

Use of CHROMagar™ Staphylococcus with addition of Cefoxitin for early detection of methicillin-resistant Staphylococcus, important pathogens in the implant-associated infection in traumatology - orthopedics



O.V. Kimaikina, L.G. Grigoricheva

The Federal state-financed institution "The Federal Center of Traumatology, Orthopedics and Endoprosthetics" of The Ministry of Health of the Russian Federation (Barnaul)

Research objective

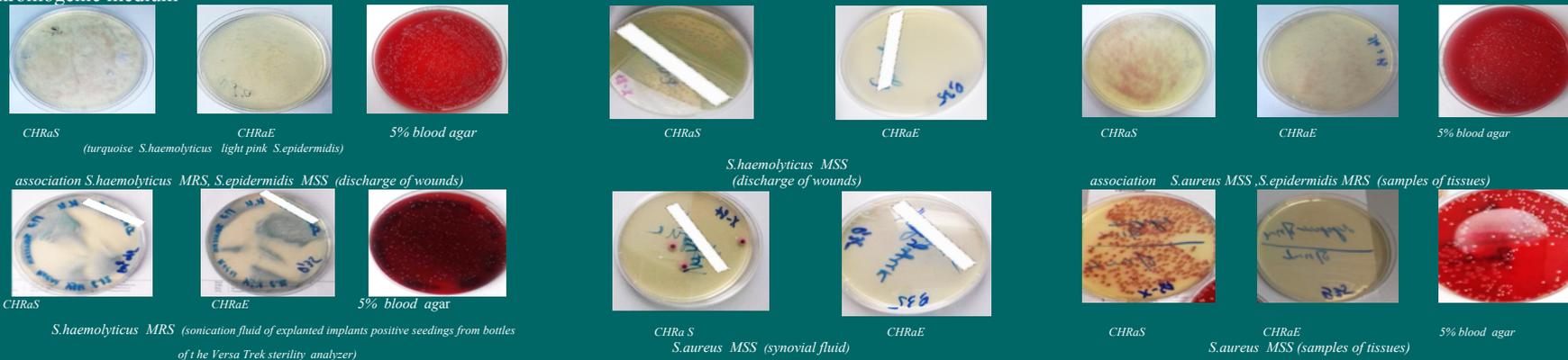
The leading pathogens in implant-associated infection in 2013-2016 were Staphylococci - of joints 67% (34% of *S.aureus* and 66% Coagulase-Negative-Staphylococcus (CNS)) and a spine 80% (56% and 44%), including Methicillin-Resistant Staphylococcus (MRS), 52% and 43% respectively. Chromogenic medium supplemented with antibiotics facilitates the detection of resistance bacteria. CHROMagar™ Staphylococcus (CHROMagar – Paris FRANCE) (CHRaS) is a chromogenic medium for the detection of *Staphylococcus* *ssp.* We investigated the detection rate of MSS and MRS from patients with implant-associated infection using an experimental agar CHRaS supplemented with Cefoxitin (CHRaE)

Materials and methods

The study included 82 biological samples (synovial fluid, sonication fluid of explanted implants, samples of tissues, a discharge of wounds and positive seedings from bottles of the Versa Trek sterility analyzer). Each sample was plated on 5% of a blood agar, CHRaS and CHRaE. The concentration of Cefoxitin suppressing MSS was set experimentally. Growth of *Staphylococci* on both, CHRaE and CHRaS, was presumed MRS, while only growth in CHRaS was presumed MSS. Identification and antibiotic susceptibility were carried out on the Walk Away analyzer. The control strains were *S.aureus* ATCC38591 (MRS) and ATCC29213 (MSS)

Results

Staphylococci growth was found in 46 of the 53 positive samples (87%) on blood agar and CHRaS. After 24h of incubation of CHRaS, were found: 13 samples with MRS, 28 with MSS, and 5 associations MSS and MRS. Results of identification and susceptibility by the Walk Away analyzer received usually after 48-72 h. The colony color and positive number of isolates were: mauve *S.aureus* – 24 and *S.auricularis* – 1; light pink *S.epidermidis* – 20; turquoise *S.haemolyticus* – 5; white *S.hominis* - 1. Results of sensitivity were in agreement with the presumption on Chromogenic medium



Conclusions

The use of CHRaE will improve the detection of resistant Staphylococci, particularly important for patients with implant-associated infection of joints when microorganisms are not detected in aspiration fluid of the prosthetic joint at a pre-operative stage and for patients with spinal implant-associated infection. Reducing the time of result will also allow to use Vancomycin more rationally. It is also important to detect the growth of Staphylococci in intraoperative samples, after implantation of implant. Inclusion of CHRaE in routine microbiological practice can facilitate identification of associations of Staphylococcus with various methicillin-susceptibility.