

## Classification

- *Non-infective*: uncommon
  - *Thrombotic* - deposition of fibrin on (L>R) valve in small sterile vegetations (1-5 mm). May be a history of valve damage secondary to Rh F or ischaemia.
  - *Libman-Sacks* - Atypical verrucous endocarditis at autopsy in ~40% of SLE pats.
  - *Malignancy*
- *Infective*: Much more common. Used to be split into acute (normal valves) and subacute (abnormal or prosthetic valves, insidious course). Now more often classified into:
  - *Native valve (NVE)*
  - *Prosthetic valve (PVE)*

The rest of the article concerns **Infective Endocarditis**.

## Risk Factors

- Heart disease
  - Valvular: e.g. Rh F, MV prolapse
  - Structural: e.g. VSD, congenital heart disease
- IVDU - 30x risk of general pop. TV>MV>AV
- Dental - Poor hygiene, procedures (even brushing)
- Recent instrumentation (esp GI, GU).
- Renal dialysis
- Others DM, HIV, M>F, skin infections

## Causes

*Native valve - Non-IVDU*: Strep ~35% (mainly viridans <60y, bovis >60y), *S. aureus* ~30%, *S. epidermidis* ~10%, Enterococci <10%, culture negative ~10%

*IVDU*: *S. aureus* >70%, Strep 15% (mainly viridans), *Candida*, polymicrobial

*Prosthetic valve - Early (contaminant)*: *S. epidermidis* (aka coagulase neg), *S. aureus*

*Late*: Strep viridans, *S. aureus*, *S. epidermidis*, Enterococci (sim to NVE)

*Rarer cases of IE (<10%)*: HACEK (*Haemophilus*, *Acinobacillus*, *Cardiobacterium*, *Eikenella* & *Kingella* spp.), Gram-ve bacilli (e.g. *Pseudomonas*), fungi (rare).

**Pathogenesis** Initial endothelial damage → platelet-fibrin deposits (non-bacterial thrombotic endocarditis → microbial invasion → infected vegetations → local damage (valve dysfunction & even conduction disturbance) & embolisation (bacteraemia, distant ischaemia/infarction by small vessel occlusion)

## Clinical features

*Infection*: Fever, rigors, night sweats, malaise, wt loss, anaemia, late splenomegaly & clubbing

*Cardiac lesions*: New/changed murmur (L>R). AV & bundle blocks (aortic root abscess). CCF.

*Immune complex deposition*: Vasculitis may affect any vessel. Microscopic haematuria is common; GN & ARF. Roth spots (boat-shaped retinal haemorrhage with pale centre); splinter haemorrhages, Osler's nodes (tender) Janeway lesions (painless) are pathognomonic.

*Embolic phenomena*: Emboli may cause infarction/abscesses in the relevant organ e.g. brain, heart, kidney, spleen, GI tract. In right sided endocarditis, pulmonary abscesses may occur.

**Prosthetic valve endocarditis may be sub-acute with absence of classical signs.**

## Diagnosis

**Bloods:** FBC (haemolytic anaemia, ↑WCC), high ESR/CRP. Also check U&E, Mg<sup>2+</sup>, LFTs. Serology (C3, C4, RF, ANA), cultures (≥3 sets at different sites ±times, >90% Dx from first 2; <10% neg).

**Urinalysis** microscopic haematuria.

**CXR** (cardiomegaly, pneumonia, APO) and **ECG** (RBBB, prolonged PR interval) at regular intervals.

**Echocardiography** Transoesophageal more sensitive than transthoracic and better for visualising mitral lesions and possible development of aortic root abscess. Still ~10% false neg rate with repeated TOE.

**Definitive diagnosis is based on the Duke criteria:** 2 major OR 1 major and 3 minor OR all 5 minor criteria:

**Major Criteria:** Positive (typical x 2 or persistent) blood culture, positive ECHO (vegetation, abscess, dehisced valve)

**Minor criteria:** Predisposition (cardiac lesion; IV drug abuse), fever >38°C, vascular/immunological signs, positive blood culture that don't meet major criteria, positive ECHO that doesn't meet major criteria

**Management** Liaise early with a microbiologist and a cardiologist.

- Resus if respiratory or CVS compromise
- Antibiotics: for 2-6 weeks

**Empirical IV therapy:** benzylpenicillin 1.8g q4h + gentamicin 4-6mg/kg od + flucloxacillin 2g q6h IV. If penicillin sensitivity, prosthetic valve, acquired in hospital, or community MRSA suspected use vancomycin 1g q12h + gentamicin 4-6mg/kg od

- Consider surgery if: CCF, valvular obstruction; repeated emboli; fungal endocarditis; persistent bacteraemia; S.aureus, myocardial abscess; unstable infected prosthetic valve.
- Anticoagulation not proven to prevent embolic events and risk of ICH. Stop in S.aureus (particularly high risk) endocarditis, consider stopping in other cases.

**Prognosis** Overall mort=20-25%. Prosthetic (50%)>Native. Better if R sided IVDU (10%). Worse if CCF (>50%). Also org-dep: 50% with pseudomonas, >30% with staph; 14% with bowel orgs; 6% with sensitive streptococci. Relapse <10% with native valves, sl higher with prosthetic.

**Prophylaxis** No evidence for benefit. Decision to give based on risk from cardiac lesion & proc. If both high → then prophylaxis. If only 1 is high prophylaxis should probably be given else not.

### Cardiac Lesions

- **High risk:** prosthetic valves, cyanotic CHD, surgical L→R shunts, MVP+MR, prev. endocarditis
- **Medium risk:** Other cong. heart disease, acq. valve disease, HOCM, surg sys-pulm shunts.

### Procedures

- **High Risk** -Dental (extraction, periodontal surgery, re-implantation), resp tract surgery or biopsy, GU (prostatic surgery, cystoscopy, circ, surg if infection present), GI (variceal surgery, ERCP, Biliary tract surgery, Intestinal surgery but not endoscopy)  
(Other areas - I&D of abscess - use antibiotics appropriate for local infection.)
- **Medium risk:** Other dental work that might cause 'significant bleeding',

### Antibiotic regimes

- **Dental/RT** - amoxicillin 2g IV immed prior to proc OR PO 1 hr pre-proc.  
If penicillin sensitive: clindamycin 600mg IV 20mins pre-proc OR PO 1hr pre-proc.
- **GU/GIT** - gentamicin 2mg/kg IV immed prior to proc  
PLUS amoxicillin 2g IV immed prior to proc OR PO 1 hr pre-proc. and 1g PO 6hrs post proc.  
If penicillin sensitive: gentamicin plus vancomycin 1g IV infused pre-proc.