The Royal College of Surgeons of England

Ann R Coll Surg Engl 2003; **85**: 252–255

Audit

An audit of post-splenectomy prophylaxis – are we following the guidelines?

Jyothi Ramachandra[1], Amanda Bond[2], Charles Ranaboldo[2], Jonathan Cullis[3]

Departments of General Medicine[1], General Surgery[2], and Haematology[3], Salisbury District Hospital, Salisbury, Wiltshire, UK

***Introduction*: Asplenic individuals have major difficulties coping with specific infections (*e.g. Streptococcus pneumoniae*). This is an audit to look at a district general hospital's compliance with published guidelines for immunisations and antibiotic prophylaxis post-splenectomy.**
***Patients and Method*: A retrospective review of hospital records of consecutive splenectomy patients from January 1996 to March 2001.**
***Results*: Of 76 patients, 72% were vaccinated (30/76 with pneumococcal, HIB and meningococcal vaccines, 15/76 with Pneumovax and HIB, 10/76 with Pneumovax only), 63% were discharged on prophylactic antibiotics, and 81% of surviving patients had adequate communication with the GP regarding splenectomy. Patients undergoing non-elective splenectomy were less likely to be vaccinated or receive prophylactic antibiotics when compared with elective splenectomy patients.**
***Conclusions*: Results are comparable with other published studies, but are still unsatisfactory for many splenectomy patients. Vaccination rates must be improved and more information given to patients and GPs to allow for appropriate follow-up care.**

Key words: Splenectomy – Prophylactic immunisation – Prophylactic antibiotics

The spleen is an important component of the body's defences against many infections, and the adverse consequences of its removal have become increasingly apparent over the last 4–5 decades. Asplenic individuals have major difficulties in coping with specific infections, especially those involving encapsulated bacteria, such as *Streptococcus pneumoniae*, and are at increased risk of serious sepsis, which may be fatal. The overall incidence of septicaemia is low in adults, but death rates from overwhelming post-splenectomy sepsis (OPSI) have been reported to be up to 600 times greater than in the general population, with an estimated life-time risk for OPSI of 5%.[1]

Much attention has focused recently on highlighting the risks faced by asplenic patients, and on producing guidance for the prevention of OPSI.[2,3] The 2001 guidelines are shown in Table 1.

Despite all such efforts, reports of OPSI continue to occur.[4] Therefore, we decided to audit the current practice in our hospital to determine whether guidelines are being followed for immunisation and antibiotic prophylaxis.

Patients and Methods

The hospital records of consecutive patients undergoing

Correspondence to: Miss Amanda Bond, 6 Silver Birch Close, Church Crookham, Fleet, Hampshire GU52 6LL, UK
Tel: +44 1252 812270; E-mail: akbond@doctors.org.uk

Table 1 *The 2001 guidelines for prevention of OPSI post-splenectomy*

Pneumococcal immunisation – the available polyvalent vaccine should be given to all splenectomised patients. Re-immunisation should be performed every 5 years or given dependent on antibody levels
Haemophilus influenzae type b (HIB) vaccine should be given to patients not previously immunised. (Routine immunisation of 1-year-olds only began in 1992)
Meningococcal group C conjugate vaccine should be given if not previously immunised (again only recently routinely given to children and teenagers). The group A conjugate vaccine should be given to travellers
Influenza vaccine is recommended yearly
Life-long prophylactic antibiotics are recommended (oral phenoxymethylpenicillin or an alternative)
Patients should be given a leaflet and a card to alert health professionals to their risk of overwhelming infection
Patients should be educated as to the risks of overseas travel (malaria) and animal bites
All records should be labelled. Vaccination and re-vaccination should be documented

splenectomy at Salisbury District Hospital between January 1996 and March 2001 (just over 5 years) were reviewed and audited against the British Committee for standards in Haematology (BCSH) guidelines, published in 1996.[2]

Cases were identified using theatre and pathology records. Information regarding indication for splenectomy, date of surgery, vaccination and antibiotic prophylaxis was recorded from each set of notes. In addition, we looked for evidence that the patients' general practitioners (GPs) had been informed of splenectomy.

Results

Patients

A total of 76 patients underwent splenectomy during the 5-year period of whom 43 were male. The age range was 12–90 years, but only one patient was under 16 years at the time of surgery.

Indications

Of the 76 procedures, 55 were defined as non-elective (72%), either because they were done as an emergency (*e.g.* traumatic rupture), or because splenectomy had not been anticipated at the beginning of the procedure (*e.g.* iatrogenic trauma to the spleen during laparotomy).

The commonest indications for splenectomy were iatrogenic trauma (n = 24) and traumatic rupture (n = 20). In 6 of these 44 cases, partial splenectomy was performed in an attempt to preserve some functioning spleen and, therefore, reduce the risk of post-splenectomy complications. Other indications were splenectomy during radical surgery for carcinoma (n = 8), immune thrombocytopenic purpura (n = 6) or autoimmune haemolytic anaemia (n = 3), splenic cyst (n = 3), splenomegaly due to non-Hodgkin's lymphoma (n = 3), chronic lymphocytic leukaemia (n = 1) or myeloproliferative disorder (n = 2), staging of lymphoma (n = 1), chronic pancreatitis (n = 2), spontaneous rupture of splenic artery (n = 1), and diagnostic splenectomy (n = 2) as summarised in Figure 1.

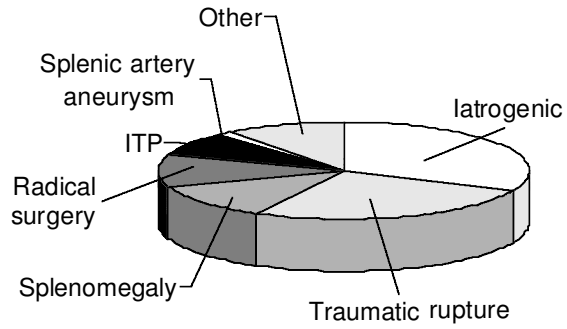

Figure 1 Indications for splenectomy.

Vaccination history

Of the 76 cases, 55 (72%) were vaccinated (30 patients received Pneumovax, HIB and Mengivac vaccines, 15 received Pneumovax and HIB, and 10 received Pneumovax alone). Of those patients undergoing elective splenectomy (n = 21), vaccination was administered to 18

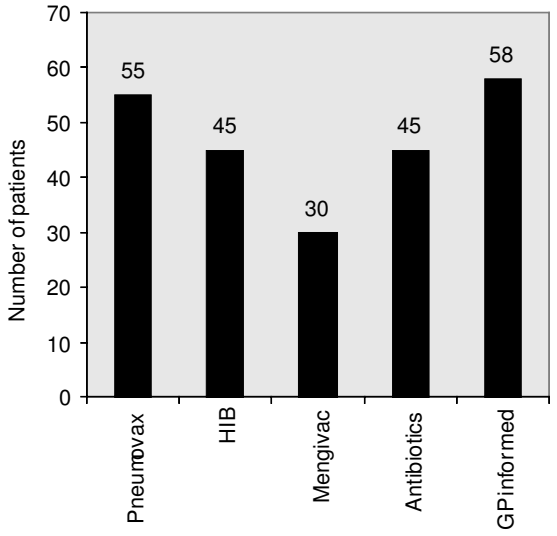

Figure 2 Number of patients with each intervention.

patients (86%), but in 2 of these was only administered postoperatively. Of those undergoing non-elective splenectomy, 27 of 55 patients (49%) received vaccination. One of the patients undergoing partial splenectomy (n = 6) was vaccinated (Fig. 2).

Antibiotic prophylaxis

Overall, 72 patients survived to hospital discharge. Hospital records indicated that 45 patients (63%) were discharged on penicillin or equivalent prophylaxis. In one of these, the patient was given instructions to continue the antibiotic for 2 months only. Of patients undergoing elective splenectomy (n = 21), 18 were sent home on antibiotic prophylaxis (86%), whereas of non-elective splenectomy patients (n = 51), 27 (53%) received appropriate prophylaxis. None of the 6 patients undergoing partial splenectomy received antibiotic prophylaxis.

Communication to GP

In the notes of 58 of the 72 surviving patients (81%), there was adequate documentation that the GP had been informed that the patient had undergone splenectomy. GPs were more likely to be informed that their patient had undergone splenectomy when the operation was elective (20 out of 21 patients, 95%) than if it was non-elective (36 out of 51 surviving patients, 71%).

Discussion

These audit findings are not dissimilar to other audits of post-splenectomy prophylaxis published recently. Brigden *et al*.[14] reported that only 68% of patients in their survey received pneumococcal vaccination. A similar vaccination rate was observed in a Danish study by Ejstrud *et al*.,[15] with the lowest rate of vaccination occurring in patients splenectomised during radical cancer surgery or for iatrogenic trauma. Finally, a Scottish audit showed that only 37.4% of splenectomised patients were both vaccinated and given antibiotic prophylaxis according to published guidelines.[16]

Our audit of patients undergoing splenectomy over a 5-year period shows that we also are falling short of published recommendations,[2,3] both in terms of immunisation and prescribing of prophylactic antibiotics. Only 72% of patients received vaccination, and in 18% of these only the pneumococcal vaccine was administered. The 1996 guidelines[2] suggested that both Pneumovax and HIB vaccines should be administered to all patients, with the meningococcal polysaccharide A+C (Mengivac) being reserved for patients travelling to areas where the A+C strains predominate. The recent up-date to the BCSH guidelines suggests that patients not previously immunised should now receive the new meningococcal C conjugate vaccine.[3]

Prophylactic antibiotics were administered to 63% of patients; in one case they were given with the advice that they only be continued for 2 months. This does not conform to the advice in the BCSH guidelines which recommend life-long penicillin prophylaxis.[2,3] There is increasing evidence that the risk of OPSI persists for years after splenectomy.[4] The risk is greater for those splenectomised for haematological malignancy, but all asplenic patients should receive optimal advice and protection whatever the underlying aetiology. Antibiotic prophylaxis is especially important when one considers that Pneumovax offers protection against only 75% of infecting strains[4] and OPSI episodes classified as vaccine failures have been described.[6,7] Furthermore a recent study showed that a programme of pneumococcal vaccination and prophylactic antibiotics prevented OPSI in a population of 280 children for an average of 4.3 years after splenectomy.[8]

Concerns raised about universal and life-long penicillin prophylaxis include: (i) a lack of good clinical data to confirm its efficacy,[9] (ii) the emergence of penicillin resistance amongst pneumococcal strains in some parts of the world,[10] (iii) non-compliance of patients prescribed long-term penicillin; and (iv) documented incidents of failure of penicillin prophylaxis to prevent OPSI despite the responsible organism being sensitive to penicillin *in vitro*.[4] This has led some to advocate a policy of issuing patients with a supply of antibiotics (*e.g*. amoxycillin) for self-administration at the first signs of infection.[11] However, a recent survey showed that only two of 62 asplenic patients not taking prophylactic penicillin had a home supply of antibiotics for this purpose.[4]

In 6 patients in the emergency group, partial splenectomy was performed: only one of these patients was vaccinated, and 0/6 received antibiotic prophylaxis. It was, however, documented in the notes of these patients that prophylaxis was 'not necessary'. There is some evidence that splenic reticulo-endothelial function can be preserved by partial splenectomy, provided that at least 25% of splenic tissue is preserved,[12,13] but some authors recommend a more cautious approach, at least in children, and that pneumococcal and HIB vaccinations should be given along with antibiotic prophylaxis until such a time that splenic function can be assessed.[18]

It is evident that vaccination rates, antibiotic prophylaxis and communication with the GP were all lower in the non-elective group than in the elective group.

Finally, although not a subject of this audit, it is also critical that patients are made aware that they are more susceptible to infection and that, despite appropriate measures, breakthrough infection may occur. It is strongly

recommended that they be given written information and carry a card or bracelet to alert health care professionals to the risk of overwhelming infection.

Conclusions

In common with other reports, the data show that compliance with post-splenectomy prophylaxis needs to be improved, and that the problem is particularly significant in those patients undergoing non-elective splenectomy. There should be 100% vaccination rates, and patients should be discharged with antibiotics and adequate information as to how and when to use them. The education and awareness of appropriate teams to this problem must be enhanced to improve treatment to those patients whose spleens are removed.

References

1. Lynch AM, Kapila R. Overwhelming post splenectomy infection. *Infect Dis Clin North Am* 1996; **10**: 693–707.
2. Working Party of the British Committee for Standards in Haematology Clinical Haematology Task Force. Guidelines for the prevention and treatment of infection inpatients with an absent or dysfunctional spleen. *BMJ* 1996; **312**: 430–4.
3. Working Party of the British Committee for Standards in Haematology Clinical Haematology Task Force. Updated guideline: the prevention and treatment of infection in patients with an absent or dysfunctional spleen. *eBMJ* 2001; <www.bmj.com/cgi/eletters/312/7028/430>.
4. Waghorn DJ. Overwhelming infection in asplenic patients: current best practice preventive measures are not being followed. *J Clin Pathol* 2001; **54**: 214–8.
5. Jones DM, Karczmarski EB. Meningococcal infections in England and Wales: 1994. *Commun Dis Rep CDR Wkly* 1995; **5**: 125–9.
6. Klinge J, Hammersen G, Scharf J, Liufficken R, Reinert RR. Overwhelming post-splenectomy infection in vaccine type *Streptococcus pneumoniae* in a 12-year-old girl despite vaccination and antibiotic prophylaxis. *J Infection* 1997; **25**: 368–71.
7. Abildgaard N, Nielsen JL. Pneumococcal septicaemia and meningitis in vaccinated splenectomised adult patients. *Scand J Infect Dis* 1994; **26**: 615–7.
8. Konradsen HB, Henrichsen J. Pneumococcal infections in splenectomised children are preventable. *Acta Paediatr Scand* 1991; **80**: 423–7.
9. Makris M, Greaves M, Winfield DA, Preston FE, Lilleyman JS. Long-term management after splenectomy. Lifelong penicillin unproved in trials. *BMJ* 1994; **308**: 131–2.
10. Klugman KP, Koornhof HJ. Worldwide increase in pneumococcal antibiotic resistance. *Lancet* 1989; **ii**: 444.
11. Finch RG, Read R. Lifelong penicillin may be ineffective. *BMJ* 1994; **308**: 132.
12. Malangoni MA, Dawes LG, Droege EA, Rao SA, Collier BD, Almagro UA. Splenic phagocytic function after partial splenectomy and splenic autotransplantation. *Arch Surg* 1985; **120**: 275–8.
13. Traub A, Giebink GS, Smith C, Kuni CC, Brekke ML, Edlund D *et al*. Splenic reticuloendothelial function after splenectomy, spleen repair, and spleen autotransplantation. *N Engl J Med* 1987; **317**: 1559–64.
14. Brigden ML, Pattullo A, Brown G. Pneumococcal vaccine administration associated with splenectomy: the need for improved education, documentation, and the use of a practical checklist. *Am J Hematol* 2000; **65**: 25–9.
15. Ejstrud P, Hansen JB, Andreasen DA. Prophylaxis against pneumococcal infection after splenectomy: a challenge for hospitals and primary care. *Eur J Surg* 1997; **163**: 733–8.
16. Pickering J, Campbell H. An audit of the vaccination and antibiotic prophylaxis practices amongst patients splenectomised in Lothian. *Health Bull (Edinb)* 2000; **59**: 390–5.
17. Shatz DV, Schinskey MF, Pais LB, Romero-Steiner S, Kirton OC, Carlone GM. Immune responses of splenectomised trauma patients to the 23-valent pneumococcal polysaccharide vaccine at 1 versus 7 versus 14 days after splenectomy. *J Trauma* 1998; **44**: 760–5.
18. Tchernia G, Bader-Meunier B, Berterottiere P, Eber S, Dommergues JP, Gauthier F. Effectiveness of partial splenectomy in hereditary spherocytosis. *Curr Opin Hematol* 1997; **4**: 136–41.