

ANTIBIOTIC PROPHYLAXIS FOR NON-SURGICAL PROCEDURES

Chapter

6

BACTERIAL ENDOCARDITIS PROPHYLAXIS

The European Society of Cardiology guidelines (ESC 2015) limit antibiotic prophylaxis to patients who have the highest risk of infective endocarditis (IE) undergoing high-risk dental procedures. The ESC highlights the importance of oral and cutaneous hygiene measures. They have also recognised that there is an increase in IE due to staphylococci and an increase in healthcare-associated IE, thereby highlighting the importance of non-specific infection prevention measures.

CARDIAC CONDITIONS AT HIGHEST RISK OF INFECTIVE ENDOCARDITIS FOR WHICH PROPHYLAXIS IS RECOMMENDED WHEN A HIGH-RISK PROCEDURE IS PERFORMED:

- Patients with a prosthetic valve or if prosthetic material is used for cardiac valve repair
- Patients with previous IE
- Patients with congenital heart disease
 - Any type of cyanotic congenital heart disease, without surgical repair or with residual defects, palliative shunts or conduits
 - Congenital heart disease with complete repair with prosthetic material whether placed by surgery or by percutaneous technique up to six months after the procedure
 - When a residual defect or valvular regurgitation persists at the site of implantation of any prosthetic material or device by cardiac surgery or percutaneous technique



NOTE

Antibiotic prophylaxis is no longer recommended for other forms of valvular or congenital heart disease, i.e. bicuspid aortic valve, mitral valve prolapsed and calcific aortic stenosis.

NON-SPECIFIC PREVENTION MEASURES TO BE FOLLOWED IN HIGH-RISK AND INTERMEDIATE-RISK PATIENTS


- Dental and cutaneous hygiene must be strictly followed
- Dental follow-up should be performed six monthly in high-risk patients and yearly in other patients
- Wounds must be disinfected
- Antibiotics must be prescribed for any focus of bacterial infection
- Eradicate or decrease the chronic bacterial load on the skin and in urine
- Discourage piercing and tattooing
- Infection control measures must be strictly applied to any at-risk procedure
- The use of infusion catheters and invasive procedures must be limited where possible.
- Favour peripheral over central catheters and systematic replacement of the peripheral catheter every three to four days. Care bundles must be strictly followed for central and peripheral cannulae.

RECOMMENDATIONS FOR PROPHYLAXIS ACCORDING TO THE TYPE OF PROCEDURE

DENTAL PROCEDURES

Antibiotic prophylaxis should only be considered for dental procedures requiring manipulation of the gingival or periapical region of the teeth or perforation of the oral mucosa (including scaling and root canal procedures). Implants are not contraindicated in all patients although the indication should be discussed on an individual case basis.

Antibiotic prophylaxis is not recommended for local anaesthetic injections in non-infected tissue, removal of sutures, dental X-rays, placement or adjustment of removable prosthodontic or orthodontic appliances or braces. Prophylaxis is also not recommended following the shedding of deciduous teeth or trauma to the lips or oral mucosa.

 PROPHYLACTIC ANTIBIOTICS USED FOR DENTAL PROCEDURES¹				
SITUATION	ANTIBIOTIC	ADULTS	CHILDREN ^{**}	TIME BEFORE PROCEDURE
Oral prophylaxis	Amoxicillin or ampicillin	2 g PO	50 mg/kg PO	1 hour
Unable to take oral medicine	Ampicillin	2 g IV	50 mg/kg IV	30 minutes
Allergic to penicillin and able to take oral medicine	Cephalexin*	2 g PO	50 mg/kg PO	1 hour
	OR Clindamycin	600 mg PO	20 mg/kg PO	1 hour
	OR Azithromycin	500 mg PO	15 mg/kg PO	1 hour
	OR Clarithromycin	500 mg PO	15 mg/kg PO	1 hour
Allergic to penicillin and unable to take oral medicine	Cefazolin/ Ceftriaxone*	1 g IV	50 mg/kg IV	30 minutes
	OR Clindamycin	600 mg IV	20 mg/kg IV	30 minutes

*Cephalosporins should not be used in patients with anaphylaxis, angio-oedema or urticaria after administration of penicillins or other β -lactams.

**Paediatric dose should not exceed the adult dose.

RESPIRATORY TRACT PROCEDURES

Antibiotic prophylaxis is not recommended for respiratory tract procedures, including bronchoscopy or laryngoscopy, transnasal or endotracheal intubation.

An antibiotic regimen is recommended for high-risk cardiac patients where there is incision of the respiratory mucosa or who undergo an invasive respiratory tract procedure to treat an established infection, e.g. drainage of an abscess. The antibiotic should be active against the viridans group of streptococci as per the antibiotics used for dental prophylaxis. In the case of an infection suspected or known to be caused by *S. aureus*, the regimen should contain an anti-staphylococcal penicillin or cephalosporin. Vancomycin should be given to patients with a penicillin allergy.

GASTROINTESTINAL OR UROGENITAL PROCEDURES

Antibiotic prophylaxis is not recommended for transoesophageal echocardiography, gastroscopy, colonoscopy, cystoscopy, vaginal or caesarean delivery.

An antibiotic regimen is recommended in the case of an established infection or if antibiotic therapy is indicated to prevent wound infection or sepsis associated with a gastrointestinal or genitourinary tract procedure in high-risk patients. The regimen must include an agent active against enterococci, e.g. ampicillin, amoxicillin or vancomycin.

Intrauterine devices can be used when other contraceptive methods are not possible and in women at low risk of genital infections.

SKIN AND SOFT TISSUE

An antibiotic regimen is recommended for high-risk patients undergoing surgical procedures involving infected skin (including oral abscesses), skin structure or musculoskeletal tissue. The therapeutic regimen must contain an agent active against staphylococci and β -haemolytic streptococci, e.g. an anti-staphylococcal penicillin or cephalosporin. Vancomycin or clindamycin may be used in patients unable to tolerate a β -lactam antibiotic.

BODY PIERCING AND TATTOOING

Antibiotic prophylaxis is not recommended. Piercing and tattooing procedures should be discouraged in high-risk patients and in patients with native valve disease. Procedures, if undertaken, should be performed under strict sterile conditions.

CARDIAC OR VASCULAR INTERVENTIONS

Perioperative antibiotic prophylaxis must be considered in any patient undergoing implantation of a prosthetic valve, any type of prosthetic graft or pacemakers. Preoperative screening for nasal carriage of *Staphylococcus aureus* is recommended before elective cardiac surgery in order to treat carriers using local mupirocin and chlorhexidine. Systematic local treatment without screening is not recommended. Potential sources of dental sepsis should be eliminated at least two weeks before implantation of a prosthetic valve, intracardiac or intravascular foreign material.

The prophylactic regimen must include an agent active against staphylococci (most frequent microorganisms underlying early prosthetic valve infections are coagulase-negative staphylococci and *Staphylococcus aureus*). Prophylaxis must be started 30–60 minutes before the procedure, repeated if the procedure lasts longer than three hours or blood loss exceeds 1500 mL and terminated 48 hours afterwards. Cefazolin 1 g IV is a commonly used prophylactic antibiotic in this setting.

PROPHYLAXIS FOR PATIENTS WITH ASPLENIA/HYPOSPLENISM

Asplenic patients (surgically removed or congenitally absent) and those with impaired splenic function (e.g. sickle cell disease, splenic infiltration) are at risk for a fulminant sepsis syndrome usually due to the capsulated bacterial pathogens, including *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Neisseria meningitidis*, as well as *Capnocytophaga canimorsus* (after cat or dog bite). They are also at risk of fatal malaria infections.

Active immunisation and administration of prophylactic antibiotics offers protection against many of these pathogens.

WHEN TO IMMUNISE AND START WITH ANTIBIOTICS


- **Elective splenectomy:** Immunisation should be completed at least two weeks prior to surgery. This may require starting the vaccinations 10–12 weeks before the scheduled surgery. Prophylactic antibiotics should be started post-surgery.
- **Emergency splenectomy:** Immunise after the seventh postoperative day. Prophylactic antibiotics should be started immediately.

ACTIVE IMMUNISATION FOR PATIENTS WITH ASPLENIA/HYPOSPLENISM

PNEUMOCOCCAL VACCINATION SCHEDULE FOR PATIENTS WITH ASPLENIA/HYPOSPLENISM

Two types of pneumococcal vaccines are available:

- Conjugate pneumococcal vaccines PCV, e.g. PCV13 (Prevenar®) or PCV10 (Synflorix®). Conjugate vaccines are highly immunogenic in infants as young as two months of age, provide higher antibody titres and induce immunological memory. It has comparable or enhanced immunogenicity compared with PPSV23 in adults.
- Pneumococcal polysaccharide vaccine e.g. PPSV23; (Pneumovax®). This vaccine provides short-term immunity against 23 pneumococcal serotypes.

 PNEUMOCOCCAL VACCINATIONS		
	PRIMARY IMMUNISATION	REVACCINATION/BOOSTERS
Children < 2 years	1 dose PCV at 6, 10 and 14 weeks as per SA vaccine schedule.	1 dose PCV at 12–15 months
Children 2–5 years	1 dose PPSV23 (provided PCV course completed and PCV at > 12 months). If no PCV at > 12 months, then give 1 dose PCV followed by 1 dose PPSV23 at least 8 weeks later.	
Children/ Adolescents 5–18 years	1 dose PPSV23 (provided PCV given > 12 months). If no PCV at > 12 months, then give 1 dose PCV followed by 1 dose PPSV23 at least 8 weeks later.	1 booster dose PPSV23 every 5 years
Adults > 18 years	For patients not previously immunised give 1 dose PCV followed by 1 dose PPSV23 at least 8 weeks later.	1 booster dose PPSV23 every 5 years

MENINGOCOCCAL VACCINATION SCHEDULE FOR PATIENTS WITH ASPLENIA/HYPOSPLENISM

Two types of meningococcal vaccines are available:

- A quadrivalent ACWY meningococcal conjugate vaccine (Menactra®) – this is the preferred vaccine for patients with asplenia/hyposplenia
- A quadrivalent ACWY meningococcal polysaccharide vaccine (Menomune®)

Rx MENINGOCOCCAL VACCINATIONS (CONJUGATE VACCINES)		
	PRIMARY IMMUNISATION	REVACCINATION/BOOSTERS
Children < 2 years	> 6 weeks – ≤ 6 months*: 3 doses conjugate vaccine 8 weeks apart. 4 th dose at 12 months 7 – ≤ 24 months: 2 doses conjugate vaccine 8 weeks apart	
Children 2–5 years	2 doses conjugate vaccine 8 weeks apart	1 booster dose every 5 years
Children/ Adolescents 5–18 years	2 doses conjugate vaccine 8 weeks apart	1 booster dose every 5 years
Adults > 18 years	2 doses conjugate vaccine 8 weeks apart	1 booster dose every 5 years

* Note: Menactra[®] may interfere with the protection conferred by the pneumococcal conjugate vaccine therefore give first dose four weeks after the third dose of PCV where possible. Consult a specialist for advice.


HAEMOPHILUS INFLUENZAE TYPE B VACCINATION SCHEDULE FOR PATIENTS WITH ASPLENIA/HYPOSPLENISM

A conjugate *Haemophilus influenzae* type b (Hib) vaccine is available, either alone (Hiberix[®]) or as part of a multivalent vaccine (Infanrix-Hexa[®], Hexaxim[®]).

Rx HAEMOPHILUS INFLUENZAE TYPE B VACCINATIONS		
	PRIMARY IMMUNISATION	REVACCINATION/BOOSTERS
Children < 2 years	1 dose Hib vaccine at 6, 10 and 14 weeks as per SA vaccine schedule	1 dose Hib vaccine at 18 months
Children 2–5 years	If full initial course given then no additional doses needed If ≤ 1 dose given before 12 months: Give 2 doses Hib vaccine 8 weeks apart If 2 doses given before 12 months: 1 dose Hib vaccine should be given	
Children/ Adolescents 5–18 years	1 dose Hib vaccine	No need for booster doses
Adults > 18 years	1 dose Hib vaccine	No need for booster doses


INFLUENZA VACCINATION SCHEDULE FOR PATIENTS WITH ASPLENIA/HYPOSPLENISM

The trivalent inactivated influenza virus vaccine should be given to asplenic/hyposplenic patients.

 INFLUENZA VIRUS VACCINATIONS		
	PRIMARY IMMUNISATION	REVACCINATION/BOOSTERS
Children > 6 months to < 9 years	2 doses influenza vaccine 4 weeks apart	Give annual seasonal influenza vaccine
Children > 9 years, adolescents and adults	1 dose influenza vaccine	Give annual seasonal influenza vaccine


ANTIBIOTIC PROPHYLAXIS AND TREATMENT FOR PATIENTS WITH ASPLENIA/HYPOSPLENISM

The administration of oral antibiotics to splenectomised individuals is necessary. These are given either as daily prophylactic antibiotics or as antibiotic therapy if the patient develops a fever. Prophylaxis is also recommended before sinus and airway procedures.


 ANTIBIOTIC PROPHYLAXIS: ASPLENIA/HYPOSPLENISM			
	ANTIBIOTIC RECOMMENDATION	ANTIBIOTIC IF PENICILLIN ALLERGIC	DURATION
Daily prophylaxis for infants and children	Amoxicillin 20 mg/kg (up to 250 mg) PO daily OR Penicillin VK 125 mg PO 12 hourly (< 5 years) Penicillin VK 250 mg PO 12 hourly (≥ 5 years)	Clarithromycin 125 mg PO 12 hourly (< 5 years) Clarithromycin 250 mg PO 12 hourly (≥ 5 years)	Minimum duration: Up to 5 years of age for asplenia/hyposplenia For at least 3 years after splenectomy Consider lifelong if immuno-suppressed or those who have had a severe sepsis event
Daily prophylaxis for adults	Amoxicillin 250 mg PO daily OR Penicillin VK 250 mg PO 12 hourly	Clarithromycin 500 mg PO 12 hourly	Minimum of 3 years Lifelong if immuno-suppressed or those who have had a severe sepsis event
Prophylaxis pre-sinus or airway procedure	Children > 3 months of age and < 40 kg: amoxicillin 50 mg/kg PO one hour before the procedure Adults: amoxicillin 2 g PO 30 to 60 minutes before the procedure		

EMERGENCY ANTIBIOTIC TREATMENT FOR A FEBRILE ILLNESS

Asplenic individuals should seek medical care for any febrile illness, and may need to 'self-medicate'. Patients should have prescribed antibiotics on hand and take them immediately at home before going to hospital.

	EMERGENCY ANTIBIOTIC RECOMMENDATION	EMERGENCY ANTIBIOTIC IF PENICILLIN ALLERGIC
Infants and children	Amoxicillin-clavulanate 90 mg/kg/day PO in two divided doses (max 875 mg/dose)	Clarithromycin 7.5 mg/kg/dose PO 12 hourly (max 500 mg)
Adults	Amoxicillin-clavulanate 875/125 mg PO 12 hourly	Levofloxacin 750 mg PO daily OR Moxifloxacin 400 mg PO daily


If a patient is suspected of having bacteraemia and is being seen at a clinician's surgery or a clinic, empiric antibiotics such as ceftriaxone should be administered immediately, prior to transfer to hospital.

	CEFTRIAXONE DOSE
	Children 100 mg/kg IV or 50 mg/kg IM if immediate IV access cannot be established; adults 2 g IV

PREVENTION OF RHEUMATIC FEVER

PRIMARY PROPHYLAXIS: TREAT THE PHARYNGITIS

- Eradicate group A β -haemolytic *Streptococci* (*S. pyogenes*, GABS) from the throat in order to prevent an initial attack of rheumatic fever.
- Ideally a throat culture should be obtained and if positive for GABS, treat with an antibiotic. A delay in antibiotic prescription pending availability of culture results does not reduce efficacy in acute rheumatic fever prevention.
- A high-risk patient (from three to 21 years) presenting with a sore throat can be empirically treated with an antibiotic without obtaining a throat culture. High-risk patients are those with concurrent or past rheumatic fever or household contact with a person with rheumatic fever.

	ANTIBIOTIC RECOMMENDATION FOR GABS PHARYNGITIS	ANTIBIOTIC RECOMMENDATION FOR GABS PHARYNGITIS IF PENICILLIN ALLERGIC
Children	<p>Benzathine penicillin G:</p> <p>Age 3–5 years: 600 000 U IMI as a single dose</p> <p>Age > 5 years: 1.2 MU IMI as a single dose</p> <p>OR</p> <p>Penicillin VK:</p> <p>< 27 kg: 250 mg PO 12 hourly for 10 days</p> <p>> 27 kg: 500 mg PO 12 hourly 10 days</p> <p>OR</p> <p>Amoxicillin 50 mg/kg/day PO (maximum 1 g per day) for 10 days. May be administered once daily or in two divided doses</p>	<p>Azithromycin 10–20 mg/kg PO once daily for 5 days (maximum dose 500 mg)</p> <p>OR</p> <p>Clarithromycin 15 mg/kg/day PO divided into two doses for 10 days</p>

Rx	Adolescents and adults	Benzathine penicillin G 1.2 MU IMI as a single dose OR Penicillin VK 500 mg PO 12 hourly for 10 days OR Amoxicillin 500 mg PO 12 hourly for 10 days	Azithromycin 500 mg PO once daily for 3 days OR Clarithromycin 500 mg PO 12 hourly or 500 mg modified-release once daily for 10 days
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SECONDARY PROPHYLAXIS: PREVENT RECURRENT PHARYNGITIS

Secondary prophylaxis is indicated for previous documented rheumatic fever, whether or not they have rheumatic heart disease. To prevent infection of the upper respiratory tract by Group A β -hemolytic streptococci, an antibiotic must be administered continuously for a prolonged period.

Rx	ANTIBIOTIC RECOMMENDATION	ANTIBIOTIC IF PENICILLIN ALLERGIC	DURATION
Prophylaxis for children	Benzathine penicillin G: ≤ 30 kg: 600 000 U IMI every 3 weeks > 30 kg: 1.2 MU IMI every 3 weeks OR Penicillin VK 250 mg PO 12 hourly every day	Azithromycin 5 mg/kg PO daily (up to 250 mg)	No carditis: 5 years or until age 21 (whichever is longer) Carditis without residual valve disease: 10 years post an attack Carditis with residual valve disease: 10 years since last episode or until age 40 (whichever is longer)
Prophylaxis for adults	Benzathine penicillin G: 1.2 MU IMI every 3 weeks OR Penicillin VK 250 mg PO 12 hourly every day	Azithromycin 250 mg PO once daily	

REFERENCE

1. Gilbert, DN, et al. 2015. *The Sanford Guide to Antimicrobial Therapy*. 45th Ed. Sperryville, VA: Antimicrobial Therapy Inc.