Vaccine 33 (2015) 3703–3708

Contents lists available at ScienceDirect

Vaccine

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

Attitude, knowledge and factors associated with influenza and pneumococcal vaccine uptake in a large cohort of patients with secondary immune deficiency

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ARTICLE INFO

Article history:
Received 9 February 2015
Received in revised form 1 June 2015
Accepted 2 June 2015
Available online 11 June 2015

Keywords:
Vaccination
Influenza
Pneumococcal
Immunocompromised
Knowledge, Attitudes

ABSTRACT

Background: Immunocompromised patients are at increased risk for severe influenza and invasive pneumococcal diseases. Population-specific vaccine recommendations are thus warranted. This study aimed to estimate the prevalence and predictors of influenza and pneumococcal vaccine uptake in a large cohort of patients with secondary immune deficiency.
Methods: An anonymous online survey was submitted to the members of 11 French associations of immunocompromised patients. The questionnaire included questions concerning underlying disease, care and treatment, flu and pneumococcal vaccine uptake, attitudes and knowledge about vaccination. Factors associated with vaccine uptake were assessed by multivariate logistic regression.
Results: Among the 10,897 solicited patients, 3653 agreed to participate (33.5%): 75% were female, 20% aged 65+, 79% were followed for an autoimmune disease, 13% were solid organ recipients or waiting for transplantation and 8% were treated for hematological malignancies. 3109 (85%) participants were treated with immunosuppressive therapy. Self-reported vaccine uptake was 59% (95%CI [57–60]) against seasonal influenza and 49% (95%CI [47–50]) against pneumococcal diseases. Better knowledge of and favorable attitudes toward vaccination were positively associated with vaccine uptake while being treated with a biological therapy was negatively associated.
Conclusion: Despite specific recommendations regarding immunocompromised patients, influenza and pneumococcal vaccination rates do not reach recommended levels. Targeted information campaigns on vaccination toward these populations should be implemented to improve vaccine coverage and thus reduce the burden of infections.

1. Introduction

Extensive use of immunosuppressants in patients with autoimmune diseases, hematological disorders or solid organ transplants (SOTs) has led to the emergence of a specific population with chronically impaired immunity. For instance, use of systemic corticosteroid concerns 1–3% of the general population [1]. According to a 2011 report of the American College of Rheumatology, tumor necrosis factor (TNF)-inhibitors have been prescribed to more than 600,000 persons worldwide. Likewise, up to 180,000 persons were living with a functional organ transplantation the US in 2007[2].

Immunocompromised patients are at high risk of infections, some of which preventable by vaccination. In particular, influenza and invasive pneumococcal diseases (IPD) have higher frequency and mortality rates in this population [3]. For example, influenza infection is at higher risk of complications in patients awaiting liver transplant [4,5]. Mortality rates of influenza is also dramatically high (from 11% to 33%) [6–8] among cancer patients and hematopoietic stem cell recipients. In patients with solid or hematologic malignancies, the risk of IPD is, respectively, 23 and 38

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http://dx.doi.org/10.1016/j.vaccine.2015.06.012
0264-410X/

times higher than in healthy subjects [9]. Likewise, incidence of IPD is up to 150 times higher among SOTs than in the general population (36 cases per 1000 patient-year in cardiac transplant recipients, 28 in kidney transplant recipients compared to 0.24 in the general population) [12]. In patients with autoimmune disease, risk of infections is increased as well. Before the methotrexate and anti-TNF inhibitors era, studies showed a general increase in mortality due to infection in RA patients. Furthermore, recent studies found corticosteroids and anti-TNF inhibitors therapy associated with increased risk of serious bacterial infection in these population [13–18]. Likewise, infection and especially pneumonia was the main cause of death (48%) within the first year of follow-up in 535 patients with ANCA-associated vasculitis [19].

Therefore, vaccination against influenza and pneumococcal disease are recommended for adults with immunocompromised patients [11,20–23]. Those vaccinations have shown a decrease risk of influenza-like illnesses (ILI) and hospitalizations during influenza epidemics, as well as the rate of IPD among high-risk patients [10,11,24,25].

One dose of seasonal flu vaccine is recommended annually for all immunocompromised patients [20,26]. Since 2012, the Advisory Committee on Immunization Practices and the Centre for Disease Control have recommended that immunocompromised patients should receive one dose of the pneumococcal conjugated 13-valent vaccine (PCV13) followed at least 8 weeks later by one dose of the pneumococcal polysaccharide 23-valent vaccine (PPSV23) [27,28]. In France, the French college of rheumatology used to recommend until 2012 pneumococcal vaccination using the PPSV23 every 5 years in people receiving anti-TNF drugs [29]. Since 2012, the High Council of Public Health recommends that adults with immunocompromising conditions and functional or anatomic asplenia and who have not previously received PCV13 or PPSV23, should receive a dose of PCV13 first followed by a dose of PPSV23 at least 8 weeks later [20].

Despite the recommendations, vaccine coverages remain low in immunocompromised patients. A 2007–2011 US nationwide survey (the National Health and Wellness Survey) found 56% and 52% of immunocompromised hosts vaccinated against influenza and pneumococcus, respectively [30].

Vaccine safety and effectiveness appear to be important concerns among treating physicians of immunocompromised patients [31,32]. On the contrary, data are scarce regarding immunocompromised patients' knowledge and attitudes toward vaccinations. To date, only small-sized single center studies, with data being collected by treating physicians, have been published. Of note, the main explanatory factor for low vaccination rates was that the patients had not been offered vaccine injection [33–35].

In this context, our study aimed (1) to estimate influenza and pneumococcal vaccine uptakes and (2) to identify factors associated with vaccine uptake in a large cohort of patients with secondary immune deficiencies.

2. Methods

2.1. Study population

AVNIR (Associations VacciNation Immunodéprimées Réalité) is a group of associations created in January 2013. It includes 11 non-profit French organizations of patients whose goal is to support immunocompromised patients receiving care for one of the following diseases: rheumatoid arthritis, ankylosing spondylitis, systemic scleroderma, psoriasis, psoriatic arthritis, chronic heart and kidney failure (including patients who have gone through organ transplantation), leukemia, chronic myeloid leukemia and lymphoma. The aim of this group is to promote supportive care among immunocompromised patients in order to decrease the burden of infections.

A large online survey was launched among adult patients who had registered in any AVNIR association.

2.2. Data collection

An electronic questionnaire was submitted by AVNIR during summer 2013 to all association members ($N = 10{,}897$). No reminder was sent. Participants were asked to answer 40 multiple choice questions for an overall estimated time of 15 min. The questionnaire collected information on the types of diseases and their care (Referring physician (General Practioner, Specialist)), number of visits per year for the chronic disease). Concerning treatments, participants were asked if they were receiving immunosuppressive therapy including: chemotherapy, systemic corticosteroids, immunosuppressive agents (Azathioprine, Mycophenolatemofetil, Cyclophosphamide, Methotrexate) or biological agents (TNF-alpha inhibitors).

Patient awareness regarding vaccination was ascertained by both self-evaluation of general knowledge regarding vaccination (defined as either restricted; low; average; or high), and declarative statements regarding: the sources of information about vaccines (either patient association, physicians, other health care workers, medias, health authorities) and the recommended and contraindicated vaccines in the setting of their disease.

Patients were asked if they were favorable to vaccination in general (5-point Likert scale including a "don't know" answer). They were also asked who is the most trustful person to deliver information on vaccination (patient associations, physicians, other health care workers, media, health authorities) and topics on which they want more information (different types of vaccines; information on their production; role of adjuvants; safety; recommended and contra indicated vaccines).

Finally, respondents were asked if they had been vaccinated by the 2012/2013 seasonal influenza vaccine (and/or in the past five years) and/or in the past five years by a pneumococcal vaccine.

2.3. Ethics

Participation to the survey was voluntary. Data was collected anonymously and participants had the right to access to their answers. The National Data Protection Authority (Commission Nationale Informatique et Libertés), responsible for ethical issues and protection of individual data in France, approved the panel and its procedures.

2.4. Statistical analysis

Self-reported vaccine uptakes are given with 95% confidence intervals (95%CI). Correlates of vaccine uptake were studied with univariate and then multivariate logistic regressions. We first tested socio-demographic variables, care modalities, knowledge and attitudes toward vaccination in univariate analyses. We then entered explicative variables with a p-value <0.20 in a multivariate model adjusted on age, sex and disease group ('auto-immune disease', 'transplant recipient/transplantation candidate' or 'malignant blood disease'); we used a backward stepwise selection procedure (removal criteria: $p > 0.05$). $p \leq 0.05$ was considered statistically significant. All analyses were performed using Stata (V12, © Copyright 1996–2014 StataCorpLPt).