A survey of vaccine coverage and antibiotic prophylaxis in splenectomised patients in Scotland

M H Kyaw, E M Holmes, J Chalmers, I G Jones, H Campbell

Methods: Patients who had undergone splenectomy between 1 January 1988 and 31 December 1998 were identified using the Scottish Morbidity Record (SMR01), which is collected at discharge from all episodes of hospital inpatient or day case care. It records information on demography, number of hospital admissions, and the clinical nature of the patient treatment episode. SMR01 records were linked to General Register Office (Scotland) death registrations using probability matching to exclude patients who had died because their medical records would not be available to general practitioners. A questionnaire was sent to general practitioners of living patients requesting details of elective or emergency splenectomy, antibiotic prescribing, and vaccination with pneumococcal, meningococcal, Hib, and influenza vaccines. A reminder was sent to those who did not respond after six weeks. The Carstairs deprivation score was used to determine the deprivation index values of the patients’ areas of residence and the coverage of these vaccines. Data analysis was performed on SPSS version 10 and Stata (Stata Corporation, version 6, 1999; College Station, Texas, USA) for Fisher’s exact test.

RESULTS
There were 974 living patients who had undergone splenectomy during the study period. Information on vaccination status was available for 708 (73%) of those patients. A higher coverage was documented for pneumococcal vaccine (622 of 708, 88%) and Hib vaccine (468 of 664, 70%) than for meningococcal vaccine (317 of 619, 51%) (table 1). All three vaccines were received by 47% (269 of 576) of the patients. Vaccination status before elective splenectomy was recorded for 541 (56%) of the patients. Coverage of pneumococcal vaccine (153 of 541, 28%) was higher than that of Hib (83 of 435, 19%) or meningococcal vaccine (48 of 335, 14%) for elective splenectomy. All three vaccines were received by 13% (38 of 291) of the patients. An increasing trend in coverage of influenza vaccine was noted between 1997 and 2000: from 76% in the 1997/1998 season to 96% in the 2000/2001 season. Antibiotic prophylaxis was received by 67% of all patients. The current recommendation, comprising pneumococcal and Hib vaccination and antibiotic prophylaxis, was received by only 52% of the patients. There was no association between the coverage of vaccine and socioeconomic status.

Conclusion: Further improvement in coverage of recommended vaccines and antibiotic prophylaxis is still needed to reduce the risk of serious infection in this high risk group.

METHODS
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Abbreviations: BCSH, British Committee for Standards in Haematology; DoH, Department of Health; Hib, Haemophilus influenzae type b; SMR, Scottish Morbidity Record

“Patients without spleens are at a significantly increased risk of serious infection with encapsulated bacteria”
DISCUSSION

Optimal management comprising pneumococcal and Hib vaccines and antibiotic prophylaxis was received by 52% of the patients. Annual influenza vaccination uptake increased substantially during 1997 and 2000 and reached over 96% coverage in the 2000/2001 season. A review of studies of postsplenectomy infection between 1952 and 1987, before the availability of Hib conjugate vaccine, found that most cases of postsplenectomy infection are caused by *S pneumoniae* (57% of cases), followed by *H influenzae* (6%), *N meningitidis* (4%), and *Escherichia coli* (4%), with a 32–77% case fatality rate. The widespread use of Hib conjugate vaccine appears to influence the prevalence of causative organisms of postsplenectomy infection. Passive surveillance data in the UK, based on 77 cases, showed that the coverage of pneumococcal, meningococcal, and Hib vaccines is recommended for at least two weeks before elective splenectomy, compliance with this schedule was suboptimal. It appears that compliance with current recommendations for the timing of vaccination with regard to splenectomy was poor among clinicians. Although the effectiveness of pneumococcal, meningococcal, and Hib vaccines in asplenic patients is uncertain, the increased susceptibility to serious infection and the documented safety and potential benefits of these vaccines justify their use in these patients. As yet, meningococcal polysaccharide vaccine is not included in the general recommendations, the vaccine is likely to offer benefits to these patients and thus should be considered.

New conjugate vaccines may offer better protection against these organisms. Meningococcal group C conjugate vaccine has recently been recommended for routine immunisation in high-risk group patients.

**Table 1** Vaccine and antibiotic coverage in splenectomised patients

<table>
<thead>
<tr>
<th>DoH and BCSH recommendations Vaccine or antibiotic prophylaxis</th>
<th>Timing of vaccination</th>
<th>Vaccine coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes Pneumococcal</td>
<td>All cases (before or after surgery)</td>
<td>622/708 88</td>
</tr>
<tr>
<td>Yes Hib</td>
<td>Two weeks before elective surgery</td>
<td>153/541 28</td>
</tr>
<tr>
<td>No Meningococcal</td>
<td>All cases (before or after surgery)</td>
<td>468/664 70</td>
</tr>
<tr>
<td>Yes Influenza</td>
<td>Two weeks before elective operation</td>
<td>83/435 19</td>
</tr>
<tr>
<td>Yes Antibiotic prophylaxis</td>
<td>All cases (before or after surgery)</td>
<td>317/619 51</td>
</tr>
<tr>
<td>Yes Pneumococcal and Hib</td>
<td>Two weeks before elective surgery</td>
<td>48/335 14</td>
</tr>
<tr>
<td>No Pneumococcal and meningococcal</td>
<td>All cases (before or after surgery)</td>
<td>16/21 76</td>
</tr>
<tr>
<td>No Hib and meningococcal</td>
<td>Two weeks before elective surgery</td>
<td>24/27 89</td>
</tr>
<tr>
<td>No Pneumococcal, meningococcal and Hib</td>
<td>All cases (before or after surgery)</td>
<td>82/89 92</td>
</tr>
<tr>
<td>Yes Pneumococcal and Hib vaccine and antibiotic prophylaxis</td>
<td>Two weeks before elective surgery</td>
<td>329/342 96</td>
</tr>
<tr>
<td>No Pneumococcal, meningococcal, and Hib vaccine and prophylaxis</td>
<td>All cases (before or after surgery) for vaccine and antibiotic prophylaxis</td>
<td>518/770 67</td>
</tr>
<tr>
<td>Yes Pneumococcal and Hib</td>
<td>Two weeks before elective surgery</td>
<td>439/641 68</td>
</tr>
<tr>
<td>No Pneumococcal, meningococcal and Hib</td>
<td>Two weeks before elective surgery</td>
<td>80/406 20</td>
</tr>
<tr>
<td>No Pneumococcal and meningococcal</td>
<td>All cases (before or after surgery)</td>
<td>305/602 51</td>
</tr>
<tr>
<td>No Hib and meningococcal</td>
<td>Two weeks before elective surgery</td>
<td>44/313 14</td>
</tr>
<tr>
<td>No Pneumococcal, meningococcal and Hib</td>
<td>All cases (before or after surgery)</td>
<td>276/588 47</td>
</tr>
<tr>
<td>Yes Pneumococcal and Hib vaccine and antibiotic prophylaxis</td>
<td>Two weeks before elective surgery</td>
<td>40/305 13</td>
</tr>
<tr>
<td>No Pneumococcal, meningococcal, and Hib vaccine and prophylaxis</td>
<td>All cases (before or after surgery)</td>
<td>269/576 47</td>
</tr>
<tr>
<td>Yes Pneumococcal and Hib</td>
<td>All cases (before or after surgery)</td>
<td>38/291 13</td>
</tr>
<tr>
<td>No Pneumococcal, meningococcal</td>
<td>Two weeks before elective surgery</td>
<td>333/634 52</td>
</tr>
</tbody>
</table>

*BCSH, British Committee for Standards in Haematology; DoH, Department of Health; Hib, Haemophilus influenza type b.*

**Take home messages**

- Coverage of pneumococcal vaccine (88%) was higher than that of *Haemophilus influenza* type b (Hib) conjugate vaccine (70%) or meningococcal vaccine (51%) and only 47% of patients received all three vaccines.
- A higher coverage was also documented for pneumococcal vaccine (28%) than Hib (19%) and meningococcal vaccine (14%) before elective splenectomy and only 13% of patients received all three vaccines before splenectomy.
- Coverage of influenza vaccine increased from 76% in the 1997/1998 season to 96% in the 2000/2001 season.
- Antibiotic prophylaxis was received by 67% of all patients and only 52% of patients received pneumococcal and Hib vaccination and antibiotic prophylaxis (the current recommendation).
- Thus, it is apparent that further improvement in coverage of recommended vaccines and antibiotic prophylaxis is still needed to reduce the risk of serious infection in this high-risk group.
asplenic patients. The decision to use pneumococcal conjugate vaccine is expected soon. Although our study found no significant correlation between the coverage of the combination of pneumococcal polysaccharide and Hib vaccine or the combination of pneumococcal, meningococcal, and Hib vaccine, with or without antibiotic prophylaxis, studies in the USA have highlighted low socioeconomic status in relation to poor coverage of childhood and adult vaccines.

“As yet, meningococcal polysaccharide vaccine is not included in the general recommendations, the vaccine is likely to offer benefits to these patients and thus should be considered”

Although current guidelines recommend life long antibiotic use in these patients, only 67% of patients in our study had received antibiotic prophylaxis. We do not know how many of these patients had discontinued the prophylactic regimen or were taking macrolides (those allergic to penicillin). The rapid emergence of drug resistant pneumococcus complicates this preventive measure and highlights the need for the improved use of pneumococcal polysaccharide vaccine, which covers most drug resistant serotypes. Our survey indicates a high degree of coverage for pneumococcal and influenza vaccine but suboptimal coverage for Hib and meningococcal vaccine and antibiotic prophylaxis despite the existence of national guidelines and the risk of serious infection in these patients. Efforts to increase the coverage of recommended vaccines and antibiotic prophylaxis should continue.

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