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The Evolution Of Surgical Hands Anti-Sepsis: From Scrub To Rub

Faaiz Ali Shah[1], Ashok Shyam[2,3]

Learning Point of the Article:

The objective of surgical hand anti-sepsis is to eliminate the transient skin bacteria and reduce the resident skin bacteria present on the hands of members of surgical teams. An appropriate anti-septic agent is used to prevent the transfer of these pathogens from healthcare worker to the surgical site of the patient in case of perforation in the gloves or contact with contaminated skin. The surgical hand anti-sepsis has evolved over the years from traditional handwashing with water using an anti-septic agent to rubbing hands with waterless aqueous alcohol. In this editorial, we have discussed the importance of surgical hands anti-sepsis and rationale for preferring surgical hands rubbing over scrubbing.

Introduction

Surgical site infection (SSI) is the infection which affects the surgical incision site or deep tissues of the body and revealed within 30 days after surgery or within 1 year if implants are left inside body for treatment purpose [1]. The prevalence of SSI is 2.5%–41% globally but expected to be significantly higher in low-middle income countries where hospitals are often less equipped [2].

SSI is the leading cause of healthcare-associated infections which not only prolonged the hospital stay of admitted patients but also increase the treatment charges and may result in higher morbidity and mortality [3]. SSI can result from multiple factors pertaining to patient, surgeon, and operating environment but the most effective and low cost method to decrease the frequency of SSI is the optimum surgical hands anti-sepsis [4]. Routine handwashing removes visible physical contamination and transient skin flora; whereas surgical hand anti-sepsis is the additional use of anti-microbial product or alcohol based hand rub for preventing the growth of resident skin flora [5].

The hands of surgeon can harbor a variety of microorganisms. The most common resident skin flora are Staphylococcus Epidermidis, Staphylococcus Hominis, Coryneform bacteria, Pityrosporum, and coagulase negative Staphylococci. The resident flora is usually harmless but in sterile body cavities they can cause serious infections. The transient skin flora include Staphylococcus aureus, Gram-negative bacteria and yeast which can be acquired by members of surgical teams when they came in contact with patients or other objects which colonize them. The transient flora is the major pathogens responsible for SSI [6]. The commonly used hand anti-septic agents are iodine-iodophors, chlorhexadine gluconate, alcohol-containing preparation, para-chloro-meta-xylenol, and triclosan [7].

SSI is preventable and studies have shown that 30–70% of infections can be avoided with surgical handwashing [8-11]. Joseph Lister has indicated that handwashing can reduce the SSI from 45 to 15%. [12] Rang [13] reported that Semmelweis was successful in lowering infection rate from 18.3% to 1.3% through handwashing in his clinic. The World Health Organization (WHO) has developed Global Guidelines for the prevention of SSI which encompass a wide range of evidence based recommendations with special emphasis on hand hygiene, pre-surgical hand scrubbing (SHS) and rubbing techniques, and

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Dr. Faaiz Ali Shah

Dr. Ashok Shyam

[1]Department of Orthopaedics and Traumatology, Lady Reading Hospital, Peshawar, Pakistan,
[2]Indian Orthopaedic Research Group, Thane, Maharashtra, India,
[3]Department of Orthopaedics, Sancheti Institute for Orthopaedics and Rehabilitation, Pune, Maharashtra, India..

Address of Correspondence:
Dr. Faaiz Ali Shah,
Orthopaedic Division, Lady Reading Hospital, Peshawar, Pakistan.
E-mail: faaizalishah@yahoo.com

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various anti-septic solutions [14, 15]. The two most commonly used pre-operative handwashing techniques are surgical hand scrubbing(SHS) and surgical hand rubbing (SHR). Hand scrubbing is the traditional technique of washing hands and forearm with anti-septic solution under running water, whereas hand rubbing involves cleaning hands and forearm with alcohol based solution without using any water [16]. The use of waterless-alcohol solutions for hand anti-sepsis instead of traditional hands washing with water is a major change in hand hygiene practices [17]. The WHO prefers hands rubbing with alcohol-based hand rubbing solutions particularly for third world countries for three reasons [18]. First, studies have confirmed that hand rubbing with aqueous alcohol is as effective as traditional handwashing in achieving pre-operative surgical hands anti-sepsis. Second, health facilities which cannot maintain the steady flow of tape water and the recommended quality and temperature of water, hand rubbing with waterless preparation is a good alternative. Third, usage of clean drinking water for hands scrubbing is discouraged to preserve clean water as studies have revealed that traditional hands scrubbing utilize 11 L of water per scrub [19]. The length of time for SHS and SHR depends upon manufacture's recommendations but usually 2–5 min is sufficient as per the WHO guidelines. SHR is applied to dry hands only and in sufficient amount so that hands and forearm are wet throughout the SHR procedure.

Apart from WHO other guidelines like Centers for Disease Control and Prevention(CDC) USA, Association of PeriOperative Registered Nurses (AORN) and Infection Prevention and Control Canada also endorse that alcohol-based hands rub can be used an effective alternative to handwashing [20, 21]. In a systematic review and meta-analysis by Feng et al. [16], it was documented that SHR had similar efficacy and cost-effectiveness as that of surgical hands washing with added advantages of easy application, dermal tolerance and less time consumption than traditional hand scrubbing with water. These advantages are extremely important for surgical teams which usually performed surgical hand anti-sepsis more frequently and in some cases on daily basis before performing surgeries. Hand rubbing anti-sepsis has been used in USA and some parts of Europe since long [22]. Overall the compliance of the healthcare workers to hand hygiene has been poor and reported to be <50% [23]. Hand rubbing with alcohol preparation has demonstrated an increase compliance of healthcare workers to hand hygiene guidelines [24].

Conclusion

Surgical hand anti-sepsis is the initial crucial step which can prevent and control SSI. Although alcohol based hands rub has many advantages over traditional hand scrubbing with water, implementation in a hospital setting can be a challenge due to resistance of the operating surgeons in changing their usual traditional practice. The WHO endorsed the use of multimodal hand hygiene improvement programs for the implementation of evidence based hand hygiene practice. These strategies include uninterrupted supply of alcohol based hand rub solutions, education, evaluation, feedback, reminders, and administrative support.

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