Comparison of octenidine dihydrochloride (Octenisept®), polihexanide (Prontosan®) and povidon iodine (Betadine®) for topical antibacterial effects in Pseudomonas aeruginosa-contaminated, full-skin thickness burn wounds in rats

Fatih Uygur, Mustafa Özyurt, Rahmi Evinç, Tugrul Hosbul, Bahattin Çeliköz, Tuncer Haznedaroglu

Central European Journal of Medicine (Impact Factor: 0.26). 3(4):417-421. DOI:10.2478/s11536-008-0042-x

ABSTRACT Pseudomonas aeruginosa is one of the most frequently isolated organisms from infected burn wounds and a significant cause of nosocomial infection and septic mortality among burn patients. In this animal study, three antiseptic agents which were Octenidine dihydrochloride (Octenisept®, Schülke & Mayr, Norderstedt, Germany), polyhexanide (Prontosan®, B. Braun, Melsungen AG, Germany) and povidon iodine (Betadine, Purdue Pharma L.P, Stamford, USA) were compared to assess the antiseptic effect of their applications on experimental burn wounds in in rats contaiminated with P. aeruginosa. All treatment modalities were effective against P. aeruginosa because there were significant differences between treatment groups and control groups. The mean eschar concentrations were not different between polyhexanide and povidon iodine groups, but there were significant differences between the octenidine dihydrochloride group and the other treatment groups, indicating that the Octenidine dihydrochloride significantly eliminated P. aeruginosa more effectively in the tissues compared to the to other agents. All treatment modalities were sufficient to prevent the P. aeruginosa invasion into the muscle and to cause systemic infection. In conclusion, Octenidine dihydrochloride is the most effective antiseptic agent in the treatment of the P. aeruginosa-contaminated burn wounds; Octenidine dihydrochloride can be considered as a treatment choice because of its peculiar ability of limit the frequency of replacing wound dressings.

[less]

.

373 VIEWS

- Citations (23)
- Cited In (2)
- Sorted by: **Order of availability**
  - Order of availability
  - Appearance in publication

- **Article: Effect of chlorhexidine and benzalkonium chloride on bacterial biofilm formation.**

  A Houari, P Di Martino

  [show abstract] [hide abstract]
  ABSTRACT: To study the effect of antiseptics on bacterial biofilm formation. Biofilm formation and planktonic growth were tested in microtiter plates in the presence of antiseptics. For Escherichia coli G1473 in the presence of chlorhexidine or benzalkonium chloride, for Klebsiella pneumoniae CF504 in the presence of chlorhexidine and for Pseudomonas aeruginosa PAO1 in the presence of benzalkonium chloride, biofilm development and planktonic growth were affected at the same concentrations of antiseptics. For PAO1 in the presence of chlorhexidine and CF504 in the presence of benzalkonium chloride, planktonic growth was significantly inhibited by a fourfold lower antiseptic concentration than biofilm development. For Staphylococcus epidermidis CIP53124 in the presence of antiseptics at the minimal inhibitory concentration (MIC), a total inhibition of biofilm formation was observed. For Staph. epidermidis exposed to chlorhexidine at 1/2, 1/4 and 1/8 MIC, or to benzalkonium chloride at 1/8, 1/16 or 1/32 MIC, biofilm formation was increased from 11.4% to 22.5% without any significant effect onto planktonic growth. Chlorhexidine and benzalkonium chloride inhibited biofilm formation of different bacterial species but were able to induce biofilm development for the Staph. epidermidis CIP53124 strain at sub-MICs. Sublethal exposure to cationic antiseptics may contribute to the persistence of staphylococci through biofilm induction.

  Letters in Applied Microbiology 01/2008; 45(6):652-6. · 1.63 Impact Factor

- **Article: Local Antiseptics in surgery—Revival and advance**

  H. Willenegger

  European Journal of Trauma and Emergency Surgery - EUR J TRAUMA EMERG SURG. 01/1994; 20(2):94-110.

- **Article: Interaction of biologically active molecules with phospholipid membranes: I. Fluorescence depolarization studies on the effect of polymeric biocide bearing biguanide groups in the main chain**

  Tomiki Ikeda, Shigeo Tazuke, Mitsuo Watanabe

[show abstract] [hide abstract]
ABSTRACT: Interaction of poly(hexamethylene biguanide hydrochloride) (PHMB), which is a polymeric biocide bearing biguanide groups in its main chain, with phospholipid bilayers was studied by the fluorescence depolarization method. A strong interaction of PHMB with negatively charged bilayers composed of phosphatidylglycerol(PG) alone or of PG and phosphatidylcholine (PC) was observed, whereas neutral PC bilayers were not affected. On adding PHMB, the fluorescence polarization of diphenylhexatriene embedded in the negatively charged bilayers was reduced to a great extent, especially in the gel phase. This was interpreted in terms of PHMB-induced expansion and fluidization of the bilayer, which enables the probe molecule to undergo less-hindered torsional motion. Similarity between PHMB and polymyxin B in the structure, the mode of action against bacteria and the interaction with lipid membranes is discussed.

Biochimica et Biophysica Acta 12/1983; · 4.66 Impact Factor

Similar Publications

- **Intracutaneous suture versus transcutaneous skin stapling for closure of midline or horizontal skin incision in elective abdominal surgery and their outcome on superficial surgical site infections-INTRANS: study protocol for a randomized controlled trial.**

  Katja Maschuw, Christine Heinz, Elisabeth Maurer, Alexander Reuss, Carmen Schade-Brittinger, Detlef Klaus Bartsch

- **Production and efficacy testing of antimicrobial fabrics for use in hospitals**

  G Singh, JA Beddow, E Joyce, T Mason

- **[Surgical site infections. Effectiveness of polyhexamethylene biguanide wound dressings.]**

  Carlos Martín-Trapero, María Martín-Torrijos, Lourdes Fernández-Conde, Manuela Torrijos-Torrijos, Elena Manzano-Martín, J Luis Pacheco-Del Cerro, Luis I Díez-Valladares