Atlantic Provinces Pediatric Hematology/Oncology Network
Réseau d'Oncologie et Hématologie Pédiatrique des Provinces Atlantiques
5850/5980 University Avenue, PO Box 9700, Halifax, NS, B3K 6R8
(902) 470-8888

Quick Reference Guideline for the Prevention and Empiric Therapy of Bacterial Infections for Children with Asplenia and Hyposplenia

APPHON/ROHPPA supportive care guidelines are developed by Atlantic Provinces health professional specialists using evidence-based or best practice references. Format and content of the guidelines will change as they are reviewed and revised on a periodic basis. Care has been taken to ensure accuracy of the information. However, any physician or health professional using these guidelines will be responsible for verifying doses and administering medications and care according to their own institutional formularies and policies and acceptable standards of care.

Overwhelming bacterial infection is a significant risk in patients with no splenic function or absent spleen (asplenia) or a dysfunctional spleen (functional asplenia/hyposplenia). The frequency of overwhelming post-splenectomy infection (OPSI) varies in different studies and according to: time since splenectomy, patient age and co-morbidities.

The following guideline summary is the recommendations from the full APPHON/ROHPPA Guideline for the Prevention and Empiric Therapy of Bacterial Infections for Children with Asplenia and Hyposplenia. The purpose of these recommendations is to provide clinical institutions and other organizations with a framework on which to build their own institutional protocols and to encourage standardization of protocols across regions to enhance consistency of care for patients and families.

Health Questions

The following clinical questions guided the development of this guideline:

1) What is the appropriate vaccination schedule for children with asplenia or hyposplenia?
2) What is the appropriate antibiotic prophylaxis schedule and duration for children with asplenia or hyposplenia?
3) What is the appropriate treatment of fever in children with asplenia or hyposplenia?

Scope and Purpose

The objective of this guideline is to reduce the incidence of overwhelming post-splenectomy infection and death by:

a) Providing information to healthcare professionals regarding vaccinations, antibiotic prophylaxis and empiric treatment of OPSI.
b) Providing information to patients and families regarding vaccination, antibiotic prophylaxis and actions to take if a person with asplenia/hyposplenia has a suspected infection.
c) Consideration of efficacy, cost, tolerability and toxicity of medications and vaccines recommended.

The *scope* of this guideline includes methods of prevention of overwhelming post-splenectomy infection in asplenic and hyposplenic children. This guideline has been developed based on available evidence. It is acknowledged that due to the paucity of evidence and the limited number of high quality studies in asplenic/hyposplenic children there are many gaps in knowledge. Readers are reminded that implementation of these recommendations will require adaptation to the local context, appreciating factors such as individual patient needs and preferences, clinician knowledge, skill and practice scope, available resources and organizational policies and standards. The choice of antibiotics to treat OPSI may vary based on local resistance patterns, local epidemiology and local antibiotic preferences based on cost and resources.

Target Audience of the Guideline

The intended users of this guideline are all health professionals within Canada caring for children and youth without a spleen or with a hypofunctioning spleen. The guideline is particularly addressed to physicians (hematology, emergency room, surgery and family doctors), pharmacists, nurse practitioners and nurses working in hospitals where asplenic and hyposplenic patients receive care.

The guideline will also be relevant to the administrators of health care institutions, public health agencies and insurance companies who must ensure sufficient resources are available to provide vaccines and antibiotic medications.

Summary of Guideline Recommendations

Recommendation		Evidence*
1. Antibiotic prophylaxis		
1.1	All children 3 months and older with asplenia or hyposplenia should receive antibiotic prophylaxis with penicillin VK: a) 25 mg/kg/day up to a maximum of 125 or 150 mg per dose twice daily for 3 months to 5 years of age. OR b) 25 mg/kg/day up to a maximum of 250 or 300 mg per dose twice daily for children 5 years and older.	Strong Recommendation, Moderate quality evidence

Recommendation		Evidence*
1.2	If children 3 months and older are not able to tolerate penicillin or if penicillin is not available, amoxicillin can be used as an alternative at a dose of: a) 10 mg/kg/dose twice daily for children 3 months to 5 years. OR b) 250 mg per dose twice daily for children 5 years and older.	Strong Recommendation, Very low quality evidence
1.3	All children 3 months of age and younger with asplenia or hyposplenia should receive antibiotic prophylaxis with an antibiotic that is also active against E.coli and Klebsiella sp. The authors of this guideline recommend cefixime 8 mg/kg/day once daily.	Strong Recommendation, Very low quality evidence
1.4	Children who are allergic to penicillin should see an allergist.	Strong Recommendation Very low quality evidence
1.5	Children with asplenia and hyposplenia who are not high risk for overwhelming post-splenectomy infection and who have received their pneumococcal vaccination: a) Should receive antibiotic prophylaxis for at least 2 years post splenectomy. AND b) Can stop antibiotic prophylaxis at age 5 years in consultation with a specialist.	Strong Recommendation Moderate quality evidence
1.6	Children at high risk for pneumococcal infection should receive life-long antibiotic prophylaxis.	Strong Recommendation, Low quality evidence
1.7	Families non-compliant with antibiotic prophylaxis should be instructed to have available a stand-by supply of prophylactic antibiotics and give their child a dose if their child has a fever or suspect a fever and seek medical attention immediately.	Strong Recommendation Very low quality evidence
2. Optimal timing of vaccines around splenectomy		
2.1	All children should be vaccinated at least 14 days prior to a splenectomy if not previously immunized. In the case of an emergency splenectomy, all children who were not previously vaccinated should be vaccinated 14 days post-splenectomy.	Strong Recommendation, Moderate quality evidence
3. Pneumococcal vaccine		
3.1	All previously unvaccinated children 2 years and older should receive one dose of the pneumococcal conjugate vaccine (PCV13) followed at least 8 weeks later by the pneumococcal polysaccharide vaccine (PPV23).	Strong Recommendation, Low quality evidence
3.2	All children who previously received only pneumococcal polysaccharide vaccine should receive one dose of pneumococcal conjugate vaccine (PCV13) at least 8 weeks after receipt of the polysaccharide vaccine.	Conditional Recommendation Very low quality evidence
3.3	All children who have received pneumococcal conjugate vaccine (PCV7 or PCV10) should receive a dose of PCV13 as soon as possible (or at least 4 weeks after the last dose of pneumococcal conjugate vaccine).	Conditional Recommendation Very low quality evidence

Recommendation		Evidence*
3.4	A single booster dose with the pneumococcal polysaccharide vaccine (PPV23) should be given: a. If 11 years or older at time of primary vaccination revaccinate at 5 years post splenectomy. b. If 10 years or less at time of primary vaccination revaccinate at 3 years post splenectomy.	Strong Recommendation, Low quality evidence
4. Meningococcal vaccine		
4.1	All children with asplenia and hyposplenia should receive the meningococcal quadrivalent conjugate vaccine ACYW: a) 2 to less than 12 months: 2-3 doses given 8 weeks apart with another dose between 12 and 23 months and at least 8 weeks from the previous dose. (Menveo™) b) 12 to 23 months: 2 doses at least 8 weeks apart. (Menveo™) c) 2 years and older: 1 dose. (Menveo™ or Menactra™ can also be used)	Strong Recommendation, Low quality evidence
4.2	All children 1 year and older with asplenia and hyposplenia not previously vaccinated should receive 1 dose of the meningococcal conjugate C vaccine and: a) 2 doses of the meningococcal quadrivalent conjugate vaccine ACYW (Menveo™) if 12-23 months. b) 1 dose of the meningococcal quadrivalent conjugate vaccine ACYW (Menveo™ or Menactra™) if 2 years and older. All vaccines should be given at least 8 weeks apart.	Strong Recommendation, Very low quality evidence
4.3	All children with asplenia and hyposplenia over 5 years of age should receive a booster dose with quadrivalent meningococcal conjugate ACYW vaccine. Either Menveo™ or Menactra™ can be used. a) For those vaccinated at 6 years of age and under: provide a booster dose 3-5 years after the last dose, followed by every 5 years. b) For those vaccinated at 7 years of age and older: provide a booster dose 5 years after the last dose, followed by every 5 years.	Strong Recommendation, Very low quality evidence
4.4	All children with asplenia and hyposplenia should receive the meningococcal serogroup B (4CMenB) vaccine. a) 2-5 months: 3 doses at least 1 month apart and a booster dose at 12-23 months b) 6-11 months: 2 doses at least 2 months apart and a booster dose at 12-23 months (at least 2 months after the 2nd dose) c) 12 months-10 years: 2 doses at least 2 months apart d) 11-17 years: 2 doses at least 1 month apart	Strong Recommendation Very low quality evidence
5. *Haemophilus influenzae* vaccine		
5.1	All children with asplenia and hyposplenia who have not been previously vaccinated should receive the *Haemophilus influenzae* type B vaccine.	Strong Recommendation, Low quality evidence

Recommendation		Evidence*
5.2	All children 5 years of age and older with asplenia and hyposplenia should receive a dose of *Haemophilus influenzae* type B vaccine regardless of vaccination history.	Strong Recommendation, Very low quality evidence
6. Influenza vaccine		
6.1	All children with asplenia and hyposplenia 6 months of age and older should receive the influenza vaccine once a year.	Strong Recommendation, Moderate quality evidence
7. Management of fever		
7.1	A blood culture should be collected at presentation to the hospital or clinic.	Strong recommendation Very low quality evidence
7.2	Parenteral antibiotics should be given within 60 minutes of presentation to the hospital or clinic.	Strong recommendation Very low quality evidence
7.3	Children less than 2 months of age should be treated with cefotaxime and ampicillin in order to provide added protection for *E. coli* and *Klebsiella* bacteria that can cause OPSI in this age group. If the child is critically ill or showing signs of meningitis, vancomycin should be added.	Strong recommendation Very low quality evidence
7.4	Children 2 months and older should be treated with a third generation cephalosporin. If the child is critically ill or showing signs of meningitis, vancomycin should be added.	Strong recommendation Very low quality evidence
7.5	If patient has a confirmed anaphylaxis to penicillin, meropenem can be used as an alternative.	Strong recommendation Very low quality evidence
7.6	A macrolide should be added in the treatment of fever or infection to: a) Children 6 months and greater with respiratory symptoms suggestive of atypical pneumonia or mycoplasma. OR b) Children who intermittently take their prophylactic antibiotics as these children are at increased risk of resistance.	Strong recommendation Very low quality evidence
7.7	When culture and sensitivity results indicate the organism is penicillin susceptible switch to penicillin. For children allergic to penicillin, clindamycin can be administered.	Strong recommendation Very low quality evidence
8. Health professional record keeping and education to children and families		
8.1	Families and patients should be well educated about the potential signs of infection, associated risks and management and prevention of overwhelming post-splenectomy infections.	Strong recommendation Very low quality evidence
8.2	Families of children with a fever should be instructed to immediately take an age appropriate amount of their prophylactic antibiotic if they haven't already and seek immediate medical attention.	Strong recommendation Very low quality evidence
8.3	Children and families should be educated as to the potential risk of overseas travel, with special emphasis on malaria and unusual infections, for example resulting from tick and animal bites.	Strong recommendation Very low quality evidence

Recommendation		Evidence*
8.4	Patients should be given appropriate written or electronic information and carry a card to alert health professionals to the risk of overwhelming infections.	Strong recommendation Very low quality evidence
8.5	Patients may wish to invest in an alert bracelet or pendant.	Strong recommendation Very low quality evidence
8.6	Patients should be given written information of their vaccination and re-vaccination status.	Strong recommendation Very low quality evidence
8.7	Pediatricians and general practitioners should make sure children with asplenia are up-to-date on all their vaccines.	Strong recommendation Very low quality evidence

*using “GRADE” criteria (Appendix E in full guideline)

For more information see full APPHON/ROHPPA guideline:
“**Guideline for the Prevention and Empiric Therapy of Bacterial Infections for Children with Asplenia and Hyposplenia” -** http://www.apphon-rohppa.com/