The normal **pericardial** sac contains about 50 ml of fluid, similar to lymph, which lubricates the surface of the heart. The pericardium limits distension of the heart, contributes to the haemodynamic interdependence of the ventricles, and acts as a barrier to infection

ACUTE PERICARDITIS

Pericardial inflammation may be due to infection, immunological reaction, trauma or neoplasm (Box 18.133) and sometimes remains unexplained. Pericarditis and myocarditis often coexist, and all forms of pericarditis may produce a pericardial effusion

Common

Acute myocardial infarction

Viral (e.g. Coxsackie B, but often not identified)

Less common

Uraemia

Malignant disease

Trauma (e.g. blunt chest injury)

Connective tissue disease (e.g. SLE)

Rare (in UK)

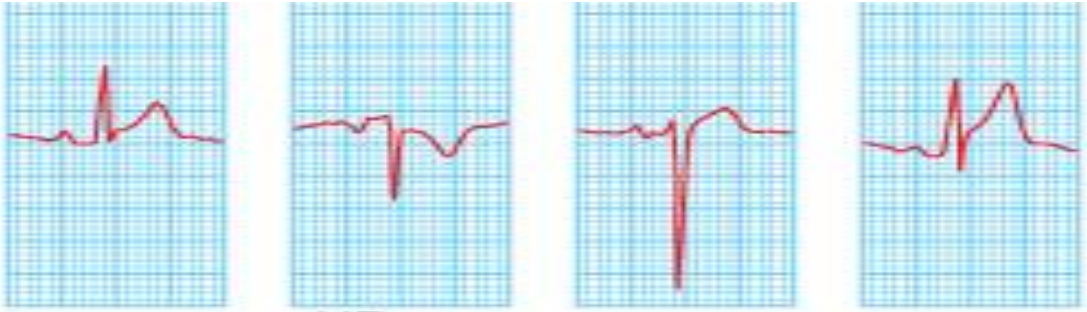
Bacterial infection

Rheumatic fever

Tuberculosis

Clinical features The characteristic pain of pericarditis is retrosternal, radiates to the shoulders and neck and is typically aggravated by deep breathing, movement, a change of position, exercise and swallowing. A low-grade fever is common. A pericardial friction rub is a high-pitched superficial scratching or crunching noise produced by movement of the inflamed pericardium, and is diagnostic of pericarditis; it is usually heard in systole but may also be audible in diastole and frequently has a 'to-and-fro' quality.

Investigations The ECG shows ST elevation with upward concavity (Fig. 18.106) over the affected area, which may be widespread. PR interval depression is a very sensitive indicator of acute pericarditis. Later, there may be T-wave inversion, particularly if there is a degree of myocarditis



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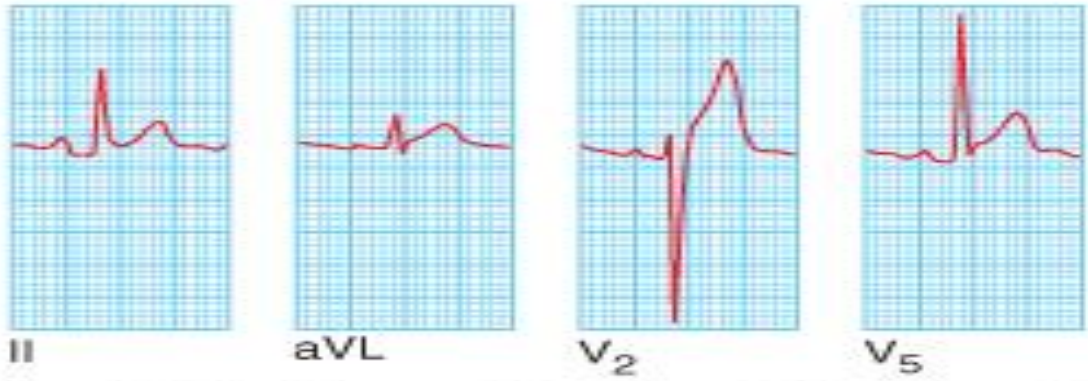

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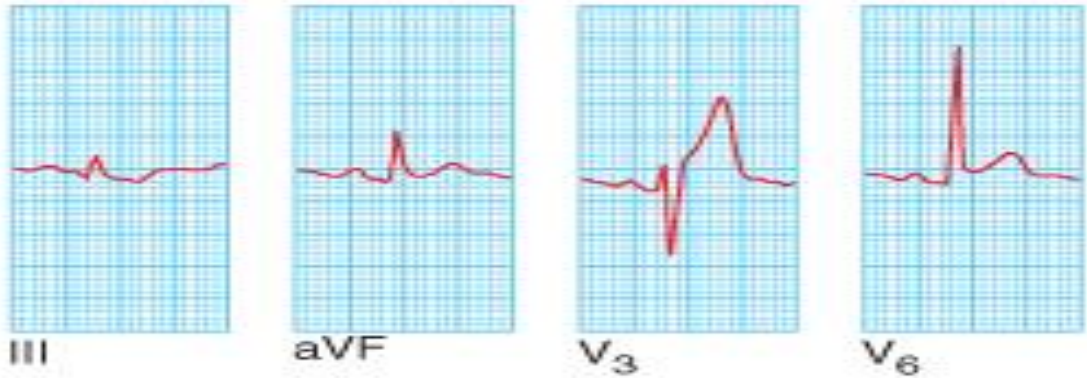


TREATMENT

The pain is usually relieved by aspirin (600 mg 4-hourly), but a more potent anti-inflammatory agent such as indometacin (25 mg 8-hourly) may be required. Corticosteroids may suppress symptoms but there is no evidence that they accelerate cure. In viral pericarditis, recovery usually occurs within a few days or weeks, but there may be recurrences (chronic relapsing pericarditis). Purulent pericarditis requires treatment with antimicrobial therapy, paracentesis and, if necessary, surgical drainage

Cardiac tamponade This term is used to describe acute heart failure due to compression of the heart by a large or rapidly developing effusion. Typical physical findings are of a markedly raised jugular venous pulse, hypotension, pulsus paradoxus (p. 526) and oliguria. Atypical presentations may occur when the effusion is loculated as a result of previous pericarditis or cardiac surgery

INFECTIVE ENDOCARDITIS

Infective endocarditis is due to microbial infection of a heart valve (native or prosthetic), the lining of a cardiac chamber or blood vessel, or a congenital anomaly (e.g. septal defect). The causative organism is usually a bacterium, but may be a rickettsia, chlamydia or fungus

Pathogenesis

Haemodynamic Factors •

Bacterial colonisation more likely to occur around – lesions with high degrees of tubulence

eg. small VSD, valvular stenosis •

Large surface areas, low flow and low turbulence – are less likely to cause IE

eg large VSD, •

Pathogenesis

Bacteraemia •

Transient bacteraemia occurs when a heavily colonised – mucosal surface is traumatised

Dental extraction •

Periodontal surgery •

Tooth brushing •

Tonsillectomy •

Operations involving the respiratory, GI or GU tract mucosa •

Oesophageal dilatation •

Biliary tract surgery •

Infective Endocarditis

- Majority of cases caused by streptococcus, staphylococcus, enterococcus, or fastidious gram negative cocco-bacillary forms
- Gram negative organisms
  - P. aeruginosa most common
  - HACEK - slow growing, fastidious organisms that may need 3 weeks to grow out of culture
    - Haemophilus sp.
    - Actinobacillus
    - Cardiobacterium
    - Eikenella
    - Kingella

- Aortic valve more common than mitral

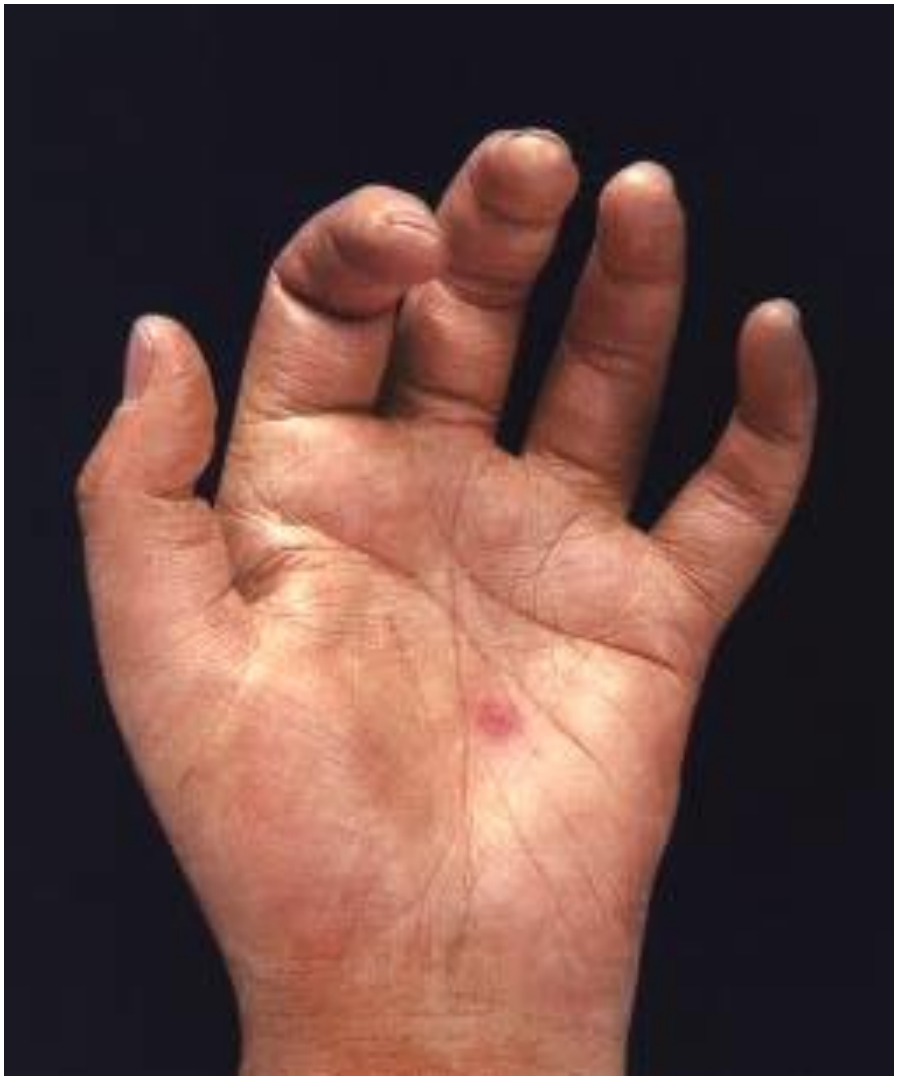
18.119 INFECTIVE ENDOCARDITIS ON NATIVE PREVALENCE OF ORGANISMS IN EUROPE AND NORTH AMERICA (% OF CASES)

Bacteria	
• Streptococci	
Viridans group	30-40%
Enterococci	10-15%
Other streptococci	20-25%
• Staphylococci	
Staph. aureus	9-27%
Coagulase-negative	1-3%
• Gram-negative bacilli	Total 3-8%
• Haemophilus	
• Anaerobes	
Other organisms	
• Rickettsiae, fungi	< 2%

Clinical Manifestations

- Fever, most common symptom, sign (but may be absent)
- Anorexia, weight-loss, malaise, night sweats
- Heart murmur
- Petechiae on the skin, conjunctivae, oral mucosa
- Splenomegaly
- Right-sided endocarditis is not associated with peripheral emboli/phenomena but pulmonary findings predominate

Janeway Lesions



Subconjunctival haemorrhages
(2–5%)

'Varying' murmurs
(90% new or changed murmur)
Conduction disorder
(10–20%)
Cardiac failure
(40–50%)

Haematuria
(60–70%)

Osler's nodes
(5%)

Petechial rash
(40–50%, may be transient)

Loss of pulses

Cerebral emboli
(15%)

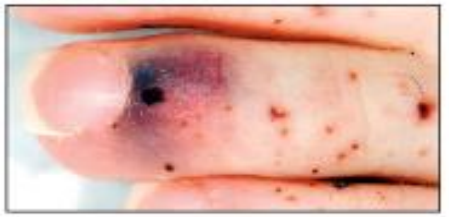
Roth's spots in fundi
(rare, < 5%)

Petechial haemorrhages on mucous membranes and fundi
(20–30%)

Poor dentition

Splenomegaly
(30–40%, long-standing endocarditis only)

Systemic emboli
(7%)
Nail-fold infarct



Digital clubbing
(10%, long-standing endocarditis only)

Splinter haemorrhages
(10%)

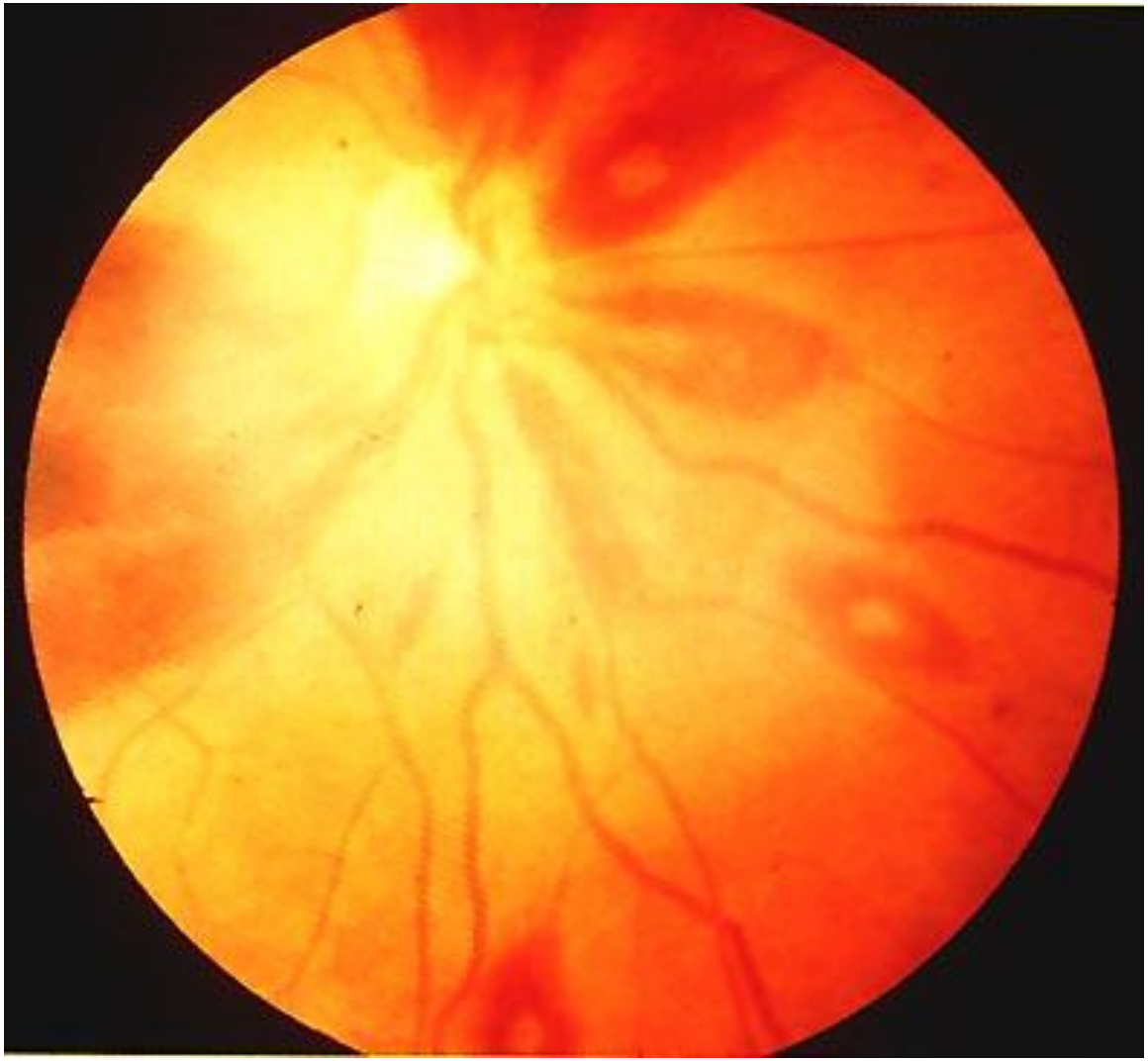
Splinter Hemorrhage

Osler's Nodes:
Painful erythmatous nodular lesions resulting from infective endocarditis

Zitelli & Davis, Pediatric Physical Diagnosis Electronic Atlas, Mosby 2004

Subconjunctival Hemorrhages

Roth's Spots



.121 DIAGNOSIS OF INFECTIVE ENDOCARDITIS (MODIFIED DUKE CRITERIA) **Major criteria**

Positive blood culture

Typical organism from two cultures

Persistent positive blood cultures taken > 12 hours apart

Three or more positive cultures taken over more than 1 hour

Endocardial involvement

Positive echocardiographic findings of vegetations

New valvular regurgitation

Minor criteria

Predisposing valvular or cardiac abnormality

Intravenous drug misuse

Pyrexia ≥38°C

Embolic phenomenon

Vasculitic phenomenon

Blood cultures suggestive-organism grown but not achievingmajor criteria

Suggestive echocardiographic findings

Definite endocarditis: two major, or one major and three minor, or five minor

Possible endocarditis: one major and one minor, or three minor

Investigations

١. Blood culture

٢. Echo

- TTE
- TOE

٣. FBC/ESR/CRP

٤. Rheumatoid Factor

٥. MSU

Prevention

- Prophylactic regimen targeted against likely organism
  - Strep. viridans – oral, respiratory, eosphogeal –
  - Enterococcus – genitourinary, gastrointestinal –
  - S. aureus – infected skin, mucosal surfaces –

Chemoprophylaxis

Adult Prophylaxis: Dental, Oral, Respiratory, Esophageal
Standard Regimen

Amoxicillin 2g PO 1h before procedure or
Ampicillin 2g IM/IV 30m before procedure
Penicillin Allergic
Clindamycin
600 mg PO 1h before procedure or
600 mg IV 30m before
Cephalexin OR Cefadroxil 2g PO 1 hour before
Cefazolin 1.0g IM/IV 30 min before procedure
Azithromycin or Clarithromycin 500mg PO 1h before

Adult Genitourinary or Gastrointestinal Procedures

High Risk Patients
Standard Regimen
Before procedure (30 minutes):
Ampicillin 2g IV/IM AND
Gentamicin 1.5 mg/kg (MAX 120 mg) IM/IV
After procedure (6 hours later)
Ampicillin 1g IM/IV OR
Amoxicillin 1g PO
Penicillin Allergic
Complete infusion 30 minutes before procedure
Vancomycin 1g IV over 1-2h AND
Gentamicin 1.5 mg/kg IV/IM (MAX 120 mg)

Moderate Risk Patients
Standard Regimen
Amoxicillin 2g PO 1h before OR
Ampicillin 2g IM/IV 30m before
Penicillin Allergic
Vancomycin 1g IV over 1-2h, complete 30m before

1-For streptococci

Benzyl penicillin i.v(1.2 g 4-hourly)-4w native valveand 6 w fore prosthetic

. and gentamicin i.v.(1 mg/kg 8-12-hourly)2w

For sensative to pencilline

Vancomycin i.v. 1 g 12-hourly 4w and gentamicin i.v.[2] 1 mg/kg 8-12-hourly 4 week

And 6 w for prosthetic valves

Or ceftriaxone 1gm by 2 or 3

Staphylococci				
Penicillin-sensitive	Benzyl penicillin i.v.	1.2 g 4-hourly	4 week	6 weeks
Penicillin-resistant Meticillin-sensitive	Flucloxacillin i.v.	2 g 4-hourly (< 85 kg 6-hourly)	4 weeks	6 weeks[3]
Penicillin-resistant Meticillin-resistant	Vancomycin i.v. and gentamicin i.v.	1 g 12-hourly 1 mg/kg 8-hourly	4 weeks 4 weeks	6 weeks[3]

18.125 ANTIBIOTIC PROPHYLAXIS AGAINST ENDOCARDITIS

Procedure	Antibiotic regimen
Dental or upper respiratory tract procedures under local anaesthetic	Amoxicillin 3 g orally 1 hr before
If allergic to or received penicillin in last month	Clindamycin 600 mg orally 1 hr before
N.B. Previous endocarditis: treat as special-risk (see below).	
Dental or upper respiratory tract procedures under general anaesthetic	Amoxicillin 1 g i.v. at induction *plus* amoxicillin 0.5 g orally 6 hrs later
If allergic to or received penicillin in last month	Vancomycin 1 g i.v. infusion over at least 100 mins *plus* gentamicin 120 mg i.v. at induction
Special-risk patients, i.e. prosthetic valve or previous endocarditis Genitourinary procedures	Amoxicillin 1 g i.v. *plus* gentamicin 120 mg i.v. at induction *plus* amoxicillin 0.5 g orally 6 hrs later
If allergic to or received	Vancomycin 1 g i.v. infusion over at least
penicillin in last month	100 mins *plus* gentamicin 120 mg i.v. at induction
N.B. Obstetric and gynaecological procedures or gastrointestinal surgery/instrumentation-treat only special-risk patients.	

Surgical Therapy

Indications: •

Congestive cardiac failure –

perivalvular invasive disease –

uncontrolled infection despite maximal antimicrobial therapy –

Pseudomonas aeruginosa*, *Brucella* species*, Coxiella burnetti, •
***Candida* and fungi**

Presence of prosthetic valve endocarditis unless late infection –

Large vegetation –

Major embolus –

Heart block –

MORTALITY

- ***Viridans Streptococci*** **and** ***S. bovis*** **: 4-16%**
- ***Enterococci*****:15-25%**
- ***S. aureus*****: 25-47%**
- ***Q fever*****: 5-37% (17% in Ireland)**
- ***P. aeruginosa,*** **fungi*****, Enterobacteriaceae*** **> 50%**
- **Overall mortality 20-25% and for right-sided endocarditis in IVDA is 10%**