

## 4.3.8 Viruses

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### 1. INTRODUCTION

- CF patients are not infected more often by respiratory viruses than healthy subjects, but in CF patients
  - respiratory virus infections cause more severe and prolonged symptoms.
  - a viral infection may predispose to a secondary bacterial infection.
  - virus-induced infectious bronchiolitis may be responsible for small airways disease associated with a rapid decline of FEV<sub>1</sub> and gas exchange abnormalities (**see also Chapter “Small airways disease”**).
  - after lung transplantation, viral-infections have been reported to increase the risk of bronchiolitis obliterans syndrome (BOS) and mortality.
- It is estimated that 25-50% of pulmonary exacerbations in CF patients are triggered by respiratory viruses.
- All the usual viruses are implicated but influenza virus, rhinovirus and parainfluenza are the most common. In adult CF patients, respiratory syncytial virus (RSV) is much less prevalent than in children.
- CF patients, especially those with advanced stage disease, are particularly susceptible to influenza A virus (H1N1).

### 2. PREVENTION

- Annual influenza immunization is strongly recommended for all CF patients.
- It is recommended that healthcare workers of the CF clinic receive the seasonal influenza vaccine annually.
- Standard and droplet precautions (hand hygiene, facemask and avoidance of aerosol-generating procedures) should be applied when caring for patients infected with influenza or other respiratory viruses (**see also Chapter “Infection control”**).
- In adults with severe lung disease, who are being considered for transplantation, immunity against common childhood diseases, particularly measles and varicella, should be checked according to the national guidelines (**see also Chapter “Vaccination”**).

### 3. MANAGEMENT

- **Viral colds with no or minor chest symptoms**
  - A viral infection may predispose CF patients to a secondary bacterial infection and therefore treatment with oral antibiotics for two weeks may be useful. The choice of

antibiotic should be guided by the bacterial pathogens identified in recent sputum cultures if available. For example:

- In case of no previous *P. aeruginosa* isolation: coverage for *S. aureus* and *H. influenzae*, e.g. with co-amoxicillin or TMP/SMX
  - In case of previous *P. aeruginosa* isolation: ciprofloxacin
  - Experimental data suggest that macrolides may be effective in treating virus-induced pulmonary exacerbations in CF, but there is not enough evidence to recommend this approach in clinical routine.
- **Viral colds with severe chest symptoms**
    - Treatment with IV antibiotics based on recent sputum culture is often necessary (**see also Chapters of the section “Pulmonary Disease: Infections”**).
  - **Influenza**
    - CF patients are at risk for more severe disease, especially for Influenza A (H1N1).
      - In a CF patient with severe pulmonary involvement who presents with flu-like illness during the flu season, especially if the patient is non-vaccinated: it is recommended to perform a diagnostic test for respiratory viruses and, if positive for influenza virus, to start treatment with oseltamivir (Tamiflu®) 75mg twice daily for 5 days within 48 hours of symptoms onset.
      - If no test is available, empiric treatment with oseltamivir should be considered.  
*Note:* Although there is no evidence of decreased response to vaccination in non-immunocompromised CF patients, the effectiveness of the influenza vaccine may vary by season. For that reason patients with high risk of flu-related complications should seek additional prevention and treatment measures even if they have been previously vaccinated.
    - Nasopharyngeal or throat swabs or aspirates should be taken for virus detection to confirm the diagnosis.

## 4. REFERENCES

1. Renk H, Regamey N, Hartl D. Influenza A(H1N1)pdm09 and cystic fibrosis lung disease: a systematic meta-analysis. PLoS One 2014;9:e78583.
2. Schogler A, Kopf BS, Edwards MR, et al. Novel antiviral properties of azithromycin in cystic fibrosis airway epithelial cells. The European respiratory journal 2015;45:428-39.
3. Frickmann H, Jungblut S, Hirche TO, Gross U, Kuhns M, Zautner AE. Spectrum of viral infections in patients with cystic fibrosis. Eur J Microbiol Immunol (Bp) 2012;2:161-75.
4. Wark PA, Tooze M, Cheese L, et al. Viral infections trigger exacerbations of cystic fibrosis in adults and children. The European respiratory journal 2012;40:510-2.