

133/1/1441



CARDIAC INFECTIONS: ARF AND ENDOCARDITIS

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Acute Rheumatic fever (ARF)

OUTLINES

- Etiology.
- Epidemiology
- Pathophysiology
- Jones criteria
- Diagnosis
- Treatment
- Complications
- Prevention
- Prognosis

ETIOLOGY

→ Group A strep. ≡ strep. pyogenes

- Preceded by GAS pharyngitis.
- Antibiotics
- ABT to treat GAS pharyngitis prevents rheumatic fever.
- ABT prophylaxis prevents ARF recurrence
- serotypes of GAS (M types 1, 3, 5, 6, 18, 29) are more frequently isolated

اه أطفال اللي بيصير عندهم rheumatic fever بعد GAS pharyngitis
بتكون احتمالية انه يتكرر عالية جدا مع GAS pharyngitis

له يعني طفل صار معه GAS pharyngitis وبعدها rheumatic fever
فعلى الأرجح تاني مرة بيصير معه GAS pharyngitis وبعدها rheumatic fever
من أول مرة.

* Complications of GAS pharyngitis :

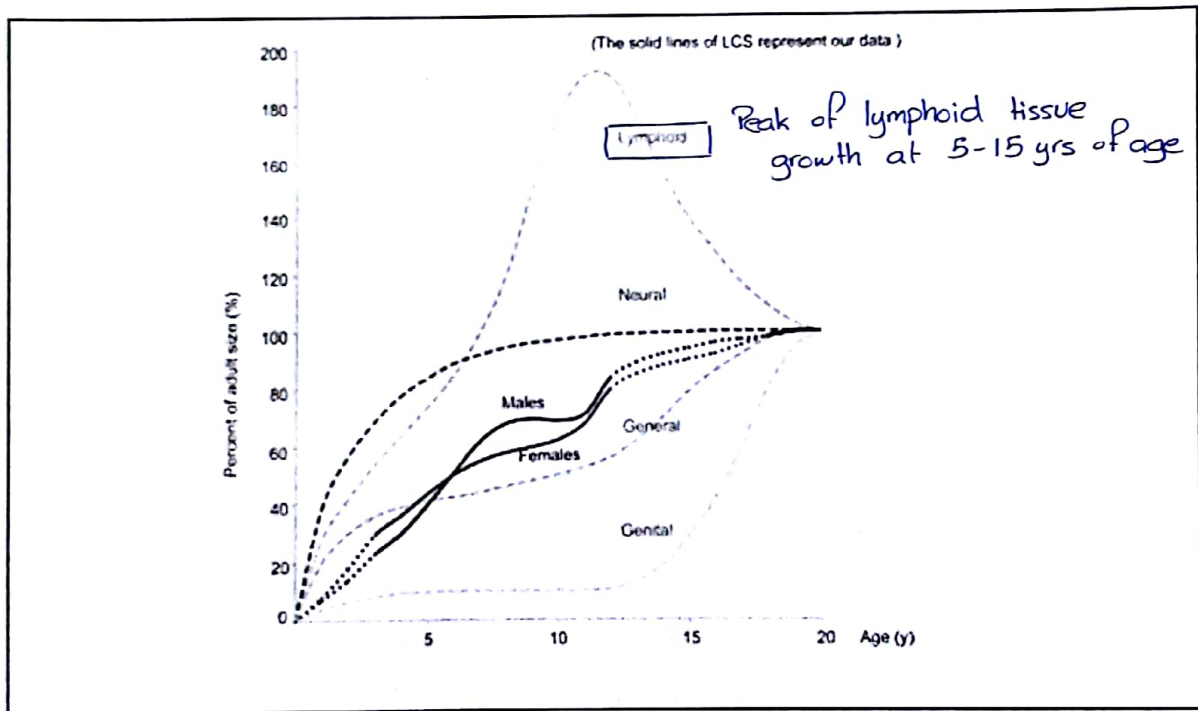
- Rheumatic fever
- Reactive arthritis
- Glomerulonephritis

EPIDEMIOLOGY

• Why more frequent in developing countries:

- Host factors:
 - genetic susceptibility
 - Lack of appropriate medical care.
 - Poverty and crowding.
- Pathogen factors
 - Certain GAS are rheumatogenic serotypes (types 1, 3, 5, 6, and 18)
- Most common form of acquired heart disease
- peaks : 5-15 yr of age → why?! because this is the age of having active lymphatic tissue (the age to get infected)
- Once happened → increased risk of recurrence

* ملاحظة ← أقل من سنين ما مشوف GAS pharyngitis
 (ال pharyngitis بقبل أقل من سنين يكون viral)



لو كسا ها = الاله

PATHOGENESIS

- Cytotoxicity theory:
 - GAS toxin leads to ARF and rheumatic heart disease.
- Immunologic theory
 - Latency.
 - Cross antigenicity of several GAS and tissues (e.g., heart valve, sarcomere, brain, joint)

** Very Important !!*

JONES CRITERIA

MAJOR MANIFESTATIONS	MINOR MANIFESTATIONS	EVIDENCE OF GAS INFECTION
1. Carditis 2. Polyarthritits 3. Erythema marginatum 4. Subcutaneous nodules 5. Chore	1. Arthralgia 2. Fever 3. High ESR or CRP 4. Prolonged P-R <i>↳ 1st degree heart block</i>	1. Positive throat culture 2. or rapid streptococcal <i>titre test</i> 3. or ASO titer <i>↳ بيتوف Ag-Ab ال reaction</i>
<ul style="list-style-type: none"> • Guidelines for the Diagnosis of Initial or Recurrent Attack of Rheumatic Fever (Jones Criteria, Updated 2015) • 2 major or 1 major and 2 minor criteria PLUS evidence of preceding GAS infection needed to diagnose ARF • recurrent ARF: presence of 3 minor criteria PLUS evidence of preceding GAS infection. 		

JONES CRITERIA

- Initial attack:
 - 2 major manifestations, plus evidence of recent GAS infection.
 - Or 1 major and 2 minor manifestations, plus evidence of recent GAS infection.
 - Chorea alone, plus evidence of recent GAS infection.
- Recurrent attack: 2 major, or 1 major and 2 minor, or 3 minor manifestations , plus evidence of recent GAS infection
- Carditis is now defined as clinical and/or subclinical (echocardiographic valvulitis)
- Arthritis: monoarthritis or polyarthralgia

Revised Jones Criterion

Major manifestations

- | | |
|-----------------|------------------------|
| • Carditis | • Erythema marginatum |
| • Polyarthritis | • Subcutaneous nodules |
| • Chorea | |

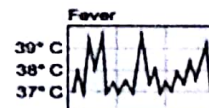
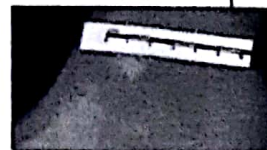
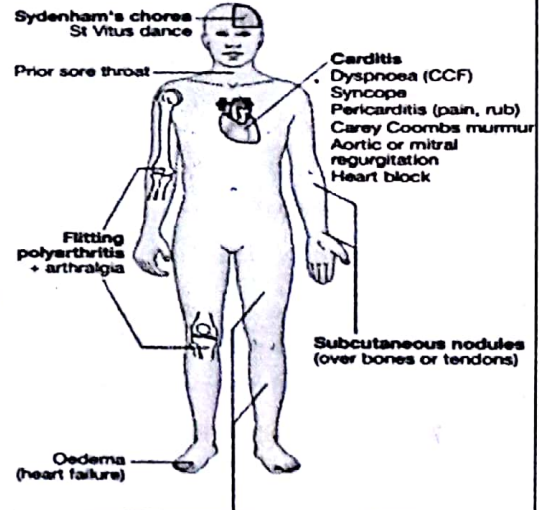
Minor manifestations

- | | |
|----------------------------|-------------------------|
| • Fever | • Raised ESR or CRP |
| • Arthralgia | • Leucocytosis |
| • Previous rheumatic fever | • First-degree AV block |

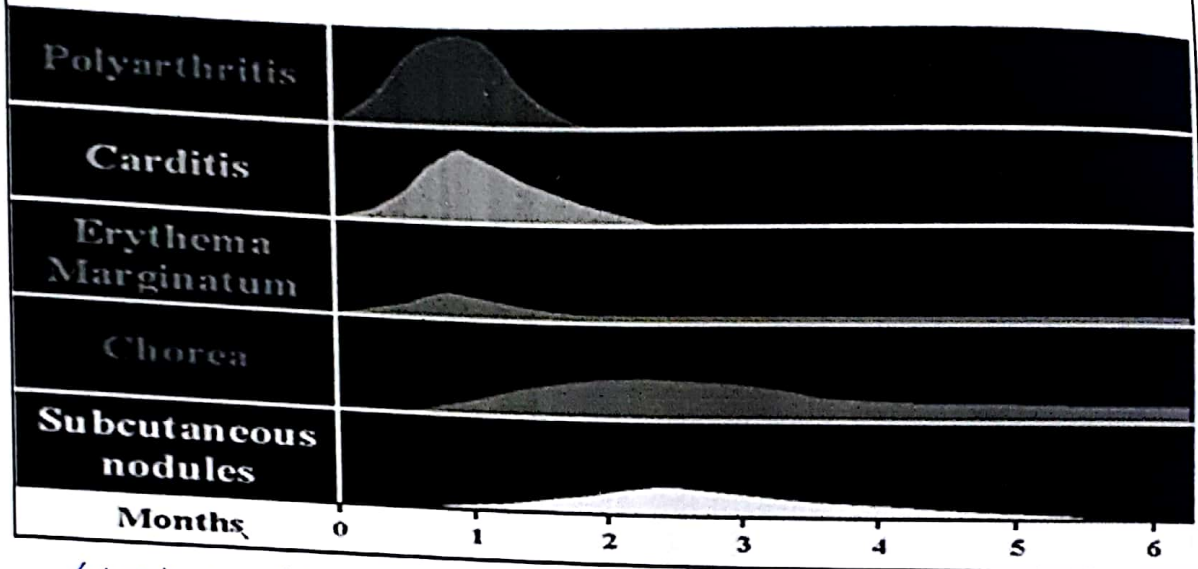
Plus

- Supporting evidence of preceding streptococcal infection: recent scarlet fever, raised antistreptolysin O or other streptococcal antibody titre, positive throat culture

N.B. Evidence of recent streptococcal infection is particularly important if there is only one major manifestation.



Clinical Manifestations of Acute Rheumatic Fever



ال chorea ممكن تطول شوي ... بعدها أشهر لتبلش (بكون راح ال strep)

MIGRATORY POLYARTHRITIS

- In 75% of ARF.
- larger joints (knees, ankles, wrists, and elbows)
- Migratory
- Arthritis is the earliest manifestation
- Last weeks if untreated. → Aspirin
- ★ **Response to salicylates is characteristic** → عشان هيك في كتب بتحكى انه اذا انت ساكك ب rheumatic fever ، آخر الاسبوع لحد ما تتأكد شوي.
- Not deforming
- inverse relationship between the severity of arthritis and severity of cardiac involvement

CARDITIS

- 50-60% of all ARF
- subclinical carditis accepted in revised Jones criteria 2015.
 - subclinical carditis defined: without a murmur but with echocardiographic evidence of valvulitis
 - clinical carditis (with a valvulitis murmur)
- Pancarditis: but mainly Endocarditis (valvulitis)
- **MR** or MR+AR MR → Mitral Regurgitation AR → Aortic Regurgitation
- insufficiency is characteristic
- mitral and/or aortic valvular stenosis usually appears in years
- tachycardia and cardiac murmur
- Most serious ARF complication, May require valve replacement, if recurrent

SYDENHAM CHOREA

- 10-15% of ARF.
- could be isolated, frequently subtle
- Emotional lability, incoordination, poor school performance, uncontrollable movements, and facial grimacing, all exacerbated by stress and disappearing with sleep, are characteristic.
- Later than arthritis or carditis (ASO may disappear when chorea presents)

Occurs in 10-15% of pts with acute RF

- Occasionally unilateral

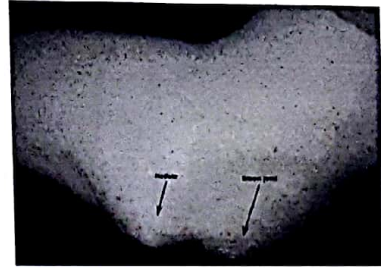
- lasts 3 m to 2-3 yrs , no permanent damage

لكنها مزعجة و علاجها شوي صعب



SUBCUTANEOUS NODULES

- rare ($\leq 1\%$)
- firm nodules
- along the extensor surfaces of tendons near bony prominences
- Corollates with significant rheumatic heart disease.



ERYTHEMA MARGINATUM

- On trunk and extremities, but not on the face
- accentuated by warming the skin

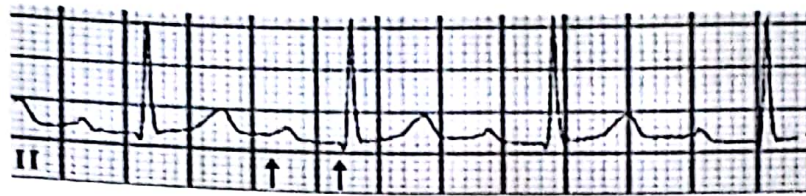


MINOR CRITERIA

minor criteria

يعني إذا ال arthritis موجودة ... ما يستخدم ال arthralgia على إنزها

- Arthralgia: (only if arthritis is not used as a major criterion)
- Fever, more than 38.0°
- elevated acute phase reactants
- prolonged P-R interval on ECG (unless carditis is a major criterion)



- First-degree heart block with prolonged PR interval (interval between arrows), which may be present as a minor criterion for acute rheumatic fever.

RECENT GAS INFECTION

- Must have.
- ARF develops 2-4 wk post GAS pharyngitis.
- 1/3 have no Hx of pharyngitis.
- 80-85% have high ASO.
- 95-100% have an elevation if 3 different antibodies (antistreptolysin O, anti-DNase B, antihyaluronidase) are measured.
- clinical findings of acute rheumatic fever generally coincide with peak antistreptococcal antibody responses.

← واسع جداً

DDX OF ARF

ARTHRITIS	CARDITIS	CHOREA
Juvenile idiopathic arthritis	Viral myocarditis	Huntington chore
Reactive arthritis (e.g., Shigella, Salmonella, Yersinia)	Viral pericarditis	Wilson disease
Serum sickness	Infective endocarditis	SLE
Sickle cell disease Malignancy SLE Lyme disease (Borrelia burgdorferi) Pyogenic arthritis Post strep RA	Kawasaki disease Congenital heart disease Mitral valve prolapse Innocent murmurs	Cerebral palsy Tic disorder Hyperactivity

- bed rest (esp if carditis present).
 - ABT: ^{→ (Antibiotic)} Penicillin V K (which is oral)
 - PCV V K **10 days**.
 - Or Amoxicillin oral for 10 days → 1 injx because it is long acting
 - Or Benzathenine Penicillin G X 1 intramuscular injx
 - If PCN allergic: erythromycin, azithromycin or clindamycin
- ← بي ال killing تبع ال Penicillin أحسن من فلول.

ANTIINFLAMMATORY THERAPY

- Early treatment may mask the disease.
- Use Acetaminophen early if still unsure if DX.
- Salicylates.: (High dose aspirin) then low dose for a few weeks.
 - 50-70 mg/kg/day QID PO X 3-5 days
 - Then 50 mg/kg/day in 4 QID PO X 3 wk
 - Then half that 2-4 wk
- Corticosteroids. If Carditis present.
 - prednisone is 2 mg/kg/day QID X 2-3 wk
 - followed by half the dose for 2-3 wk
 - then by 5 mg/24 hr every 2-3 days.
- Repeat if ARF rebounded
- Carditis Rx: Steriod, Digoxcin, fluid and salt restriction, diuretics, and oxygen

SYDENHAM CHOREA RX

- Late: usually antiinflammatory not needed.

Treatment: • Sedatives:

- phenobarbital, drug of choice
- Alternate choices: haloperidol or chlorpromazine
- Plus minus corticosteroids.

COMPLICATIONS

- "Acute Rheumatic Fever licks the joints and bites the heart" (Laseque 1884)

PROGNOSIS

- 50-70% of carditis recover.
- Worsening carditis may occur in subsequent attacks.
- ARF recurrence 50% risk with each GAS pharyngitis
- ARF Recurrence is highest in the 1st 5 yr
- 20% of patients who present with "pure" chorea who are not given secondary prophylaxis develop rheumatic heart disease within 20 yr.

→ Therefore we give prophylactic
Abx for at least 5 years
(Prophylaxis medication that
is used is Penicillin G injn
once a month)

الوقاية من الالتهاب

PREVENTION

- primary prevention:
 - DX and treat GAS pharyngitis before ARF appears.
 - Effective if PCN given in first 9 days of pharyngitis
- secondary prevention:
 - Maitance ABT since recurrence likely.
 - Benzathine PCN G IM X 1 Q 4 weeks
 - Or PCV V K PO
 - Or Sulfa
 - Macrolide if PCN allergic

DURATION OF PROPHYLAXIS BY AHA

CATEGORY	DURATION
Rheumatic fever without carditis	5 yr or until 21 yr of age, whichever is longer
Rheumatic fever with carditis but without residual heart disease (no valvular disease*)	10 yr or until 21 yr of age, whichever is longer
Rheumatic fever with carditis and residual heart disease (persistent valvular disease*)	10 yr or until 40 yr of age, whichever is longer; sometimes

Endocarditis

* Which is mainly infx of the valves of the heart
* Most commonly from Strep. viridans

↳ it comes from poor oral hygiene
→ Strep viridans causes subacute endocarditis (from 2-3 weeks)

However
→ Staph aureus causes acute endocarditis (more overwhelming)

هناي مجموعة كليا
من بكتريا واحدة
اسمها الصبح
Viridans strep

WHO DEVELOPS PEDIATRIC ENDOCARDITIS?

- Marked decline in Rheumatic HD
- Relative increase in congenital HD (VSD, PDA, TOF, aortic valve abnormalities; operated patients with S-P shunts, prosthetic material)
- Central venous catheters, normal hearts
- Highest risk: Aortic valve prosthesis or systemic-pulmonary shunt

TABLE 26-1 Underlying Heart Disease in 266 Children with Infective Endocarditis

Underlying Heart Disease	Percentage Affected (%)
Congenital heart disease	78
Tetralogy of Fallot	24
Ventricular septal defect	16
Congenital aortic stenosis	8
Patent ductus arteriosus	7
Transposition of great vessel	4
Others	19
Rheumatic heart disease	14
No heart disease	8

From Kaplan EL. Infective endocarditis in the pediatric age group: an overview. In: Kaplan EL, Taranta AV, editors. *Infective endocarditis: an American Heart Association symposium*. Dallas: American Heart Association; 1977, p. 51-4.

ETIOLOGY

- **STREPTOCOCCI** (~ 45%)
 - Viridans 35%
 - Enterococci ~ 5%
 - *S. pneumoniae*, beta streptococci (GBS) - ~ 7%
- **STAPHYLOCOCCI**: especially post-op, foreign body-associated or in normal hearts (~ 40%)
 - *S. aureus* ~ 30% (seen also in IV drug abusers)
 - Coagulase-negative staph ~ 10%

ETIOLOGY

→ They are difficult to grow, causing blood culture -ve endocarditis

- HACEK group: ~ 5%
 - Haemophilus species, Actinobacillus actinomycetemcomitans, Cardiobacterium hominis, Eikenella corrodens, Kingella kingae
 - fastidious Gram-negative coccobacilli
- Others ~ 5-7%
 - Fungi, especially Candida ~ 2-5%
 - Gram-negative enterics ~ 3%
- Culture-negative ~ 5%

INFECTIVE ENDOCARDITIS PATHOGENESIS

- Areas of turbulent flow (jet effect, eddies)
 - Stenosis (valves, coarct) → valve يضرب ال
 - Small VSD → thrombus بهين و high pressure → value فيضرب ال
فتصبح predisposed area و بهين infx
- Endothelial disruption results (also occurs with indwelling line)
- Sterile fibrin-platelet thrombus develops on the disrupted surface
- Entrapment of bacteria from "stray bacteremia" initiates focus of infection; platelets and fibrin deposit to form vegetation. Receptors are involved (MSCRAMM's).

* So if a pt is known to have congenital heart disease (or is at risk to develop endocarditis) → They should be given prophylactic Abx before doing any dental procedure

Present

ASYMPTOMATIC BACTEREMIA OCCURS IN:

Initiating Event	Percentage of Positive Blood Cultures (%)	Predominant Organisms
Dental extraction (children)	30-65	<i>Streptococcus</i> , diphtheroids
Chewing gum, candy, paraffin	0-51	<i>Streptococcus</i> , <i>Staphylococcus epidermidis</i>
Tooth brushing	0-26	<i>Streptococcus</i>
Tonsillectomy	28-38	<i>Streptococcus</i> , <i>Haemophilus</i> , diphtheroids
Bronchoscopy (rigid scope)	15	<i>Streptococcus</i> , <i>S. epidermidis</i>
Bronchoscopy (fiberoptic)	0	
Orotracheal intubation	0	
Nasotracheal intubation/suctioning	16	<i>Streptococcus</i> , aerobic gram-negative rods
Sigmoidoscopy/colonoscopy	0-9.5	<i>Enterococcus</i> , aerobic gram-negative rods
Upper gastrointestinal endoscopy	8-12	<i>Streptococcus</i> , <i>Neisseria</i> , <i>S. epidermidis</i> , diphtheroids, other
Percutaneous liver biopsy	3-14	<i>Pneumococcus</i> , aerobic gram-negative rods, <i>Staphylococcus aureus</i> , other
Urethral catheterization	8	Not stated
Manipulation of <i>S. aureus</i> suppurative foci	54	

From Everett ED, Hirschmann JU. Transient bacteremia and endocarditis prophylaxis: a review. *Medicine (Baltimore)* 1977;56:61-77.
 © 1977, The Williams & Wilkins Company, Baltimore.

INFECTIVE ENDOCARDITIS CLINICAL SYNDROMES

- Acute Presentation
 - High fever, toxicity, \pm CHF
 - *S. aureus* most common; β strep, *S. pneumoniae*
 - Early post-op; normal heart; indwelling lines
- Subacute Presentation (more common)
 - Insidious, non-toxic, malaise, immune phenomena
 - *Viridans strep* most common pathogen
 - Also fungal, HACEK agents, coagulase-negative staph
 - Extracardiac manifestations are less common than in adults (splenomegaly, hematuria, immune phenomena)

كثير مرضى ينجوا بدون علاج Fever الهم أسبوعين أو ٣ ، فترتي presentation ال
 subacute bacterial endocarditis ← منسويته echo و blood culture

C/P

Symptom	Average (%)	Range (%)	Physical Finding	Average (%)	Range (%)
Fever	90	56-100	Splenomegaly	55	36-67
Malaise	55	40-79	Petechiae	33	10-50
Anorexia/weight loss	31	8-83	Embolic phenomena	28	14-50
Heart failure	30	9-47	New or change in heart murmur	24	9-44
Arthralgia	24	16-38	Clubbing	14	2-42
Neurologic findings	18	12-21	Osler nodes	7	7-8
Gastrointestinal findings	16	9-36	Roth spots	5	0-6
Chest pain	9	5-20	Janeway lesion	5	0-10
			Splinter hemorrhages	5	0-10

ممکن يصير في emboli

و نزوح عاد kidney و تعطل Hematuria

INFECTIVE ENDOCARDITIS EVALUATION

- 3 or more blood cultures (separate venipunctures) over 6-24 hours before therapy:
 - Continuous bacteremia is the rule in endocarditis
 - Trans-thoracic Echo (~ 80% sensitive, higher than in adults)
 - * Trans-esophageal echo is better than the trans-thoracic echo (TTE)
- بين الأثلب بعملوا TTE عشان أسهل

INFECTIVE ENDOCARDITIS EVALUATION

- Role of Trans-esophageal Echo in kids is evolving:
 - Better imaging of aortic root structures
 - Superior in individuals with thick chest walls, obesity
 - Superior with prosthetic valves
 - Superior for vegetations, abscesses

SELECTED LABORATORY FINDINGS OF BACTERIAL ENDOCARDITIS IN CHILDREN

Laboratory Finding	Average (%)	Range (%)
Positive blood culture	87	68-98
Elevated erythrocyte sedimentation rate	80	71-96
Low hemoglobin (anemia)	44	19-79
Positive rheumatoid factor	38	25-55
Hematuria	35	28-47

INFECTIVE ENDOCARDITIS DIAGNOSTIC CRITERIA

- X • Duke Criteria: ^{سکا ما نینظرا}
^{کانیا معقدہ}
^{بیس مرہم نغوف JONES criteria}
- **Definite IE:** Pathologic evidence, or 2 majors, or 1 major and 3 minors, or 5 minors
 - **Possible IE:** 1 major and 1 or 2 minors, or 3-4 minors alone
 - **Rejected:** Firm alternate diagnosis; or resolution of illness or absence of evidence of IE at surgery or autopsy after ≤ 4 days of antibiotics

X INFECTIVE ENDOCARDITIS REVISED DUKE CRITERIA (2000)

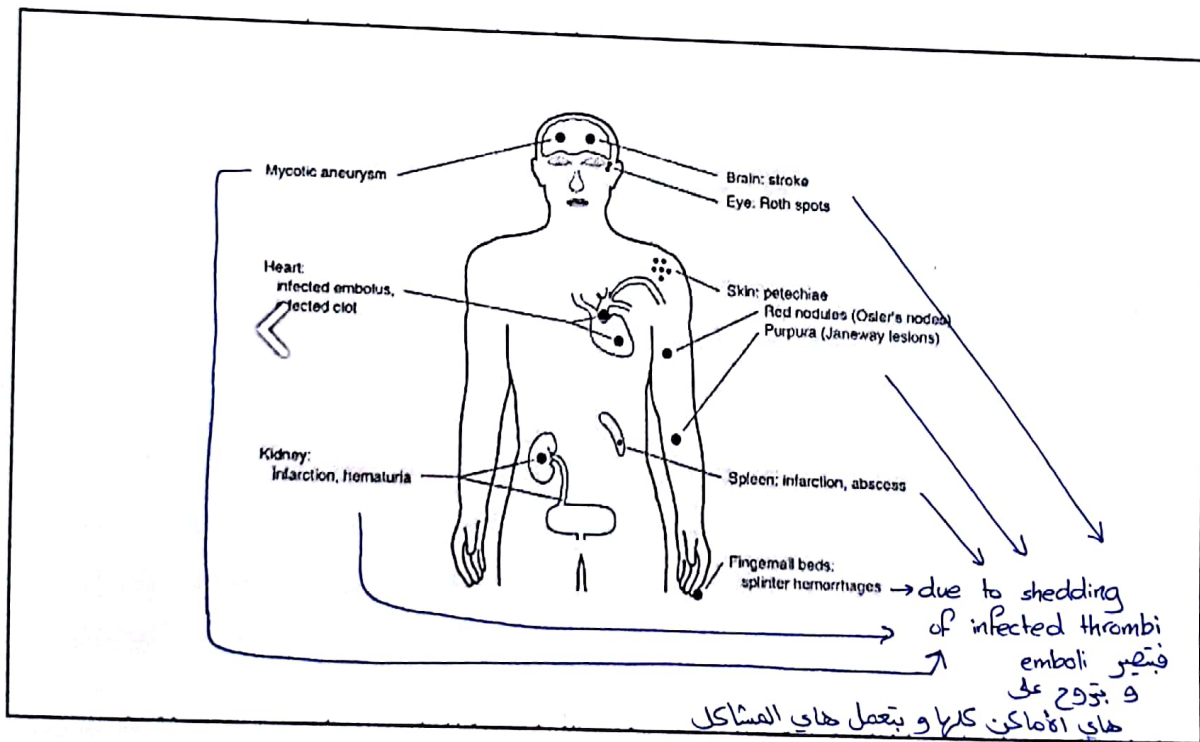
• MAJOR CRITERIA

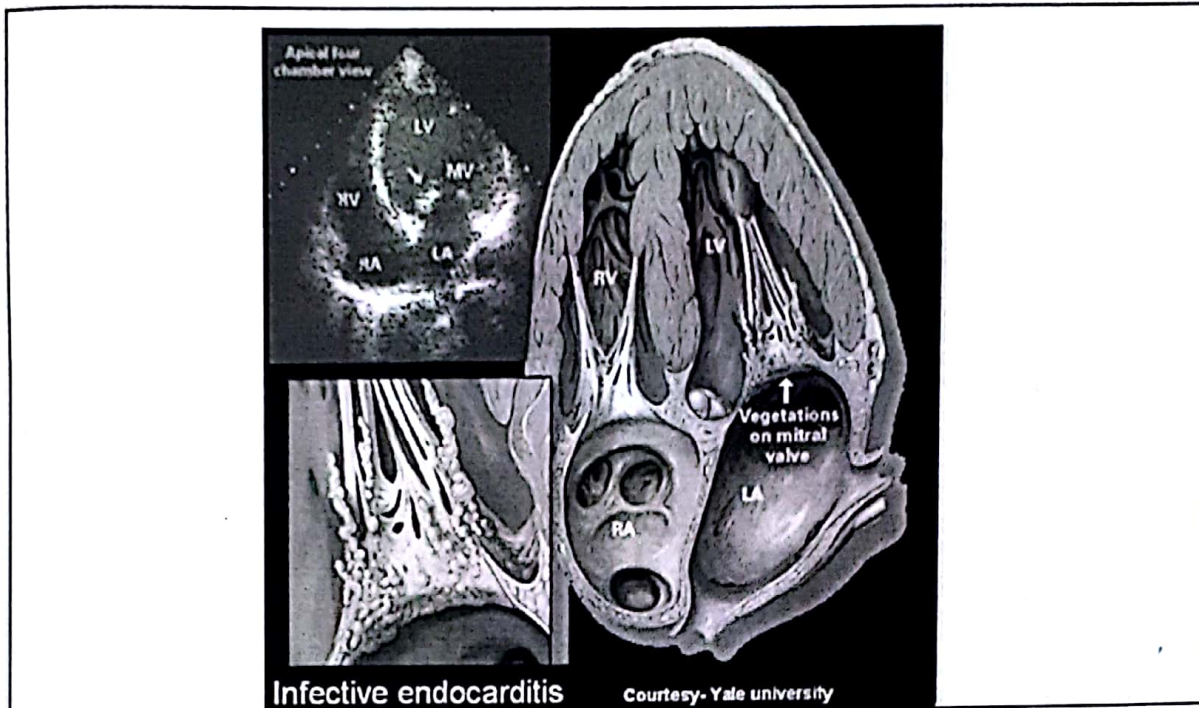
- Positive blood cultures
 - Typical IE organism from ≥ 2 cultures or
 - Persistently positive cultures (≥ 2 BC at least 12 hr apart or all of 3 or majority of ≥ 4 BC at least 1 hr apart)
 - Single positive for *C. burnetii* or IgG $> 1:800$
- Evidence of endocardial involvement
 - Positive echocardiogram or
 - New valvar regurgitation

X INFECTIVE ENDOCARDITIS REVISED DUKE CRITERIA (CONT.)

• MINOR CRITERIA

- Predisposing heart disease or IVDA
- Fever 38° C
- Vascular phenomena (Janeway lesions, emboli, conjunctival hemorrhages, mycotic aneurysms, strokes)
- Immunologic phenomena (nephritis, Osler nodes, Roth spots, rheumatoid factor)
- Positive blood cultures not meeting major criterion





→ Due to shedding of infected thrombi

VASCULAR PHENOMENA

- Janeway lesions
- Emboli
- Conjunctival hemorrhages
- Mycotic aneurysms
- Strokes

JANEWAY LESIONS

painless small erythematous or hemorrhagic lesions on the palms and soles



IMMUNOLOGIC PHENOMENA

- Nephritis
- Osler nodes
- Roth spots
- Rheumatoid factor → +ve بكون
- splinter hemorrhages

Roth Spots

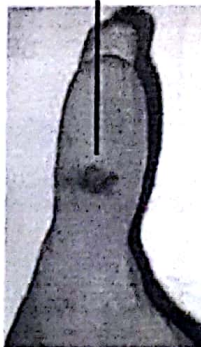
- These "white-centered" hemorrhages
- not specific for endocarditis



OSLER NODES

Osler nodes :tender, pea-sized intradermal nodules in the pads of the fingers and toes

Osler Node



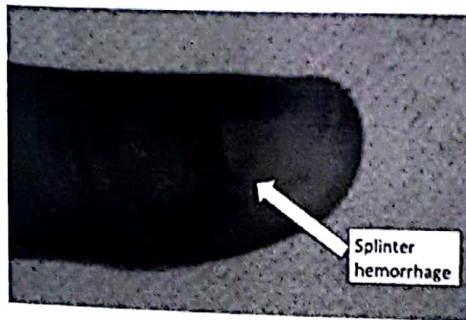
Janeway Lesion



SPLINTER HEMORRHAGES

linear lesions beneath the nails.

- may represent vasculitis produced by circulating antigen-antibody complexes..



INFECTIVE ENDOCARDITIS TREATMENT I

- بقعد أشهر نعالج فيه حسب ال organism
- PROLONGED
 - PARENTERAL
 - BACTERICIDAL ANTIBIOTICS

لا سكا لا

INFECTIVE ENDOCARDITIS TREATMENT I

- Highly sensitive streptococci (PenMIC ≤ 0.1 mcg/ml)
 - Penicillin G or Ceftriaxone 4 weeks
 - Penicillin G or Ceftriaxone, plus Gentamicin 2 weeks
 - Vancomycin (for Pen-allergic) 4 weeks
- Relatively resistant streptococci (PenMIC $> 0.1 \leq 0.5$)
 - Penicillin G or Ceftriaxone 4 weeks
 - plus Gentamicin 2 weeks
 - Vancomycin (for Pen-allergic) 4 weeks
- Enterococci or Pen-resistant streptococci (MIC > 0.5)
 - Pen G or Ampicillin plus Gentamicin 4-6 weeks
 - Vancomycin (for Pen-allergic) plus Gentamicin 6 weeks

لا سكا لا

INFECTIVE ENDOCARDITIS TREATMENT II

- Staphylococci (without prosthetic material)
 - Nafcillin or Oxacillin 6 weeks \pm Gentamicin 3-5 days
 - Cefazolin (for Pen-allergic) 6 weeks \pm Gentamicin 3-5 days
 - Vancomycin (for Pen-allergic or for MRSA/MRSE) 6 weeks
- Staphylococci (with prosthetic material)
 - For Methicillin Resistant Staph:
 - Vancomycin plus Rifampin ≥ 6 weeks plus Gentamicin 2 weeks
 - For Methicillin Sensitive Staph:
 - Nafcillin or Oxacillin or cefazolin ≥ 6 weeks plus Rifampin ≥ 6 weeks plus Gentamicin 2 weeks
- HACEK Agents
 - Ceftriaxone 4 weeks, or Ampicillin and Gentamicin 4 weeks

"CULTURE - NEGATIVE" ENDOCARDITIS INCLUDES

*Think also about the HACEK group

- Partially treated endocarditis
- Nutritionally deficient streptococci
- Fungal endocarditis
- Q fever (rare) Chlamydia
- Bartonella quintana
- Rx: 4-6 weeks of amp-sulbactam or vancomycin and gentamicin, possibly with cipro. Ceftriaxone and gentamicin \pm doxycycline if Bartonella suspected

HIGH RISK FOR COMPLICATIONS

- Prosthetic valve IE
- Left-sided IE \rightarrow because it may result in systemic emboli
- *Staphylococcus aureus* IE
- Fungal IE
- Previous episode of IE
- Prolonged symptoms (≥ 3 months)
- Cyanotic CHD
- Systemic-pulmonary shunts
- Poor clinical response to antibiotics

INFECTIVE ENDOCARDITIS COMPLICATIONS I

- Cardiac
 - Obstruction, perforation, CHF
 - Heart block, arrhythmia
 - Periannular extension/Myocardial abscess
 - Prosthetic device dysfunction, dehiscence, or obstruction of valve or shunt
- spread of the infx (local or remote)*

INFECTIVE ENDOCARDITIS COMPLICATIONS II

- Extra-Cardiac
 - Thrombo-embolic events, stroke
 - Mycotic aneurysms
 - Metastatic infection
 - Persistent bacteremia or fungemia
 - Immune-mediated phenomena
 - Nephritis, Osler, Roth, rheumatoid factor

INFECTIVE ENDOCARDITIS NON-ECHO SURGICAL INDICATIONS

- Persistent bacteremia despite appropriate therapy (usually >5-7 days)
- CHF 2° to obstruction or ruptured chordae or leaflet
- Fungal endocarditis
- Prosthetic valve infection (esp. staphylococcal)

ECHO FEATURES SUGGESTING POSSIBLE NEED FOR SURGERY

- **Vegetation**
 - Persistent after systemic embolus
 - Anterior leaflet of MV, esp. >10 mm
 - 1 embolus or more in 1st 2 weeks of therapy
 - 2 emboli or more during or after therapy
 - Increase in size despite appropriate therapy
- **Valvar dysfunction**
 - Acute AI or MI with failure
 - CHF unresponsive to medical therapy
 - Valve perforation or rupture
- **Perivalvar extension**
 - Valve dehiscence, rupture or fistula
 - New heart block

PREVENTION OF IE

- Maintain good oral hygiene
- Antibiotic prophylaxis now recommended only for dental procedures in those with:
 - Prosthetic valve
 - History of previous IE
 - Congenital heart disease
 - Unrepaired cyanotic CHD
 - Repaired CHD in 1st 6 months after repair
 - Repaired CHD with residual defect
 - Heart transplant with valve dysfunction

Wilson: Circulation 2007; 115

ENDOCARDITIS PROPHYLAXIS REGIMENS FOR A DENTAL PROCEDURE → given 60 mins before the procedure

Situation	Agent	Regimen: Single Dose 30 to 60 Minutes Before Procedure	
		ADULTS	CHILDREN
Oral Unable to take oral	Amoxicillin	2 g	50 mg/kg
	Ampicillin	2 g IM or IV	50 mg/kg IM or IV
Allergic to penicillins oral	or Cefazolin or Ceftriaxone	1 g IM or IV	50 mg/kg IM or IV
	Cephalexin*	2 g	50 mg/kg
	or Clindamycin	600 mg	20 mg/kg
	or Azithromycin or clarithromycin	500 mg	15 mg/kg
Allergic to penicillins and unable to take oral	Cefazolin		
	or Ceftriaxone*	1 g IM or IV	50 mg/kg IM or IV
	or Clindamycin	600 mg IM or IV	20 mg/kg IM or IV

Wilson W, Taubert KA, Gewitz M, et al. Prevention of infective endocarditis: guidelines from the American Heart Association. Circulation 2007;116:1736-54.