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Hygienic alcohol hand gels negatively influence persistent antimicrobial activity of chlorhexidine

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Abstract

Background and Objectives : Use of alcoholic hand-rub products is drastically spreading for the purpose of preoperative surgical hand disinfection in Japan. However, Kaiser N. et al. reported that some alcoholic hand-rub products in the US containing thickening agent showed inhibitory action on the persistent antimicrobial activity of CHG. We investigated whether Japanese marketed alcoholic hand-rub antiseptics influenced the persistent antimicrobial activity of CHG scrub product when used in combination.

Materials and Methods : Three commercially available alcoholic hand gel products, one marketed 76.9-81.4 v/v% ethanol solution, and one experimentally produced alcoholic hand gel containing no anionic substances were investigated on the human skin after treatment with a CHG surgical scrub product. Left forearm of healthy volunteers was scrubbed with a 4% CHG scrub formulation. Three circular test sites were set on the anterior skin, and test alcohol hand-rub products were applied on two of three test sites. Right forearm was treated in the same manner without CHG treatment. To allow the alcohol to evaporate, we waited twenty minutes after application of the alcohol hand-rub product, and then *E. coli* K 12 (NBRC 3301) suspension was applied. After 5 minutes, samples were collected using cylinder scrub technique, and were diluted and plated on trypticase soy agar. Colony forming units of each plate were counted after being cultured for 24 hours and reduction factors were calculated.

Results : CHG-treated test sites showed clear persistent antimicrobial activities. However, results from the test sites applied with commercially available alcoholic hand gels showed complete or partial inhibitory antimicrobial activity of CHG, whereas the test sites applied with the experimentally produced alcoholic hand gel and the 76.9-81.4v/v% ethanol solution did not.

Discussion : It is possible that the anionic thickening agent, carboxy vinyl polymer, contained in the tested alcoholic hand gels may have a negative effect on the residual persistent antibacterial activity of CHG. Results of our study strongly suggest that the commercially available hygienic alcohol hand gels in Japan, which contain an anionic charged polymer as a thickening agent, negatively influence residual persistent antimicrobial activity of CHG, similar to what has been reported in the US. Accordingly, we feel that alcohol hand preparation antiseptic

products should be carefully chosen depending on usage, and hygienic alcohol hand gel products containing an anionic thickening agent seemed to be inappropriate for “preoperative hand preparation” when used in combination with CHG scrub products.

Review of Guidelines for Transmissible Spongiform Encephalopathies

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Abstract

Background/Objective：Transmissible Spongiform Encephalopathies (TSEs), including Creutzfeldt-Jakob disease (CJD), are degenerative neurological diseases. Because of its fatality and resistance to conventional sterilization of its agent, TSE is a great threat to healthcare facilities. Prevention of iatrogenic TSE transmission is a very important task for them. To integrate information about TSEs and the prevention of TSE transmission, we reviewed guidelines for TSEs.

Method：We searched guidelines for TSEs via the internet. The search were conducted in English and the search keywords were as follows; TSE, CJD, prion, guideline, guidance. We added into the search results the Japanese guideline for TSEs, and examined the guidelines comparatively. We classified their contents into five categories according to topics, so that variety of guidelines became clear.

Result：There were six guidelines searched and reviewed. The five of them were published in the United Kingdom, the European Union, the United States, Canada, and Japan. The last was published by the World Health Organization.

The guidelines are composed of about three parts; general information, consideration for infection control and of transmission risk, recommendation for healthcare facilities.

The classified categories according to the topic are as follows; (1) consideration of transmission risk (2) policy for prevention of transmission of TSE agents (3) consideration of care and treatment for patients with TSE risk (4) policy for device use and reprocessing (5) decontamination procedure and inactivation methods.

There are many differences in description by guidelines; for example in (1), there are assessment of patient risk, procedure risk, intended use of device, and route of exposure, recommended reprocessing policy and methods, and so on. Other differences are also seen at various points.

Discussion：Despite of many difference, each guideline has total integrity as a guideline respectively. The description related to the five categories take important roles in the guidelines. Those categories are expected to have more developments by further studies, which lead to more advanced prevention of TSEs. In the five categories, consideration of transmission risk seems to be most important.

Conclusion：Each guideline has total integrity for its own goal. Of the five useful categories, consideration of transmission risk is the most important.

Study on expenses of the items used for infection prevention and control in a tertiary university hospital. (Oral presentation)

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Abstract

To evaluate the expenses of the items used for infection prevention and conterol in a tertiary university hospital, all of them are evaluated for two years retrospectively and partially prospectively in 2009.
In the results, the expenses for the preventive measures showed the tendency to increase which means the increase of consciousness of the hospital personnel for infection prevention and control in the hospital. However the cost-benefit of it have to be discussed.

Background：Risk management including infection prevention and control is one of the important strategies for healthcare of good quality. Now in every hospital an effective strategy for infection prevention and control based on the evidence is strongly required. So, the sufficient and adequate supply of those items necessary for the infection prevention and control is required. However, at the same time, the cost-benefit of them also have to be considered.

Objective：To know the expenses of the routine strategies for infection prevention and control in a tertiary university hospital (963beds, ICU: 9beds) which is depending on the consciousness of the personnel for the compliances of the preventive measures.

Method： In a tertiary university hospital, during 2007 and 2008 retrospectively, and for two weeks in a ward prospectively in 2009, all the items for infection prevention and control including hand rubs, paper towels, gloves, masks, aprons, gowns, and others used in the hospital have been investigated and the average cost has been calculated in each ward for a patent day.

Results：The average cost for a patient per day revealed to be greater in 2008 than that of 2007. It suggests that most hospital personnel have become conscious of the precaution procedures. However the cost-benefit of the preventive measures must be also discussed.

Treatment of loan instruments before surgery in clinical settings

-Utilization of adenosine triphosphate detector for the measurement of contamination-

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Abstract

Background：The Japanese Association for Operative Medicine (JAOM) published the practical guideline to achieve appropriate surgical operation in 2008. The guideline includes the recommendations on the usage, return, and reuse processes for surgical loan instruments. The guideline also recommends venders to clean-up the instruments when returned from medical institutions. However, the surveillance performed in 2009 revealed that 63.2% of 57 medical institutions reported cleaning by vendor was seemed to be insufficient .

Objective：We are considering the effectiveness of the adenosine triphosphate (ATP) detector as an easy, fast and quantitative measurement tool for checking the cleanness of the surgical loan instruments before use. In order to clarify the relation between the amount of applied protein and the level of ATP, two types of ATP detector were tested.

Method：Twenty five micro liter of bovine whole blood (1~1000-fold dilution) were applied on the stainless test piece and dried for 2 hours under room temperature. Value of relative light units (RLU) of the ATP was measured by the two types of ATP detector. Amount of applied protein was accurately measured by the Bradford method using Coomassie brilliant blue reagent.The amount of protein and absorbance at 595 nm was approximated by the following formula.

Results & Discussion：Logarithmic protein level (μg) and logarithmic ATP level (RLU) measured by the ATP detectors (A and B) were well correlated and the each correlation coefficient score (r^2) was more than 0.9 . We decided to use those ATP detectors for measuring the level of contamination of surgical loan instruments before use.

For our future study, we will estimate the level of contamination on loan instruments before use by those ATP detectors.

An important point for choosing antiseptics available for clinical use based on American Society of Testing and Materials standard E1174 testing protocol.

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Abstract

Background: It is important to evaluate the efficacy of antiseptics according to the standardized methodology that reflect the situations in clinical practice. American Society of Testing and Materials (ASTM) standard E1174 is well known for evaluating efficacy of the products typically used by healthcare workers *in vivo*. However, there weren't any study cases focused on the difference of efficacy (bacterial reduction) between some products to judge the availability for their clinical use systematically.

Objectives: We reviewed some testing data published in the past according to the ASTM E1174 protocol and then focused on a critical point to choose antiseptics which would show promising effectiveness in clinical settings through the actual standardized testing based on a scientific background.

Methods: A series of studies was conducted at the same testing facility in the US based on the same ASTM standard, as specified by the FDA's TFM (Tentative Final Monograph) for Effectiveness Testing of the Healthcare Personnel Handwashes. Hands of subjects per each product were contaminated with bacterial suspension of *Serratia marcescens* (ATCC #14756) over the course of 11 consecutive hand contaminations, the first followed by a glove-juice sample for baseline, and the remaining 10 by applications of product. Glove-juice sampling was performed after product applications 1st, 3rd, 7th and 10th. To determine relative product efficacy, we compared and analyzed the bacterial reduction indices with those of other products published in the *American Journal of Infection Control* (1999; vol. 27:332-338) and *Yakugaku Zasshi* (2010; vol. 130:747-754).

Results & Conclusion: The test product, formulation C (75 w/w% ethanol lotion), and a formulation B (70 w/w% ethanol lotion) met the performance criteria of the TFM and kept the efficacy after repeated use, but a

formulation A (62 w/w% ethanol gel) failed after 10th application. We found healthcare workers could choose the appropriate products that definite effectiveness are expected with repeated applications by reference to the difference of the transition pattern of bacterial reduction at the specific sampling point between 1st and 10th applications on the ASTM E1174 protocol and it could lead to keep advanced hand hygiene level from the viewpoint of infection prevention and control.