Original Research Paper

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Surgery

COMPARATIVE STUDY OF ANTISEPTICS FOR THE PREVENTION OF INFECTION DURING EMERGENCY SURGERY

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ABSTRACT **Background:** There is uncertainty in pre-operative skin antiseptics in emergency surgery. SSI is the most common and expensive complication of emergency surgery.[1]To make clinical decisions instantly, the surgeon must consider all conditions and the relative efficiency of antiseptics in emergency surgery. **Method And Materials:** We have searched for randomised research work. We also consider non-randomised studies and TED talks. We also include symposiums, workshops, and seminar publications. We consider antiseptics or a combination of antiseptics or sequential application of different antiseptics. The references show selected book topics, talks, research papers, reports, and studies. **Results:** We have considered the research work, as shown in the references. We include antiseptics for comparative studies. Adverse effects of antiseptics are also observed, and chemical and pharmacological properties are also found in different works of literature. The latest antiseptics and its application are also reported.

KEYWORDS : Combinations of Antiseptics, a complication of emergency surgery, and the relative efficiency of antiseptics.

INTRODUCTION:

An anti-microbial substance is an antiseptic (in Greek, Anti means against, and *Septikos* means putrefactive). In 1867, Joseph Lister published a research paper titled "Antiseptic Principle of the Practice of Surgery." It was the first introduction of antiseptics, which can be classified into eight substance classes.

A patient's general health is one of the most critical considerations in determining a wound's prognosis and result. Chloroxylenol, isopropyl alcohol, hexachlorophene, and benzalkonium are commonly used antiseptic agents in general and emergency surgery.

When the risk of infection is high, or there has been a significant loss of tissue, the wound may be left open and allowed to heal by tissue growth.This process is known as "healing by the second intention." [2]

Several reports are opposite to each other. One of the research teams reports no evidence of the relative effectiveness of any antiseptic preparation on SWHSI[2]. There is evidence of antiseptics' effectiveness in small groups, which means further research is required on a large scale under different environments.[2]

Though the range of dressings is available for surgical wounds, particular antiseptics and their concentrations are not suggested because they depend on the patient's environment and internal and external conditions. There is no diagnostics test to identify whether the bacterial load in a wound is capable of causing infection.

DISCUSSION:

Wound healing is a natural but complex process. Many factors affect this process. Bacterial infection is one of the most dangerous complications that may occur during the surgical wound healing process. One of its effects on bacteria wound healing is a challenge for medical service providers.

Antiseptics are used worldwide in surgical hospitals. Antiseptics are used at all stages: pre-operative, during operation and post-operative. Research has proved that widely used antiseptics show relevant cytotoxicity and cross-reactivity with specific wound healing[(9)]. Antibiotic resistance to aureus strain is highly significant—elevated resistance toward local antiseptics. [(10)]

Antiseptics are considered when the surgeon finalises the surgical procedure. The skin cannot be sterilised because approximately 20% of resident flora are beyond surgical scrubs and antiseptics. For the surgical procedure, when skin is prepared with antiseptics. It has two goals: To remove transient pathogenic microorganisms on the skin surface and to remove or reduce resident flora to a lower level.

In emergency surgery, a surgeon may not have sufficient time to assess the scientific condition. Finally, it is up to the surgeon to tailor the optimal antigen for his /her specific surgical procedure.

For limb surgery, 'painting' the limb requires lots of time and may be difficult for the area between toes and fingers. The 'sterile bag 'preparation technique has an additional advantage in emergency surgery cases, especially when duration matters. In other words, this technique can potentially increase operation theatre efficiency and patient safety[(9)]. Take care of the risk of using skin antiseptics in infants; severe chemical injuries from antiseptics may occur.

The effectiveness of pre-operative skin preparation is essential, and it depends on the types of antiseptic and application methods. The latest technological improvements are in the paints[(11)].

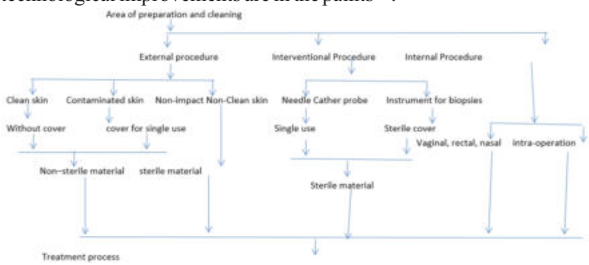

Chart-1

Important Points:

1. The Porous antiseptic material needs to envelop the wounded part, filter air, and absorb all discharge, providing complete protection efficiently.
2. In large cavities, absorption as an antiseptic should generally be avoided.
3. The antiseptic water bath for treating wounds of the extremities has excellent results.
4. 2% to 8% Zinc chloride (water-based) solution exceedingly effective in destroying organisms in suppurating wounds (1 to 4, Franklin. K. Paddock, Antiseptic surgery, annual or action 1885, Massachusetts Medical Society).
5. Before selecting antiseptic agents, their adverse effects should be observed and considered. Its environmental effects and Efficiency in the particular environment must be considered.
6. The wound may be converted from primary to secondary infection when wound closure fails or dehiscence.
7. Ideal antiseptics are broad spectrum and sporicial-kill all forms of bacteria. It must have long-duration action and be active in the presence of blood, pus exudates, and excreta.
8. Antiseptics must be chemically stable and non-absorbable by the skin.
9. Antiseptics must be nontoxic, non-irritating to tissues, and have a rapid onset.
10. Antiseptics are temperature, humidity and pH-dependent. Antiseptics are appended to all external parameters and should be assessed.
11. Period of contact with microbes is also an implant property of Antiseptics.
12. WHO's recommendation indicates that it no longer supports using povidone-iodine alcohol for surgical site preparation.

13. WHO's recommendation indicates support for the use of chlorhexidine–alcohol.
14. The combination of antiseptic solutions produces a synergistic effect and reduces the chance of microbial resistance.
15. Some antiseptic solutions also have adhesive properties [4].
16. Microbial counts are high in number in the vagina axilla, groin, anus, and perineal region, and special care is needed for this region[4-5].
17. In pediatric surgery, using anti-microbial triclosan-coated sutures could reduce the risk of surgical site infection[4-5].
18. After cesarean surgery, use sutures rather than stable to reduce surgical site infection[4-5].

Official Statements

Guideline for cleaning and preparing for cleaning and preparing external and internal –use ultrasound.Transducers and equipment. Between patients, as well as safe handling and use of ultrasound coupling gel.

American Institute of Ultrasound in Medical

CONCLUSION:

The medical science of antiseptic efficacy and functional testing is very complex. To prevent surgical site infection, the primary question is: What is the comparative clinical effectiveness of pre-operative for preventing surgical site infection? What are the application techniques for applying skin antiseptics? These are the main problems associated with antiseptics, and the right choice of antiseptics is inconclusive. Also, some reports show that the application of antiseptics is inconsequential.

A surgeon may consider other characteristics of alternative antiseptics, including cost and side effects. Due to the dramatic rise of antibiotic resistance, selecting appropriate antiseptics and their application can be a potential alternative for preventing and treating surgical site infections and complications.

Table -1 Antiseptics And Their Properties

Sr no.	The popular name for antiseptic	The chemical name of antiseptic	Chemical group	Use of antiseptics	Mechanisms antiseptic	Remarks
1	Cresol(Lysol)	Methyl phenol	Phenol derivatives	Utensils, excreta, washing hands		Less damaging to tissues than phenol 3 to time more active
2.	Phenol	Carbolic acid	Phenol group	earliest used injures tissue and cell, burn skin	Denaturing Bacterial proteins	Extremely irritating corrosive
3.	Chloroxylenol	Para-chlorameta xylenol	Phenol(derivative)	4.8% surgical antiseptics, 1% mouth was	Does not coagulate proteins	Non-corrosive Non-irritatins to skin
4.	Hexachlorophene	Hexachlorophene	Phenol derivatives	Effective only against Gm+ve Inshoap	Slow but persistent action	72% solution banned antifungal Also
5.	Hydrogen peroxide	Hydrogen peroxide	Oxidising agents	Loosening and removing slough	Oxidises necrotic matter and bacteria	1 to 2% solution for a house for household first aid.
6.	Potassium permanganate	Potassium permanganate	Oxidising agents	Treatment of infected eczema -open and blistering wounds -athlete's foot and impetic	oxi	
7.	Benzoyl peroxide	Benzene carbonyl chloride	Oxidising agents	Kill bacteria, anaerobes	Liberates o_2 in the presence of water	Widely used drug for acne.
8.	iodine	Iodine	Halogens	Rapidly acting on bacteria, fungi virus preomd post-operative.	Iodinating and oxidising microbial protoplasm.	Cause burns and blisters
9.	Loopholes	Povidine iodine	Helogens	Surgical scrub disinfecting surgical instruments non-specific vaginitis	Oxidation of bacterial proplasm	
10.	Chlorine	Polent germicide	Chlorine	Kills pathogens	Oxidation of bacterial proplasm	
11	Chromophores(bleaching power)	Calcium hypochlorite	Choloraphores	Disinfect drinking water and liquids	Oxidation of bacterial protoplasm	Irritator
12	Sodium hypochlorite		Cholorophores	In root canal therapy	Oxidation of bacterial protoplasm	Too irritant to be used as an antiseptic
13	Chlorhexidine (savlon)	Chlorhexidine	Biguanides	Surgical scrub, neonatal bath, mouthwash, general skin antiseptics	Disrupting bacterial cells and denaturation of bacteria protein Active against GM +ve bacteria	0.5 to 1% in touch paste

14	Cetrimide	Alkytrimethy lammonium bromide	Quaternavy ammonium	Detergents Effectively remove dust and greave Act by altering the permeability of the cell membrane	Cidal to bacteria, fungi, viruses	Widely used as antiseptics
15	Ethanol	Ethyl alcohol	Alcohols	40-90% concentration is good antiseptics	Precipiting bacteria proteins	Should be applied to open wound irritant ulcer
16	Isopropanel	Isopropyl alcohol	Alcohol	Antiseptics disinfection hand sanitiser	It is rubbing alcohol and hand sanitisers	It requires a longer contact time for disinfection
17	Formaldehyde	Formaldehyde	Aldelyde	Preservation of dead tissues	Better sterilising agent	37%aqueous solution is known as formalin
18	Boric acid	Hydrogen borate	Acids	Weak antiseptics bacteriostatic Antibacterial activity against infection, such as bacterial vaginosis and condition	A 3% solution of boric acid in the treatment of deep wounds is possible	Systemic Absorption Homeopathic medician Swing pool chemical
19	Mercuric Compound (salt)	Mercury chloride and mercury bichloride	Metal salt		Inhibiting bacterial enzymes	Highly toxic Compound One of the early Compound
20	Silver compound	Silver sulphadiazine	Metallic salt	Pseudomonas in burn patient	Interring with essential metabolic activities of microbial cells Release silver ions slowly	Silver nitrate is highly active against gonococci
21	Zinc Compound (salt)		Metallic salt	Milt antiseptic is used in eye and ear drops and is also a very sensitive		
22	Gentain violt (Gentain violot (methyl violet 10 b)	Hexa methyl parasailing chloride	Dye `	Active against bacteria (gram +ve) fungi antifungal	For chronic ulcer and furunculosis, bed sores, ringworms	For Minor cuts and scapes, Antitumor properties
23	Acriflavine	Acritiavinium chloride	Dye	Active against gram +ve bacteria and gonocci For chronic ulcers and wounds	It can remove plasmids containing anti-microbial Resistance genes from Grsm positive	Prompt healing and non-irritant

Table-II Latest Antiseptics And Their Properties

Sr.no	Popular name of the antiseptics	The chemical name of antiseptic	Chemical group	Use of antiseptics	Mechanism of antiseptics	Remarks
1.	OLG	Olanexidine gluconate	Gluconic acid	Fast-acting on bacterial activity	Positively charged molecules kind to the negatively charged libid bacterial cell surface	OLG is more effective than PHP-1 in preventing SSI during gastrointestinal Cancel
2.	Chlorhexidine					Pre-operative cleansing of patient's skin with[11] cholorohexidine alcohol superior[12]
3.	Triclosan	Methoxy aimed pectin-based mucoadhesive buccal patch	B-cyclodextrin			To develop buccal patches
4.	Chlorhexidine gluconate in 70% v/v isopropyl alcohol	Compound and mixture	Alcohol	Pre-operative skin cleansing		Recommended for by CDPC, NIHCE, HPS, and WHO[3]

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