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Effectiveness of preconceptional and prenatal cystic fibrosis carrier screening: a systematic review.

Code: PM37846447 **Year:** 2023 **Date:** 2013 - updated: 04 OCT 2022 **Author:** Banzi R

Study design (if review, criteria of inclusion for studies)

Randomised or quasi-randomised controlled trials

List of included studies (2)

Muhlebach 2017; Neri 2016

Participants

Children and adults with CF with a confirmed positive microbiological isolate of MRSA on clinically relevant CF respiratory cultures prior to enrolment into the trial. All disease severities. Patients with nasal carriage of MRSA alone are excluded

Interventions

Any combinations of topical, inhaled, oral or intravenous antimicrobials with the primary aim of eradicating MRSA once detected on clinically relevant CF respiratory cultures compared with placebo, standard treatment or no treatment

Outcome measures

Primary outcomes: eradication of MRSA (as defined by negative respiratory culture after completion of the eradication protocol); time until next positive MRSA isolate from clinically relevant respiratory culture

Main results

The review includes three RCTs with 135 participants with MRSA infection. Two trials compared active treatment versus observation only and one trial compared active treatment with placebo. Active treatment versus observation In both trials (106 participants), active treatment consisted of oral trimethoprim and sulfamethoxazole combined with rifampicin. One trial administered this combination for two weeks alongside nasal, skin and oral decontamination and a threeâ€•week environmental decontamination, while the second trial administered this drug combination for 21 days with five days intranasal mupirocin. Both trials reported successful eradication of MRSA in people with cystic fibrosis, but they used different definitions of eradication. One trial (45 participants) defined MRSA eradication as negative MRSA respiratory cultures at day 28, and reported that oral trimethoprim and sulfamethoxazole combined with rifampicin may lead to a higher proportion of negative cultures compared to control (odds ratio (OR) 12.6 (95% confidence interval (CI) 2.84 to 55.84; lowâ€•certainty evidence). However, by day 168 of followâ€•up, there was no difference between groups in the proportion of participants who remained MRSAâ€•negative (OR 1.17, 95% CI 0.31 to 4.42; lowâ€•certainty evidence). The second trial defined successful eradication as the absence of MRSA following treatment in at least three cultures over a period of six months. We are uncertain if the intervention led to results favouring the treatment group as the certainty of the evidence was very low (OR 2.74, 95% CI 0.64 to 11.75). There were no differences between groups in the remaining outcomes for this comparison: quality of life, frequency of exacerbations or adverse effects (all lowâ€•certainty evidence) or the change from baseline in lung function or weight (both very lowâ€•certainty evidence). The time until next positive MRSA isolate was not reported. The included trials found no differences between groups in terms of nasal colonisation with MRSA. While not a specific outcome of this review, investigators from one study reported that the rate of hospitalisation from screening through day 168 was lower with oral trimethoprim and sulfamethoxazole combined with rifampicin compared to control (rate ratio 0.22, 95% CI 0.05 to 0.72; P = 0.01). Nebulised vancomycin with oral antibiotics versus nebulised placebo with oral antibiotics The third trial (29 participants) defined eradication as a negative respiratory sample for MRSA at one month following completion of treatment. No differences were reported in MRSA eradication between treatment arms (OR 1.00, 95% CI 0.14 to 7.39; lowâ€•certainty evidence). No differences between groups were seen in lung function or adverse effects (lowâ€•certainty evidence), in quality of life (very lowâ€•certainty evidence) or nasal colonisation with MRSA. The trial did not report on the change in weight or frequency of exacerbations.

Authors' conclusions

Early eradication of MRSA is possible in people with cystic fibrosis, with one trial demonstrating superiority of active MRSA treatment compared with observation only in terms of the proportion of MRSAâ€•negative respiratory cultures at day 28. However, followâ€•up at

three or six months showed no difference between treatment and control in the proportion of participants remaining MRSAâ€•negative. Moreover, the longerâ€•term clinical consequences â€“ in terms of lung function, mortality and cost of care â€“ remain unclear. Using GRADE methodology, we judged the certainty of the evidence provided by this review to be very low to low, due to potential biases from the openâ€•label design, high rates of attrition and small sample sizes. Based on the available evidence, we believe that whilst early eradication of respiratory MRSA in people with cystic fibrosis is possible, there is not currently enough evidence regarding the clinical outcomes of eradication to support the use of the interventions studied.

http://dx.doi.org/10.19191/EP23.4-5.A612.064

See also

Epidemiol Prev. 2023 Jul-Oct;47(4-5):243-256. doi: 10.19191/EP23.4-5.A612.064.

Keywords

Anti-Bacterial Agents; pharmacological_intervention; Respiratory Tract Infections; Respiratory Tract Diseases; Infection; Bacterial Infections; Staphylococcus aureus;