TABLE 1 Levels of circulating biochemical markers in patients with SSc and healthy controls

Biochemical parameter	Patient	Control	*P*-value
Copper, μmol/l	16.4 (15.3–18.5)	16.3 (14.7–19.6)	0.901
Ceruloplasmin, g/l	0.19 (0.18–0.24)	0.19 (0.16–0.21)	0.352
Zinc, μmol/l	11.6 (11.0–12.8)	13.1 (11.6–13.8)	0.085
Selenium, μmol/l	0.84 (0.80–0.95)	1.05 (0.95–1.10)	<0.001
HbA1c, mmol/mol	37.0 (36.0–40.0)	36.5 (34.0–39.0)	0.365
Sodium, mmol/l	141.0 (139.5–143.0)	141.0 (140.0–142.0)	0.636
Potassium, mmol/l	4.2 (4.1–4.5)	4.4 (4.3–4.5)	0.360
Urea, mmol/l	4.7 (3.9–5.3)	4.4 (4.1–5.7)	0.849
Creatinine, μmol/l	73.0 (61.5–79.0)	70.0 (64.5–78.5)	0.988
Alanine aminotransferase, U/l	20.0 (16.0–22.5)	23.0 (16.5–28.0)	0.220
ALP, U/l	54.0 (47.5–69.5)	60.0 (50.0–75.0)	0.511
Total bilirubin, μmol/l	7.0 (6.0–10.0)	9.0 (6.0–10.5)	0.385
Total protein, g/l	67.0 (66.0–69.5)	69.0 (66.0–72.5)	0.289
Albumin, g/l	43.0 (42.0–44.5)	45.0 (43.0–46.5)	0.010

Values are median (interquartile range).

Acknowledgements

Garth J. S. Cooper's research is facilitated by the Manchester Biomedical Research Centre and the NIHR Greater Manchester Comprehensive Local Research Network.

Disclosure statement: The authors have declared no conflicts of interest.

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Rheumatology 2015;54:748–750
doi:10.1093/rheumatology/keu531
Advance Access publication 8 February 2015

Reasons for non-vaccination in French rheumatoid arthritis and spondyloarthritis patients

SIR, Patients with inflammatory arthritis are at increased risk of infections, some of which could be prevented in part by vaccines [1, 2]. Influenza and pneumococcal vaccines are recommended in patients with inflammatory rheumatic diseases [3]. However, vaccination coverage of these patients remains very low [4–6]. Limited data on French vaccine coverage are available, especially since new recommendations for vaccination have been developed [3].

We describe our experience in a population of French patients with inflammatory rheumatic diseases (RA and SpA). A standardized questionnaire collecting information on vaccination status and reasons for non-vaccination was delivered to RA and SpA patients seen consecutively between December 2012 and December 2013 in the rheumatology departments of four teaching hospitals (Bordeaux, Clermont-Ferrand, Limoges and Montpellier). Participants were asked for consent to review their electronic medical records. Ethical approval was not required for this audit and was not obtained.

We collected data from 457 patients, 268 with RA and 189 with SpA. Among RA patients, 89% ($n = 239$) had received at least one biologic treatment. Among SpA patients, 87.8% ($n = 166$) had received at least one anti-TNF-α treatment. There was no difference regarding patient demographics across the four centres. Pneumococcal vaccination was received by 53% ($n = 142$) of RA patients and 54.5% ($n = 103$) of SpA patients. Influenza vaccine had been administered to 59.7% ($n = 160$) of RA patients and 47.1% ($n = 89$) of SpA patients.

The main reason stated by unvaccinated patients was the absence of a recommendation from their treating physician. Regarding pneumococcal vaccination, 78.5% ($n = 99$) of unvaccinated RA patients ($n = 126$) and 78.9% ($n = 68$) of unvaccinated SpA patients ($n = 86$) had not received a recommendation for the vaccine. For influenza vaccination these percentages were, respectively, 48.1% ($n = 52$) and 61% ($n = 61$) for unvaccinated RA ($n = 108$) and SpA patients ($n = 100$). Other reasons for the low vaccination rate were fear of side effects [18.3% ($n = 23$) and 14% ($n = 12$) for RA and SpA patients, respectively, for pneumococcal vaccine; 39.8% ($n = 43$) and 21% ($n = 21$) for RA and SpA patients, respectively, for influenza vaccine] and patients' belief that vaccination was useless [4% ($n = 5$) and 8.1% ($n = 7$) for RA and SpA patients, respectively, for pneumococcal vaccine; 18.5% ($n = 20$) and 15% ($n = 15$) for RA and SpA patients, respectively, for influenza vaccine].

Table 1 Predictive factors for pneumococcal and influenza vaccine recommendation by physicians for RA and SpA patients

Characteristics	Influenza vaccine offered to patients ($n = 216$)	Influenza vaccine not offered to patients ($n = 52$)	Pneumococcal vaccine offered to patients ($n = 169$)	Pneumococcal vaccine not offered to patients ($n = 99$)
RA patients ($n = 268$)				
Age, mean (S.D.), years	62 (0.8)*	56.8 (1.4)	61 (0.9)	61.1 (1.3)
DAS28, mean (S.D.)	3.0 (0.01)*	3.6 (0.3)	3.1 (0.1)	3.1 (0.2)
$\geqslant 1$ co-morbidity ($n = 111$), %	46*	28	45	39
Lung disease ($n = 26$), %	11.8*	2	13.1*	4.4
HBP ($n = 55$), %	22.7	14	20.8	21.5
Treatment[a] with anti-TNF-α ($n = 207$), %	79.6	78	81	77
Treatment[a] with ABA ($n = 65$), %	23.7	30	26.8	21.7
Treatment[a] with TCZ ($n = 71$), %	29.4	18	29.8	22.8
Treatment[a] with RTX ($n = 55$), %	20.9	22	36.9**	13.6
Treatment[a] with MTX ($n = 241$), %	91.5	96	91.7	94.6
MTX dosage, mean (S.D.), mg/week	13.0 (4.3)	13.0 (4.1)	12.6 (4.4)	13.2 (3.8)
Treatment with CS ($n = 82$), %	30.8	34	33.3	30
CS dosage, mean (S.D.), mg/day	6.7 (5.4)	7.6 (9.5)	7.5 (7.3)	5.2 (3.8)
Biologics received, mean (S.D.), n	2.1 (0.01)	2.0 (0.2)	2.2 (0.1)	1.9 (0.1)
SpA patients ($n = 189$)				
Age, mean (S.D.), years	49.7 (1.1)**	40.7 (1.5)	47.2 (1.2)	46.1 (2.1)
BASDAI, mean (S.D.)	3.8 (0.5)	3.8 (0.3)	4.2 (0.6)	3.2 (0.4)
$\geqslant 1$ co-morbidity ($n = 56$), %	35.2*	20.7	29.3	31.1
Lung disease ($n = 17$), %	8.8	10.3	8.6	8.9
HBP ($n = 35$), %	23.2*	10.3	19.8	17.8
Treatment[a] with anti-TNF-α ($n = 166$), %	91.2*	81.0	90.5*	77.8
Treatment[a] with MTX ($n = 74$), %	45.6*	27.6	40.5	37.8
MTX dosage, mean (S.D.), mg/week	12.5 (3.9)	12.8 (3.9)	12.9 (3.2)	12.1 (4.8)
Anti-TNF-α treatments received, mean (S.D.), n	1.4 (0.1)*	1.1 (0.1)	1.4 (0.1)	1.2 (0.1)

[a]The data given are a mix of prior use of drugs as well as current use. Data about the drugs refer to the full duration of the disease. Comparisons were realized between patients who were offered a vaccine and patients who were not offered a vaccine. Independent samples t-tests were conducted to compare means. Chi-square test or Fischer's exact test for sample size $\leqslant 5$ were conducted to compare proportions. Statistical analyses were performed using GraphPad Prism version 5.0 (GraphPad Software, La Jolla, CA, USA). A P-value <0.05 was considered statistically significant. *$P < 0.05$; **$P < 0.0001$. ABA: abatacept; HBP: high blood pressure; RTX: rituximab; TCZ: tocilizumab.

For patients vaccinated against pneumococcus, 21.8% ($n = 31$) of vaccinated RA patients and 13.6% ($n = 14$) of vaccinated SpA patients did so following their general practitioner's recommendation, whereas 79.6% ($n = 113$) of vaccinated RA patients and 84.5% ($n = 87$) of vaccinated SpA patients had been advised by their rheumatologist.

For recommendation of influenza vaccination, differences between general practitioners and rheumatologists were lower: 45.6% ($n = 73$) of vaccinated RA patients and 50.6% ($n = 45$) of vaccinated SpA patients had been recommended the vaccine by their family doctor, whereas the recommendation had come from the rheumatologist in 35.6% ($n = 57$) of vaccinated RA patients and 42.7% ($n = 38$) of vaccinated SpA patients. Moreover, for influenza vaccination, 23.8% ($n = 38$) of vaccinated RA patients and 18% ($n = 16$) of vaccinated SpA patients had been offered the vaccination by the social security system (in France, influenza vaccination is routinely offered to people >65 years of age and to those who are immunocompromised).

As shown in Table 1, in RA patients, rituximab treatment ($P < 0.0001$) and the presence of lung disease ($P = 0.03$) were associated with pneumococcal vaccine having been recommended to patients. The presence of co-morbidities ($P = 0.021$), especially lung disease ($P = 0.036$), increased age and lower disease activity ($P = 0.005$) were associated with the recommendation of influenza vaccination. In SpA patients, anti-TNF-α treatment ($P = 0.03$) was associated with pneumococcal vaccine having been recommended. Anti-TNF-α treatment ($P = 0.049$), number of anti-TNF-α treatments received ($P = 0.03$), MTX treatment ($P = 0.02$), the presence of co-morbidities ($P = 0.0475$) and increased age ($P < 0.0001$) were associated with the recommendation of influenza vaccination. Very similar CS and MTX dosages across groups were observed. A major impact of treatment dose on the recommendation of vaccination thus seems unlikely.

These results confirm the suboptimal application of influenza and pneumococcal vaccines in RA and SpA patients. In our study, as well as in other studies worldwide, the main reason remains that patients are not being offered the vaccine [4–6]. In 2011, a French national study revealed that the uptake rate for influenza vaccination among individuals >65 years of age was 61%, and 71% in a subgroup with an underlying pathology [7]. Influenza vaccination rates in our study were lower, notably in SpA patients. Additional information must be provided to patients and physicians, especially general practitioners, focusing on the relevance of vaccination in RA and SpA patients, even to those <65 years old. A dedicated visit to screen co-morbidities in patients with chronic inflammatory rheumatic diseases might help in checking vaccine status, among other assessments.

Key message

- Despite current recommendations, vaccination proposal to patients with inflammatory rheumatic diseases is still suboptimal.

Acknowledgements

We thank Roche Pharmaceuticals for providing logistic support in organizing sessions bringing together the participants of the four centres, but who remained independent of the collection, analysis and interpretation of data.

Funding: No specific funding was received from any funding bodies in the public, commercial or not-for-profit sectors to carry out the work described in this article.

Disclosure statement: The authors have declared no conflicts of interest.

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