Preculture Antiseptic Cleaning in Women Patients; is it a Myth or a Scientific Fact?

Kadın Hastalarda Kültür Öncesi Antiseptik Temizliği; Efsane mi, Bilimsel Gerçek mi?

İdrar Kültüründe Antiseptik Temizliğin Etkinliği / Effect of Antiseptic Cleaning in Urine Culture

Cenk Murat Yazici[1], Dumrul Gulen[2], Cagri Dogan[1], Ayse Demet Kaya[2], Ercan Malkoç[3]
[1]Namik Kemal University, Department of Urology, [2]Namik Kemal University, Department of Clinical Microbiology,
[3]Çorlu Military Hospital, Tekirdag, Turkey

Özet

Amaç: İdrar kültürü, üroloji kliniklerinde en sık kullanılan laboratuar testidir. İdrar kültürlerindeki kontaminasyon, hem klinik hem de ekonomik açıdan ekstra çaba gerektiren zorlayıcı bir problemdir. Perineal antiseptik temizliğin, kontaminasyon oranlarını düşürmede etkili bir yöntem olduğu düşünülmektedir. Bu prospektif çalışmada, perineal temizlik sırasında antiseptik kullanımının, kontaminasyon oranlarını bilimsel anlamda düşürüp düşürmediği yada bu bilginin ürolojik bir efsane olup olmadığını araştırtırmayı planladık. Gereç ve Yöntem: İdrar yaparken yanma ve/veya sık idrara çıkma şikayetiyle kliniğimize başvuran ve idrar dipstik analizinde minimum bir pozitif lökosit tespit edilen, 18 yaş üstü toplam 150 bayan hasta prospektif olarak çalışmaya dahil edildi. Her hastadan 6 saat arayla, ilki steril salin kullanılarak, diğerinde ise antiseptik ile perineal temizlik sonrası, orta akım idrar örneği alındı. Örnekler mikrobiyoloji labaratuarında idrar kültürü değerlendirilmesine alındı. Bulgular: Hastaların ortalama yaşı 45,0 ± 22 yıl olarak saptandı. İlk idrar örneklerinden yapılan kültür çalışmasında 96'sının (%64) steril, 32'sinin (%21.3) kontamine ve 22'sinin (%14.7) anlamlı bakteriyel üremeye sahip olduğu rapor edildi. Antiseptik temizlik sonrası yapılan kültür analizinde bu sonuçlar sırasıyla 101 (%67,3), 27 (%18) ve 22 (%14,7) olarak bildirildi (p=0,62). Salin grubundaki kontamine kültürlerin ortalama koloni sayısı 88,8 ± 63,9 iken, bu sayı antiseptik grupta 50,7 ± 37,6 olarak belirtildi (p=0,02). Tartışma: Perineal antiseptik temizlik kültür sonuçlarını anlamlı ölçüde etkilememektedir. Bakteriyel üreme ve kontaminasyon oranlarında her iki grup arasında belirgin fark olmaması, perineal temizlik için antiseptik kullanımının anlamsız olabileceğini göstermektedir.

Anahtar Kelimeler

İdrar Analizi; Perine; Anti-Enfektif Ajanlar; Sistit; Üriner Kanal Enfeksiyonları

Abstract

Aim: Urine culture is one of the most common labaratory test in urology clinics. Contamination of urine cultures is a challenging problem that causes extra efforts for both clinical and economical aspects. Perineal antiseptic cleaning was thought to be an effective method to reduce contamination rates. In this prospective study, we tried to evaluate if antiseptic usage during perineal cleaning was able to decrease contamination rates in scientific manner or is it a myth of urology. Material and Method: A total of 150 female patients over 18 years old with the symptom of dysuria and/or frequency and had a minimum one positive leukocyte at urine dipstick test, were prospectively enrolled to the study. Two midstream clean-catch urine samples were given by the same patient at 6 hour intervals, one with sterile saline and other with antiseptic usage for perineal cleaning. All samples were incubated in microbiology laboratory for urine culture evaluation. Results: Median age of study population was 45.0 ± 22 years old. Culture reports of the first urine samples were; 96(64%) sterile, 32(21,3%) contaminated and 22(14.7%) with significant bacterial growth. These results were 101(67.3%), 27(18%) and 22(14.7%) at cultures with antiseptic cleaning, respectively (p=0.62). Mean colony count of contaminated cultures in saline group was 88.8 ± 63.9 whereas it was 50.7 ± 37.6 in antiseptic group (p=0.02). Discussion: Perineal antiseptic cleaning did not significantly affect culture results. Significant bacterial growth and contamination rates did not differ between groups indicating that, antiseptic usage for perineal cleaning may not be warrant.

Keywords

Urine Analysis; Perineum; Anti-Infective Agents; Cystitis; Urinary Tract Infections

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Corresponding Author: Cenk Murat Yazici, Namik Kemal Universitesi, Tip Fakultesi Hastanesi, Uroloji Anabilim Dali, 59100 Tekirdag, Turkey.
T.: +905068552687 F.: +90 2822624625 E-Mail : drcenkyazici@yahoo.com

Introduction

Urethral catheterization for urine culture sampling was a routine method before 1950. In 1958, Boswell et al. [1] described a noninvasive technique called "mid-stream clean catch technique" (MSCC). They described MSCC as cleaning the perineum and collecting midstream sample in a sterile container for microbiological evaluation. This technique had been accepted by many authors and became a standard method for urine culture in scientific manner.

Although obtaining an uncontaminated urine sample of male patient is easier, it is more complicated for female patients due to their anatomical properties. Keeping labias apart during micturation is one of the vital steps of MSCC in female patients. Another step of this technique is perineal antiseptic cleaning before micturation but this step may not be as vital as it was supposed to be. Although, antiseptic cleaning were thought to decrease contamination rates theoretically, there are some studies opposing this theory.[2-4] Despite these scientific data, perineal cleaning with antiseptic solutions has still been used in daily practice like a myth.

In this prospective study, we evaluated the effect of perineal antiseptic cleaning on urine culture results in symptomatic adult women in respect to both clinical and microbiological aspects.

Material and Method

After the permission of local ethic committee, a total of 150 female patients over 18 years old, who had been admitted to outpatient urology clinic between January 2011 to May 2011, with the symptom of dysuria and/or frequency and had a minimum one positive leukocyte at urine dipstick test, were prospectively enrolled to the study. Pregnant patients, patients with neurogenic deficit of upper and/or lower extremities, patients with history of antibiotic usage in the last week and patients with active vaginitis were excluded from the survey. All of the study population was familiar with MSCC technique and had performed minimum one culture sampling in their life. This prospective study was approved by the institutional review board and a written informed consent was provided.

Proper sampling technique was described to the patients by the same urologist, both verbally and with written information as;

1- Keep your labias apart with one hand

2- Clean your perineum from front to back one at a time with the gauze that is given to you by your doctor.

3- Drip the initial part of your urine to lavatory and collect the middle portion of your urine to the sterile container.

4- Do not touch to the inner surface of sterile container during the process of urine sampling.

Two MSCC urine samples were given by the same patient at 6 hour intervals excluding the first urine of the day. A sterile gauze moistened with 10 ml. of sterile water was used for perineal cleaning of the first urine samples. Patients were informed not to overhydrate themselves during the time interval for the second sample. After 6 hour of the first sampling, a sterile gauze moistened with 10ml. Savlon® solution (Allergo ilaç, İstanbul) (chlorhexidine 1,5% + Cetrimide 15%) was given to patients for perineal cleaning. The study was designed to be single blind trial that patients did not know which solution was antiseptic. Urine samples were transferred and inoculated immediately at the microbiology unit of university for culture incubation.

Specimens were streaked into sheep blood and MacConkey agars by using 1µl calibrated loop and incubated at 37°C for 24 hours. After a preliminary evaluation, specimens were re-incubated for another 24 hours and then the final results were documented. Results were classified as no growth, contaminated and significant. Significant bacteriuria was defined by the growth of a single type of microorganism at a concentration of ≥102 CFU/ml., contamination was the growth of at least two microorganisms at a concentration of 102 to 104 CFU/ml and any growth ≤102 CFU/ml was accepted as no growth.

SPSS 16.0 version was used for statistical analysis of study. As we performed 2 different procedures to the same patient group, our data was independent. For this reason we performed Chi-Square test and Mann-Whitney U test according to normalcy evaluation of Kolmogorov-Smirnov test.

Results

Median age of study population was 45,0 ± 22 years old. Culture reports of the first urine samples were; 96 (64%) sterile, 32 (21,3%) contaminated and 22 (14,7%) with significant bacterial growth. These results were 101 (67,3%), 27 (18%) and 22 (14,7%) at cultures with antiseptic cleaning, respectively. Among the patients with bacterial growth in saline group, 17 (77,3%) had Escherichia coli, 2 had Enterococcus faecalis (9,1%), 2 had Staphylococcus saprophyticus (9,1%) and 1 had Streptococcus species (4,5%). Microbiological properties of antiseptic group who had significant growth were identical to saline group. Bacterial growths of positive cultures, in both saline and antiseptic group were totally constant (table I).

In saline group, there were 32 (21,3%) patients with contamination, where as it was 27 (18%) in antiseptic group. A total of 5 (15,6%) contaminated urine cultures became sterile with the use of antiseptic solution but this decrease was not statistically significant. (p=0,62) Difteroids and koagulase negative streptococcus colonies which cause contamination were lost after antiseptic cleaning. Although 27(18%) patients were still contaminated in antiseptic group, colony counts were significantly reduced. Mean colony count of contaminated cultures in saline

Table 1. Culture results of patients with saline and antiseptic perineal cleaning

	Cultures with saline	Cultures with antiseptic	
Sterile	96 (64%)	101(67,3%)	p=0,62
Contaminated	32(21,3%)	27(18%)	p=0,62
Bacterial Growth	22(14,7%)	22(14,7%)	
E.coli	17(77,3)	17(77,3%)	
Enteroc. faecalis	2(9,1%)	2(9,1%)	
Staph. saprofiticus	2(9,1%)	2(9,1%)	
Strep. spc.	1(4,5)	1(4,5%)	
Total	150(100%)	150(100%)	
Colony counts in contaminated group (mean)	88,8 ± 63,9	50,7 ± 37,6	p=0,02

group was 88,8 ± 63,9 whereas it was 50,7 ± 37,6 in antiseptic group (p=0,02).

Discussion

Mid stream clean catch technique has become a standard method for urine culture sampling since 1950 [1]. Several investigators proved the inessentiality of meatal antiseptic cleaning in male patients which was a standard step in early years of this technique [5,6]. However, preculture perineal cleaning has still been the subject of debate at female patients because of the anatomical properties. Lifshitz et al. [7] reported that using antiseptic solutions before urine culture did not decrease the contamination rates. They also confirmed colony counts of significant cultures were identical in their series. In another study, Holliday et al. [8] concluded that perineal cleaning with sterile gauze did not differ from sterile saline usage. However they did not evaluate the effect of antiseptic cleaning on contamination rates. The results of Blake et al. [9] study were similar with the other studies that perineal cleaning did not statistically change culture results in teenagers. However their study and control groups were limited to 25 patients.

All these studies had similar design that the patients in study and control groups were different. However, the ability of performing same technique and properties of perineal anatomy of patients may differ, which may cause a bias in contamination rates. In order to eliminate the possible bias, both study and control group were designed to include same patients in our study. There are also some studies designed with this manner. Unlu et al. [10] evaluated urine culture results of 160 women taken one day apart and reported no statistically significant difference between antiseptic cleaning and sterile saline cleaning in terms of both contamination and bacterial growth rates. However, contamination rates in their series were below the literature as; 7 (4,4%) patients in antiseptic and 9 (5,6%) patients in saline group. With a similar design, Baerheim et al. [11] evaluated the affectivity of perineal cleaning and did not find any difference between cleaning and non-cleaning sampling technique. However, they also did not evaluate antiseptic usage for perineal cleaning.

In our study, we evaluated the urine culture results of the same patients, taken in 6 hour interval. As the bacterial growth in positive urine cultures of both saline and antiseptic group was identical, perineal cleaning with antiseptic did not change bacterial growth in significant cultures (p>0,05). According to clinical aspect, usage of sterile saline as perineal cleaner did not change the treatment modality of these patients. According to microbiological aspect, colony counts and types of microorganism did not also differ between study and control groups(p>0,05).

Theoretically, the aim of preculture antiseptic cleaning is to reduce contamination rates. As it was stated in different studies, we also found that it may not be true in daily practice. Contamination rates in our series decreased to 18% from 21,3% with antiseptic cleaning. Although, 5 patients in contaminated group became sterile with antiseptic usage, this decrease was not statistically significant (p=0,62). The only statistically significant difference was about the colony counts of contaminated cultures. Mean colony counts decreased to 50,7 ± 37,6 from 88,8 ± 63,9 by antiseptic cleaning which was statistically significant. However, most of the cultures had still been reported as contamination. The most common reason for urine contamination is actually normal vaginal flora which may include Stafilococcus spp., Streptococcus spp., Enterococci, Peptostreptococci, Grup B Streptococci, Corynebacteria, Candida spp and some Enterobactericea members. In respect to types of microorganisms in contaminated specimens, antiseptic usage for perineal cleaning was seem to be effective to Corynebacteria and Gramm (+) cocci (Stafilococcus spp., Streptococcus spp) in our study, but this was not significantly important because only 15% of contaminated samples became sterile by antiseptic usage.

Conclusion

As a conclusion, results of our series confirmed that perineal antiseptic cleaning did not significantly affect culture results. Significant bacterial growth and contamination rates with antiseptic usage did not differ between groups so antiseptic usage for perineal cleaning may not be warrant. Although there is a significant decrease in colony counts with preculture antiseptic cleaning, this does not make any sense in clinical practice.

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There is no industrial links and affiliations of this study.

Competing interests

The authors declare that they have no competing interests.

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