TRUST GUIDELINE
HYPOSPLENISM
PROTECTION OF PATIENTS WITH AN ABSENT OR DYSFUNCTIONAL SPLEEN

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FAST FIND:
- **AC1** - Hyposplenism - Summary Guidance for Clinicians
- **AC2** - Post-Splenectomy Checklist
- **RD1** - Information for patients who have had their spleen removed or whose spleen does not work properly
- **RD2** - Splenectomy Vaccination Schedule for Children under 10 Years ADDITIONAL to the National Schedule
- **RD3** - Notes on Vaccines
1. INTRODUCTION

Patients who have been splenectomised or who have a spleen that does not function adequately (hyposplenism) are at risk of overwhelming infection from certain micro-organisms such as capsulate bacteria e.g. Streptococcus pneumoniae, Haemophilus influenzae serotype b and Neisseria meningitidis. This risk can be reduced by the provision of education to the patient, appropriate vaccination and prophylactic antibiotics providing pneumococcal cover. Details of all these are given in these guidelines.

These guidelines are equally applicable to hospitalised patients as well as to patients in the community. They are also applicable not only to individuals who have recently had their spleen removed but also to those patients that have been identified at a later date of having hyposplenism regardless of cause.

These guidelines are for use on adult patients and children.

For the sake of simplicity, in this guideline the term “hyposplenism” will be taken to include asplenia/splenectomy and conditions where the spleen is still present but not fully functional (dysfunctional spleen). Where the terms asplenia/asplenic are used the term is being used solely for conditions where the spleen is absent.

2. DEFINITIONS

<table>
<thead>
<tr>
<th>Word/Term</th>
<th>Descriptor</th>
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<tr>
<td>Hyposplenism</td>
<td>Absent or reduced splenic function, usually due to surgical removal, congenital aplasia, tumour replacement, or splenic vascular accident.</td>
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<tr>
<td>Asplenia/asplenic</td>
<td>Conditions where the spleen is absent</td>
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<tr>
<td>Capsulate bacteria</td>
<td>Bacterial with an outer covering made of polysaccharide</td>
</tr>
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3. ROLES AND RESPONSIBILITIES

<table>
<thead>
<tr>
<th>Post/Group</th>
<th>Details</th>
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</table>
| Medical staff    | • Prescribing vaccines and prophylactic antibiotics for the protection of patients (adults and paediatric) with an absent or dysfunctional spleen  
                  | • Provision of patient information                                      |
| Nursing staff    | • Identifying patients who have had a splenectomy                        
                  | • Provision of patient information                                      |
| Pharmacy staff   | • Dispensing and checking of vaccines and prophylactic antibiotics        
                  | • Provision of patient information                                      |

4. HYPOSPLENISM CRITERIA

Patients who have had their spleen removed by elective or emergency surgery fall under this guideline. Individuals (adults and children) who have the following conditions may be hyposplenic:

- Homozygous sickle cell disease
- Coeliac disease*
- Inflammatory bowel disease
- Active chronic graft-versus-host disease
- Those who have undergone post therapeutic splenic irradiation

*Around 30% of adults with coeliac disease have defective splenic function. Unfortunately there is no routinely available and reliable way of assessing splenic function. The presence of Howell-Jolly bodies may be taken to indicate hyposplenism in the appropriate clinical circumstances, but their absence does not exclude hyposplenism. Patients require clinical evaluation of the likelihood of hyposplenism and this should be discussed with the appropriate specialist if there is uncertainty.
5. **VACCINATION**

Normal inoculations, including live vaccines, can be given safely to children or adults with an absent or dysfunctional spleen and vaccination against a range of potential pathogens has become accepted practice.

5.1 **Risks of infection**

Hyposplenic individuals, especially young children, have a high risk of invasive infections caused by encapsulated organisms (particularly Streptococcus pneumoniae, Haemophilus influenzae serotype b (Hib) and Neisseria meningitidis) and, at the same time, have an inherently reduced ability to mount protective antibody responses to polysaccharide antigens, which may result in vaccine failure.

There are over 90 different serotypes of S. pneumoniae, of which at least 30 can cause invasive disease in humans.

5.2 **When to give vaccines**

Vaccinations are advocated in the following circumstances:

- **Elective Splenectomy** - Vaccination should take place at least two weeks before the planned splenectomy. DoH guidance indicates vaccination to be optimal if performed 4-6 weeks before the splenectomy but also advises that if the splenectomy needs to be performed more urgently it should not be deferred to allow this 4-6 weeks interval to be achieved

- **Emergency/Unplanned Splenectomy** – Vaccine is most effective if performed at least 14 days after surgery. This requires careful coordination between hospital clinicians and GPs to ensure all vaccines are given

- **Hyposplenic individuals who have had immunosuppressive chemotherapy or radiotherapy** – it is recommended that vaccination is given at least 2 weeks before immunosuppressive therapy is commenced, and/or delayed for three months after therapy has been completed or longer until recovery of adequate immunological function where this can be appropriately assessed

5.3 **Vaccine efficacy**

The polyvalent polysaccharide pneumococcal vaccine (PPV) provides short-term immunity against 23 pneumococcal serotypes. Despite appropriate efforts, some patients remain unvaccinated, while true vaccine failures also contribute to pneumococcal infection. Failure to mount an antibody response may be genetically determined but is also more common in older patients and those splenectomised for haematological malignancies.

A failure to demonstrate a rise in titre of anti-pneumococcal antibody identifies non-responders who are at high risk of invasive pneumococcal disease. Repeat vaccination is safe in responders and the need for revaccination may be based on measurement of antibody levels. True non-responders may derive no benefit even from further vaccination attempts with a conjugate vaccine.

Unlike polysaccharide vaccines, conjugate vaccines are highly immunogenic in infants as young as 2 months of age, provide higher antibody titres and induce immunological memory. The 13-valent pneumococcal conjugate vaccine (PCV13) is more immunogenic than PPV, albeit with a more limited repertoire, and is highly effective in preventing invasive disease caused by the 13 serotypes included in the vaccine. Conjugate vaccines are immunogenic in hyposplenic individuals and have been administered safely both before and after polysaccharide vaccines post-splenectomy, but the optimum scheduling is unknown. However, PCV13 may have a role in PPV failures, although repeated prior administration of PPV may reduce the response to subsequent PCV13 administration.
5.4 Schedule for immunisation with conjugate vaccines in individuals with hyposplenism

The number of doses and the vaccinations required depend on the age at which the hyposplenism is acquired or diagnosed and their vaccination history.

For all ages:

Check patient has been vaccinated according to UK schedule: 

Administer vaccines based on age and vaccination history (see RD2)

See RD3 for further information about vaccines.

5.5 Prescribing and administering the vaccines

For inpatients the vaccines should be prescribed in the ‘Once only and Pre Anaesthetic Medication’ section on the front of the in-patient prescription chart.

All the recommended vaccines are inactivated, so if necessary they can all be given at the same time; however they must be administered at different sites.

For children under 2 years, paracetamol should be given orally as per Children’s BNF at the time of vaccination with Men B (Bexsero).

5.6 Booster Doses

Booster doses are only required for pneumococcal polysaccharide vaccine (PPV). Most hyposplenic individuals should be routinely boosted 5 years after the last dose of pneumococcal vaccine.

A small number of individuals (particularly those with sickle cell anaemia or lymphoproliferative disorders) should have their pneumococcal antibody levels checked 3 years after the last dose of vaccine. If levels are found to be unprotective then boosting would be appropriate. If levels are found to be protective then the levels should be rechecked annually until 5 years after the last dose when a booster should be given routinely.

Notes:

• The World Health Organization has recommended a serotype-specific IgG level of at least 0.35 µg/mL as a putative protective threshold following conjugate immunization in young children. The relevance of this threshold for adults, especially older people, is unclear and higher thresholds (e.g. at least 1.0 µg/mL) may be more appropriate. Where individual laboratories have in place validated methods to determine serotype specific anti-pneumococcal antibody levels this may be used to guide decision-making.

• The additional benefit of PCV vaccination in good serological responders to PPV is unclear and PCV vaccination should not therefore be routine in this group. Patients with sub-optimal or no serological response to PPV represent a high-risk group for invasive pneumococcal disease. They may benefit from PCV immunization, 2 doses given 4 weeks apart.

5.7 Annual influenza vaccination

An annual influenza vaccine of the appropriate type is recommended. National guidelines suggest giving influenza vaccine either pre-splenectomy (if planned) or after emergency splenectomy (or as soon as possible after a patient is identified as being hyposplenic). Due to lack of availability of influenza vaccine outside of the influenza season it would be most practical to give the first dose of the vaccine just before the start of the next influenza season (September to December) and annually at this time of year thereafter.
6. PROPHYLACTIC ANTIBIOTICS

6.1 Risk of infection

The increased risk of infection in patients with hyposplenism is lifelong, but is highest early after splenectomy (particularly the first 2-3 years), the highest risk being from pneumococcal infection (For further information click here). Other risk factors include:

- patient under 16 years or over 50 years of age
- inadequate serological response to pneumococcal vaccination
- previous invasive pneumococcal disease
- splenectomy for haematological malignancy (rather than trauma) especially in the context of ongoing immunosuppression
- patients treated for haematological malignancy, particularly those who have received splenic irradiation
- patients with active ongoing graft-versus-host disease.

These factors can be used to stratify patients who are at higher risk of infection. Patients who have had splenectomy for trauma are at greatest risk of infection in the immediate post-operative period and prophylaxis should continue for this period at least.

6.2 Prescribing strategies

- Lifelong prophylactic antibiotics should be offered to patients considered at continued high risk of pneumococcal infection
- High risk groups need careful counselling and follow up to ensure lifelong adherence to antibiotic prophylaxis
- Patients not at high risk should be counselled regarding the risks and benefits of lifelong antibiotics and may choose to discontinue them
- Lifelong antibiotics have potential disadvantages such as the development of bacterial resistance, side effects including allergy, and may be associated with poor adherence.
- Patients developing systemic infection (high fever) despite the above measures must be given systemic antibiotics and admitted urgently to hospital.

6.3 Prophylactic prescribing regimes

Table 4

<table>
<thead>
<tr>
<th>Drug</th>
<th>Indications</th>
<th>Dose</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenoxymethylpenicillin (Penicillin V)</td>
<td>Adults and children 5 years and over</td>
<td>250 mg bd po</td>
<td>Penicillin V has no activity against Haemophilus influenzae. Use Amoxicillin if there has been previous invasive Haemophilus disease</td>
</tr>
<tr>
<td></td>
<td>Children 1 - 4 years</td>
<td>125 mg bd po</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Children from 1 month to 11 months</td>
<td>62.5 mg bd po</td>
<td>For children under 1 month, discuss with Consultant Medical Microbiologist.</td>
</tr>
<tr>
<td>Amoxicillin: Use if cover also needed for Haemophilus influenzae (e.g. past history of invasive Haemophilus disease or recurrent respiratory disease)</td>
<td>Adults and children 12 years and over</td>
<td>500 mg bd po</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Children 5 years – 11 years</td>
<td>250 mg bd po</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Children 1 month – 4 years</td>
<td>125 mg bd po</td>
<td>For children under 1 month, discuss with Consultant Medical Microbiologist.</td>
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</tbody>
</table>
Patients can still get severe systemic infections despite the correct use of antibiotic prophylaxis. This needs to be explained to patients and they should also be supplied with therapeutic doses of antibiotics (and instructions on when to use them, see Hyposplenism: Patient information) to be taken as necessary if a “break-through” systemic infection is suspected.

### 6.4 Supply of therapeutic doses of antibiotics for use as required at home

Patients should be given a supply of amoxicillin (or clarithromycin if penicillin-allergic) at therapeutic dose to keep at home. If a patient does become clinically infected despite prophylactic antibiotics they should immediately start taking a therapeutic course of antibiotics and seek urgent medical attention as hospital admission may be required.

#### Table 5:

<table>
<thead>
<tr>
<th>Drug</th>
<th>Indications</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient not penicillin-allergic:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>Adults and children 12 years and over</td>
<td>1 g tds po</td>
</tr>
<tr>
<td></td>
<td>Children 5 – 11 years</td>
<td>500 mg tds po</td>
</tr>
<tr>
<td></td>
<td>Children 1 - 4 years</td>
<td>250 mg tds po</td>
</tr>
<tr>
<td></td>
<td>Children from 1 month – 11 months</td>
<td>125 mg tds po</td>
</tr>
<tr>
<td><strong>Patient penicillin-allergic:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clarithromycin</td>
<td>Adults 18 years and over</td>
<td>500 mg bd po</td>
</tr>
<tr>
<td></td>
<td>Children 12 to 17 years</td>
<td>250 mg bd po</td>
</tr>
<tr>
<td></td>
<td>Child 1 month to 11 years based on body weight: see below</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30 - 40 kg</td>
<td>250 mg bd po</td>
</tr>
<tr>
<td></td>
<td>20 - 29 kg</td>
<td>187.5 mg bd po</td>
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<tr>
<td></td>
<td>12 – 19 kg</td>
<td>125 mg bd po</td>
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<td></td>
<td>8 – 11 kg</td>
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<tr>
<td></td>
<td>Up to 8 kg</td>
<td>7.5 mg/kg bd po</td>
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### 6.5 Treatment of Animal and Human Bite

See Trust Antibiotic Guidelines for Animal and Human Bites in Adults and Animal and Human Bites in Children

### 6.6 “Post Splenectomy” checklist for inpatients

Once a patient has been identified as having had or about to have a splenectomy (or after they have been identified as being hyposplenic whilst under the care of a hospital physician or surgeon), carry out the checklist in AC2.
7. RECORD KEEPING AND COMMUNICATION

7.1 Record keeping

The following must be documented on the patient’s health records (inpatient and outpatient) and discharge summary for all hyposplenic patients:

- Hyposplenic or asplenic status
- All administration of vaccines including those due to be given at a later date

7.2 Communication with primary care

The following information must be communicated with the patient’s GP and any other primary, secondary or tertiary care providers:

- Hyposplenic status
- Information about vaccination courses that will need to be completed in primary care after discharge
- Information on long-term antibiotic prophylaxis and vaccinations/boosters (including dates and immunity tests, where applicable)

7.3 Further Information/Contact Numbers

| Vaccinations                                      | • Local PCT immunisation coordinator |
|                                                | • Consultant in Communicable Disease Control, Gloucestershire Health Protection Team |
| Advice on treatment of severe infection         | • Duty Clinical Consultant Microbiologist |

8. MONITORING OF COMPLIANCE

See POPAM

9. REFERENCES


Public health briefing note 2015/024. April 2015. Vaccine error: Use of Infanrix-IPV instead of Infanrix-IPV+Hib for primary immunisation and use of Infanrix-IPV+Hib without reconstitution and administration of the Hib component

Summary of Product Characteristics (SPCs) for the listed drugs. Available at www.emc.medicines.org.uk

BNF for children: accessed on line 09/09/19

UK routine immunisation schedule: accessed on line 09/09/19: https://www.gov.uk/government/publications/the-complete-routine-immunisation-schedule

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</table>
| Author           | Philippa Moore, Consultant Microbiologist & Speciality Director Pathology  
                      Delyth Ahearne, Pharmacist |
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                      **AC2** - Post-Splenectomy Checklist  
                      **RD1** - Information for patients who have had their spleen removed or whose spleen does not work properly  
                      **RD2** - Splenectomy Vaccination Schedule for Children under 10 Years ADDITIONAL to the National Schedule  
                      **RD3** - Notes on Vaccines |
| Other Relevant Documents | Local antibiotic guidelines |
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