Digestive and Liver Disease 47 (2015) 460–464

Contents lists available at ScienceDirect

Digestive and Liver Disease

journal homepage: www.elsevier.com/locate/dld

Alimentary Tract

Vaccination coverage of children with inflammatory bowel disease after an awareness campaign on the risk of infection

Aude Fleurier[a], Cecile Pelatan[b], Stephanie Willot[c], Jean-Louis Ginies[d], Estelle Breton[e], Laure Bridoux[a], Jean-Francois Segura[f], Emilie Chaillou[d], Agathe Jobert[g], Estelle Darviot[d], Benoit Cagnard[h], Nadege Delaperriere[f], Isabelle Grimal[i], Emilie Carre[a], Anne-Claire Wagner[g], Emmanuelle Sylvestre[j], Alain Dabadie[a,*]

[a] CHU Rennes, Paediatric Centre, Hôpital Sud, Rennes Cedex, France
[b] CH Le Mans, Paediatric Department, Le Mans, France
[c] CHU Tours, Paediatric Department, CH Clocheville, Tours Cedex, France
[d] CHU Angers, Paediatric Department, Angers Cedex 01, France
[e] CH Saint Brieuc, Hôpital Y. Le Foll, Paediatric Department, Saint Brieuc, France
[f] CHU Brest, CH Morvan, Paediatric Department, Brest, France
[g] CH Saint Nazaire, Paediatric Department, Boulevard de l'hôpital, Saint Nazaire, France
[h] CH Auray-Vannes, Hôpital Bretagne Atlantique, Paediatric Department, Boulevard du Général Guillaudot, Vannes Cedex, France
[i] CH Cholet, Paediatric Department, Cholet Cedex, France
[j] CHU Rennes, Public Health Department, Rennes, France

ARTICLE INFO

Article history:
Received 4 December 2014
Accepted 18 February 2015
Available online 26 February 2015

Keywords:
Awareness-raising
Children
IBD
Opportunistic infections
Vaccination

ABSTRACT

Background: Children with inflammatory bowel disease are at risk of vaccine-preventable diseases mostly due to immunosuppressive drugs.
Aim: To evaluate coverage after an awareness campaign informing patients, their parents and general practitioner about the vaccination schedule.
Methods: Vaccination coverage was firstly evaluated and followed by an awareness campaign on the risk of infection via postal mail. The trial is a case–control study on the same patients before and after the awareness campaign. Overall, 92 children were included. A questionnaire was then completed during a routine appointment to collect data including age at diagnosis, age at data collection, treatment history, and vaccination status.
Results: Vaccination rates significantly increased for vaccines against diphtheria–tetanus–poliomyelitis (92% vs. 100%), *Haemophilus influenzae* (88% vs. 98%), hepatitis B (52% vs. 71%), pneumococcus (36% vs. 57%), and meningococcus C (17% vs. 41%) ($p < 0.05$). Children who were older at diagnosis were 1.26 times more likely to be up-to-date with a minimum vaccination schedule (diphtheria–tetanus–poliomyelitis, pertussis, *H. influenzae*, measles–mumps–rubella, tuberculosis) ($p = 0.002$).
Conclusion: Informing inflammatory bowel disease patients, their parents and general practitioner about the vaccination schedule via postal mail is easy, inexpensive, reproducible, and increases vaccination coverage. This method reinforces information on the risk of infection during routine visits.

1. Introduction

The use of immunosuppressive therapy such as corticosteroids, antimetabolites (6-mercaptopurine [6MP], methotrexate, and azathioprine), and biologics has led to marked improvements for patients (children and adults) with inflammatory bowel disease (IBD); however, at the same time, these therapies increase the risk of opportunistic infections [1–4]. These infections can be prevented through vaccination. This is why specific recommendations have been implemented in addition to the usual recommendations. Patients must be brought up-to-date with scheduled vaccinations as soon as possible in the course of their disease (ideally from diagnosis) in order to achieve a better immune response and be able to administer live attenuated vaccines, which will be

* Corresponding author at: CHU Rennes, Paediatric Centre, Hôpital Sud, 16 bd de Bulgarie, BP 90347, 35203 Rennes Cedex, France. Tel.: +33 2 99 26 67 33; fax: +33 2 99 26 71 95.
E-mail address: Alain.dabadie@chu-rennes.fr (A. Dabadie).

http://dx.doi.org/10.1016/j.dld.2015.02.009
1590-8658/

contraindicated if immunosuppressive therapy is subsequently administered [1,4,5]. The recommended vaccines are those of the vaccination schedule (for France) plus the influenza and pneumococcal vaccines [6,7].

Several studies have shown that the level of vaccination coverage for IBD patients is insufficient [8,9]. A previous study involving 165 children with IBD, conducted between May and November 2011 at 11 hospitals in western France, showed that vaccination coverage in this population was largely insufficient [8]. The primary cause seems to be the lack of information provided to patients and to doctors responsible for vaccination. In addition to vaccine catch-up, prevention must also be implemented [8,10,11].

The aim of our study was to evaluate vaccination coverage among children with IBD following an awareness campaign about the infection risk to their family and their GP. To this aim, a letter was sent to patients of a previously evaluated cohort [8] and to their GP, in order to raise awareness about the vaccination schedule.

2. Materials and methods

The dosing schedule recommended to patients, their family, and their doctor was the one published by the French High Council for Public Health (HCSP) in February 2012 [6].

All patients with known vaccination coverage subsequent to data collection in 9 hospitals in western France [8] were included in this prospective study conducted from March 6, 2013 to January 31, 2014. The awareness-raising campaign implemented in this study consisted of providing information about the infection risk and the importance of vaccination coverage to the parents and GP of patients included in the previously evaluated cohort [8]. All families and GPs received a letter by post reminding them of the latest vaccination recommendations published in July 2012 by the HCSP [7] and encouraging them to verify the vaccination status of the patient. The recommended vaccines are the same as those for the general population: diphtheria, tetanus, polio (DTP), pertussis, *Haemophilus influenzae* type B (Hi), hepatitis B virus (HBV), meningococcus C (conjugate, men C), and human papillomavirus (HPV). The specifically recommended vaccines are those for seasonal influenza (inactivated vaccine) and pneumococcus. The contraindicated vaccines are the live vaccines including Tuberculosis (Bacillus Calmette Guérin, BCG), yellow fever, live attenuated influenza vaccine, measles–mumps–rubella (MMR), and varicella.

Patients who had reached adulthood, and hence were no longer under the care of a paediatric gastroenterologist, and those who were lost to follow-up were excluded.

2.1. Data collection

Following the awareness-raising campaign, patient record data and vaccination data were collected successively during a routine follow-up consultation with the paediatric gastroenterologist. The patients and their families were informed about the study, and their written consent was obtained. Data were collected by questioning the patient and his/her family, as well as from the patient's personal health records and medical records. The data collected were: age at diagnosis and at data collection, gender, type of disease [Crohn's disease (CD), ulcerative colitis (UC), or indeterminate colitis (IC)], previous and current therapy, detailed vaccination status concerning DTP, pertussis, Hi, HBV, hepatitis A virus (HAV), pneumococcus, men C, BCG, MMR, and HPV. With regard to varicella, immunity was verified either by the fact that the child had already had the disease or that he/she had been vaccinated. We defined a minimum vaccination schedule as consisting of vaccinations against DTP, pertussis, Hi, MMR, and BCG.

Table 1
Population characteristics of 92 paediatric inflammatory bowel disease patients.

	Number (%)	
Diagnosis		
Crohn's disease	62 (67%)	
Ulcerative colitis	22 (24%)	
Indeterminate colitis	8 (9%)	
Sex		
Male	47 (51%)	
Age at data collection		
<5 years	0	
5–10 years	5 (5%)	
10–15 years	38 (41%)	
15–20 years	49 (53%)	
Treatments	Current	Received[a]
Aminosalicylates	48 (52%)	53 (58%)
Corticosteroid	66 (72%)	79 (86%)
Azathioprine or 6-mercaptopurine	79 (86%)	80 (87%)
Methotrexate	7 (8%)	7 (8%)
Anti-tumour necrosis factor α	47 (51%)	51 (55%)
Current immunosuppressive therapy		Number (%)
None		16 (17%)
Monotherapy		56 (61%)
Dual therapy		19 (21%)
Triple therapy		1 (1%)

[a] "Received treatments" covers past and current treatments.

One question sought to find out the reasons for not catching up with vaccinations, and the available multiple-choice answers were: multiplicity of vaccines, non-perception of the seriousness of the disease, personal position, fear of side effects, fear of activating the disease, GP's position, or "Other" (with space provided to specify reason).

The study was approved by the Ethics Committee of the Rennes University Hospital.

2.2. Expression of results, statistics

Results are expressed as whole-number percentages (%), as well as medians, highest values, lowest values, and means to one decimal point.

The McNemar's test was used for the before vs. after comparison among the 92 patients included in the study. A Chi-square test with Yates correction for counts below 5 was used to compare catch-up rates between patients with Crohn's disease and the rest, and between patients on anti-TNF therapy and the rest.

Univariate analyses for being up-to-date with the minimum vaccination schedule (DTP, pertussis, Hi, MMR, and BCG) were performed for gender, type of disease, age at diagnosis, age at data collection, duration of disease on the campaign date, treatments received, and other vaccines. Qualitative variables were evaluated using a two-tailed Fisher's test and quantitative variables using a two-tailed Student's *t*-test (equal variances) or Welch's *t*-test (unequal variances).

A difference was considered significant when $p < 0.05$.

3. Results

The campaign letters were sent out to 105 includable patients and their GPs. Among these, 2 refused to participate in the study and 11 were not subsequently seen. Hence, 92 patients were included, giving a response rate of 88%.