Postsplenectomy Prophylaxis: A Persistent Failure to Meet Standard?

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A retrospective case review of patients that underwent emergency splenectomy or splenic preservation from May 2003 to April 2014 was undertaken at a single center. The results highlight failures in administration of postsplenectomy vaccination for emergency splenectomy patients. In this study, we highlight methods to improve postsplenectomy care.

Keywords. antibiotic prophylaxis; emergency splenectomy; vaccination.

Splenic rupture, through blunt abdominal trauma or hematological disease, may necessitate emergency splenectomy. Asplenic patients are at risk of overwhelming sepsis, and therefore splenic preservation is advised where possible. However, splenic preservation may lead to functional asplenia, particularly if devascularisation is extensive or if therapeutic embolisation of part or all of the spleen is required. Patients with asplenia are at high risk of infection, primarily by encapsulated organisms such as Streptococcus pneumoniae, Haemophilus influenzae type B, and Neisseria meningitides. Less commonly encountered pathogens such as Capnocytophaga canimorsus, Babesia microti, and possibly Plasmodium falciparum are also significant pathogens in asplenic individuals. The lifetime risk of overwhelming postsplenectomy infection (OPSI) varies according to the indication of the splenectomy; however, a 5% risk is commonly stated [1], and mortality rates for OPSI have been reported as high as 50% [2].

Prevention of infection strategy in these “at risk” patients depends on 3 components: (1) education of patients, (2) adoption of appropriate vaccination schedules, and (3) use of prophylactic antibiotics. The British Committee for Standards in Haematology (BCSH) recommends administration of polyvalent pneumococcal vaccine (PPV), H influenzae serotype B conjugate (HiB), and meningococcal group C conjugate (MenC) 2 weeks postoperatively [3]. Original guidelines advised lifelong antibiotics to all patients; however, in 2011 the BCSH adapted their antibiotic prescribing policy such that “high-risk patients” should receive lifelong antibiotic prophylaxis. All other patients should receive an emergency supply to be started for sudden acute severe illness prior to emergency ward presentation. Patients with functional hyposplenism should undergo the same vaccination regime; the BCSH do not comment on antibiotic prophylaxis. The vaccination guidelines are in agreement with the Infectious Diseases Society of America (IDSA) recommendations; however, the IDSA does not comment on antibiotic prophylaxis [4]. The aim of our study was to review practice within our center and compare it with the current guidelines.

METHODS

This study comprised a retrospective review of case notes of all patients over the age of 18 who underwent (1) emergency/urgent splenectomy or (2) splenic salvage procedures between May 2003 and April 2014 in a single center. Electronic and physical records were collected, and case management was compared with a modified data collection tool supplied by the BCSH. Both traumatic and atraumatic ruptures were included. Patients were excluded who died within 30 days of admission or if their records were incomplete.

Vaccinations were considered as administered based on documented evidence within patient records or discharge letters. Antibiotic regime was determined based on discharge and follow-up clinic letters. Data regarding operative outcomes, including complications and cause of death, were collected. All patients were followed up according to standard, postsplenectomy procedure within our center. RESULTS

Seventy-one patients underwent splenectomy, and 5 were excluded due to early mortality (within 30 days). Three patients died due to exsanguination, 2 patients died due to complications of hospital-acquired infections postoperatively. Of 66 survivors, 42 were male, median age was 53 (range 18–89), and median length of stay was 10 days (range 3–93). Fifty-eight (88%) patients underwent emergency splenectomy: 42 for traumatic rupture, 15 for atraumatic rupture, and 1 due to ruptured splenic artery. Eight patients underwent urgent splenectomy for splenomegaly, oesophageal varices, and splenic abscess.

Nine (14%) patients had clear documentation that the patient was at risk of OPSI. Of these, we identified 5 (33%) patients that were high risk according to the new BCSH guidelines; of these, only 1 of 5 (20%) was documented as such. According to BCSH
guidelines, all patients should be offered overseas travel advice and an “At Risk” card. Two patients (3%) received an At Risk card; however, none received overseas travel advice.

Sixteen patients underwent conservative management for splenic injury. Median age was 30.5 (range 18–94), 1 patient died in hospital (deemed unfit for surgery) and was therefore excluded, and 2 patients were readmitted after further hemorrhage (both successfully managed conservatively).

Just over half of splenectomized patients were administered PPV, MenC, and Hib before discharge (Table 1). Less than one third received influenza vaccination. In an additional 10 cases (15%), when vaccinations were not administered in hospital, advice to the general practitioner (GP) regarding vaccinations was provided in the discharge letter. In approximately 30% of cases, vaccinations were not administered in hospital and recommendations to the GP were not provided. These cases were recorded as “missed vaccinations”. This rose to almost 60% with influenza. In those that underwent conservative management of splenic rupture, only 1 of 15 received the appropriate vaccinations.

Before 2011, 92% of patients received the appropriate antibiotic treatment (Table 2). After 2011, all “low-risk” patients were inappropriately prescribed lifelong antibiotics and all “high-risk” patients were correctly prescribed lifelong antibiotic prophylaxis, resulting in the guidelines being followed in 33% of patients. With regards to those who underwent conservative management of splenic rupture, all were managed incorrectly.

If overall appropriate management is considered to be administration of PPV, MenC, and Hib with appropriate antibiotics (long term for all patients pre-2011, long term for high risk post-2011, and emergency for low risk), 40% of patients were treated correctly. This rises to 50% if requesting the GP to deliver the vaccinations is considered appropriate.

**DISCUSSION**

Despite guidelines by the BSCH, our findings are similar to previous studies [5, 6]: there is a persistent failure to appropriately advise, vaccinate, and provide antibiotics for splenectomized patients. Our study has highlighted deficiencies in all 3 aspects of care: documented evidence of patient education is nonexistent. Over one third of patients are discharged without appropriate vaccination cover, and use of prophylactic antibiotics is also inappropriate. Failure to deliver best practice postsplenectomy care is not limited to the United Kingdom. In 2003, The Victorian Spleen registry for splenectomized patients was developed in Melbourne and later expanded to cover several other regions including Queensland and Tasmania [7]. It was developed as a systematic attempt to combat the failings in patient education and vaccination delivery noted in Eastern Australia. Upon registration, patients receive information regarding their condition—a “spleen alert card”—to ensure clinicians are made aware of their hyposplenia and an annual letter to remind patients of flu and booster vaccinations [8]. The measures show some success. Through self-reporting questionnaires Wang et al [9] showed those taking prophylactic antibiotics within 2 years of splenectomy to be 82.9%, >80% patients received annual influenza vaccination, and the number receiving booster vaccinations remained high. Woolley et al [10] attempted to evaluate the cost effectiveness of the Splenic registry in Australia. It was estimated that over 60 years, 12.5 cases of OPSI would be avoided, at a cost of AUD 1 318 093 (approximately £660 000).

**Table 1. Vaccination Administration After Emergency Splenectomy and Splenic Preservation**

| Procedure          | PPV (%) | MenC (%) | Hib (%) | Influenza (%) |
|--------------------|---------|----------|---------|--------------|
| Emergency splenectomy |        |          |         |              |
| Administered in hospital | 37 (56) | 36 (55) | 38 (58) | 19 (29)      |
| GP advised to administer | 10 (15) | 10 (15) | 10 (15) | 8 (18)       |
| Missed vaccinations* | 19 (29) | 20 (30) | 18 (27) | 39 (59)      |
| Splenic conservation |        |          |         |              |
| Administered in hospital | 1 (7)  | 1 (7)  | 1 (7)  | 0 (0)        |
| GP advised to administer | 0      | 0      | 0      | 0            |
| Missed vaccinations* | 14 (93) | 14 (93) | 14 (93) | 15 (100)     |

*Vaccinations were recorded as missed when there was no documentation that they were given and it was not communicated to the GP to administer them.

**Table 2. Antibiotic Prescribing After Emergency Splenectomy and Splenic Conservation**

| Procedure          | Lifelong Antibiotics (%) | 2-Year Antibiotics (%) | Emergency Antibiotics (%) | Nil Antibiotics (%) |
|--------------------|--------------------------|------------------------|---------------------------|---------------------|
| Emergency splenectomy |                         |                        |                           |                     |
| Pre-2011 (n = 51) | 45 (88)                  | 2 (4)                  | –                         | 4 (8)               |
| Post-2011 Low risk (n = 10) | 10 (100)            | –                      | 0 (0)                     | 0 (0)               |
| High risk (n = 5) | 5 (100)                  | –                      | 0 (0)                     | 0 (0)               |
| Splenic conservation |                         |                        |                           |                     |
| Pre-2011 (n = 1) | 1                        | 0                      | 0                         | 0                   |
| Post-2011 Low risk (n = 7) | 0                     | 0                      | 0                         | 7                   |
| High risk (n = 9) | 0                        | 0                      | 0                         | 9                   |

*Nil, not in list.
Although the introduction of a Splenic registry is unlikely to occur overnight, there are several changes that can be made to our approach to postsplenectomy care. Our results show that 45% of patients are discharged from hospital without vaccinations. From here the responsibility of administering the immunizations has traditionally resided with the GP, yet there is an argument for transferring this responsibility back to the discharging team. Communication between primary and secondary care has often been criticized. Murphy et al [11] have shown that only 70% of discharge letters are received by the GP within 2 weeks. Further evidence suggests that the availability of the discharge letter at the first postdischarge visit is low (12%–34%), and often they do not convey enough information for primary care givers to provide adequate postdischarge treatment [12]. This suggests that a delay in vaccination administration is almost inevitable, or it may not occur at all. To obviate this risk, a 2-week, postoperative outpatient appointment would provide ample opportunity for both vaccination administration and patient education.

As well as vaccinations, the postoperative consultation should be structured to deliver several key points. These include timing of revaccinations, reinforcement of antibiotic prophylaxis, provision of an At Risk card or bracelet, and delivery of over-