

Original Article

Lack of evidence of increased risk of bacterial transmission during cystic fibrosis educational programmes



Winnie Ridderberg^{a,b}, Camilla Andersen^a, Michael Væth^c, Vibeke Bregnballe^d,
Niels Nørskov-Lauritsen^{a,*}, Peter Oluf Schiøtz^d

^a Department of Clinical Microbiology, Aarhus University Hospital, Palle Juul-Jensens Boulevard 99, DK-8200 Aarhus, Denmark

^b Department of Clinical Medicine, Health, Aarhus University, Vennelyst Boulevard 9, DK-8000 Aarhus, Denmark

^c Department of Public Health, Section for Biostatistics, Aarhus University, Bartholins Allé 2, DK-8000 Aarhus, Denmark

^d Department of Paediatrics, Aarhus University Hospital, Palle Juul-Jensens Boulevard 99, DK-8200 Aarhus, Denmark

Received 20 February 2015; revised 29 April 2015; accepted 30 April 2015

Available online 21 May 2015

Abstract

Background: Educational and rehabilitation programmes increase the quality-of-life of patients with cystic fibrosis, but patients are discouraged to participate because of the risk of cross-infections.

Methods: Isolates of *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Haemophilus influenzae* cultured one year before to one year after attendance were investigated by pulsed field gel electrophoresis, multilocus sequence typing and/or *spa*-typing.

Results: We typed 984 bacterial isolates cultured from 46 patients aged 5–18 years attending educational programmes at Aarhus University Hospital during 2009–2011. There were no cross-infections with *P. aeruginosa*. Six cases of *S. aureus* or *H. influenzae* strain replacement with a new strain-type shared with a fellow attendee were found. However, the probability of acquiring a shared strain of *S. aureus* or *H. influenzae* was not increased for patients attending educational programmes.

Conclusions: Transmission of *P. aeruginosa*, *S. aureus* and *H. influenzae* related to attendance to the investigated educational programmes could not be documented.

© 2015 European Cystic Fibrosis Society. Published by Elsevier B.V. All rights reserved.

Keywords: Cross-infection; Epidemiology; Pulsed-field gel electrophoresis; Multilocus sequence typing; *spa*-typing

1. Introduction

The median survival of patients with cystic fibrosis (CF) has increased dramatically and may reach 50 years for children born in the year 2000 [1]. Patients are faced with a lifetime of condition management, and strategies are needed to ensure that children acquire the skills necessary to manage a chronic disease. As CF treatment regimens are complex and time-consuming, non-adherence is common among adolescents and young adults [2]. It is important that they learn to balance

the demands of a chronic disease with the challenges of normal everyday-life. It is also important to address the psychosocial aspects of living with a chronic, ultimately fatal, disease in order to ensure the quality of the increased lifespan [3–5].

Several studies have shown positive effects of CF educational and rehabilitation programmes on treatment adherence, health-related quality-of-life, social integration, and physiologic status on children and adolescents with CF [6–13]. Support from, and interaction with, peer CF patients also improves quality-of-life and is highly appreciated by CF patients [3,4,6]. The primary concern regarding rehabilitation programmes is the risk of transmission of pathogenic microorganisms, as several reports have described spread of *Pseudomonas aeruginosa*

* Corresponding author. Tel.: +45 7845 5603; fax: +45 7845 5611.

E-mail address: nielnoer@rm.dk (N. Nørskov-Lauritsen).

during holiday camps [14–16]. Two studies have investigated transmission of *P. aeruginosa* at health camps and rehabilitation centres. Greenberg and co-workers studied isolates from 19 patients who attended three consecutive health camps at the Dead Sea in Israel 1999–2000 [17]. Patients were segregated according to *P. aeruginosa* carrier status and spent three weeks in the camp. Cross-infections with *P. aeruginosa* could not be demonstrated, but only isolates cultured during the three weeks were investigated. Van Daele and co-workers studied 76 patients with at least one sputum culture positive for *P. aeruginosa* during stay at a rehabilitation centre in Belgium 2001–2 (median duration = 63 days) [18]. Only isolates cultured at the rehabilitation centre were investigated. Eight cases of probable patient-to-patient transmission were observed, and the risk of persistent cross-infections with *P. aeruginosa* was estimated to be 4% during the study period [18].

Educational programmes (EP) differ greatly from camps in terms of level and extent of close social contact. Attendance is restricted to a limited number of organised sessions, and the continuous presence of healthcare workers assures focus on compulsory infection control precautions. Educational programmes do not include rehabilitation of patients. At the CF centre at Aarhus University Hospital, Denmark, there is a long tradition of CF educational programmes for paediatric patients [19,20]. The aim of the present study was to assess the risk of patient-to-patient transmission of *P. aeruginosa*, *Staphylococcus aureus* and *Haemophilus influenzae* among children and adolescents with CF attending educational programmes at Aarhus University Hospital during 2009–2011.

2. Methods

2.1. Educational programmes

From 2009 to 2011, seven educational programmes were organised (Table 1). Patients were grouped according to age, and each group consisted of 4 to 13 patients. The youngest groups (aged 5–6-years) met three times during a period of three months. The 10-year-olds and the 14-year-olds met six times during ten months, while the 12–13-year-olds and the 15–18-year-olds met only once. All sessions lasted 4–6 h. The programmes were arranged to be age-appropriate and consisted of theoretical lessons on subjects such as the respiratory and the digestive systems, reproduction and genetics, medication and infection control; physical and practical activities such as gymnastics, swimming and cooking; and discussions on

subjects such as taking responsibility, everyday-life with CF and dreams for the future. Furthermore, a medical doctor examined participants and respiratory airway secretions were sent for culture. Participation in the educational programme substituted a routine visit to the clinic.

CF patients infected with *Burkholderia cepacia* complex, methicillin-resistant *S. aureus*, *Pandorea* sp., multiresistant *Achromobacter* sp., or multiresistant *P. aeruginosa* were excluded from participation in educational programmes. The attendees were not segregated according to *P. aeruginosa* carrier status, but patients with respiratory cultures of *P. aeruginosa* six months prior to attendance (n = 13) were treated with oral ciprofloxacin and inhaled tobramycin the evening before and on the morning of educational programme days in order to minimise the risk of transmission. Children with respiratory cultures of *Achromobacter* sp. six months prior to attendance (n = 1) were treated with inhaled colistine the evening before and on the morning of educational programme days in order to minimise the risk of transmission.

All CF patients were instructed to use an alcohol-based hand sanitizer upon entering the CF centre and to follow local guidelines for optimal hand and respiratory hygiene and cough etiquette to minimise the risk of cross-infection. Local hygiene guidelines do not include use of gloves and mask.

2.2. Routine microbial surveillance and laboratory processing of samples

Patients routinely visit the outpatient clinic on a monthly basis, and respiratory secretions (secured by laryngeal aspiration if patients do not produce sputum) were sent for culture. Samples were semi-quantitatively plated on 5% horse blood agar, chocolate agar, MacConkey agar, modified Conradi–Drigalsky agar, Sabouraud agar and *Burkholderia Cepacia* Selective Agar (BCSA). A Mueller–Hinton plate with 5% horse blood and 20 mg/L NAD, plus selected antibiotic disks, was also inoculated; this plate was not used for antibiotic susceptibility testing but as a selective medium aiding the initial differentiation of bacterial species. Plates were cultured for two days, BCSA for a minimum of three days (increased to seven days during the study period [21]). Identification of *S. aureus* was confirmed by agglutination with Slidex® Staph-Kit (BioMérieux); identification of *H. influenzae* as previously described [22]; characteristic, non-mucoid *P. aeruginosa* by pigmentation, positive oxidase test and odour; and non-typical *P. aeruginosa* and other Gram-negative non-fermenters by

Table 1
Overview of educational programmes, patients and programme sessions.

Educational programme	Year	Age (years)	No. patients	No. sessions	Session dates	Study period
EP01	2009	15–18	13	1	September	Jan 2009–Sept 2010
EP02	2010	15–18	7	1	January	Jan 2009–Jan 2011
EP03	2010	5–6	9	3	April, May, June	Apr 2009–June 2011
EP04	2010	12–13	8	1	November	Nov 2009–Nov 2011
EP05	2010–2011	10	5	6	April, June, August, October, November, January	April 2009–Jan 2012
EP06	2010–2011	14	6	6	August, October, December, January, March, May	Aug 2009–May 2012
EP07	2011	5–6	4	3	April, May, June	Apr 2010–June 2012

Download English Version:

<https://daneshyari.com/en/article/4207947>

Download Persian Version:

<https://daneshyari.com/article/4207947>

[Daneshyari.com](https://daneshyari.com)