Antibiotics for pulmonary exacerbations

Antibiotic treatment for stenotrophomonas maltophilia in people with cystic fibrosis

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Background

Stenotrophomonas maltophilia (SM) is one of the most common emerging gram – negative micro-organisms found in the sputum colture of people with cystic fibrosis and its prevalence is increasing (Hatziagorou E, 2019).

One relevant problem is that SM is a bacteria which is resistant to several antibiotics.

Papers from US registry studied the epidemiology of SM in CF, pointing out the association of SM with more severe and more advanced disease, but it did not appear to be a risk factor neither for earlier death nor for decline of pulmonary function. A recent cohort study from Canada showed that chronic SM infection is associated with an almost three-fold increased risk of death or lung transplantation in CF patients, but it is still unclear, however, whether chronic SM infection is simply a marker of severity of disease and ultimate mortality or it is causally related to disease progression (Waters V, 2013). The same authors studied whether SM infection follows the same pattern and shares similar risk factors for acquisition as described for Pseudomonas aeruginosa (Stanojevic S, 2013). Recently, a single center experience reported that acquisition of SM in CF was associated with an acceleration in lung function decline. Among those with chronic colonization, acquisition was also associated with increased hospitalization rates (Barsky EE, 2017).

Chronic infection with SM has recently been shown to be an independent predictor of pulmonary exacerbation requiring hospitalization and antibiotics. However, the role of antibiotic treatment of SM infection in people with cystic fibrosis is still unclear. The role of SM as a pathogen in CF was recently reviewed by Hansen (Hansen CR, 2012) and by Parkins (Parkins MD, 2015).

Papers examining data from US (Binder AM, 2013) and EU (Viviani L, 2016) registries showed that colonization by SM is associated with a higher risk of Nontuberculous Mycobacterial infections. Finally, data from Germany and Austria showed that co-infection by SM is an independent risk factor for worse lung function in subjects with CF chronically infected by Staphylococcus aureus (Junge S, 2016).

SM is common in the sputum of people with cystic fibrosis related diabetes (CFRD), raising the question as to whether this is a risk factor for its acquisition. UK researchers investigated this issue at a population level, by using data from the UK registry. They concluded that although SM is more common in people with CFRD, it is not an independent risk-factor for SM acquisition. (Frost K, 2019)

Also data from the EU CF registry confirm the relationship between CFRD and colonization by SM (Olesen HV, 2019)

Issues

To assess the effectiveness of antibiotic treatment for SM in people with cystic fibrosis in relation to:

1. lung function and pulmonary exacerbations;
2. the eradication of SM

What is known

One CDSR is available on this topic (Amin R, 2016).

No evidence is available regarding the effectiveness of antibiotic treatment for SM in CF patients. A question to raise is that the majority of patients with SM infection also had infections caused by other bacteria and it is very difficult to obtain data separately for the different causes of infection.

Whether or not to treat SM infection (either as mono-infection or as co-infection) in patients with CF is actually a decision clinicians adopt according to their clinical judgement.

Unresolved questions

Randomized clinical trials are needed to address either microbiological (bacterial density, eradication) or clinical outcomes about SM infection in CF.

The optimal management of CF patients with persistent S. maltophilia infection is not yet known and requires further studies.

No RCT is currently ongoing on this topic.

Keywords

Bacterial Infections; Infection; Pneumonia; Respiratory Tract Infections; Stenotrophomonas Maltophilia; Anti-Bacterial Agents; Carbapenems; Cephalosporins; Monobactams; Others anti-bacterial agents; Penicillins; Quinolones; Tetracyclines;