Journal of Infection and Public Health xxx (2017) xxx–xxx

Contents lists available at ScienceDirect

Journal of Infection and Public Health

journal homepage: http://www.elsevier.com/locate/jiph

Adherence to vaccination guidelines post splenectomy: A five year follow up study

Tristan Boam[a,*], Peter Sellars[a], John Isherwood[b], Chloe Hollobone[b], Cristina Pollard[b], David M. Lloyd[b], Ashley R. Dennison[b], Giuseppe Garcea[b]

[a] Nottingham University Hospitals, Nottingham, UK
[b] Department of Hepatobiliary and Pancreatic Surgery, Leicester General Hospital, University of Leicester, Leicester, UK[1]

ARTICLE INFO

Article history:
Received 17 July 2016
Received in revised form
21 November 2016
Accepted 7 January 2017

Keywords:
Splenectomy
Vaccinations
Guidelines

ABSTRACT

Following a splenectomy patients are at increased risk of significant infections. In its most severe form, overwhelming post-splenectomy infection (OPSI) has a mortality rate of up to 80%. In this study we aim to establish the adherence to vaccination and antibiotic national guidelines in splenectomised patients. A retrospective study of 100 patients who underwent splenectomy (21 emergency, 79 elective), in two teaching hospitals was undertaken over a five-year period. Patients were followed up for five years. Hospital and GP records were reviewed for adherence to pre, intra and postoperative vaccination, thromboprophylaxis and antibiotic guidance. Eighty-six eligible patients (91.5%) received their *Haemophilus influenzae* B, meningococcal C and pneumococcus vaccinations peri-operatively. Eighty-one (86%) received post-operative antibiotics. Ninety-nine percent of patients received thromboprophylaxis treatment. Eighty-nine (95%) were treated with long-term antibiotic prophylaxis. Only 20 patients (23%) had an emergency supply of antibiotics. Ninety-five percent of patients were administered an annual influenza vaccination and 84% of eligible patients received a five-year pneumococcal booster vaccination. Improvement in the management of this patient cohort can be achieved by a multidisciplinary approach involving adherence to national guidelines, standardised trust protocols, patient information leaflets and advice detailing risk of infection, standardised GP letters and a splenectomy register to monitor and manage this vulnerable group of patients.

Introduction

Following splenectomy patients are at increased risk of severe infections [1]. In its most virulent form, overwhelming post-splenectomy infection (OPSI) has a mortality rate of up to 80%. The lifetime risk of OPSI in splenectomised patients has been estimated at around 1–2% [2] and the three most common causative organisms are *Streptococcus pneumoniae*, *Haemophilus influenzae* B (HiB) and *Neisseria meningitidis* group C (Men C) [3]. Antimicrobial prophylaxis in this patient group is indicated to protect against infections by these pathogens [4]. Patients are also at increased risk of mortality from protozoal infections, principally malaria and babeosis and should be alert to the risks of overseas travel and animal bites [5]. Short and long term risk of infection following splenectomy vary depending on the initial indication and patient co-morbidity risks [6]. Higher risks of mortality are clearly associated with underlying malignancy [7]. Current best practice for prevention of these complications can be grouped into a triple approach consisting of vaccination, antibiotics and patient education. In addition to the risk of infection, splenectomised patients are also at an increased risk of venous thromboembolism [6], so preventative measures must be employed particularly if a post-operative thrombocytosis occurs. The majority of NHS trusts have guidelines for the management of splenectomised patients which vary in degrees of similarity to national recommendations. In this article we present a retrospective study of adherence to vaccination, thromboprophylaxis and antibiotic national guidelines for splenectomised patients and a review of the current literature.

Methods

A retrospective study of post-splenectomy antimicrobial and thromboembolic prophylaxis was undertaken at the University

* Corresponding author at: Department of Hepatobiliary and Pancreatic Surgery, Leicester General Hospital, University of Leicester, Leicester, LE5 4PW, UK.
E-mail address: Tristanboam@doctors.org.uk (T. Boam).
[1] Work conducted at this institution.

http://dx.doi.org/10.1016/j.jiph.2017.01.006

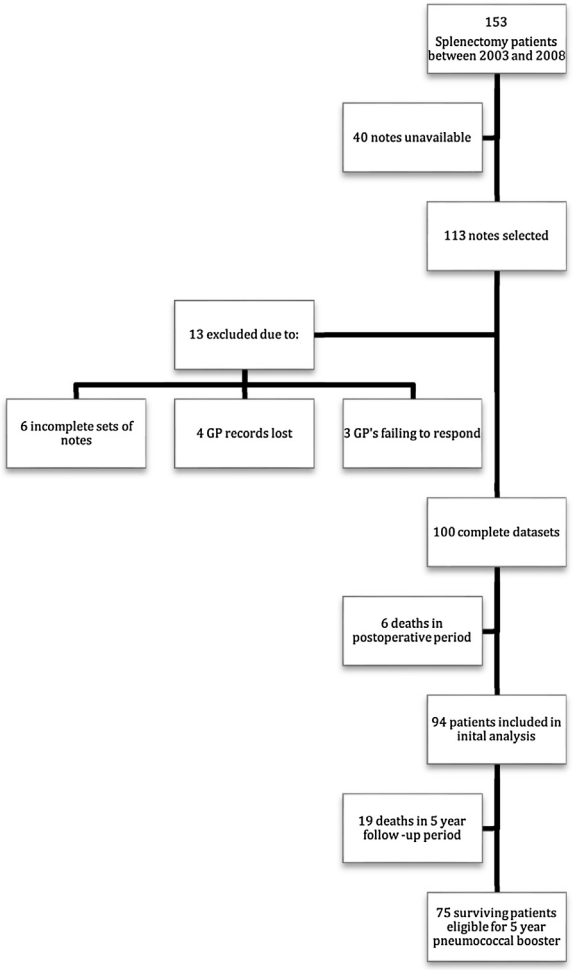

Fig. 1. Patient selection process and reasons for exclusion from each stage of the analysis.

Teaching Hospitals of Leicester (UHL). The standards used were recommendations set in a publication by a Working Party of the Haemato-Oncology Task Force and British Committee for Standards in Haematology (BCSH) in 2011 [8]. These recommendations are based on evidence from well-conducted clinical studies and expert opinions given the lack of randomised-controlled trials in this field. We reviewed both hospital notes and contacted General Practitioners (GP) by telephone for predetermined criteria based on the current UHL guidelines.

A five year period between January 2003 and December 2008 was selected to evaluate treatment and follow-up of 153 adult patients who underwent splenectomy (Fig. 1). Patients were followed up for five years and 113 patients were randomly selected on the basis of availability of their hospital notes. Hospital notes were assessed for: the indication for splenectomy, triple vaccinations for Men C, HiB and pneumococcus before or after splenectomy, peri-operative prophylactic antibiotics, peri-operative thromboembolic prophylaxis both mechanical (thromboembolic stockings) and pharmacological (low molecular weight heparin), intra and post-operative intravenous antibiotics if nil-by-mouth and post-operative aspirin if platelets exceeded 1000 μL/mL. GP notes were assessed for long term prophylactic antibiotics (Phenoxymethylpenicillin [Pen V] or Erythromycin), patient supply of emergency antibiotics, annual influenza vaccination and five-year pneumococcal booster vaccination.

Results

One hundred and thirteen patient notes were selected, in 6 notes were incomplete or inadequate, 4 were not on GP records or the GP had closed down and 3 GPs failed to respond. A total of 21 emergency and 79 elective patients who underwent splenectomy were evaluable. There were 58 male and 42 female patients between the ages of 18 and 86 years old (mean = 56 years old). Idiopathic thrombocytopenic purpura (ITP) was the most common indication for elective splenectomy (n = 21). Splenic injury, for example in road traffic accidents was the most common indication for emergency splenectomy (n = 10), the second most common being iatrogenic (n = 9). The other indications for surgery are shown in Table A1. Of the 100 patients, 6 died in the immediate post-operative period, 3 emergency patients and 3 patients who had a splenectomy following intestinal surgery for malignancy. Reasons for death included myocardial infarction (n = 1), pneumonia (n = 1) but in 4 notes were incomplete and the reason for death was not documented or attainable. Ninety-four patients were suitable for final analysis. Nineteen patients died during the five-year follow-up period and were excluded from the five-year pneumococcus booster vaccination analysis.

Hospital treatment

Eighty-six patients (91.5%) received their HiB, Men C and pneumococcus vaccinations peri-operatively (Fig. 2). Fourteen patients (8.5%), 12 elective and 2 emergency, did not have a record of their vaccinations having been administered. Eighty-one patients (86%) received post-operative antibiotics and 13 (14%) did not have any documentation of antibiotic prophylaxis in the peri-operative period. Eleven patients had a post-operative platelet count greater than 1000 per μL, only 5 received post-operative aspirin (45%) until their count was below 1000 per μL. Ninety patients were suitable for thromboembolic prophylaxis of whom 89 (99%) received treatment in the form of subcutaneous low molecular weight heparin and thromboembolic stockings.

General practice follow-up care

Eighty-nine patients (95%) were placed on long term prophylactic Penicillin V or Erythromycin (Fig. 3). Only 20 patients (23%) were given an emergency supply of antibiotics in case they were to run out or become acutely unwell. Seven patients were excluded due to frailty or other underlying conditions such as dementia. An annual Influenza vaccination was administered to 81 of 85 eligible patients (95%), with 9 patients being excluded due to receiving other treatments such as chemotherapy at the time of treatment and or death before vaccination could be administered. A five-year pneumococcal booster was given to 57 of 68 eligible patients (84%). Twenty-six patients were lost to follow-up due to death or moving out of the area.

Discussion

Current national guidelines state that the pneumococcal, Men C and HiB triple vaccination should be given in patients with an absent or dysfunctional spleen, in addition to an annual influenza vaccination.

The pneumococcal vaccination is available as a 23-valent polysaccharide (PPSV23) (*Pneumovax*®) or as a 13-valent conjugate (PCV13). Current "green book" guidelines recommend PPSV23 for all patients over the age of 65 that require primary vaccination, and splenectomised patients must receive a dose in the perioperative period and boosters every 5 years as the antibody levels are found to decline in these cases. PCV13 is currently given to infants as

Please cite this article in press as: Boam T, et al. Adherence to vaccination guidelines post splenectomy: A five year follow up study. J Infect Public Health (2017), http://dx.doi.org/10.1016/j.jiph.2017.01.006