Cochrane Database of Systematic Reviews - - Cochrane Review

Interventions for the eradication of methicillin-resistant Staphylococcus aureus (MRSA) in people with cystic fibrosis

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

Randomised controlled trials (RCTs) or quasiâ€•RCTs of any combination of topical, inhaled, oral or intravenous antibiotics for treating MRSA compared with placebo, standard treatment or no treatment in pwCF, regardless of age or disease severity.

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

At up to 12 months following therapy: eradication of MRSA from respiratory cultures, time until next positive MRSA isolate, quality of life (QoL), change from baseline in forced expiratory volume in one second (FEV1) % predicted, change in weight (kg), frequency of pulmonary exacerbations and adverse effects of treatment

Main results

Oral antibiotics versus no treatmen: - Two trials (106 participants) compared observation to oral trimethoprim plus sulfamethoxazole combined with rifampicin; in one trial for two weeks alongside topical decontamination and a threeâ€•week environmental decontamination, and in a second for 21 days alongside intranasal mupirocin (five days); 29 participants withdrew from the second trial by the end of followâ€•up. Oral antibiotics have little or no effect on any outcome reported below, in contrast to one study (45 participants) which was terminated early due to results clearly favouring treatment. In one trial defining eradication as negative MRSA respiratory cultures at day 28 and remaining so at day 168 (45 participants), treatment may result in more negative cultures than observation (odds ratio (OR) 12.6 (95% confidence interval (CI) 2.84 to 55.84; lowâ€•certainty). There may be little to no difference between groups by day 168 of followâ€•up (OR 1.17, 95% CI 0.31 to 4.42), and also in one trial defining successful eradication as no MRSA in at least three cultures over six months followâ€•up (OR 2.74, 95% CI 0.64 to 11.75; lowâ€•certainty). Treatment may result in an increase in FEV1 % predicted from baseline (MD 5.67%, 95% CI 1.43 to 9.90; 2 trials, 58 participants; lowâ€•certainty evidence). There may be little to no differences between groups in QoL, frequency of pulmonary exacerbations (although one study reported a lower hospitalisation rate through day 168 with treatment (P = 0.01)), adverse effects, or weight (all lowâ€•certainty evidence). Nebulised antibiotics versus placebo Two trials (275 participants randomised, 251 analysed) compared a standard dose of vancomycin (one trial additionally compared a high dose) to placebo. The multiâ€•arm trial reported a decrease in MRSA colony forming units (CFUs) at each time point, up to one month. There were no differences in most lung function results in either trial, but treatment probably increased FEV1% predicted at 20 weeks (MD 3.55%, 95% CI 0.33 to 6.77; P = 0.03; 1 trial, 133 participants; moderateâ€•certainty evidence). This trial also reported no difference in pulmonary exacerbation frequency, while the multiâ€•arm trial reported a longer time to the next exacerbation with the lower vancomycin dose (no placebo data available). Evidence from both trials suggests that nebulised antibiotics may make little or no difference in QoL (high to lowâ€•certainty), or frequency of adverse outcomes or of exacerbations (lowâ€•toâ€•moderateâ€•certainty evidence). Oral antibiotics plus nebulised antibiotics (vancomycin) versus oral antibiotics plus placebo One trial (29 participants randomised, 25 participants analysed) compared combination antibiotic treatment (inhaled plus oral) to oral antibiotics plus inhaled placebo, defining eradication as a negative MRSA respiratory sample at one month following treatment. Combination antibiotic treatment may result in little or no difference in MRSA eradication at three months (OR 1.63, 95% CI 0.19 to 13.93; lowâ€•certainty evidence), lung function (no data available for analysis) or adverse effects (lowâ€•certainty evidence), in QoL (very lowâ€•certainty evidence) or nasal colonisation with MRSA.

Authors' conclusions

Early eradication of MRSA is possible in pwCF; evidence from one trial suggested active MRSA treatment may result in a higher proportion of MRSAâ€•negative respiratory cultures after one month compared with observation. However, longer followâ€•up showed treatment may make little or no difference in the proportion of participants remaining MRSAâ€•negative. One trial of nebulised antibiotics alone compared to placebo reported a decrease in MRSA CFUs with a higher antibiotic dose. The longerâ€•term clinical consequences of any treatment option â€“ in terms of lung function, mortality and cost of care â€“ remain unclear. We judged the evidence to range from high to very lowâ€•certainty, due to potential biases from trial design, high attrition rates and small sample sizes. While early eradication of respiratory MRSA in pwCF may be possible, the currently available evidence does not demonstrate that routine treatment of respiratory MRSA in pwCF is effective. Research is needed to assess MRSA infection and treatment in the age of modulator therapies

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See also

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Keywords

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