

Hu-Scrub Reference Manual



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I. INTRODUCTION

The importance of hand hygiene was raised by Ignaz Semmelweis, a Hungarian doctor, in the mid-nineteenth century. He analyzed the maternal deaths of many maternal deaths and suggested the necessity of hand hygiene through the study that hand hygiene management resulted in a drastic reduction of maternal mortality.

In recent years, the WHO has designated May 5 as a hand hygiene day, "proper hand hygiene can reduce the risk of healthcare infections (HAIs) and has the potential to save 8 million lives in hospitals every year".

Recently, there have been many cases of secondary infection in Korea such as hepatitis C among hemodialysis patients. In order to prevent the spread of blood-borne infectious diseases in the hemodialysis room, the Center for Quality Management emphasizes the need to thoroughly observe the basic infection control principles of hand hygiene and glove wear.

Since many microorganisms exist in the patient's skin and surrounding environment, the hands of the medical staff are contaminated with the microorganisms of the patient by direct or indirect contact. Contaminated microorganisms proliferate in the hands of medical personnel, and if not hand hygiene, the degree of contamination becomes worse. If the hand hygiene method is not appropriate (lack of hand sanitizer, lack of time to perform, etc.), microorganisms remain in the hands of the medical staff and there is a possibility of cross infection.

The practice of hand hygiene is the most basic and economical way to prevent the spread of antibiotic resistant bacteria. Difier Pittet, Director of Infection Control at the University of Geneva Hospital, has conducted hand hygiene activities for many years, including posters throughout the hospital, beaches for alcohol hand sanitizers, and feedback, improving hand hygiene performance, Respectively. In the UK, 187 hospitals introduced hand hygiene campaigns, resulting in improved hand hygiene performance and decreased MRSA bacteremia. In addition, several studies have shown that cross-infection is effective in reducing the incidence of medical-related infections and antibiotic-resistant bacteria transmission.

Hand hygiene includes hand disinfection prior to surgery, which means 'hand washing using an antimicrobial agent prior to surgery or surgery' or 'hand rubbing'. Pre-operative hand disinfectants are called surge scrubs. One of the most commonly used ingredients is Iodine and Iodophor. These ingredients, called povidone iodine, work relatively safely and quickly, but they remain on the skin and cause skin irritation and damage, making them inconvenient to rinse after use. There is also a disadvantage in that the hands are roughened due to brushing during the cleaning process. Newborns are absorbed through the mucous membranes and therefore require attention in obstetrics and gynecology, which requires surgeon scrubs.

One of the most common ingredients in the field is alcohol. The effect is immediate and effective against most bacteria and viruses. Alcohol (ethyl alcohol and isopropyl alcohol) has been proven to be effective against proliferative Gram (+) and (-) bacteria, Mycobacterium tuberculosis, and various viruses including multidrug-resistant bacteria (MRSA, VRE, etc.) and also effective

against lipid membrane viruses (eg, herpes-simplex virus, HIV, influenza virus, RSV, vaccinia virus etc.). The CDC hand hygiene guidelines state that 70-80% of alcohol has a great effect on inactivating dialysis viruses. Sulna alcohol has a major disadvantage of low persistence because it has little residual effect.⁵⁾

Unlike alcohol, chlorhexidine gluconate has little irritation to the skin and lasts for about 6 hours. However, immediate effects are somewhat inconvenient to use because they are somewhat slower than alcohol.

Considering the advantages and disadvantages of chlorhexidine gluconate and ethanol, there are also recently some formulations in which both components are mixed. Alcohol quickly disinfects the virus and maintains long-lasting disinfection with chlorhexidine gluconate. The WHO guidelines for hand disinfection indicate that a mixture of the two ingredients is valid. According to the Hand Disinfection Guidelines, the antibacterial efficacy of a formulation added with a compound that restrains bacterial regrowth on alcohol-based disinfectants by prolonged action (eg, chlorhexidine gluconate or quaternary ammonium compound) There is a notice that it is superior to the whole hand disinfection method.⁶⁾

Hu-Scrub contains 83% of alcohol and 1% of chlorhexidine gluconate, which complement each other's disadvantages. More than 70% of alcohol is rapidly and widely disinfected and maintained long-lasting with chlorhexidine gluconate. Automatic dispensing reduces the risk of secondary contamination and ease of use. Because disinfection does not require rinsing, the problem of roughness of the hands is improved by not brushing, and the time of hand disinfection before surgery is reduced.

II. PRODUCT INFORMANTION

1. GENERAL INFIRMATION OF Hu-Scrub

(1) Composition

■ Active ingredient	: Chlorhexidine gluconate	1%
■ Inert ingredients	: Ethanol	83%
	Purified water	A proper quantity

(2) Physical properties

■ Description	: Clear, colorless liquid
■ Use	: Use as it is undiluted solution
■ pH	: 5.5 ~ 7.0

2. EFFICACY OF Hu-Scrub

Alcohol penetrates cell membranes of microorganisms, denatures proteins and inhibits enzymatic activity, thereby exhibiting a disinfecting action. It is the most widely used disinfectant and it is known that 90% of microorganisms are killed in 2 minutes when 70% of ethanol is treated on skin. It evaporates quickly and is almost no toxic, so it is often used for hand disinfection, but it is less persistent.

Although chlorhexidine gluconate is known to be ineffective in its delayed action, it has no skin irritation, has a long lasting effect, and is more effective against Gram (+) bacteria. According to the 'CDC Hand Disinfection Guidelines', adding low concentrations (0.5-1.0%) of chlorhexidine gluconate to an alcohol-based formulation shows more residual activity than using alcohol alone. Hu-Scrub is a fast and long acting mixture of alcohol with low concentrations of chlorhexidine gluconate.

(1) Efficacy test

Hu-Scrub was evaluated for efficacy activity against Mycobacterium tuberculosis, fungi, bacteria, and multidrug-resistant organism in Korea research institute of chemical technology (KRICT). In the efficacy test results of Korea Testing & Research Institute (KTR), Hu-Scrub is effective at least a decimal log (lg) reduction of 5 in mycobacterium tuberculosis.

[Table 1] In-vitro testing

Testing Institute	Test organism	Contact time
Korea Testing & Research Institute (KTR)	Bacteria	
	<i>Staphylococcus aureus</i> ATCC 6538	15 sec
	<i>Escherichia coli</i> ATCC 25922	15 sec
	<i>Pseudomonas aeruginosa</i> ATCC 15522	15 sec
	<i>Salmonella typhimurium</i> ATCC 13311	15 sec
	Multidrug-Resistant Organism	
	MRSA ATCC 33591	15 sec
Catholic university of Pusan	VRE ATCC 29211	15 sec
Korea Testing & Research Institute (KTR)	Fungi	
	<i>Candida albicans</i> ATCC 10231	15 sec
Korea research institute of chemical technology (KRICT)	Virus	
	<i>Rota virus</i>	1 min
Catholic university of Pusan, Korea	Mycobacteria	
	<i>Mycobacterium bovis</i> BCG Japanese	1 min

3. STABILITY TEST OF Hu-Scrub

(1) Toxicity evaluation

Chlorhexidine gluconate

Item	Animal	Results
Skin irritation	Rabbit	Mid irritation
Eye irritation	Rat	Irritation
Acute oral toxicity	Rat	LD ₅₀ **=2,000mg/kg

Ethanol

Item	Animal	Results
Eye irritation	Rat	Irritation
Acute oral toxicity	Rat	LD ₅₀ **=6,200mg/kg

*Source : CAMSEC and Toxnet

** LD₅₀(lethal dose 50%)

4. DIRECTIONS FOR USE

- Use as it is undiluted solution in hand
- When using the automatic dispensing, it will be sprayed about 1.5ml once, so rub one or two times on one hand.
- Not only the palm but also the top of the wrist is thoroughly disinfected.

(1) How to use

<p>1</p>  <p>1~2 times spray</p> <p>Spray Hu-Scrub on left hand.</p>	<p>2</p>  <p>For 5 min</p> <p>I rub the right hand end on the floor of my left hand.</p>	<p>3</p>  <p>For 5 ~10 min</p> <p>From right wrist</p>
<p>4</p>  <p>Right arm and</p>	<p>5</p>  <p>Repeating steps 1 to 5 on the opposite hand and perform step 6.</p> <p>Rubbing to the right elbow</p>	<p>6</p>  <p>1~2 times spray</p> <p>Spray Hu-Scrub scrub evenly on both hands.</p>
<p>7</p>  <p>I rub the palm of my hand.</p>	<p>8</p>  <p>I rub it on the back of my hand with the palm facing.</p>	<p>9</p>  <p>Rub between the fingers.</p>
<p>10</p>  <p>Grab the finger of the slave and move it back and forth, left and right to rub the back of the finger.</p>	<p>11</p>  <p>I hold my thumb and rub it.</p>	<p>12</p>  <p>Dry completely</p>

5. STORAGE AND PRECAUTION

(1) General precautions

- In case of shock, it is necessary to thoroughly examine the history of hypersensitivity to the chlorhexidine and whether the substance is hypersensitivity.
- There have been reports of IgE antibodies specific to chlorhexidine in the blood of some patients who developed shock due to chlorhexidine.
- This solution is use undiluted solution.
- Be careful not to get in your eyes as it may cause damage to the cornea on contact with eyes. If case of eye contact, rinse with plenty of water.

(2) First aid measures

- Do not use for purposes other than hand disinfection.
- In case of repeated use, be careful that the skin may become rough due to defatting.
- Organic substances such as serum and agricultural water weaken the bactericidal action of the Hu-Scrub. If they are attached, wash them thoroughly before use.
- Soap weakens the bactericidal action of the Hu-Scrub, so wash the soap used for preliminary washing thoroughly before use.
- Flammable and volatile, so be careful with fire.

(3) Packing and shelf-life

- Packing unit : 1L/bottle (1L x 10 bottle /Box)
- Storage information : Light-resistant , tight containers, Room temperature (1~30°C)
- Shelf- life : 36 months

III. CONCLUTION

Hand hygiene is the most important way to block infection by reducing the risk of transmission of pathogens. Iodine has been known as an effective disinfectant since the 1800s, but it has been replaced with skin disinfectants by iodopar for skin irritation and staining. Iodophores have fewer skin irritation or allergic reactions than Iodine, but they have a higher incidence of irritant contact dermatitis than other hand hygiene products. In addition, Iodophor production has been reported due to the contamination of Gram-negative bacteria.

Compared with the "disinfection effect of Chlorhexidine/Ethanol mixture and Povidone-iodine" which was carried out in 2006, the chlorhexidine gluconate and alcohol mixture were comparatively superior in the disinfection duration. In addition, the iodine formulation showed 45% allergic response, but the allergic reaction of chlorhexidine gluconate and alcohol mixture was only 5%.⁷⁾⁻⁸⁾

Hu-Scrub showed rapid and high efficacy power in bacteria, viruses, and mycobacterium tuberculosis, and enhanced the persistence of disinfection with chlorhexidine gluconate. It has no stickiness after use in liquid form and it is quick-drying, minimizing skin irritation and damage. It can be used conveniently by using automatic dispenser, and by providing additional accessories, Hu-Scrub can be used in various ways.

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