

Missed opportunities in vaccination of patients with subsequent pneumococcal bacteraemia

Nigel C Weightman and Anthony Walters

SUMMARY

A 10-year survey was undertaken to determine whether patients who developed pneumococcal bacteraemia had previously been given pneumococcal vaccine, and whether they had previously had the opportunity of being vaccinated. Fifty-two per cent of the patients were candidates for vaccine. Of these, only 14% had been vaccinated. In the preceding five years, 97% of non-vaccinated patients had the opportunity of being assessed for, and administered, vaccine. Guidelines for the use of pneumococcal vaccine are not being followed, despite opportunities to do so. **Keywords:** *Streptococcus pneumoniae*; bacteraemia, pneumococcal; vaccination.

Introduction

DESPITE continued controversy over the efficacy of pneumococcal polysaccharide vaccine (reported to be anywhere between 55% and 83% for invasive disease^{1,2}), it remains a recommended vaccine in the United Kingdom (UK)³ for selected patient groups. The vaccine is underused in these groups,⁴ although the reasons for this are unclear. We undertook a retrospective survey of patients admitted to a district general hospital (DGH) over the previous 10 years in whom pneumococcal bacteraemia was detected, to ascertain whether they fell into a category for which vaccination is recommended, and if they had previously received pneumococcal vaccine. Over this period, the only licensed pneumococcal vaccines were 23 valent polysaccharide preparations, which became available in 1989; recommendations for their use appeared in 1992.³ For patients who were candidates for the vaccine and yet had not received it, details of their interactions with the healthcare system (hospital or general practice) were obtained, to see if there had been 'missed opportunities' when vaccine could have been administered.

Method

The DGH serves a semi-rural population of 120 000. As part of an ongoing local interest, all cases of bacteraemia in the hospital have been contemporaneously recorded for the past 20 years. From this local database, those caused by *Streptococcus pneumoniae* for the 10-year period 1990–1999 inclusive were determined and the available hospital case notes were reviewed. As bacteraemic patients account for over 90% of all invasive pneumococcal disease, those with isolates from other sterile sites were omitted from the study. Where the patient fell into one of the categories for which pneumococcal vaccination is recommended in the UK,³ and where there was no record of vaccination in the hospital notes, the patient's general practitioner (GP) was contacted to enquire into the pneumococcal vaccination history. For deceased patients, archived GP notes were accessed, and the vaccination history obtained from these. Details of the patient's interaction with the hospital (as an inpatient or outpatient) and GP were also obtained, to ascertain if there had been opportunities for the patient to be vaccinated in the previous five years.

Results

A total of 109 episodes of pneumococcal bacteraemia in 108 patients were detected over the 10-year period. Patients were aged from three months to 97 years (mean = 63.5 years). There were seven patients aged less than two years

N C Weightman, FRCPath, consultant microbiologist, Department of Microbiology, Friarage Hospital, Northallerton, North Yorkshire. A Walters, MB CHB, general practitioner, Mayford House Surgery, Northallerton, North Yorkshire.

Address for correspondence

Dr N C Weightman, Department of Microbiology, Friarage Hospital, Northallerton, North Yorkshire DL6 1JG. E-mail: Nigel.Weightman@stees.nhs.uk

Submitted: 21 November 2002; Editor's response: 19 March 2003; final acceptance: 8 May 2003.

©British Journal of General Practice, 2003, 53, 547–549.

HOW THIS FITS IN*What do we know?*

Pneumococcal bacteraemia has a mortality rate of 20% and there are licensed vaccines for its prevention. Pneumococcal polysaccharide vaccine, although recommended for at risk groups, is underused in the UK.

What does this paper add?

Underuse of the vaccine is not owing to lack of opportunity for the health care professional to assess the need for vaccine and to vaccinate patients.



for whom polysaccharide vaccine was not indicated in the UK during the study period. Of the 102 episodes in 101 patients aged over two years, detailed hospital records were available for 88 patients, representing 89 episodes, and these showed that 46 (52%) patients, representing 47 episodes, were candidates for vaccine. Of these 46 patients, three had documented vaccination in their hospital records. General practice records were available for 33 of the remaining 43 patients, which showed that two had been vaccinated and 31 had not. Vaccination history was therefore available for 36 patients who should have received vaccine and subsequently developed one or more episodes of pneumococcal bacteraemia. Of these 36, five (14%) had been vaccinated. Even if all the 10 patients on whom records were unavailable had been vaccinated, this would mean the vaccination coverage would only have risen to 33% in those who were candidates for vaccine. Indications for vaccination in these patients are given in Table 1.

In the five years preceding their episode of bacteraemia, 30 of the 31 non-vaccinated patients had either consulted their GP, attended the hospital outpatients department, or been admitted to hospital, and had therefore had the opportunity of being assessed for, and administered, pneumococcal vaccine. The patients are summarised in Figure 1.

Discussion

Pneumococcal bacteraemia results from a severe, invasive infection with *Streptococcus pneumoniae* and is therefore at the most serious end of the disease spectrum caused by this organism, with a mortality rate of 20%.⁵ This study

Table 1. Indications for pneumococcal vaccination in 29 patients who did not, and five patients who did, receive vaccine prior to pneumococcal bacteraemia (some patients had more than one indication).

	Not vaccinated (n = 29)	Vaccinated (n = 5)
Asplenia	0	2
Chronic renal disease	1	0
Immunodeficiency/immunosuppression	12	1
Chronic heart disease	14	0
Chronic lung disease	11	1
Chronic liver disease	2	0
Diabetes mellitus	7	2

focused on pneumococcal bacteraemia as a clear-cut, easily definable entity, and analysed whether there were any of the risk factors used in the UK to recommend vaccination, and the preceding pneumococcal vaccination status of each patient.

The incidence of detected pneumococcal bacteraemia in the population served by the hospital was 9.1 per 100 000 per year, compared with an incidence of 7.2 in this region of England in 1993–1995.⁵ Just under half of the patients aged over two years (48%) did not fulfil any of the criteria for pneumococcal vaccination in the UK, which are determined by risk criteria and not age *per se*.³

Of the 46 patients who were known to be candidates for vaccine, it was notable that only three had such vaccination either mentioned or documented in their hospital records. Two patients who had received vaccine from their GP did not have this fact recorded in their hospital records when admitted with invasive pneumococcal disease.

By the very nature of the diseases that render patients candidates for vaccine, which tend to be chronic and requiring continuing treatment and monitoring, these individuals tend to interact with the healthcare system frequently. Where the information could be ascertained, in all but one instance unvaccinated at-risk patients had interacted with the hospital or GP in the years (and often months) preceding their admission. There had therefore nearly always been the opportunity for medical staff to determine that the patient was in a category that made them suitable for vaccination, and to offer the vaccine. There was no instance when it was recorded that vaccine had been offered and refused.

There are no reliable data on the total number of individuals in the local population who were candidates for, or who received, pneumococcal vaccine over the study period. We are therefore unable to ascertain whether vaccination coverage in our selected patient group is similar to that in the general local population.

The low uptake of vaccination of at-risk patients against pneumococcal disease is not unique to the UK.⁶ In this study, it was reassuring that the only two patients without spleens had been vaccinated, but of concern is that so many patients in other risk groups had been missed. Patients with immunodeficiency or immunosuppression, chronic heart or lung diseases, or diabetes, made up the vast majority of unvaccinated patients in this study. There is a lack of perception of the need for vaccinating patients in these groups.⁷ Although patient opinion is an important consideration in vaccination coverage in adults, lack of physician encouragement has previously been reported as accounting for most missed vaccination opportunities.⁸ Despite the recommendation that GPs should actively identify and vaccinate those patients at risk, a further factor that might influence GPs to vaccinate appropriate patients is the lack of direct reimbursement by an item-of-service payment, or via target setting, for giving pneumococcal vaccine, although some income can be gained by buying in and administering the vaccine. A policy for vaccination other than that based on particularly vulnerable groups needs to be considered for the UK. In the interim, GPs may wish, during the winter influenza vaccination campaigns, to assess their patients for eligibility for pneumococcal vaccine.

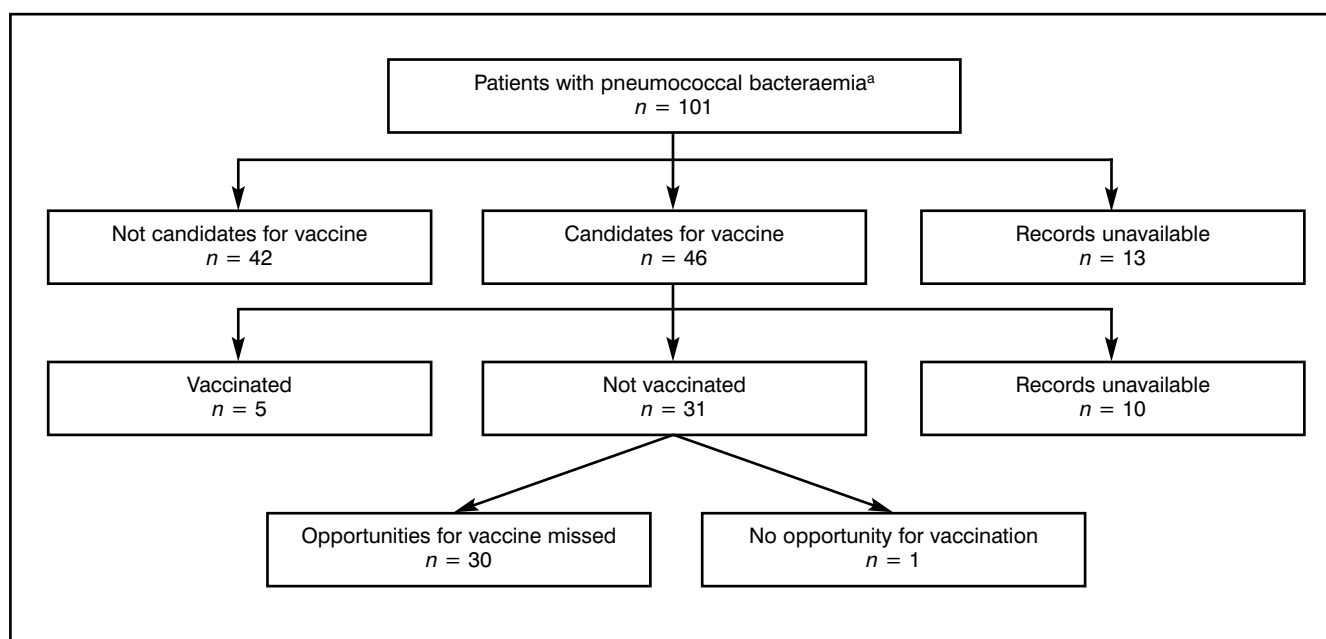


Figure 1. Previous vaccination history in 101 patients aged over two years with pneumococcal bacteraemia. ^aOne patient had two episodes, with no opportunity before the first episode and missed opportunities before the second episode.

References

1. Hutchinson BG, Oxmans AD, Shannon HS, *et al*. Clinical effectiveness of pneumococcal vaccine: meta-analysis. *Can Fam Physician* 1999; **45**: 2381-2393.
2. Hirschmann JV. Use of the pneumococcal polysaccharide vaccine is unwarranted in the US. *ASM News* 2000; **66**: 326-327.
3. Department of Health, Welsh Office, Scottish Office Department of Health, DHSS (Northern Ireland). *Immunisation against infectious disease*. London: HMSO, 1996: 167-172.
4. Turner DPJ, Finch G. Pneumococcal vaccine uptake in medical patients discharged from a district hospital. *Commun Dis Public Health* 1999; **2**: 291-292.
5. Laurichesse H, Grimaud O, Waight P, *et al*. Pneumococcal bacteraemia and meningitis in England and Wales, 1993 to 1995. *Commun Dis Public Health* 1998; **1**: 22-27.
6. Fedson DS. Pneumococcal vaccination in the United States and 20 other developed countries, 1984-1996. *Clin Infect Dis* 1998; **26**: 1117-1123.
7. Stone S. Pneumococcal vaccine and the elderly. *Lancet* 2000; **355**: 578-579.
8. Bovier PA, Chamot E, Bouvier Gallachi M, Foutan L. Importance of patients' perceptions and general practitioners' recommendations in understanding missed opportunities for immunisations in Swiss adults. *Vaccine* 2001; **19**: 4760-4767.