



Challenges in infective endocarditis: Preventive Strategies

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Infective endocarditis: basic facts

The incidence of infective endocarditis is rising

15–20% of infective endocarditis patients die during their initial hospital admission

A further 10–15% die over the following year

35–45% of cases are caused by oral viridans group Streptococci

A similar proportion are caused by skin-related Staphylococci

40–45% require surgery during the initial hospital admission, often involving prosthetic replacement of one or more heart valves, and a further 10% need surgery in the year after discharge

Many survivors will have significantly reduced quality and length of life

Presentation can be subtle, with malaise, weight loss and fever being the most common presenting symptoms

Classification and definitions

According to location of infection and absence or presence of intracardiac material

Left-sided native valve IE

Left sided prosthetic valve IE (PVE)

- Early PVE (< 1 year)
- Late PVE (>1 year)

Right-sided IE

Device-related IE

- Permanent pacemaker
- Permanent cardioverter-defibrillator

According to the mode of acquisition

Health care associated IE

- Nosocomial (Hospitalisation >48 h before IE)
- Non nosocomial: IE starting <48 h after admission
 - Home based nursing, IV treatment, Haemodialysis, or IV chemotherapy (<30 days before)
 - Hospitalisation in acute care <90 days before IE
 - Resident in a nursing home or long-term facility

Community-acquired IE

Intravenous drug-abuse IE

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IE prevention: main changes

1. The principle of antibiotic prophylaxis when performing procedures at risk of IE in patients with predisposing cardiac conditions is maintained but,
2. Antibiotic prophylaxis must be limited to patients with the highest risk of IE undergoing the highest risk dental procedure.
3. Good oral hygiene and regular dental review are more important than antibiotic prophylaxis to reduce the risk of IE.
4. Aseptic measures are mandatory during venous catheterization and during invasive procedures.
5. Prospective epidemiological studies are needed to evaluate if the reduced use of prophylaxis is associated with a change in the incidence of IE.

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European Heart Journal (2009) 30:2369–2413



Cardiac conditions at highest risk of IE

Recommendations	Class	Level
<p>Antibiotic prophylaxis should only be considered for patients at highest risk of IE:</p> <ol style="list-style-type: none"> 1. Patients with any prosthetic valve, including a transcatheter valve, or those in whom any prosthetic material was used for cardiac valve repair. 2. Patients with previous IE. 3. Patients with congenital heart disease. <ol style="list-style-type: none"> a. Any cyanotic congenital heart disease. b. Any type of congenital heart disease repaired with a prosthetic material whether placed surgically or by percutaneous techniques, up to 6 months after the procedure or lifelong if residual shunt or valvular regurgitation remains. 	IIa	C
Antibiotic prophylaxis is not recommended in other forms of valvular or congenital heart disease.	III	C

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European Heart Journal (2019) 40, 3075–3123 - doi:10.1093/eurheartj/ehz319



Procedures at highest-risk of IE

Recommendations	Class	Level
<p>A. Dental procedures</p> <ul style="list-style-type: none"> • 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. 	IIa	C
<ul style="list-style-type: none"> • Antibiotic prophylaxis is not recommended for local anaesthetic injections in non-infected tissues, treatment of superficial caries, removal of sutures, dental X-rays, placement or adjustment of removable prosthodontic or orthodontic appliances or braces, or following the shedding of deciduous teeth or trauma to the lips and oral mucosa. 	III	C
<p>B. Respiratory tract procedures</p> <ul style="list-style-type: none"> • Antibiotic prophylaxis is not recommended for respiratory tract procedures, including bronchoscopy or laryngoscopy, transnasal or endotracheal intubation. 	III	C
<p>C. Gastrointestinal or urogenital procedures or TOE</p> <ul style="list-style-type: none"> • Antibiotic prophylaxis is not recommended for gastroscopy, colonoscopy, cystoscopy, vaginal or caesarean delivery or TOE. 	III	C
<p>D. Skin and soft tissues procedures</p> <ul style="list-style-type: none"> • Antibiotic prophylaxis is not recommended for any procedure. 	III	C

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Prophylaxis for dental procedures at risk

Situation	Antibiotic	Single-dose 30–60 minutes before procedure	
		Adults	Children
No allergy to penicillin or ampicillin	Amoxicillin or Ampicillin ^a	2 g orally or i.v.	50 mg/kg orally or i.v.
Allergy to penicillin or ampicillin	Clindamycin	600 mg orally or i.v.	20 mg/kg orally or i.v.

^aAlternatively, cephalexin 2 g i.v. for adults or 50 mg/kg i.v. for children, cefazolin or ceftriaxone 1 g i.v. for adults or 50 mg/kg i.v. for children.

^bCephalosporins should not be used in patients with anaphylaxis, angio-oedema, or urticaria after intake of penicillin or ampicillin due to cross-sensitivity^b.

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Non-specific prevention measures

These measures should ideally be applied to the general population and particularly reinforced in high-risk patients.

- Strict dental and cutaneous hygiene. Dental follow-up should be performed twice a year in high-risk patients and yearly in the others.
- Disinfection of wounds.
- Eradication or decrease of chronic bacterial carriage: skin, urine.
- Curative antibiotics for any focus of bacterial infection.
- No self-medication with antibiotics.
- Strict infection control measures for any at-risk procedure.
- Discourage piercing and tattooing.
- Limit the use of infusion catheters and invasive procedure when possible. Favour peripheral over central catheters, and systematic replacement of the peripheral catheter every 3–4 days. Strict adherence to care bundles for central and peripheral cannulae should be performed.

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Prophylactic measures before cardiac or vascular interventions

Recommendations	Class	Level
Pre-operative screening of nasal carriage of <i>Staphylococcus aureus</i> is recommended before elective cardiac surgery in order to treat carriers.	I	A
Peri-operative prophylaxis is recommended before placement of a pacemaker or implantable cardioverter defibrillator implantation.	I	B
Potential sources of sepsis should be eliminated \geq 2 weeks before implantation of a prosthetic valve or other intracardiac or intravascular foreign material, except in urgent procedures.	IIa	C
Peri-operative antibiotic prophylaxis should be considered in patients undergoing surgical or transcatheter implantation of a prosthetic valve, intravascular prosthetic, or other foreign material.	IIa	C
Systematic local treatment without screening of <i>Staphylococcus aureus</i> is not recommended.	III	C

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European Heart Journal (2015) 36, 3075–3123 - doi:10.1093/eurheartj/ehv319



Patients at increased risk of developing infective endocarditis

High-risk:

Patients with a previous history of infective endocarditis

Patients with any form of prosthetic heart valve (including a transcatheter valve)

Those in whom prosthetic material was used for cardiac valve repair

Patients with any type of cyanotic congenital heart disease

Patients with any type of congenital heart disease repaired with prosthetic material, whether placed surgically or by percutaneous techniques, for the first 6 months after the procedure or lifelong if a residual shunt or valvular regurgitation remains

Moderate-risk:

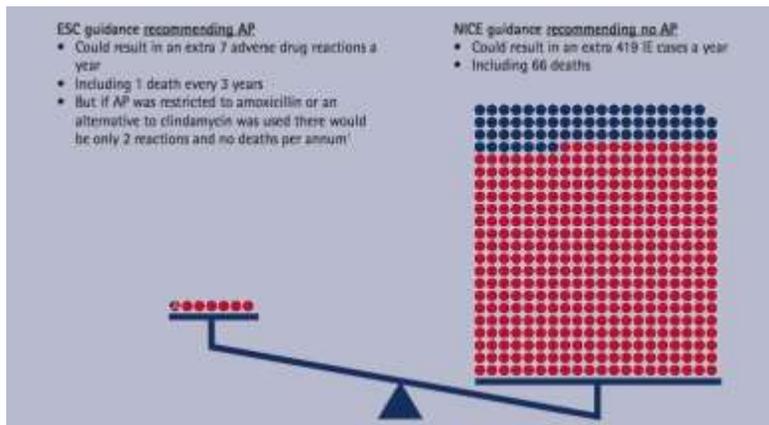
Patients with a previous history of rheumatic fever

Patients with any other form of native valve disease (including the most commonly identified conditions: bicuspid aortic valve, mitral valve prolapse and calcific aortic stenosis)

Patients with unrepaired congenital anomalies of the heart valves

Note: ESC only recommends antibiotic prophylaxis for high-risk patients. Non-specific prevention measures are recommended for both groups. This table has been adapted from the 2015 ESC Guidelines for the management of infective endocarditis with the permission of Oxford University Press (UK) and the European Society of Cardiology. www.escardio.org

To prophylact or not to prophylact, that is the questions?



Main principles of prevention in IE

1. The principle of antibiotic prophylaxis when performing procedures at risk of IE in patients with predisposing cardiac conditions is maintained.
2. Antibiotic prophylaxis must be limited to patients with the highest risk of IE undergoing the highest risk dental procedures.
3. Good oral hygiene and regular dental review are more important than antibiotic prophylaxis to reduce the risk of IE.
4. Aseptic measures are mandatory during venous catheter manipulation and during any invasive procedures in order to reduce the rate of health care-associated IE.
5. Whether the reduced use of antibiotic prophylaxis is really associated with a change in the incidence of IE needs further investigations

What should we do in Egypt?

Antibiotic prophylaxis should be extended to moderate risk patients with high risk dental procedures

Strict hygienic conditions should be emphasized to all population specially oral hygien.

Strict asptic condition should be maintained in hospitals and during surgical procedures

Self medication with antibiotic should be discouraged

Application and reinforcement of hospital quality performance and infection control are mandatory

Thank You

