recommended for implementation and supported by certain clinical or epidemiological studies and by strong theoretical rationale.
Category IC	Required for implementation, as mandated by federal or state regulation or standard.
Category II	Suggested for implementation and supported by suggestive clinical or epidemiological studies or by strong theoretical rationale.
Unresolved Category III	No recommendation; practices for which insufficient evidence or no consensus exists about efficacy.

Thus, VAP is a considerable problem. According to the British National Institute for Health and Clinical Excellence (NICE), VAP accounts for 31% of all nosocomial infections acquired at ICUs and occurs in 9–27% of all intubated patients (Sten Artz 2008). Most cases can be detected in the first 5 days. Consequentially, patients remain in the hospital longer, which incurs greater costs (Deja et al. 2011).

This background explains the efforts undertaken in recent years to improve VAP prophylaxis. In 2003, the CDC defined still-valid guidelines for avoiding VAP (Tablan et al. 2004, Mattner & Gastmeier 2005). Oral hygiene recommendations and the evaluation of their efficacy are important components of VAP prevention (Tab. I and II). The main problem lies in implementing these guidelines; globally, there are few uniform, adapted strategies.

Tab. II Catalogue of practices for preventing bacterial, nosocomial pneumonia based on CDC recommendations

Practice	*Relevance*
I) Staff education and involvement in infection prevention	
A) Continuing education	IA
II) Infection and microbiological surveillance	
A) Communicate data to personnel	IB
III) Prevention of transmission of microorganisms	
A) Sterilization, Disinfection, Equipment	
1) General	
a) Sterilization	IA
2) Mechanical ventilators	
a) No sterilization required	II
3) Active/Passive humidifiers, heat-moisture exchangers (HME)	
a) Active humidifying	
1) Change tubing only if visibly soiled	IA
2) Tubing condensate	
a) Drainage, patient protection	IB
b) Wearing gloves	IA
c) Washing hands with soap or disinfectant	IA

Practice	*Relevance*
3) Filter on expiratory-phase tubing	unresolved
4) Humidifier fluid	
a) Sterile fluid	II
b) Closed, continuous-feed humidifier	unresolved
b) Passive humidifying (HME)	
1) Active or passive humidification with supported ventilation	unresolved
2) Changing the HME	
a) Change when soiled or malfunctioning	II
b) Change no more often than every 48 hours	II
3) No routine changing of parts attached to HME	II
4) In-line/Handheld medication nebulizers	
a) Rinse with sterile water, disinfect Repeat rinsing with sterile water	IB
b) Only sterile fluids under aseptic conditions	IA
c) Only freshly opened medication vials	IB
5) Ventilation bag	
a) Sterilize if possible, otherwise disinfect well	IB
b) Change filter	unresolved
6) Anesthesia machines, equipment	
a) Do not sterilize or disinfect the equipment	IB
b) Disinfect or sterilize equipment between uses on different patients	IB
7) Pulmonary function machines	
a) Change mouthpiece and filter after each patient	II
B) Preventing transfer of microbes from person to person	
1) General	
a) Hand disinfection	IA
b) Protective gloves	
1) Wear in contact with contaminated objects or secretions	IB
2) Change intra- and interindividually	IA
3) If contamination is expected, wear protective gown	IB
2) Care of patients with tracheostomy	
a) Tracheostomy under aseptic conditions	II
b) Changing tubing under aseptic conditions	IB
c) Use of local antibiotics	unresolved
3) Tracheal suctioning	
a) Open or closed suctioning (closed suctioning only in Vd. a. Tb, MRSA etc.)	unresolved
b) Wearing gloves	unresolved
c) Sterile disposable catheter with open suctioning	II
IV) Preventing patient infections	
A) Increasing immunity of patient to infections	
1) Pneumococcal vaccination (age >65 J/<2 J, immunocompromised patients)	
a) >65 (23-valent vaccine)	IA
b) <2 (7-valent vaccine)	IB
B) Preventing aspiration	
1) Prevention with endotracheal intubation	
a) Conduct noninvasive ventilation (NIV)	
1) Prefer NIV whenever possible	II
2) In the weaning process	II
b) Avoid re-intubation	IB
c) Orotracheal rather than nasotracheal intubation	IB
d) Continuous subglottic suctioning (tube with dorsal lumen)	
e) Suctioning of subglottic area before extubation	II

Practice	*Relevance*
2) Prevention associated with enteral feeding	
a) Elevate upper body 30-45 degrees in patients without contraindication	II
b) Routine verification of tube placement	IB
c) Continual or intermittent enteral feeding	unresolved
d) Position of jejunal tube proximal or distal to pylorus	unresolved
3) Prevention for influencing oropharyngeal colonization	
a) Ororpharyngeal decontamination with an antiseptic in high-risk patients	II
b) Chlorhexidine	
1) Use routinely peri- or postoperatively	unresolved
2) 0.12% solution in adults, perioperatively in cardiac surgery	II
c) Oral administration of topical antibiotics (SOD)	unresolved
4) Precautions for preventing gastric colonization	
a) Sucralfate, histamine antagonists, proton pump inhibitors	unresolved
b) Selective decontamination of GI tract (SDD)	unresolved
c) Acidifying enteral feeding	unresolved
C) Prevention of postoperative pneumonia	
1) Preoperative instructions on postoperative behavior (postoperative mobility, breathing exercises)	IB
2) Breathing exercises with the spirometer	IB
3) Postoperative physiotherapy	unresolved
D) Other precautions for preventing pneumonia	
1) Use other antimicrobial substances than for SDD	
a) Systemic antibiotics	unresolved
b) Change of first-line antibiotics	unresolved

The purpose of this survey was to determine the means by which the oral health of intubated patients at Swiss ICUs is ensured and to obtain an overview of the priority given to oral hygiene at leading Swiss ICUs.

Materials and Methods

The survey was conducted using a questionnaire with YES/NO and multiple choice questions. Prior to starting the official survey, the questionnaire was tested at 3 clinics for the comprehensibility and completeness of the items. The questionnaire was designed to be filled out in just a few minutes. It was sent to 25 selected ICUs, i.e., all certified ICUs in canton of Zurich and all ICUs of the university and A-hospitals in the rest of Switzerland (Swiss Society for Intensive-care Medicine, from 31 May 2010). The ICUs of pediatric clinics were excluded.

One of the first central points of this survey was whether protocols for VAP prevention existed. More detailed answers could be given under this point.

Furthermore, questions on the use of mechanical and chemical interventions were asked in addition to mode and frequency of application (Tab. III).

The questionnaires were mailed twice (a reminder after 3 months).

Answers were described and evaluated (number of positive answers and percentages).

Results

In total, 21 of the 25 questionnaires were returned, which is an 84% response rate.

The results are given in Table III. Three-quarters of the surveyed clinics gave a negative answer to the question on the existence of a VAP-prevention protocol! Only 5 of the 21 hospitals reported possessing such protocols.

No ICU routinely performed a systemic antibiotic regimen to prevent VAP. However, all hospitals performed mechanical tooth cleaning with toothbrushes, with 90% of these also applying toothpaste.

Three-quarters of the centers surveyed additionally used oral antiseptics. Chlorhexidine was preferred in 67% of the cases, no iodine use was reported, and 29% reported using other solutions, although most of these mouthwashes did not possess any pronounced/proven antiseptic properties (flavored mouthwashes, e.g., cardamom, lemon, bergamotte, sage; the herbal medicine "Odontal" with cinnamon and peppermint; sage rinse). One clinic reported using Octenisept (octenidine hydrochloride, phenoxyethanol).

In 81% of the cases, a rinse solution was mentioned as the application form. 14% each of spray, gel and ointment forms were used. There were several possible answers to the question on application form: 67% used a toothbrush, 33% used gauze, 24% used a (gloved) finger, and 10% used a special medication carrier, e.g., a lollipop swab (Fig. 1).

These oral hygiene measures were performed by 75% of those surveyed 3 times per day; the other 25% indicated doing so twice a day. At all clinics, oral hygiene was exclusively performed by the nursing staff.

Ninety percent of those surveyed indicated starting oral hygiene procedures immediately after intubation. One clinic began oral prophylaxis after one day, and another clinic more than 2 days after intubation.

Removable dental prostheses were always removed before intubation.

Saliva substitute was additionally administered by 1/3 of the clinics.

Fig. 1 Lollipop swab. These soak up the given solution and make intraoral application on teeth, mucous membranes, tongue etc. possible.

Discussion

The CDC's (Center for Infectious Disease Control and Prevention) 1983 guidelines for prevention of nosocomial pneumonia were the first recommendations for oral prophylaxis in critically ill patients (Simmons et al. 1983). The published guidelines for the prevention of nosocomial pneumonia were modified in 2003, taking studies from the previous 10 years into account (Tablan 2004). In 2005, the modified CDC recommendations (Tab. II) were included in the official curriculum of the American Association of Critical-Care Nurses (AACN) (Burns 2007). However, these recommendations have not been uniformly kept to nor implemented in the USA to date. Hence, there are still no guidelines in the USA which exactly define for all states which measures must be performed in what manner, how often, and for which duration (Feider et al. 2010). Until recently, similar attempts to standardize the guidelines for Europe have been incomplete or nonexistent.

Tab. III Questions and answers: 21 hospitals completed the questionnaires. Evaluation of data was descriptive (number of positive answers and percentage).

	(Choice) Question	Answered with "yes"	
		N	%
1.	Does your clinic have protocols for preventing VAP?	5	**24**
2.	Is systemic antibiotic prophylaxis conducted routinely?	0	**0**
3.	Which oral hygiene measures are performed? (multiple answers possible)		
	Toothbrush	21	**100**
	Toothpaste	19	**90**
4.A	Are disinfectants used?	16	**76**
	Chlorhexidine	14	**67**
	Iodine	0	**0**
	Others	6	**29**
4.B	In what form are the disinfectants used?		
	Spray	3	**14**
	Gel	3	**14**
	Ointment	3	**14**
	Solution	17	**81**
4.C	How is the agent applied?		
	Toothbrush	14	**67**
	Finger	5	**24**
	Gauze	7	**33**
	Medication carrier/tray	2	**10**
5.	How many times **per day** are these oral hygiene measures conducted?		
	1×	0	**0**
	2×	5	**24**
	3×	16	**76**
6.	Who performs them?		
	Nursing staff	21	**100**
	Patients' relatives/friends	0	**0**
7.	How many days after intubation are the oral hygiene measures started?		
	Immediately	19	**90**
	1 day	1	**5**
	2 days	0	**0**
	Later	1	**5**
8.	Are removable dental prostheses removed?	21	**100**
9.	Is saliva substitute used?	7	**33**

Standardized implementation of VAP prophylaxis has always failed up to now also because the studies on important constituents of oral hygiene in patients with long-term intubation have been inconclusive. Important aspects of oral hygiene are still the subject of controversial discussion, and even today, almost 20 years after the introduction of the CDC's guidelines, no consensus exists on how to uniformly conduct oral hygiene most efficiently and simply. Deja et al. (2011) recently commented on the CDC's criteria and assessed them based on the latest studies. They concluded that a standardized oral hygiene program and the use of antiseptic substances can lower the risk of VAP (Deja et al. 2011).

However, in the last 4 years, a clear tendency toward standardizing the VAP prophylaxis protocols has become evident.

A recent article described the first attempt to standardize VAP prevention Europe-wide (Rello et al. 2010). Twelve European clinics participated with experts from various disciplines (microbiologists, infectologists, epidemiologists, pneumologists, intensive-care doctors, nurses).

The central, primary item in the present survey was the presence of VAP prevention protocols. Only one-fourth of the participating Swiss ICUs possessed protocols for preventing VAP. Apparently, there is to date no Switzerland-wide, standardized guidelines either on oral hygiene or for preventing nosocomial pneumonia, in particular VAP. Only one university hospital demonstrated a well-founded, evidence-based compendium of oral hygiene measures and referred directly to the corresponding studies. However, this protocol also lacked information on the relevance of these measures.

In the present survey, the item on systemic antibiotic prophylaxis was answered unanimously: none of the participating clinics performed systemic antibiotic prophylaxis in patients with long-term intubation. The dominant opinion was that the disadvantages due to the development of resistant pathogens outweigh the benefits of prophylactic antibiotic treatment for preventing VAP.

In terms of the question on plaque reduction, all participants in the present survey reported brushing the teeth of intubated patients, and 90% even used toothpaste. In the literature, plaque control is also seen as an important factor in the prevention of VAP (Halm et al. 2009). Less importance is placed on the use of various cleaning agents (toothpaste, distilled water, etc.) than on the actual mechanical reduction of plaque. The risk of external, "foreign" colonization of the plaque is markedly reduced by toothbrushing (Halm et al. 2009). In contrast, a different study concluded that toothbrushing seemed to have no positive effect on the incidence of VAP (Munro et al. 2009). In a broad-scope survey on oral hygiene practices in which 59 European ICUs participated, 68% of those surveyed found it difficult to brush the teeth of patients with long-term intubation and reported often being unable to do this adequately. In addition, 77% of those who responded reported not having received proper training in performing oral hygiene on patients (Rello et al. 2007).

Consequently, the additional use of mild chemical prophylaxis is justified. Three-fourths of the participating Swiss ICUs answered that they applied oral disinfectants. Of these, 67% used chlorhexidine. Interestingly, these data correlate with those of similar surveys of nursing staff at ICUs in Europe (61%, Rello et al. 2007) and the USA (61%, Feider et al. 2010).

Although the application of chlorhexidine (CHX) is debated in the literature, in Great Britain in 2008, its inclusion in the oral hygiene regimen for VAP prevention was suggested by the National Institute for Health and Clinical Excellence (NICE) in cooperation with National Patient Safety Agency (NPSA) (Roberts & Moule 2011). A meta-analysis of 4 randomized, controlled studies demonstrated that the sole use of CHX for oral decontamination did not significantly reduce the incidence of nosocomial pneumonia and had no influence on the mortality rate (Pineda et al. 2006). However, the results of this meta-analysis must be viewed critically, since more recent studies which showed a positive effect were not included in that evaluation.

For instance, a prospective, randomized, controlled, double-blinded, placebo-controlled clinical study by Deriso et al. (1996) at a cardiosurgical ICU found a decreased incidence of VAP with the peri-operative administration of a 0.12% CHX solution. This study is the reason why the CDC recommends CHX administration for cardiac surgery. Furthermore, in a prospective, randomized, placebo-controlled double-blind study, Cabov et al. (2010) showed that oral decontamination with CHX significantly reduced the oropharyngeal colonization rate, the incidence of nosocomial infections, the length of stay at the hospital, and the mortality of patients at a surgical ICU. Another randomized, placebo-controlled, double-blind study demonstrated that with a combination of CHX and colistin, the endotracheal colonization not only by gram-positive *(Staphylococcus aureus)* but also by gram-negative bacteria *(Pseudomonas, Acinetobacter, Enterobacteriaceae)* was significantly reduced. A marked decrease in the occurrence of VAP due to CHX application was found in another study as well (Koeman et al. 2006). In contrast, the randomized, double-blind, placebo-controlled study by Scannapieco (2009) showed that although chlorhexidine decreased the number of *Staphylococcus aureus,* it did not reduce the total number of gram-negative bacteria in dental plaque. That author also observed a statistically insignificant reduction in VAP (Scannapieco 2009). Hence, the application of CHX has been variously assessed in terms of clinical relevance (Halm & Armola 2009).

Only one clinic reported using Octenisept. This antiseptic was tested in an experimental study along with chlorhexidine, Olaflur and Cytosan (Decker et al. 2003), where Octenisept more effectively inhibited plaque formation than did the gold standard CHX. A current review shows the advantages of octenidine, including its better results in the inhibition of plaque formation, the good tissue tolerance, and the in-vitro efficacy even at low doses against gram-negative bacteria such as *Pseudomonas aeruginosa, Escherichia coli* and *Klebsiella pneumoniae* (Hübner et al. 2010, Ghannoum et al. 1990). Compared to CHX, even low doses of octenidine provide better antimicrobial effects (Rohrer et al. 2010). Remarkably, more recent clinical studies which would support these results are lacking. The positive properties of plaque inhibition, excellent biocompatibility, and efficacy against gram-negative bacteria are very promising factors in favor of its future use as a disinfectant for preventing VAP. The current state of knowledge, however, is not sufficient for making recommendations about octenidine.

None of the participating clinics reported using iodine as a disinfectant in the oral cavity. Only a few clinical studies have examined the use of iodine as a disinfectant in patients with long-term intubation (Mori et al. 2006). Due to the danger of absorption with prolonged use and the nonexistent plaque-reducing effect, its use in the oral cavity is not recommended; furthermore, an allergenic potential has been discussed (Chandu et al. 2002). Similarly, hydrogen peroxide has also been rarely tested as a mouthrinse (Hutchins et al. 2009); it is not recommended for use as such because no randomized, controlled studies on this topic exist to date (Berry et al. 2006).

The in-vivo study by Fitch et al. (1999) describes rinsing with mineral water as unfavorable, due to its decalcifying effect on dental enamel (Fitch et al. 1999).

In terms of application form, the great majority of participants indicated using the active substances as liquids. Sprays, gels and ointments were each used by 14%.

Regarding relevance, the application of CHX solution seems to make the most sense. An in-vivo study compared the antimicrobial activity of CHX in 0.2% and 0.12% solutions, as a 0.2% gel, as 0.2% and 0.12% sprays, and as a swab saturated with 0.2% solution. The results clearly demonstrated the superior antimicrobial properties of the 0.2% CHX solution (García-Caballero 2009).

Surprisingly, this data on chemical oral hygiene using CHX is not included in the discussions of comparative meta-analyses of chlorhexidine and its effect on the incidence of VAP. No distinction is made between chlorhexidine used as a solution, gel or spray.

Regarding implementability of the different chemical oral hygiene measures in critically ill, intubated patients, the spray application or toothbrush plus gel are probably much simpler than thorough, adequate rinsing of the oral cavity with a solution or decontamination using gauze soaked with CHX. This point should not be underestimated, given the fact that 68% of the surveyed nurses found cleaning the mechanically ventilated patient's oral cavity difficult (Rello et al. 2007). This situation should be taken into consideration when developing a protocol. A further important topic in drawing up guidelines is the interaction of CHX with the sodium lauryl sulphate in toothpastes. A review article on this subject concluded that over 30 minutes, or better, 2 hours should lie between toothbrushing and CHX use (Kolahi et al. 2006). Only one clinic which had a VAP prevention protocol informed the staff of this important point.

In the current survey, the toothbrush was the method of choice (67%). Gauze was the second most frequently used method (33%). A gloved finger was used by 24% of those surveyed. Only two clinics reported using foam (lollipop) swabs.

In the study by Feider et al. (2010), the use of a toothbrush for performing oral hygiene was also indicated by 67% of those surveyed. As opposed to the survey in Switzerland, in that survey, the most commonly reported aid was a foam swab (97%), which was only mentioned twice in the present study. A similar survey showed that in intubated patients, toothbrushes were used less and foam swabs more often. In non-intubated patients, the opposite tendency was found (Grap et al. 2003). For the following reasons, finger application of CHX – reported by one-fourth of the clinics – makes little sense: no relevant studies on it exist, and only CHX gel can be applied using a finger, meaning it is less effective. Thus, the present authors would not recommend it. In contrast, gauze can at least be saturated in a disinfectant solution, but the requisite scientific assessment of the efficacy of this application form is currently lacking.

Oral hygiene measures were performed three times a day by 76% of those surveyed, twice a day by 24%, and once a day by 0%. The same question in the survey by Rello et al. (2007) showed that 20% performed oral hygiene once, 31% twice, and 37% three times a day. In the study by Munro et al. (2009), a concept was described in which toothbrushing was performed 3 times a day and cleaning with CHX twice per day. As far as is currently known, the ideal frequency of such measures in the context of VAP has never been examined. This question must be examined and defined in a standardized protocol.

The question as to how long after intubation such measures should be started must also be discussed. Nineteen of 21 Swiss clinics start oral hygiene immediately after intubation. One ICU reported starting over 2 days after inserting the endotracheal tube; it would have been helpful to learn the reason for this. Plaque formation and its external colonization with pneumo-pathogenic bacteria should be fought as quickly as possible.

Using chlorhexidine in the early phase after intubation decreases the number of cultivatable oral bacteria and can slow the development of VAP (Grap et al. 2003).

All Swiss clinics removed any removable dental prostheses before intubation. Prostheses serve as a reservoir for bacteria which can cause VAP (El-Solh et al. 2011). Removing the prosthesis thus easily eliminates a dangerous source of contamination and should always be done.

One-third of the participating clinics reported using moisturizing agents. This reflects the uncertainty about and the different assessment of this point. Because intubation keeps the mouth open, it dries out; thus, moistening the oral cavity makes sense. However, saliva substitute leads to more liquid in the oral cavity, thus possibly facilitating microaspiration around the tube's cuff.

In clinical evaluations, this factor has little weight and is therefore not documented.

The survey presented here clearly shows that great differences in how oral hygiene practices are implemented at Swiss ICUs still exist. Although it is generally recognized that VAP prophylaxis is very important, its standardized implementation seems very difficult.

A corresponding "unified doctrine" could form the foundation for quality-controlled, understandable, and evidence-based measures to prevent VAP. In addition, this would provide the prerequisite for providing nursing staff with a simple, well-structured, and consistent guide by which to orient their care. This could supply the decisive impulse for correct implementation of the necessary preventive measures.

In terms of oral hygiene, such guidelines should contain simple, clear statements on which mechanical and/or chemical aids of what type must be applied how often. Dentistry can make a relevant contribution to this.

Further steps must follow, not only to confirm the clinical relevance of the oral hygiene measures to be used but also and above all to ensure the standardized implementation of this knowledge.

Résumé

Dans les hôpitaux, 5 à 10% des patients sont traités dans une unité de soins intensifs. Leur séjour peut entraîner une infection nosocomiale, notamment en cas d'intubation. L'hygiène buccodentaire joue un rôle fondamental dans ce contexte. Dans le cadre d'une enquête menée auprès des unités suisses de soins intensifs, nous avons voulu examiner les standards de prévention orale chez les patients intubés et évaluer l'importance accordée à l'hygiène buccodentaire.

Dans ce but, nous avons envoyé à 25 cliniques un questionnaire constitué de questions à choix multiples ou à deux alternatives (oui/non). Parmi ces cliniques figurent toutes les unités de soins intensifs reconnues du canton de Zurich ainsi que les unités de soins intensifs des hôpitaux universitaires et des hôpitaux classés catégorie A par la Société Suisse de Médecine Intensive (état 31.05.2010). Les unités de soins intensifs des cliniques pédiatriques n'étaient pas concernées par cette enquête.

Parmi les formulaires envoyés, 21 ont été entièrement remplis, renvoyés et évalués (84%). Un quart des cliniques dispose de protocoles sur la prévention des pneumonies acquises sous ventilation mécanique (PAVM). Les hôpitaux n'effectuent, en aucun cas, une thérapie antibiotique systématique de routine. Parmi les cliniques questionnées, 90% brossent les dents mécaniquement avec une brosse à dents, 67% utilisent l'agent désinfectant chlorhexidine (dont 81% sous forme de solution). Trois quarts des hôpitaux appliquent trois fois par jour des mesures d'hygiène buccodentaire (dont 90% immédiatement après l'intubation).

En résumé, nous avons constaté que, dans les unités de soins intensifs suisses, l'hygiène buccodentaire n'est pas pratiquée de manière uniforme et que seules quelques cliniques disposent de directives pour éviter les PAVM. Ce constat est en corrélation avec les résultats enregistrés par des enquêtes similaires menées en Europe et aux Etats-Unis. D'autres mesures restent donc nécessaires, non seulement pour confirmer l'usage ou optimiser les règles d'hygiène buccodentaire actuelles, mais surtout pour garantir leur mise en œuvre standardisée.

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