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ORIGINAL ARTICLE

Evaluation of ultrasonography probe disinfection habits in peripheral and/or central regional blocks applied with ultrasound guidance

Ultrason eşliğinde yapılan periferik ve/veya santral rejyonel bloklarda ultrasonografi prob dezenfeksiyonu alışkanlıklarının değerlendirilmesi

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Summary

Objectives: Ultrasonography-guided regional anesthesia (UGRA) applications are important in the practice of the anesthesiology and algology in our country as well as in the world. Despite the positive effect on the patient care of the UGRA, there is concern that ultrasound probes may be used repeatedly and assume a vector role in pathogen transport. There is no standard protocol in our country to provide basic hygiene before UGRA techniques, which is a part of the daily practices of anesthesiologists. In the study, it was aimed to investigate the probes and skin disinfection habits applied by the anesthesiologists.

Methods: After the approval of the ethics committee, random selection was made from the UGRA-administered clinics in our country and the questionnaire consisting of 14 questions was e-mailed (e-mail) to 430 participants.

Results: Distribution of preferred agents for USG probe disinfectant: povidone iodine 45.5%, octenidine 8%, chlorhexidine 5.4%, alcohol solutions 7.1 %. The rate of participants who indicated that they had received a disinfection course or certificate to engage in UGRA-related initiatives was 39.3%.

Conclusion: Although the most commonly used disinfectant povidone iodide and disinfection training rate is less than 50%, the incidence of UGRA-associated infection is very low. In our country, we believe that the study has provided data on the preferences of disinfection methods of anesthetists in UGRA applications. However, we believe that it is required to be worked in larger study groups that include more anesthesiologists, in order to provide more generalizable data.

Keywords: Disinfection; infection; regional anesthesia; ultrasound.

Özet

Amaç: Ultrasonografi rehberliğinde bölgesel anestezi uygulamaları(UGRA), dünyada olduğu kadar ülkemizde de anesteziyoloji ve algoloji uygulamalarında önemlidir. UGRA' nın hasta bakımı üzerindeki olumlu etkisine rağmen, probların oldukça sık tekrarlayan kullanımı ile patojen taşınmasında vektörel bir rol üstlenmesine ile ilgili kaygılar mevcuttur. Anesteziyologların günlük uygulamalarının bir parçası olan UGRA tekniklerinden önce, temel hijyenin sağlanması hakkında ülkemizde standart bir protokol bulunmamaktadır. Çalışmada, anestezistler tarafından kullanılan ultrason problarının temizliği ve cilt dezenfeksiyonu alışkanlıklarının araştırılması amaçlanmıştır.

Gereç ve Yöntem: Etik kurulun onayı ile UGRA tekniklerini kullanan kliniklerde çalışmakta olan anestezistler arasından rastgele seçilmiş 430 katılımcıya, 14 sorudan oluşan anket e-postayla gönderilmiştir.

Bulgular: USG prob dezenfektanı için tercih edilen ajanların dağılımı: Povidon iyot %45.5, oktenidin %8, klorheksidin %5.4, alkol solüsyonu %7.1 idi. Katılımcıların %39.3'ü, UGRA ile ilgili girişimlerde bulunmak için bir dezenfeksiyon eğitimi veya sertifikası aldıklarını belirtti.

Sonuç: En yaygın kullanılan dezenfektan povidon iyodür ve dezenfeksiyon eğitimi oranı % 50'den az olmakla birlikte, UGRA ile ilişkili enfeksiyon insidansı çok düşüktür. Ülkemizde, UGRA uygulamalarında, anestezistlerin dezenfeksiyon yöntemleri tercihleri konusunda veri sağladığımız kanaatindeyiz. Ancak bu alanda genellenebilir bir veri sağlanması adına daha fazla sayıda anestezistin katıldığı çalışmaların gerekli olduğunu düşünüyoruz.

Anahtar sözcükler: Dezenfeksiyon; enfeksiyon; rejyonel anestezi; ultrason.

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Introduction

Ultrasonography-guided regional anesthesia (UGRA) applications are important in the practice of the anesthesiology and algology in our country as well as in the world.[1–5] In addition to these clinics, patient-centered ultrasonography (USG) methods have become a cornerstone in the diagnosis and treatment of patients in internal medicine, pediatrics, and emergency services. Despite the positive effect of UGRA on patient care, the ultrasound probes which are used repeatedly, carry a concern such as they assume a vector role in pathogen transport.

The sterilization principles, which is a basic prerequisite for invasive interventional procedures, may not be respected sometimes during UGRA. For this reason, it has been reported that patients are exposed to ultrasound (US) probes that have been reused after UGRA and have not been adequately sterilized, so maybe a vector for pathogens.[6] However, there is no consensus on how to preserve US probes and use of gels against probing surface damage with pre-UGRA probe disinfection, agents used, and is still a research topic.[7] In a guide published by the French Anesthesia and Critical Care Society in 2016; regional anesthesia training and material selection, safety procedures, details of different peripheral block techniques and technical aspects such as hygiene are described in detail.[7] However, it is not clear how many of these guidelines are followed during the UGRA procedure, and various probes and skin disinfection methods have been defined by different authors.[8] It has also been reported that some practitioners did not follow any guidelines in the UK study.[8]

There is no standard protocol in our country to provide basic hygiene before UGRA techniques, which is a part of the daily practices of anesthesiologists. In the study, it was aimed to investigate the probes and skin disinfection habits applied by the experts of the anesthesia before UGRA techniques in our country and to take attention to the necessity of preparing a national protocol in this regard.

Material and Method

After approval of the ethics committee, random selection was made from the UGRA-administered clinics in our country and e-mailed (e-mail) to 430 participants. The questionnaire consisting of 14 questions, prepared using the Google forms program, was sent to anesthesiologists working in clinics that a applicants UGRA. participants were asked to respond to a web-based questionnaire consisting of questions about UGRA and feedback was received from 112 participants. The purpose of the study is to evaluate the level of experience of practitioners and the disinfection methods they prefer for UGRA preparation. All of the questions are multiple-choice questions. In the questionnaire surveyed, it was researched whether the physicians' institutions, age ranges, academic status, experience level, duration of anesthesia practice, how often and how much UGRA applied, disinfection methods and disinfectant types preferred for UGRA and whether they received training for disinfection. Participants who voluntarily gave feedback to the questionnaire were uploaded to the SPSS version 20.0 program and the distributions and mean values of the responses given to the questions were determined.

Results

47.3% of the participants were female and 52.7% were male. Age distributions are 24,1% 23–30 years, 35,7% 31–40 years, 33% 41–50 years and 6,3% 50 years and over. Participants' distribution of institutions was 16,1% state hospitals, 37,5% education and research hospitals, 8% private health institutions, 38,4% university hospitals. The distribution of the medical profession consists of 34,8% assistant physicians, 46% specialists, 8% assistant professors, 6,3% associate professors and 4,5% professorship doctors. The distribution of anesthesia practice was determined as 35.7% for those who were less than 5 years, 25% for 5–10 years, 21.4% for 10–15 years, 12.5% for 15–25 years and 5.4% for those over 25 years It was. Peripheral and/or central regional blockade experience distribution in US cohort: 79.5% for less than 5 years, 13.4% for 5–10 years, and 2.7% for more than 10 years. The rate of participants who indicated that they had received a disinfection course or certificate to engage in UGRA-related initiatives was 39.3%, while 59.8% did not receive any training. Only one participant has not indicated that whether he/she had received a disinfection course or training or certificate to engage in USG-related initiatives (0.9%). 16.6% of the participants who reported receiving training reported that they received their

training from the hospital infection committee, 25% from the company to which the USG device was purchased and 58.3% from the US during the regional anesthesia course/certification. There is only one participant from participating participants reporting that they have encountered an infectious complication from an intervention with USG. The frequency distribution of peripheric and/or central regional block administration in the hospital with daily USG cohort: no application was 9.8%, less than 3% from 3 days a day, 37.5% per day, 7–8% Is more than 11%. Frequency distribution of peripheral and / or central regional block administration for physicians per day relative to USG: no application 27.7%, less than 3% per day 61.6%, daily 4–7% 8.9, daily 8–11% 0, 9, 11% more than 0.9%.

The responses of the participants for the question "Which agents do the participants prefer for USG probe disinfection" was; 45.5% prefered povidone-iodine, 8% prefered octenidine, 5.4% prefered chlorhexidine, 7.1% prefered alcohol solutions and 0.9% prefered other agents. However, 29.5% of the participants have indicated that they do not need the use of additional disinfectants because they prefer probe sheets or sterile gloves or sterile covers.

The responses of the participants for the question "Which agents do the participants prefer for skin cleansing?" was; 77.7% prefered povidone-iodine, 8% prefered octenidine, 2.7% prefered chlorhexidine, 3.6% prefered alcohol solutions and 3.6% prefered the other agents.

In the Graph1, answer of the question 'Which disinfection method do the participants prefer for USG probe disinfection?' has been presented.

Discussion

As UGRA is in the world, it also plays an important role in the practical applications of anesthesiologists and algologists in our country.[5,9–11] Along with the benefits provided by the practice, new questions arise, such as disinfection of US probes and what potential infections may be caused and how they can be prevented.

In standard surgical skin cleansing, the antiseptic solution is applied to the skin and the solution is expected to dry completely.[12] There are several guidelines for UGRA, but it is not known how well they have complied with the guidelines. Westerway et al. have reported in their study that some US users did not follow any guidelines for US probe disinfection. [8] In our survey study, it was not questioned whether practitioners followed any guidelines. However, the rate of those who have received courses, training or certificates in this regard is 39.3%.

Alcoholic solutions are described as 'ideal' as a skin disinfectant in the Germany S1 guideline (German S1 guideline is a guideline that has been published in 2014 and it refers hygiene methods to be used for US probe disinfection),[13] which was prepared to prevent infections during UGRA applications, and it has been proposed to coat US probes with a sterile sheath. In the same guideline, it is recommended the practitioner's facial mask installation, limitation of the number of persons in the room to be interrupted, spoken as little as possible, removal of jewelry, watches, bracelets and rings, use of appropriate hygienic hand disinfectant to provide hand sanitizer, to use a sterile box sleeve covering the entire body, to shave the area to be interrupted, to disinfect the interference area, and to coat the US probes with a sterile sheath. Antibiotic prophylaxis is not recommended, especially when regional anesthesia is applied.

It is not known how disinfection will be provided before UGRA applications, how US probes will be preserved. Also, gel usage and applicability of disinfection protocols is unknown in our country. According to the data obtained from the study, anesthetists who have participated in the research generally prefer to apply antiseptic after applying a sterile coating (sterile sheath or glove) to the US. This preference is also recommended in the German S1 guideline[13] 17.9% of participants reported that they were applying antiseptic directly on US probes. In our questionnaire, in which we did not question which method practitioners preferred, the rate of infective complications related to the procedure is rather low, suggesting that the selected methods are sufficient. However, the selected disinfectant agent, the coating used to coat the probe, the US gel preference causes a large number of variations. The presence of so many variations makes it difficult to discuss it.

In the German S1 guideline, alcohol solutions are defined as 'ideal', but this does not coincide with the results of our study. The most preferred agent in our study is povidone iodine. It is thought that the reason why povidone iodine is so preferred is that it is cheap and effective. The cost of povidone-iodine is considerably lower when compared with alcohol solutions, octenidine, and chlorine hexidine. It has been reported that sterile probe covers and sterile gel use cause loss of time and money[13] when high percentile alcohol solutions for disinfection are reported to damage the US probe.[6] The time loss can be ignored when the participants' daily averages are taken into account in the UGRA practice numbers. The cost of sterile sheath varies due to the institution. The disinfection materials used in our hospital and the unit prices invoiced to our hospital are given in Figure 1.

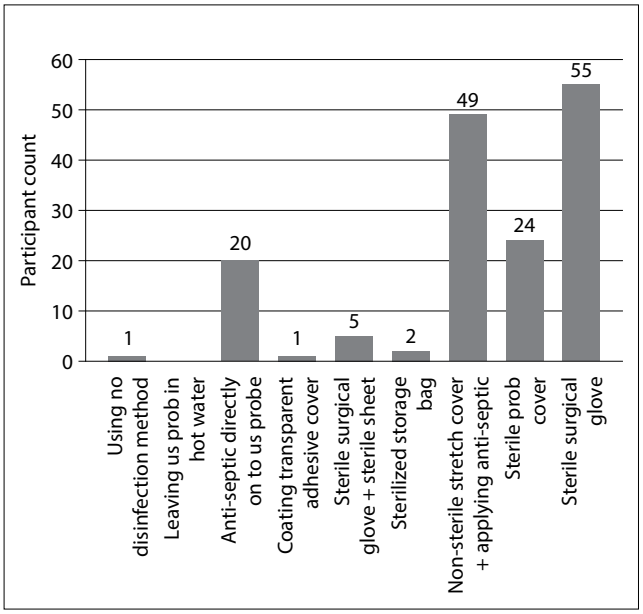

Figure 1. Distribution of preferred disinfection methods.

Sterile probe cases and use of sterile gels have been reported to cause time and money loss.[6] But, 17.9% of participants reported that they applied antiseptic directly on the US probe in the study. Aggressive disinfectants and concentrated alcohol solutions have been reported to cause damage to the US probe[14] and result in a rapid decline in image quality.[6] The cost of each of our probes, which we use in our clinic, is about 30000 Turkish Liras (TL). At this point, it seems reasonable to maintain the sterile sheath cost to protect the probe. There was no evaluation of the time usage of these processes because it was not questioned how long it took the method used in the questionnaire. It is thought that this should be considered in another study. However, considering that 61.6% of our participants have attempted less than 3 attempts per day, it does not seem to be a huge loss in terms of time.

Alakkad et al., have reported that they did not encounter any block-associated infection in their study of 10-year hospital data.[15] It is reported that sterile probe coatings were used, a mixture of povidone iodine or 70% alcohol + 2% chlorine hexidine was used as a disinfectant, and sterile US gels were preferred in the study including 7476 patients records. In the study, it was stated that UGRA-related infection rates could be reduced considerably by using sterile probe coating methods with low-level disinfectants. However, Sherman et al. reported no difference in skin contamination in the use of sterile and non-sterile US gels.[16] Of the 112 participants who participated in the survey, only 1 participant reported that they encountered infectious complications related to UGRA intervention.

Although infectious complications are unlikely, it is imperative to take measures, discuss the effectiveness of the methods and their costs. The effectiveness of the disinfectants used at this point should also be considered. The use of non-sterile US gels seems risky, but there are very few reported infectious complications. It has been reported that a wide variety of recommendations for US probe disinfection,[8,17] but generally high-level disinfectants (glutaraldehyde, hydrogen peroxide) are preferred.[17] In the study, only 1 participant reported using a disinfectant agent other than povidone iodide, alcohol, octenidine or chlorine hexyne. It is reported that the low level of preference for high-level disinfectants can lead to damage to the US probe.[6] In addition, aldehyde disinfectants can also harm patients and healthcare workers due to their carcinogenic, respiratory and toxic[18] properties, as well as damage to the US probe. It can be argued that there is no need to meet the risks of aldehyde disinfectants. In addition, the use of less costly and relatively less risky agents appears to be sufficient.[19]

Horn et al. Reported that alcohol used as a disinfectant in UGRA applications should be eradicated from the field in order to avoid neurotoxicity.[14] The use

of alcohol and high-level disinfectants should also take into account possible harmful effects to the patient. In the German S1 guideline, alcohol solutions are described as 'ideal', but remember that they must be used correctly. It should be kept in mind that US probes may also be vectors for neurotoxic agents as they could be vectors for the infectious agents. It is stated in the guideline that the agents used for these reasons should be effective and should be waited to evaporate from the skin.

Regional anesthesia applications have the advantages of patient consciousness, continued spontaneous breathing, postoperative pain control, early mobilization. Peripheral block application with nerve stimulator and ultrasound guidance increases the reliability of regional anesthesia.[20] In addition, the risk of complications decreases with the decrease in the amount of local anesthetic required.[5] Thus US use now becomes part of UGRA standard care, especially for peripheral nerve blocks.[20] In the literature review, we have made, we have not been able to get clear information about the US accessibility and the prevalence of US use in our country. In the study, a limited number of clinics and anesthesiologists were reached and the methods of disinfection they used were questioned. 64.3% of physicians participating in the survey did not have a medical experience for more than 5 years, whereas 79.5% of those who had less than 5 years experience of regional anesthesia in US guidance. At this point, we think that our physicians are new to the idea of preparing guidelines about UGRA that we have stated that UGRA backgrounds are short. As our physicians experience UGRA increases, we think that more physicians will lean to this direction in search of solutions.

The 112 participants who participated in the survey are very limited for the answers we are looking for, considering the anesthesiologists throughout the country. Furthermore, users participating in the survey are physicians who work in clinics with a patient portfolio and technical device to implement UGRA. For these reasons, we believe that the results are limited to generalize the whole country. Although, we think that our results, if limited, carry a data value. However, we believe that working in larger groups will give more inclusive results.

As a result, the familiarity of anesthesiologists with UGRA in our country is rather short. Although the most commonly used disinfectant povidone iodide and disinfection training rate is less than 50%, the incidence of UGRA-associated infection is very low. Through various guidelines published from different countries, it is aimed that the physicians will be able to catch certain conditions in UGRA applications, reduce complications and increase interventional success. In our country, we believe that the use of proven disinfection methods in UGRA applications will be beneficial both in terms of cost-effectiveness and in reducing complications. We also want to emphasize the necessity of publishing a guide for our country.

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