

with GR, in which there is no growth of the test organism on liquid media for 24 hours

Results: In the presence of $\frac{1}{2}$ MIC GR for *E. coli*, there is an increase in the antimicrobial action of all antibiotics without exception — different types of action and different structure. The effect of polymyxin, azithromycin and levomycetin is most strongly enhanced (MIC decreases 10-50 times), and at least for cyclosporine, vancomycin, rubomycin (2-3 times). In the presence of $\frac{1}{2}$ MIC GR for *S. aureus*, an increase in the antimicrobial action of all the tested antibiotics is also observed. The effect of polymyxin, capremabol, ampicillin increases to the greatest extent (5-10 times). Two antibiotics, ciprofloxacin and naftifine hydrochloride, were tested against fungi. Addition of GR reduced the MIC for both antibiotics 4 times

Conclusion: The use of antibiotics of different groups and mechanisms of action in conjunction with microbial auto-regulators of growth, in particular hexylresorcin, allows to reduce the concentration of the antibiotic used.

Disclosure of Interest: None declared

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SYSTEMATIC REVIEW OF THE EFFECT OF BACTERIOPHAGE TREATMENT IN HUMANS

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Introduction: Lytic virulent bacteriophages (specific viruses) are considered to be a promising intervention for the treatment of infections, particularly antibiotic-resistant ones. For successful implementation of this approach, convincing evidence of safety and efficacy is needed.

Objectives: **Objective:** to assess the effect of bacteriophage therapy for the prevention or treatment of bacterial infections in humans.

Methods: **Search methods** We searched MEDLINE (1935- 2018), the CENTRAL (1999-2018), Embase (1935-2018), and Russian-language literature databases eLibrary and rsl.ru (1980-2018).

Selection criteria We included randomized controlled trials (RCTs) investigating the effects of phage therapy in people with bacterial infections.

Data collection and analysis Two review authors independently selected studies, extracted data, and assessed risk of bias. We used random-effects models for meta-analysis. If meta-analysis was not possible, we summarized the results narratively.

The study protocol was recorded in PROSPERO under the registration number CRD42018100813.

Results: **Results** For the evaluation of the frequency of phage-associated adverse events, we summarized the results of six studies that reported this outcome, five countries. For wound infection and surgical site infection, polyvalent phages seemed to be clinically safe when compared with antibiotics. Fewer adverse events were reported in the PhagoBurn trial for the anti-Pseudomonas aeruginosa phage cocktail versus argentic antimicrobial, with relative risk of 0.4 (95% CI 0.1 to 1.3). Similarly, no significant difference was found by Budanov et al between the polyvalent phage and antibiotics, RR=0.3 (95% CI 0.01 to 5.8). In Wright's study more adverse events were revealed in individuals suffering from chronic otitis and treated with another anti-P. aeruginosa polyvalent bacteriophage, RR=1.2 (95% CI 0.5 to 2.9). The pediatric study of Sarker reported no adverse events attributable to phages vs placebo. Overall, meta-analysis provided us with a pooled estimate of 0.74 (95% CI 0.68 to 1.2).

Conclusion: **Conclusion** Phage-treated individuals reported fewer or not exceeding amount of adverse events compared with placebo or antibiotics. However, the conduct of well-designed and sufficiently powered RCTs would facilitate registration issues and wide accepting of bacteriophage therapy.

Disclosure of Interest: None declared

Poster session: Hand hygiene for the surgeon

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SYSTEMATIC REVIEW ON MICROBIOLOGICAL EFFICACY OF WHO ALCOHOL-BASED HAND RUB FORMULATIONS FOR SURGICAL HAND PREPARATION

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Introduction: Effective surgical hand preparation (SHP) is required prior to surgical procedures. World Health Organization (WHO) recommended two formulations for local production of alcohol-based hand rub (ABHR), composed of alcohol, glycerol, and hydrogen peroxide. However, recent evidence suggests that WHO formulations may not comply with the efficacy requirements of international norms (eg. EN 12791).

Objectives: The objective of this systematic review was to assess the efficacy of WHO ABHR formulations and/or any modified version of their composition to international norms for SHP.

Methods: The following databases were searched: MEDLINE, EMBASE, CINAHL, Cochrane Central Register of Controlled Trials, and Google Scholar. Title-abstract screening, full-text screening, and data extraction were conducted by at least two reviewers. The review was registered to PROSPERO (CRD42018112697).

Results: The search yielded 2909 studies for title-abstract screening of which 161 studies were reviewed in full-text. Five studies were identified for the final data extraction. The evidence suggests that neither WHO formulations met noninferiority of the norms, and that increased alcohol concentration by using mass rather than volume percent concentrations and reducing glycerol (either halving from 1.45% to 0.725% vol/vol or eliminating completely) improved both immediate and sustained microbiological efficacy. Generally, 5-minute rub showed better efficacy than 3-minute. None of the included studies provided data on tolerability and acceptability of the modified formulations. Four of the five studies were performed by the same research group.

Conclusion: Available evidence suggests that the microbiological efficacy of the WHO ABHR formulations is not fully compliant with international norms for SHP. However, the clinical implication of these findings is unclear. Some studies indicate that modified formulations could improve compliance with the norms but their tolerability is unclear. Thus, more research is needed to identify more effective and well-tolerated ABHR formulations for local production.

Disclosure of Interest: None declared

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COMPARING SURGEONS' SKIN TOLERANCE AND ACCEPTANCE TO ALCOHOL-BASED SURGICAL HAND PREPARATION VERSUS TRADITIONAL SURGICAL SCRUB: A MATCHED CLINICAL TRIAL

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Introduction: According to the World Health Organization (WHO), handrubbing with alcohol-based handrub (ABHR) and handscrubbing

with antimicrobial soap and water are both recommended for surgical hand preparation, as they are considered equally effective for surgical site infection prevention.

Objectives: To compare the tolerance and acceptance of surgeons to handrubbing with ABHR and handscrubbing with antimicrobial soap and water.

Methods: A matched clinical trial was conducted in a university hospital among cardiac and orthopedics surgical teams, from April 1 to October, 31, 2017. In the first phase, participants performed handscrubbing with either 2% chlorhexidine (CHG) or 10% iodopovidone (PVP-I). In the second phase, participants performed handrubbing with an ABHR (57% ethanol + 22.5% n-propanol). Two trained nurses using WHO-validated scales evaluated surgeons' skin tolerance and acceptance of the study products. Data was dichotomized in "good" or "bad" and analyzed using the MacNemar's test within the STATA program. Tolerance to the ABHR was separately compared to CHG and PVP-I containing products.

Results: We enrolled 56 surgeons potentially eligible, but 23 medical residents did not joined any operation during one of the study phases. Therefore, 33 participants constituted the "per protocol" population. Regarding tolerance, there was little variation in redness, scaliness, fissures, and visual rating of the skin when handrubbing was compared to handscrubbing with PVP-I or CHX. Regarding acceptance, participants rated better handrubbing than handscrubbing with PVP-I regarding product smell (66.6% x 0%, $p=0.002$), color (73.3% vs 0%, $p=0.001$) product texture (60% vs 0%, $p=0.004$), skin dryness effect (60% vs 0%, $p=0.004$), application (66.6% vs 0%, $p=0.002$) and general satisfaction (66.6% vs 6.7% $p=0.011$). Participants rated similarly handrubbing and handscrubbing with CHX, except for product texture, when ABHR was better rated (71.4% vs. 0%, $p=0.002$). When asked which method they preferred, 73.3% answered handrubbing.

Conclusion: Considering surgeons' skin evaluation, both handrubbing and handscrubbing were well tolerated. Regarding acceptance, handrubbing was preferred by most of the surgeons.

Disclosure of Interest: None declared

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SURGICAL HAND ANTISEPSIS WITH ALCOHOL-BASED PREPARATION: PERFORMANCE EVALUATION IN A LARGE PHILANTHROPIC HOSPITAL IN SÃO PAULO, BRAZIL.

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Introduction: Alcohol-based preparation (ABP) was implemented in July 2018 for surgical hand antiseptics (SHA) because of its rapid action, time savings, fewer side-effects and cost savings.

Objectives: To evaluate the adherence to SHA with ABP, according to World Health Organization and manufacturer recommendations.

Methods: Cross-sectional study, performed from September 2018 to March 2019, at 700-bed hospital with 17 operating rooms. Any member of surgical team using ABP for SHA was observed by a trained professional for 1h, 3 times a week using a personal electronic device with checklist in Google Forms divided in two phases: PI - Pre-antiseptics and PII - Antiseptics with ABP - executed with friction in 3 steps: S1 fingertips and forearms, S2 other side's fingertips and forearms, S3 both hands, back of the hands, interlaced fingers, back of the fingers, thumbs; duration of technique, ABP volume used and hand drying.

Results: 127 SHA were observed. PI: absence of jewelry in the hands and wrists: 124, 97.6%; hand washing and hand drying: 118, 92.9% and 114, 89.7% respectively and use of surgical mask: 125, 98.4%. PII: S1: fingertips 112, 88.1% and forearms 121, 95.2%, S2: other side's fingertips 124, 97.6% and forearms 118, 92.9%, S3: both hands 118, 92.9%, back of the hands 93, 73.2%; interlaced fingers: 83, 65.3%; back of the fingers: 43, 33.8%; thumbs: 65, 51.1%. The antiseptics time ≥ 60 seconds: 81, 63.7%; minimum volume recommended or more: 108, 85% and hand drying: 92, 71.4%. Total adherence to PI was 94.6% and PII was 17.2% and compliance to the steps 1, 2 and 3 were 87.6%, 92.3% and 67.3% respectively.

Conclusion: Lower adherence occurred in step 3 of antiseptics with ABP. Periodic evaluation of the SHA procedure with ABP is crucial in order to raise awareness and to guarantee surgical patient safety.

References

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ADHERENCE TO WORLD HEALTH ORGANIZATION RECOMMENDED TECHNIQUE FOR SURGICAL HAND PREPARATION USING ALCOHOL-BASED HANDRUB: A PILOT OBSERVATIONAL STUDY

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Introduction: Since 2010 our institution recommends performing surgical hand preparation (SHP) using alcohol-based handrub. Washing hands using soap and water is only performed in specific circumstances. Adherence to the recommended technique had never been measured.

Objectives: To evaluate adherence to the World Health Organization (WHO) recommended technique for SHP using a standardized checklist.

Methods: We performed direct observations of healthcare workers (HCWs) in the operating theatre to evaluate the quality of the technique in terms of number of steps performed out of the total, correct sequence of steps, and recommended duration. A specific data collection tool was custom-made.

Results: During a 3 month period, direct observations were performed by 2 observers on 47 HCWs: theatre nurses and instrument technicians (n=14), and surgeons (n=33). Theatre nurses and instrument technicians performed a mean of 12.8 out of 17 steps (standard deviation [SD] 1.5), on average, whereas surgeons performed a mean of 9.5 out of 17 steps (SD 2.1). Recommended duration of SHP was achieved by 10 nurses and technicians (71%) and 18 surgeons (55%). Among HCWs in whom sequence was observed, 7 (64%) nurses and technicians, and 28 (100%) surgeons performed it incorrectly.

Conclusion: There was poor overall adherence to the 3 evaluated components of the WHO recommended technique for SHP. Surgeons' performance was poorer than that of theatre nurses and technicians. Training and monitoring of SHP is needed to improved practices. Identified needs were a chronometer to time SHP duration and simplification of the illustrated technique, as well as a video tutorial.

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