Infective endocarditis

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Conflict of interest

-No conflicts.
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FAPERJ
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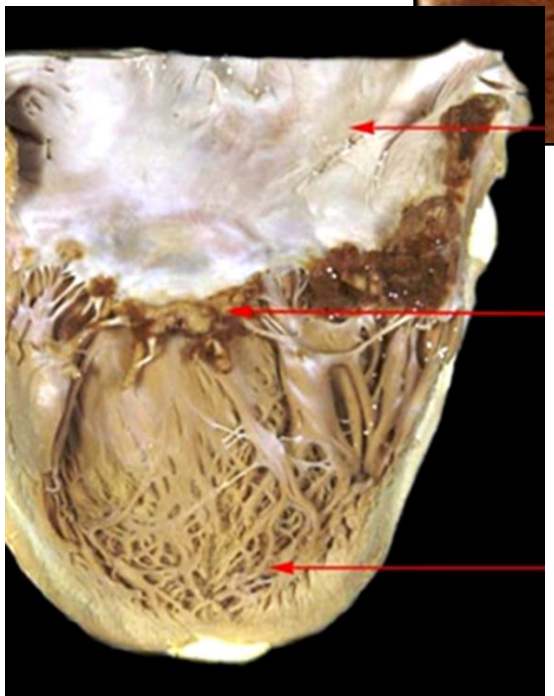
Basic references

- *American Heart Association Guidelines* 2005,2015 (Baddour et al)
- *European Society of Cardiology Guidelines* 2009,2015 (Habib et al)
- *British Guidelines*(Gould et al 2012)

Definition of Infective Endocarditis (IE)

- It is an infection of the endocardium, usually affecting the heart valves, but also the IVS, the walls of heart chambers or intracardiac devices
- Classic clinical triad (Osler's disease):
  - Fever
  - Heart murmur
  - Embolism

Main anatomical feature: vegetation



Incidence and mortality

- 3 a 10 episodes/ 100.000 persons/ years
  - In European and North American studies
  - Brazil? Other developing countries?

- High mortality
  - 15-30% in- hospital
  - 40% 5 years after hospital discharge

Murdoch et al, 2009; Cabell et al, 2002; Habib et al, 2015; Baddour et al, 2015

Epidemiology in adults

- In native valve IE, men are affected twice as often as women(2:1)

- Mean age 57.9 anos (Murdoch et al 2009), but much younger in developing countries -45 years or less (Tariq et al 2004, Garg et al 2005, Letaief et al 2007, Damasco et al 2014, Siciliano et al 2014 , Brandão et al 2015, Mirabel et al 2015)

In Brazil, as well as other developing countries

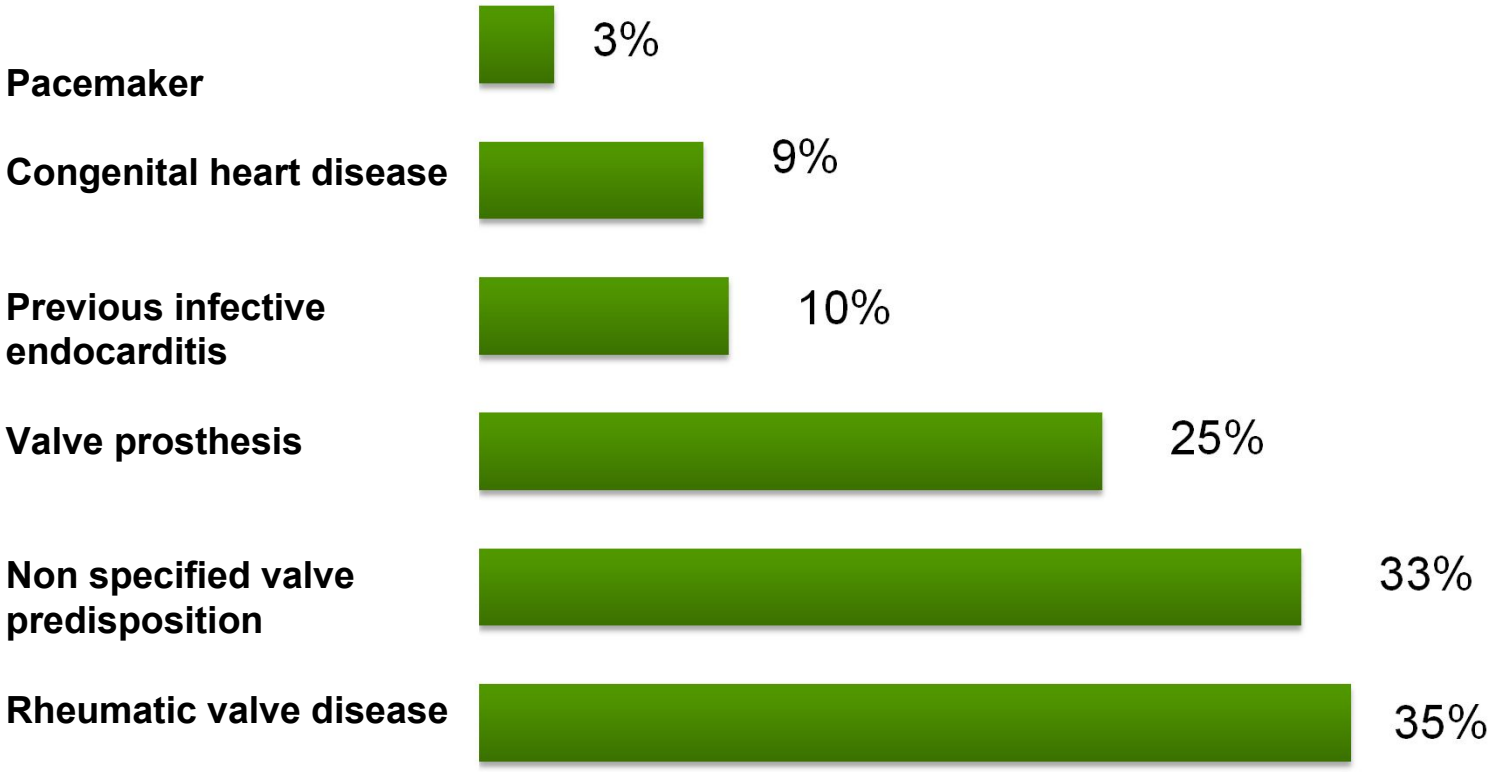
- Rheumatic heart disease (RHD) remains an important predisposition
- Incidence of RHD in IE series varies from 23 to 47%

- Tariq et al 2004, Garg et al 2005, Letaief et al 2007, Siciliano et al 2014 , Brandão et al 2015, Mirabel et al 2015

Other predispositions

- Uncorrected congenital heart disease, bicuspid aortic valve, prosthesis
- As the population ages, calcific degeneration of valves prevails

Predisposition to IE in 136 surgical episodes, INC 2006-2014



Brandão T 2015

Extracardiac risk factors

- Intravenous drug use
- Intravenous lines
- Hemodyalisis catheters and arteriovenous fistulae
- *Importantly intravenous catheters are a growing predispositon for IE, both in hospital and in non-hospital scenarios,*

  ex dialysis clinics

Diagnosis relies heavily on microorganisms isolated from blood cultures

- 3 sets of BC with at least 1 hour interval between them
  - 95% will be positive within 7 days of incubation (Watkin et al, 2003)

- BUT 3- 69% will be negative!!!
  - **Main reason: prior use of antibiotics**
  - Other reasons:
  - Zoonotic , serological diagnosis (*Coxiella* e *Bartonella*)
  - Non infective IE

Fournier et al 2016 (book chapter), Brandão T et al 2015

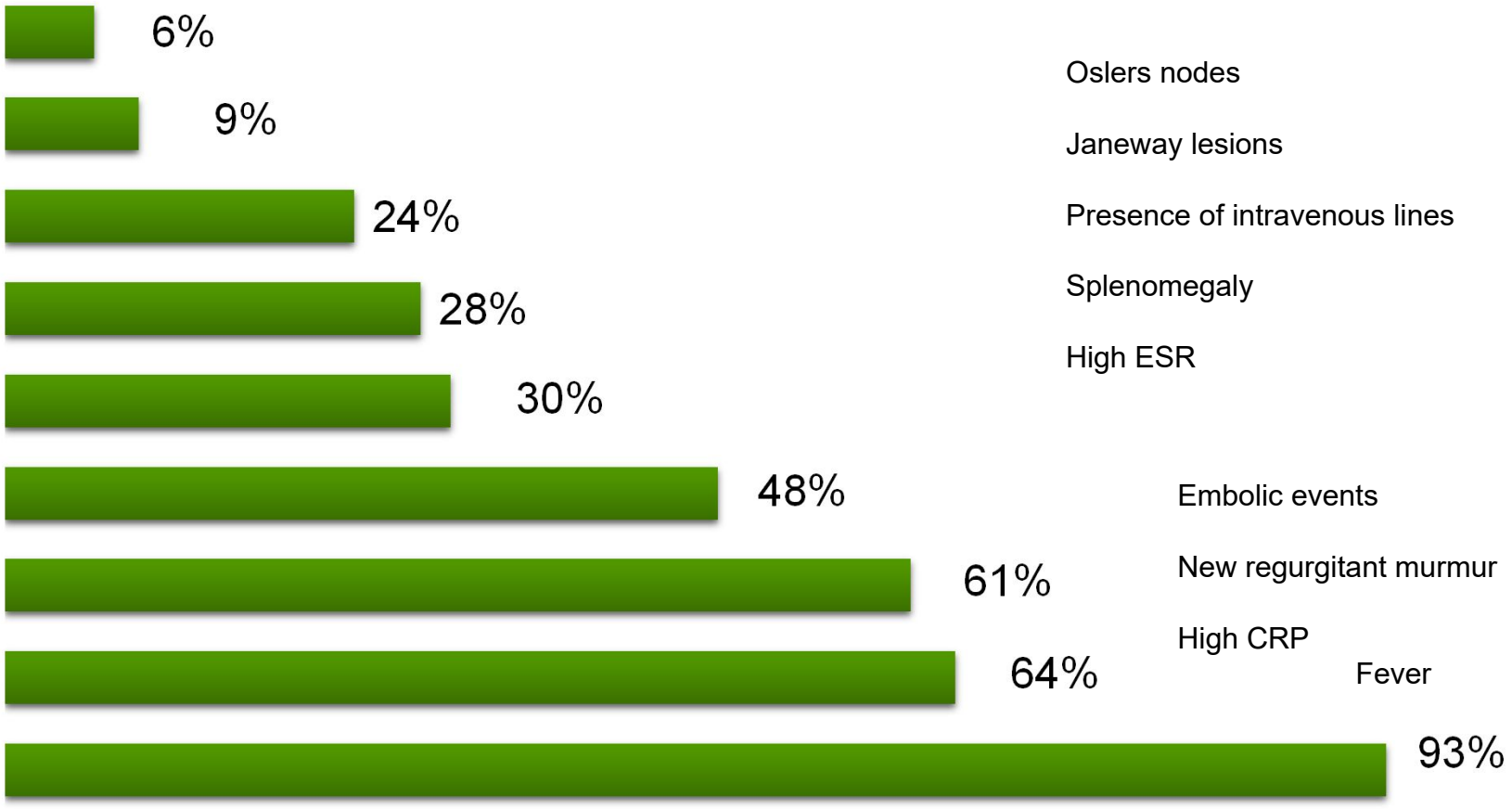
Most frequent pathogens

- *Viridans* group streptococci
- *S.aureus* (including MRSA)
- Coagulase negative staphylococci
- Enterococci
- *Bovis* group streptococci
- Classic, but infrequent: HACEK organisms
- Specific scenarios: Candida, Enterobacteria

Most frequent clinical features

- Classical features present in < 5% of patients (Janeway, Osler´s nodes, etc) in contemporary series
  - Murdoch et al 2009
- Non classical features more present: petechiae, for ex

Clinical and laboratory features in 136 surgical IE, INC 2006-2014



Brandão et al 2016

Janeway lesions
Osler's nodes

TREATMENT CONSIDERATIONS

Surgery

Antibiotic therapy

Left sided IE is a surgical condition in around 50% of cases

- Main indications for surgery are cardiac failure, resulting

from acute aortic or mitral regurgitation leading to cardiogenic shock and pulmonary edema , unresponsive to clinical management

Other indications are:

Intracardiac fistula or abscesss

Severe regurgitation not yet leading to cardiac dysfunction

THESE FEATURES MUST BE IDENTIFIED EARLY, SO AS TO OFFER PATIENTS SURGICAL TREATMENT BEFORE THEIR CARDIAC AND GENERAL CONDITION DETERIORATE FURTHER.

Antibiotic therapy

- Empirical therapy: must get it right
- Often “empirical therapy” will go on as rate of blood culture negative IE is high
- Many choices...
- But:
- Collect blood cultures first
- If patient unwell and needs to start antibiotics straight away, collect 2 sets with a 1 hour interval
- If the patient has a subacute course of disease, collect 3 sets over a period of 6 hours (0, 1 and 6 hours)
    - Gould et al 2012

Scenarios for empirical therapy in native valve IE or late prosthetic valve IE

- SITUATION A
- Subacute course, young patients (<50 years), no recent procedures or hospital admission
- Ampicillin 2 g IV every 4 hours

- SITUATION B
- Subacute course, patients>50 or <50 with procedures or recent hospital admission or men with prostatic disease
- Ampicillin 2 g IV every 4 hours plus gentamicin 2mg/kg IV once daily

If blood cultures turn out negative:

- For situation A, keep ampicilllin.
- For situation B, keep ampicillin+gentamicin or change to ampicillin+ceftriaxone.

If blood cultures turn out negative, no prior antibiotics given and epidemiology is suggestive:

- For *Coxiella burnetii* or *Bartonella* sp ceftriaxone 2 g IV daily + gentamicin 3mg/kg/day in 3 divided doses + doxycycline 100 mg PO BD
- Request serologies!!

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For acute IE in native valves or prosthetic valves older than 1 year:

- Oxacillin 2 g IV 4 -hourly +
  Vancomycin 15 mg to 20 mg/kg BD.
  - Patient must be weighed.
  - First dose of vancomycin is 20 mg/kg.
  - Do not exceed 4 g a day of vanco.
  - If vanco to continue, serum levels mandatory

If vancomicin cannot be used:

- Creatinine clearance 30 to 50 ml/min , allergy to vancomycin or MIC turns out to be >1.5 for vanco in an MRSA , use daptomycin 8 a 10 mg/kg/day IV OD.
- Associate oxacillin or gent or rifampin if native valve
- Associate gentamicin and rifampin if prosthetic valve.

Acute early prosthetic valve IE

- Valve surgery within 2 months

Vancomycin15 mg/kg/dose BD + Gentamicin 2 mg/kg/day OD + Meropenem *2 g TDS + Equinocandine OD.

- Add rifampin after 5 days
- *Empirical treatment will depend on the hospital's microbiota

Prophylaxis

- The risk of IE in oral procedures is small
- Good oral care is the cornerstone
- Use amoxicillin or a macrolide for oral procedures in high-risk patients
- Use ampicillin and gentamicin or vancomycin (if allergy) for urological procedures in high risk patients

- Gould et al 2006, AHA 2007

Prophylaxis given in North American and European guidelines for patients with:

- prosthetic cardiac valve or prosthetic material used for cardiac valve repair
- a history of infective endocarditis
- a cardiac transplant that develops cardiac valvulopathy
- unrepaired cyanotic congenital heart disease, including palliative shunts and conduits or a completely repaired congenital heart defect with prosthetic material or device during the first six months after the procedure or any repaired congenital heart defect with residual defect

- Gould et al 2006, AHA 2007

In our center, we have maintained prophylaxis for:

- Patients with mitral and/or aortic regurgitation due to rheumatic valve disease.
- Patients with bicuspid aortic valve with stenosis or regurgitation.

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