Pain, Pericardial Effusion, Pericarditis
What do I need to do?

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Disclosures

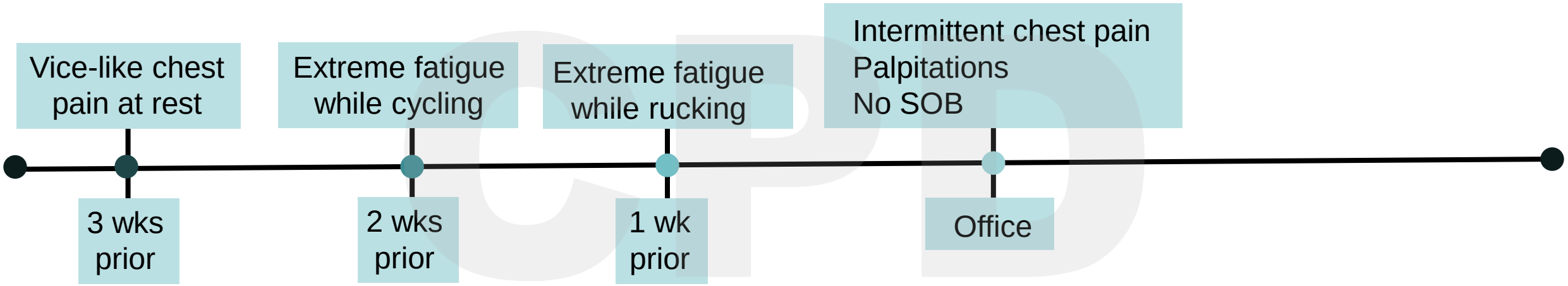
- No actual or potential conflicts of interest in relation to this program or presentation to disclose.
- The contents do not represent the views of the U.S. Department of Veterans Affairs or the U.S. government.

Objectives

- Learn the diagnostic criteria of pericarditis
- Select the appropriate pharmacotherapy for acute and recurrent pericarditis
- Recognize indications for cardiology consultation in the management of pericarditis

Case - History

- 53 yo F with hypertension, chronic leukopenia with negative ANA, migraine headaches, hypothyroidism, and TIA x 2 provoked by oral contraceptive medications.



Case – History and Exam

- Rheumatology consult 1 year ago to evaluate for possible Raynaud's → no vasculopathy
- Started hormonal replacement therapy for premature menopause at age 42
- Takes chlorthalidone for calciuria and hypertension

Physical exam

- Temp 97.8, HR 120 bpm, BP 156/89 mmHg, RR 12, O_2 Sat 100% RA
- Chest: CTA
- Cardiac: JVP 7 cm H_20, S1S2 irregularly irregular, no murmur or rub
- Abdomen: nondistended, nontender
- Ext: Trace bilateral edema

Social History

- No tobacco, alcohol, or recreational drug use

Family History: Noncontributory

Question 1

What is your differential of the patient's symptoms?

A. Myocardial infarction
B. Coronary artery vasospasm angina
C. Costochondritis
D. Esophagitis
E. Pericarditis

Epidemiology

27.7 cases per 100,000 per year

5% emergency room visits

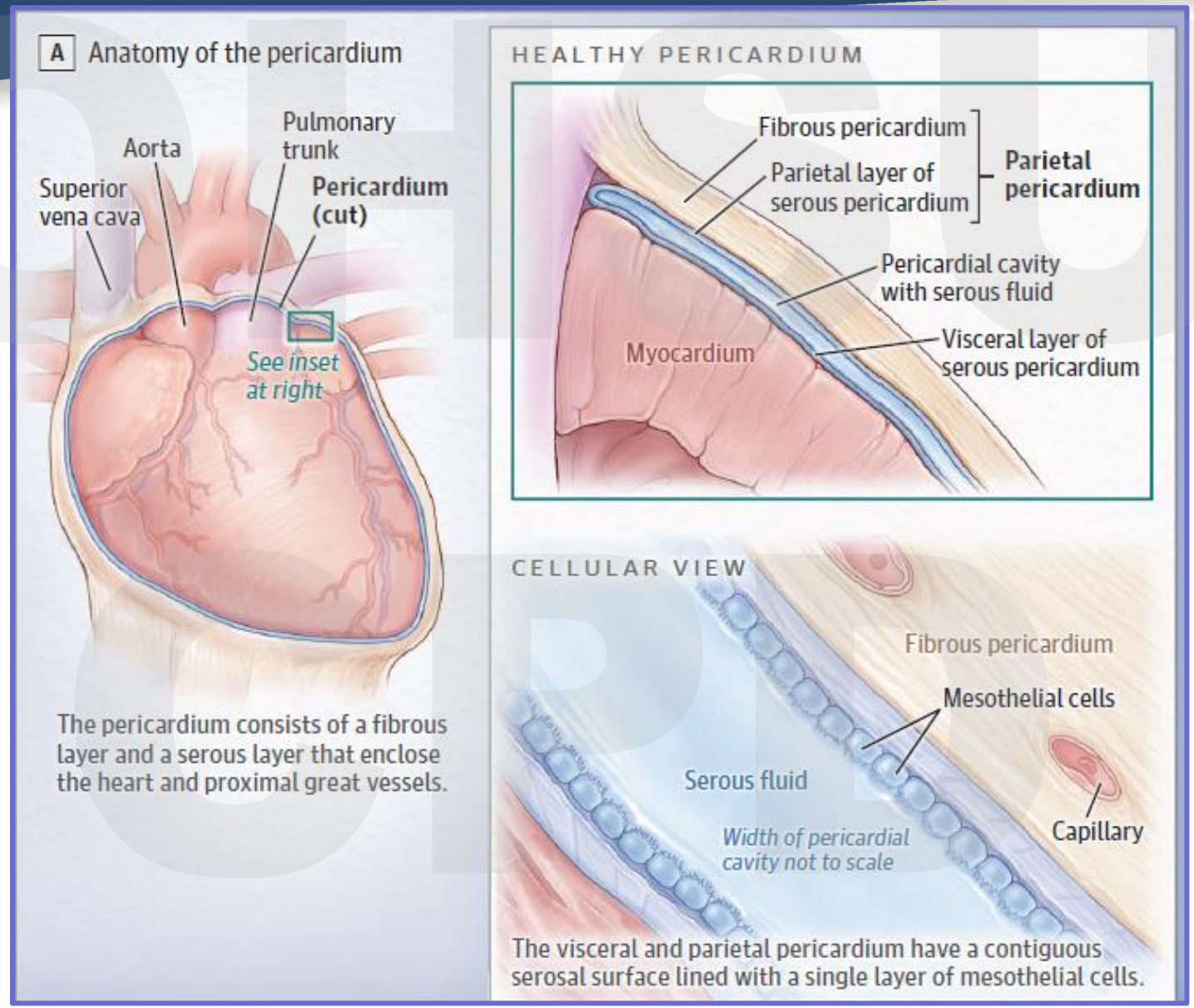
0.1% of all hospital admission

0.2% of all cardiovascular admissions

70-80% uncomplicated course

Adler Y et al. Eur Heart J. 2015;36:2921

Anatomy of the Pericardium



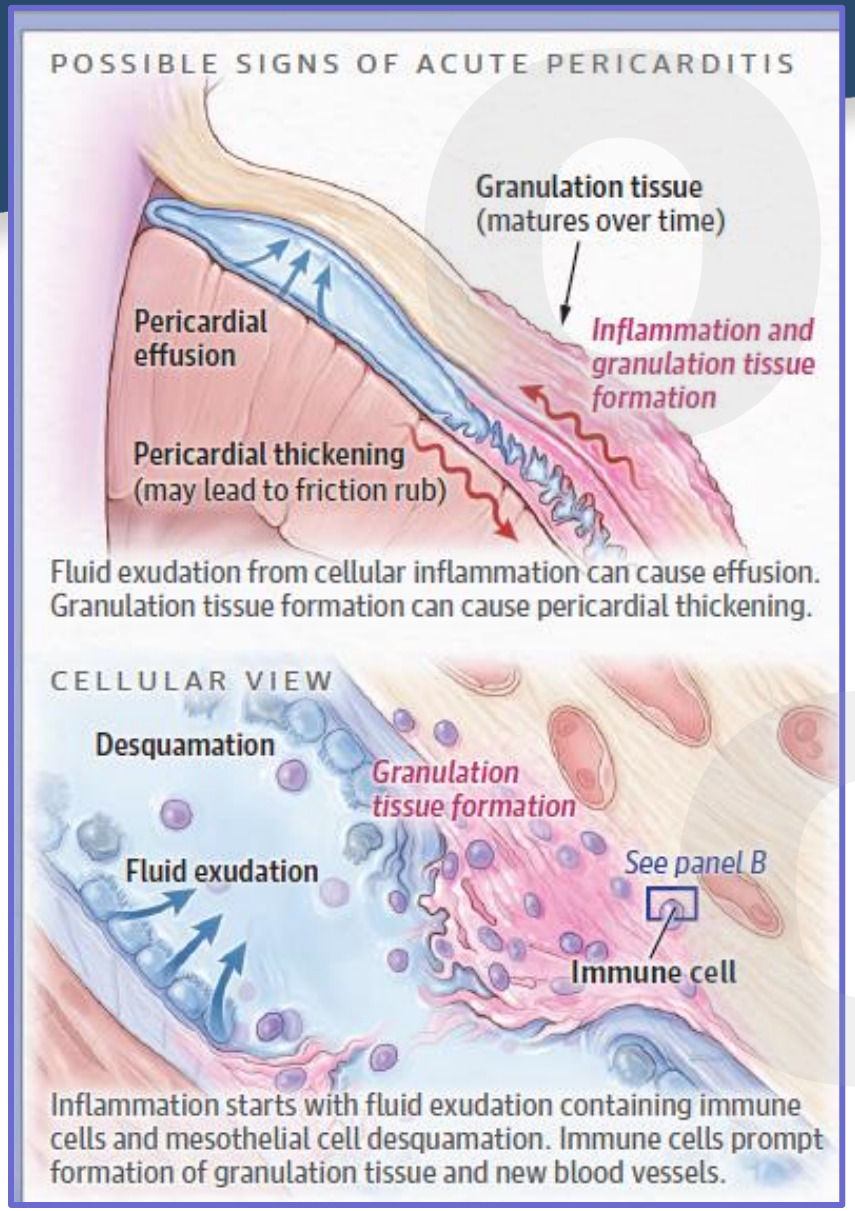
Cremer PC et al. JAMA 2024;332:1090

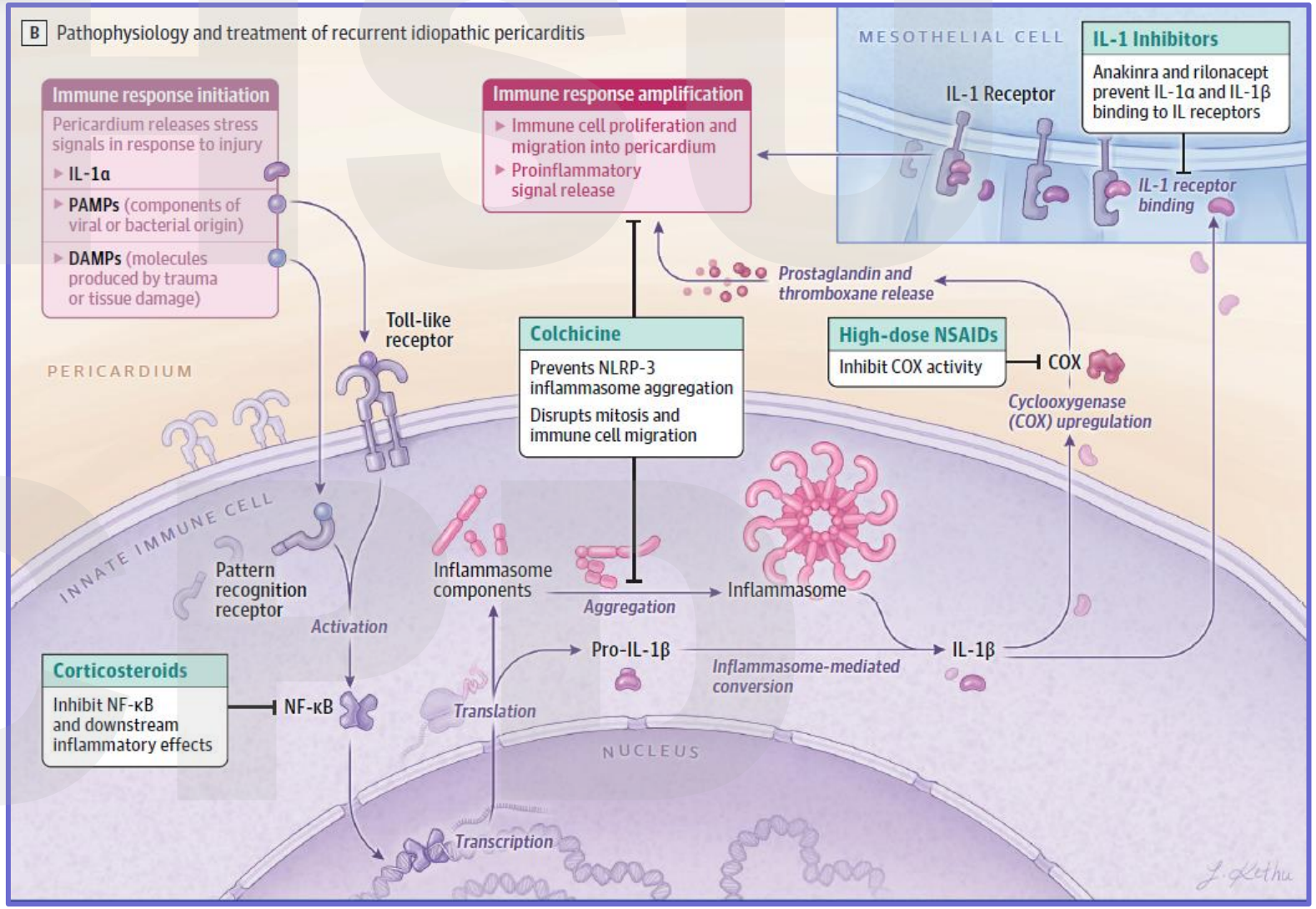
Functions of the Pericardium

Mechanical	Membranous Serosa	Metabolic	Ligamentous
• Limits short-term cardiac distension • Maintains pressure - volume relations of cardiac chambers and their output	• Lubricates to reduce friction • Barrier to infection	• Immunologic	• Limits heart displacement • Neutralizes effects of respiration and change of body position

Klein AL. JACC: Cardiovasc Imag 2024;17:937

Pathophysiology of Pericardial Inflammation





Cremer PC et al. JAMA 2024;332:1090

Definition and Classification of Pericarditis

ACUTE
75-80%
< 4-6 weeks

RECURRENT
20-30%
Clinical remission for 4-6 weeks

INCESSANT
15-20%
> 6 weeks and < 3 months

CHRONIC
> 3 months

Other Types of Pericarditis

Constrictive
Viral <1%
Autoimmune 2-5%
Bacterial 20-20%

Effusive-Constrictive

Myopericarditis

Elevated troponin

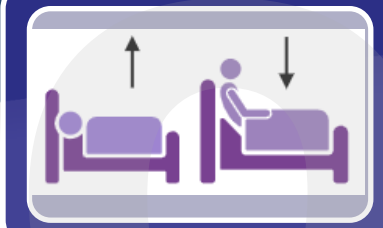
Pericardial Tamponade
<3%

Question 2

What should you do next?

A. No intervention and reassurance
B. Start ibuprofen and follow-up in 2 weeks
C. Start colchicine and follow-up in 2 weeks
D. Obtain ECG
E. Send patient to ED

Diagnosis

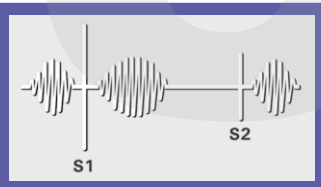


Chest pain (85-90%)

- Sharp
- Pleuritic
- Improve sitting up and leaning forward

Pericardial friction rub (< 30%)

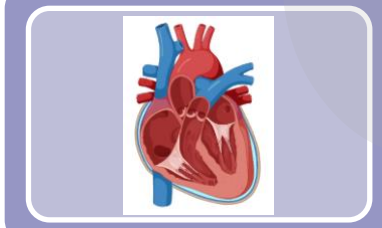
- High-pitch
- Triphasic
- Left lower sternal border-apex



Friction Rub

ECG changes (25-60%)

- Wide-spread ST elevation
- PR-segment depression

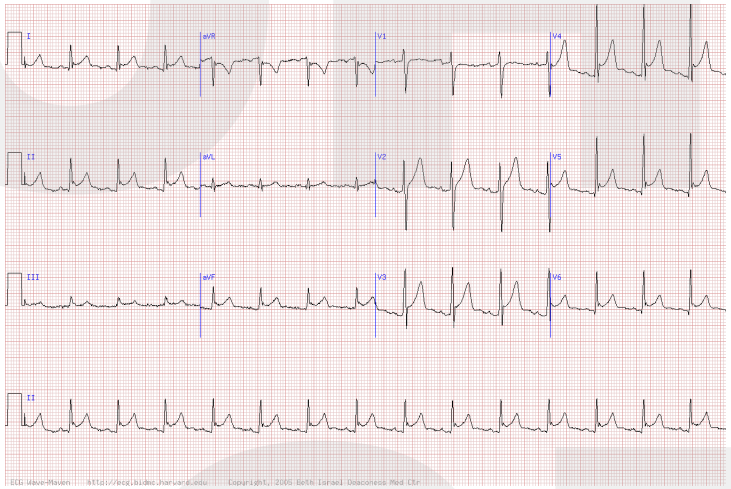


Pericardial effusion (≤60%)

- New
- Small

Klein AL et al. JACC: Cardiovasc Imag. 2024;17:937; JAMA Network. Three-component Pericardial Friction Rub

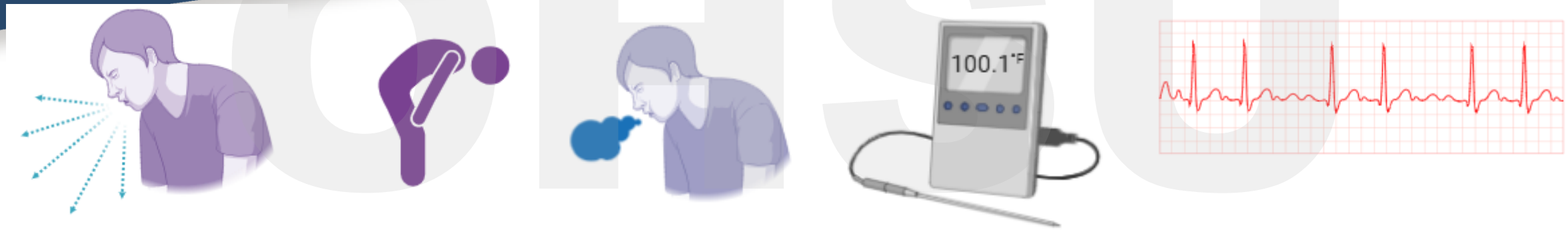
Diagnostic Tests



- CBC
- CRP
- ESR
- Troponin
- Thyroid levels

Adler Y et al. Eur Heart J. 2015;36:2921.

Supportive Diagnostic Features – Acute and Recurrent Pericarditis



Patient presentation and history

- Low-grade fever
- Fatigue
- Cough
- Dyspnea

Laboratory evaluation

Elevated inflammatory marker levels

- Erythrocyte sedimentation rate
- C-reactive protein

Patients with low-grade fever and fatigue are more likely to have a high neutrophil count and/or an elevated neutrophil to lymphocyte ratio

Cardiac magnetic resonance (CMR) study

Abnormal CMR study finding of pericardial late gadolinium contrast enhancement (LGE)

LGE, or retention of gadolinium-based contrast, reflects degree of neovascularization and inflammation

LGE must be interpreted with clinical setting due to variable presentations

Patients with LGE may have active pericarditis (see Figure 3)

Patients with thickened pericardium and no LGE have no active inflammation

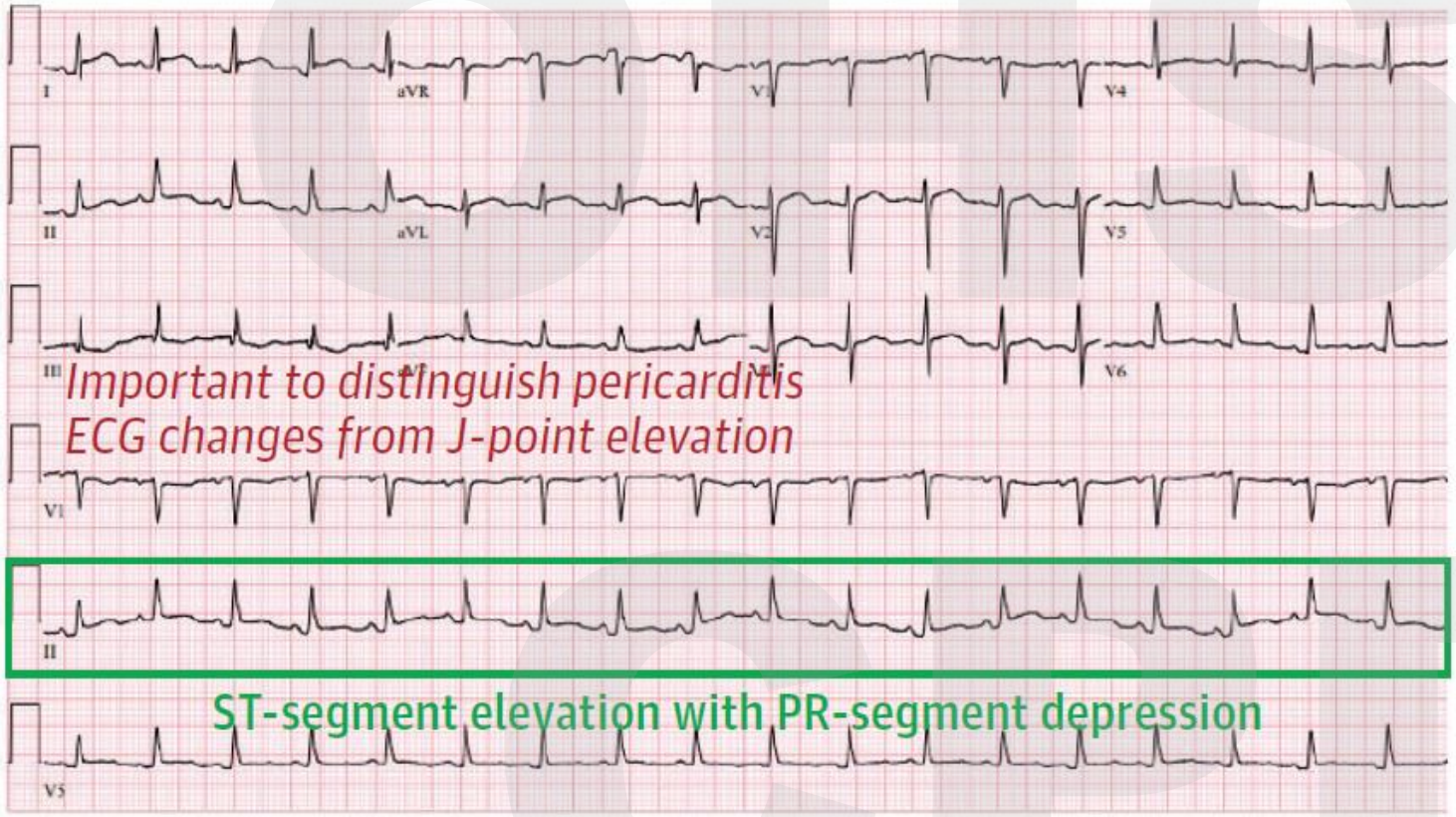
Other important considerations

- Assess for elevated cardiac troponin levels, which can be indicative of myocardial ischemia or myocarditis
- Assess for suspected systemic autoimmune disease and family history of pericarditis at time of diagnosis
- Assess for tuberculosis for patients from or living in endemic areas

Cremer PC et al. JAMA 2024;332:1090

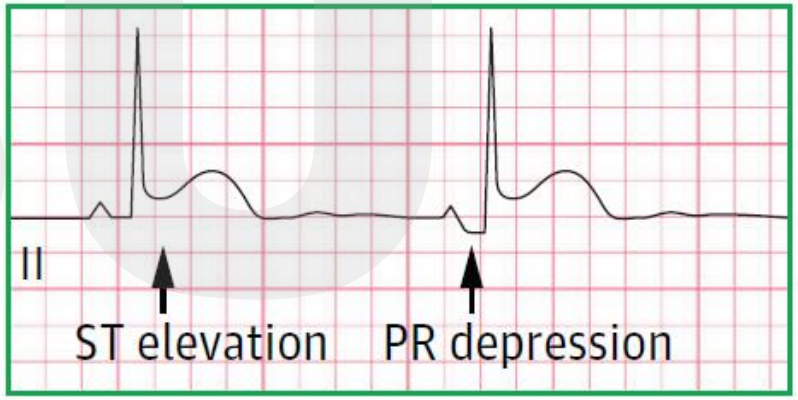
ECG – Widespread ST Elevation

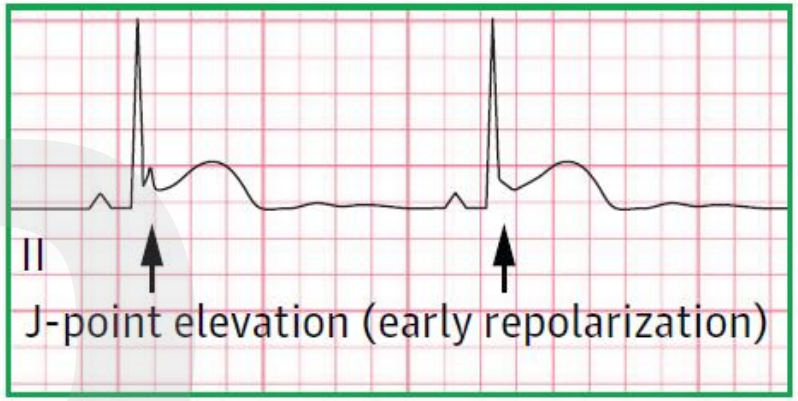
New and widespread ST-segment elevation with PR-segment depression (≈25%-50% of patients)



Important to distinguish pericarditis ECG changes from J-point elevation

ST-segment elevation with PR-segment depression





Pericarditis ECG changes can also be distinguished from J-point elevation by comparing with prior ECGs, if available

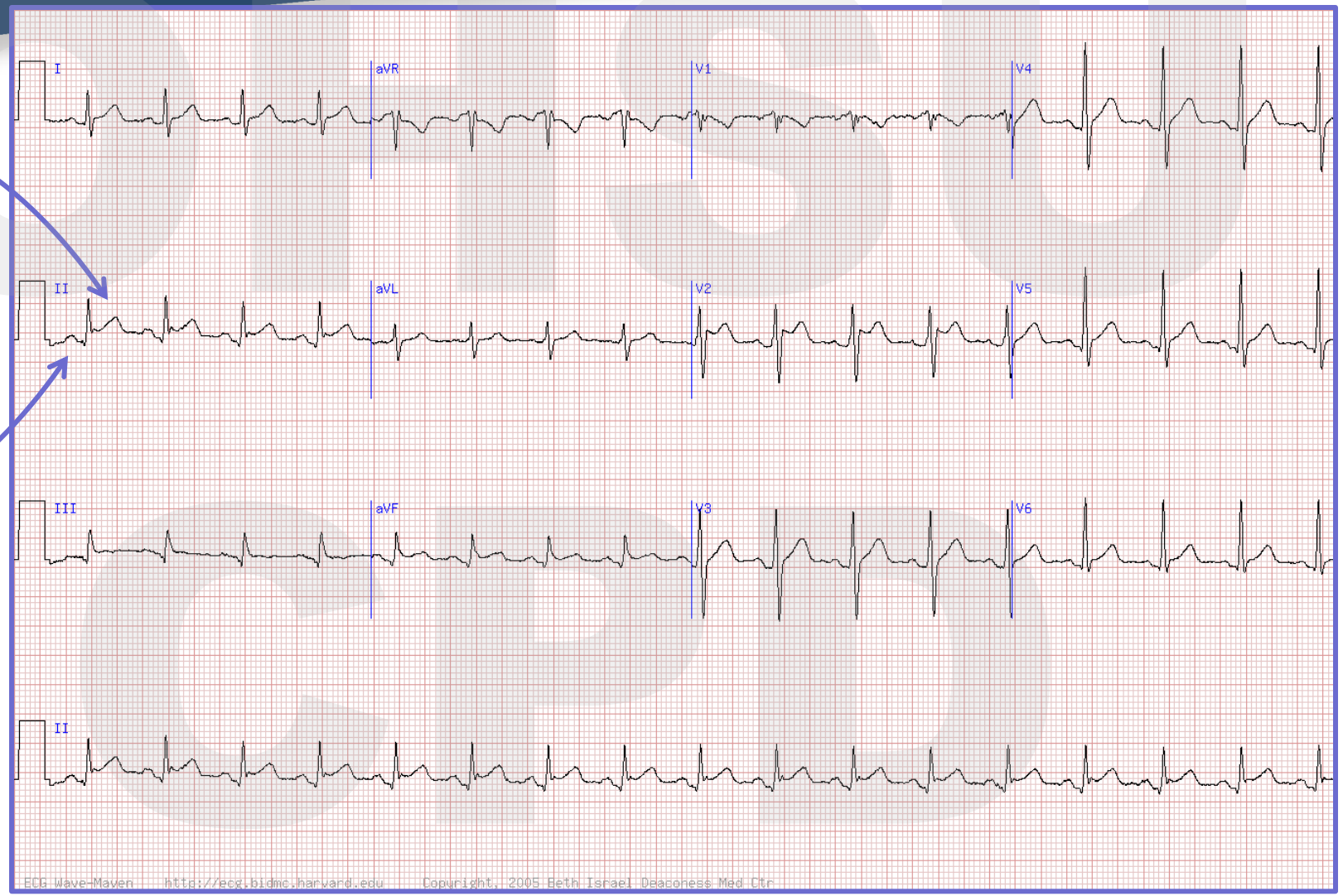
Pericarditis may trigger atrial fibrillation or flutter (≈4% of patients)

Crener PC et al. JAMA. 2024;332;1090

ECG – Pericarditis

ST elevation

PR depression

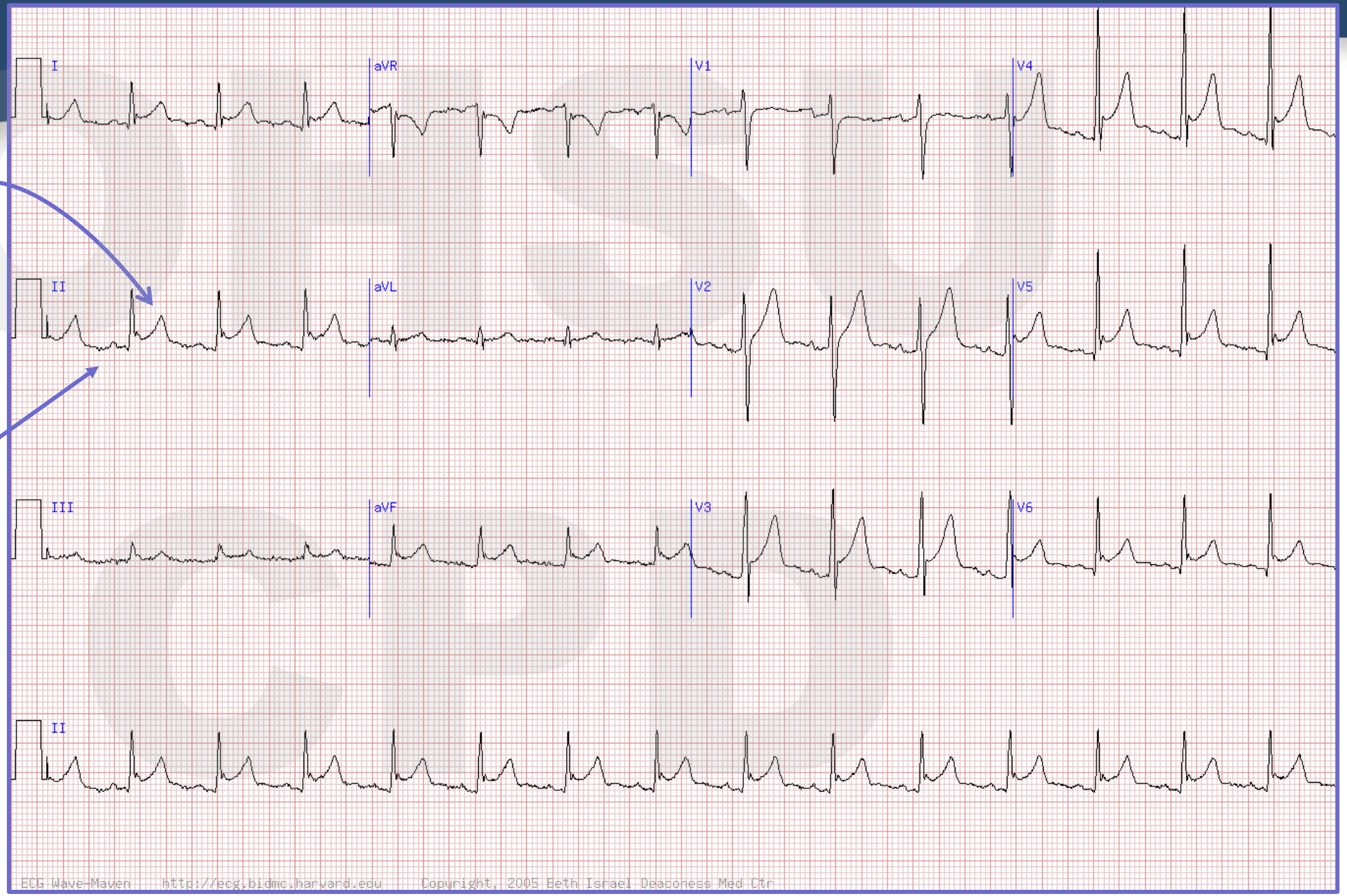


Nathanson LA, Goldberger AL. ECG Wave-Maven Case List

ECG – Pericarditis

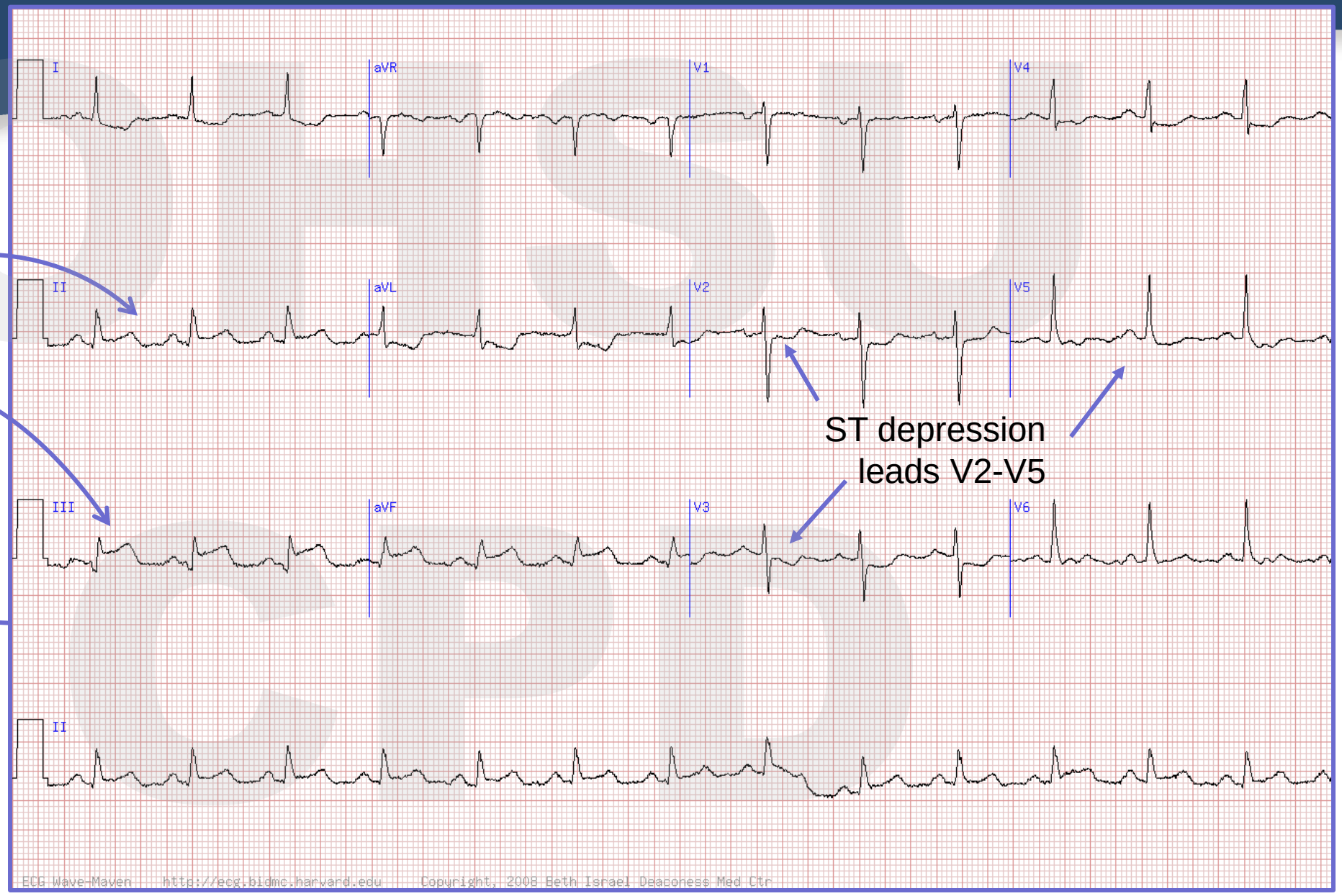
ST elevation

PR depression



Goldberg AL. ECG Wave-Maven Case List

ECG – Inferior STEMI



ST elevation
leads II, III, AVF

ST depression
leads V2-V5

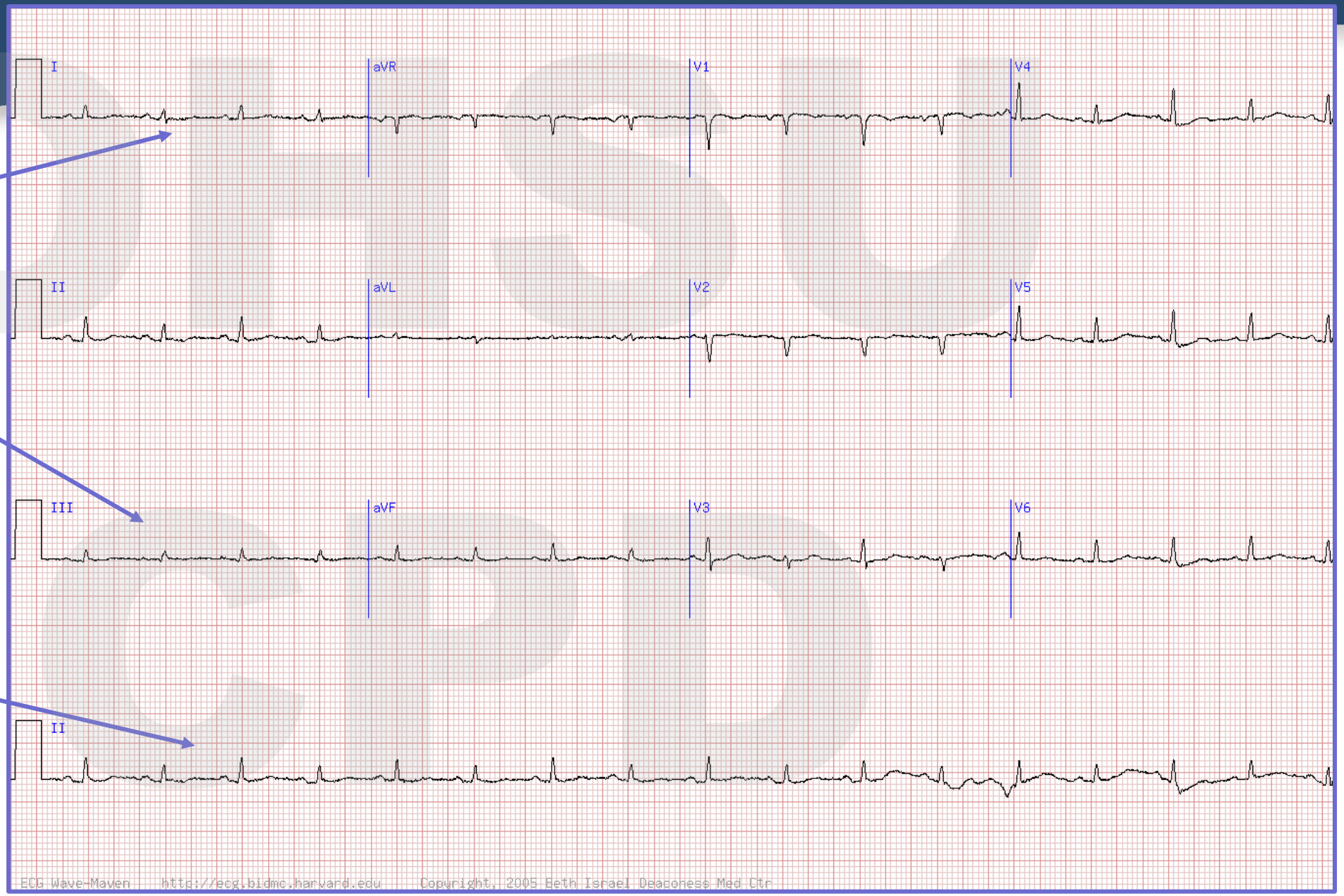
Chuan M, Goldberger AL. ECG Wave-Maven Case List

ECG – Cardiac Tamponade

Sinus tachycardia

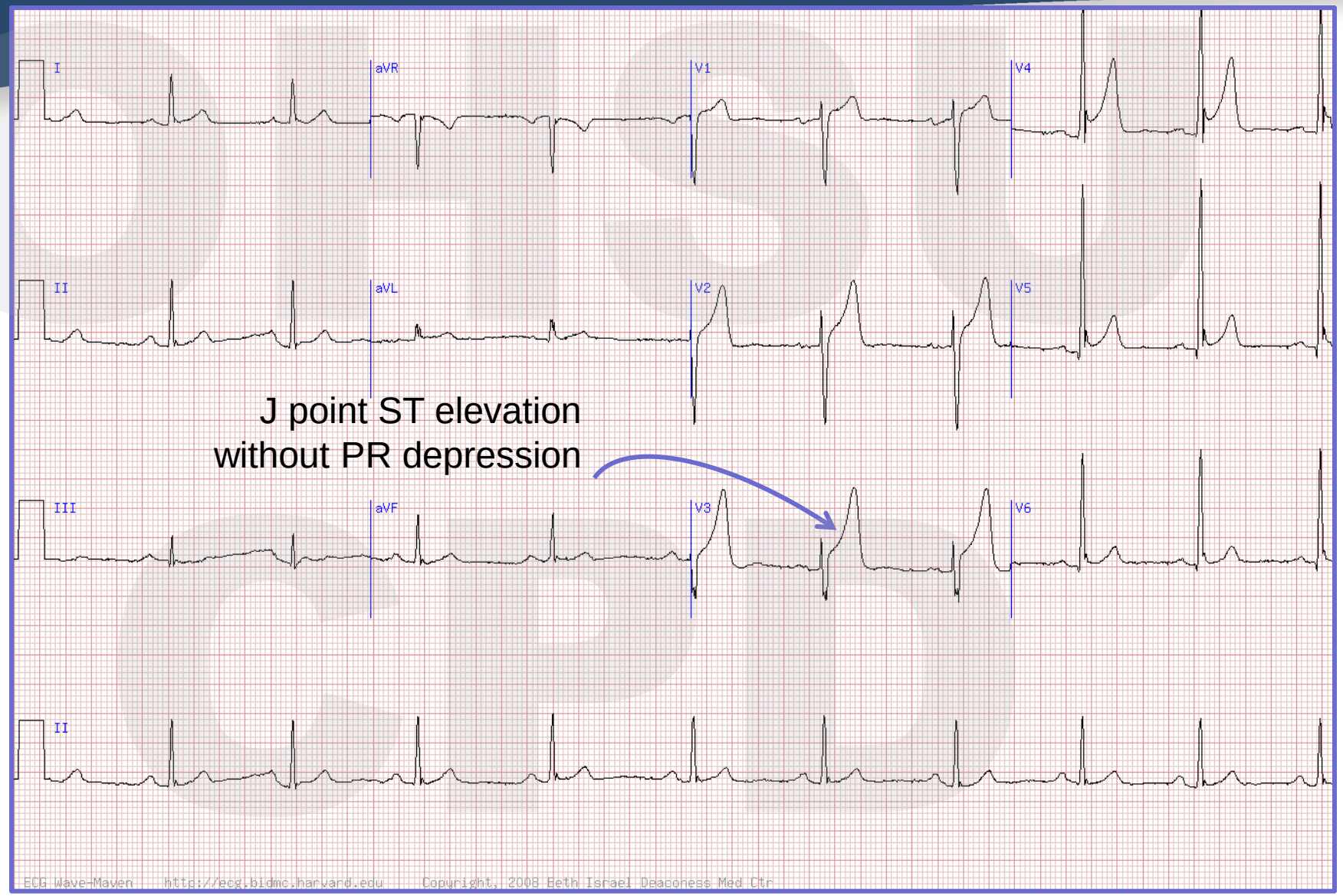
Low QRS voltage

Electrical alternans



Markis J, Goldberger AL. ECG Wave-Maven Case List

ECG – J Point ST Elevation



Perry DL, Goldberg AL. ECG Wave-Maven Case List

Question 3

ECG: Afib 128 bpm, no ST elevation or depression, normal voltage

POCUS: large circumferential pericardial effusion

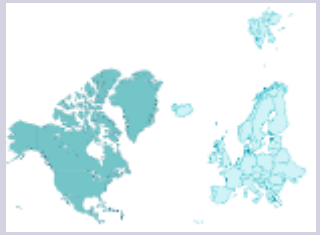
What would you do next?

A. Start metoprolol
B. Start DOAC
C. Start ibuprofen
D. Start colchicine
E. Send patient to ED

Etiologies

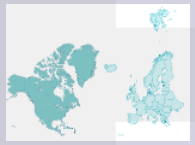
Idiopathic

- 50-60%
- Antecedent URI or gastroenteritis



Infectious

- Viral (common) →
  - Coxsackie
  - SARS-CoV2
  - Herpes virus (EBV, CMV, adenovirus, Parvovirus B19)
- Bacterial
  - Tuberculosis →
  - Coxiella
- Fungal (very rare)
  - Histoplasma
- Parasitic (very rare)
  - Echinococcus, Toxoplasma



Autoimmune (2.6%)

- Lupus (20%)
- Rheumatoid arthritis (asymptomatic pericardial effusion)
- Scleroderma
- Sjögren syndrome
- Systemic vasculitides
- Sarcoidosis
- Inflammatory bowel diseases

Injury

- Myocardial infarction
- Open heart surgery
- Trauma
- Radio frequency ablation

Metabolic (5%)

- Uremic
- Myxedema
- Hypoproteinemia
- Hypercalcemia
- Hyperparathyroidism

Malignancy (9%)

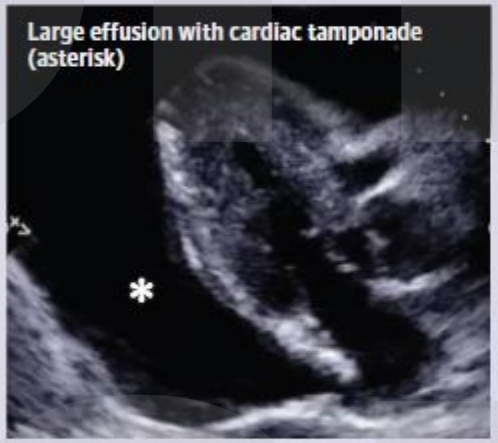
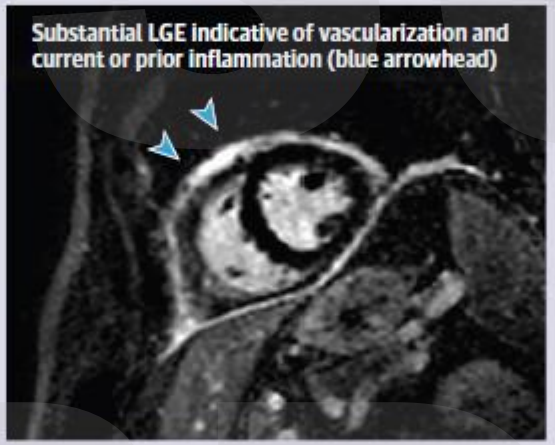
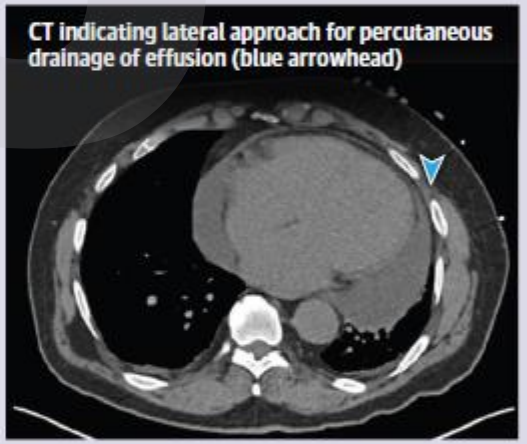
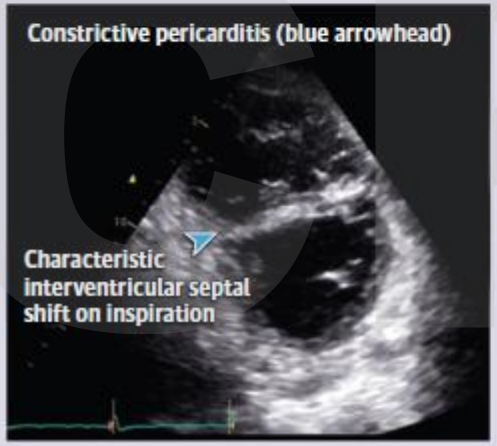
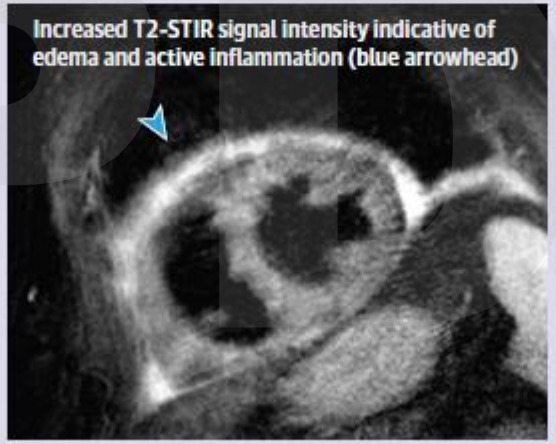
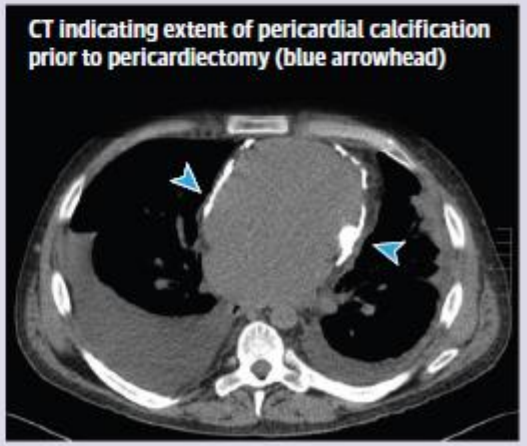
- Primary malignant
  - Lymphoma
  - Mesothelioma
  - Sarcoma
- Metastatic
  - Lung cancer (40%)
  - Breast (25%)
  - Hematologic (20%)

Medications

- Hydralazine
- Procainamide
- Methyldopa
- Penicillin
- Isoniazid
- Phenytoin
- Doxorubicin, cyclophosphamide

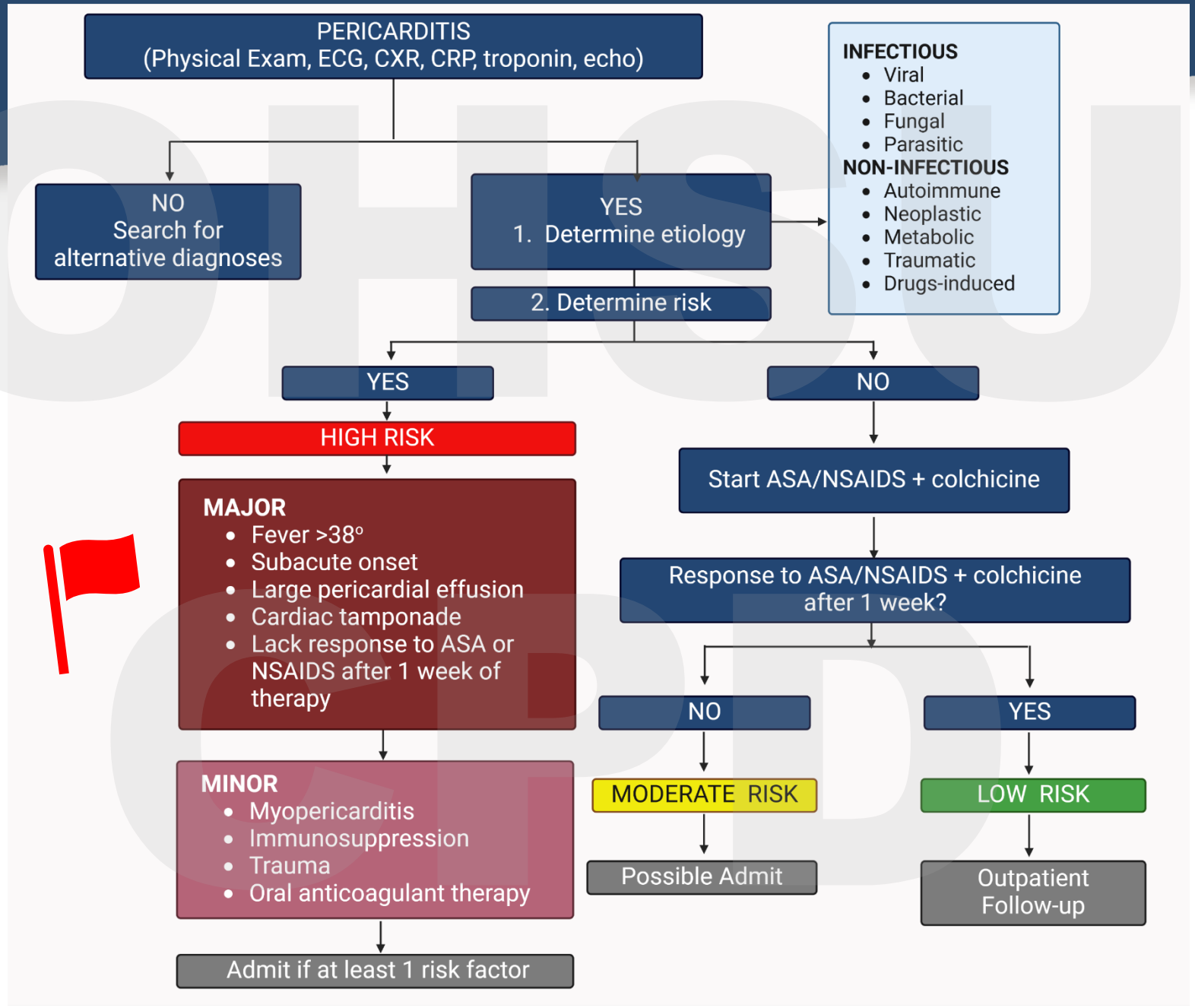
Gourlet F et al. Am J Med. 2015;128:784
Cremer PC et al. JAMA 2024;332:1090

Imaging

	Echocardiography	Cardiac magnetic resonance imaging (CMR)	Cardiac computed tomography (CT)
Assessment capabilities	First-line and initial imaging test in suspected acute or recurrent pericarditis • Characterization of pericardial effusion (location, size, rapidity of fluid accumulation) • Hemodynamic consequences of effusion (pericardial tamponade, constrictive pathophysiology) • Thickening of pericardium (hyperechoic)	Used with gadolinium-based contrast for recurrent pericarditis • Characterization of severity of pericardial inflammation • Late gadolinium contrast enhancement (LGE) correlating to extent of neovascularization	May be used for procedural and surgical planning in acute or recurrent pericarditis • Evidence of pericardial pathology when CT is obtained for alternate reason • Can be used in procedural planning prior to pericardiocentesis, pericardial window, or pericardiectomy
Clinical examples			
			

Cremer PC et al. JAMA 2024;332:1090

Triaging



Adapted from Adler Y et al.
Eur Heart J. 2015;36:2921.
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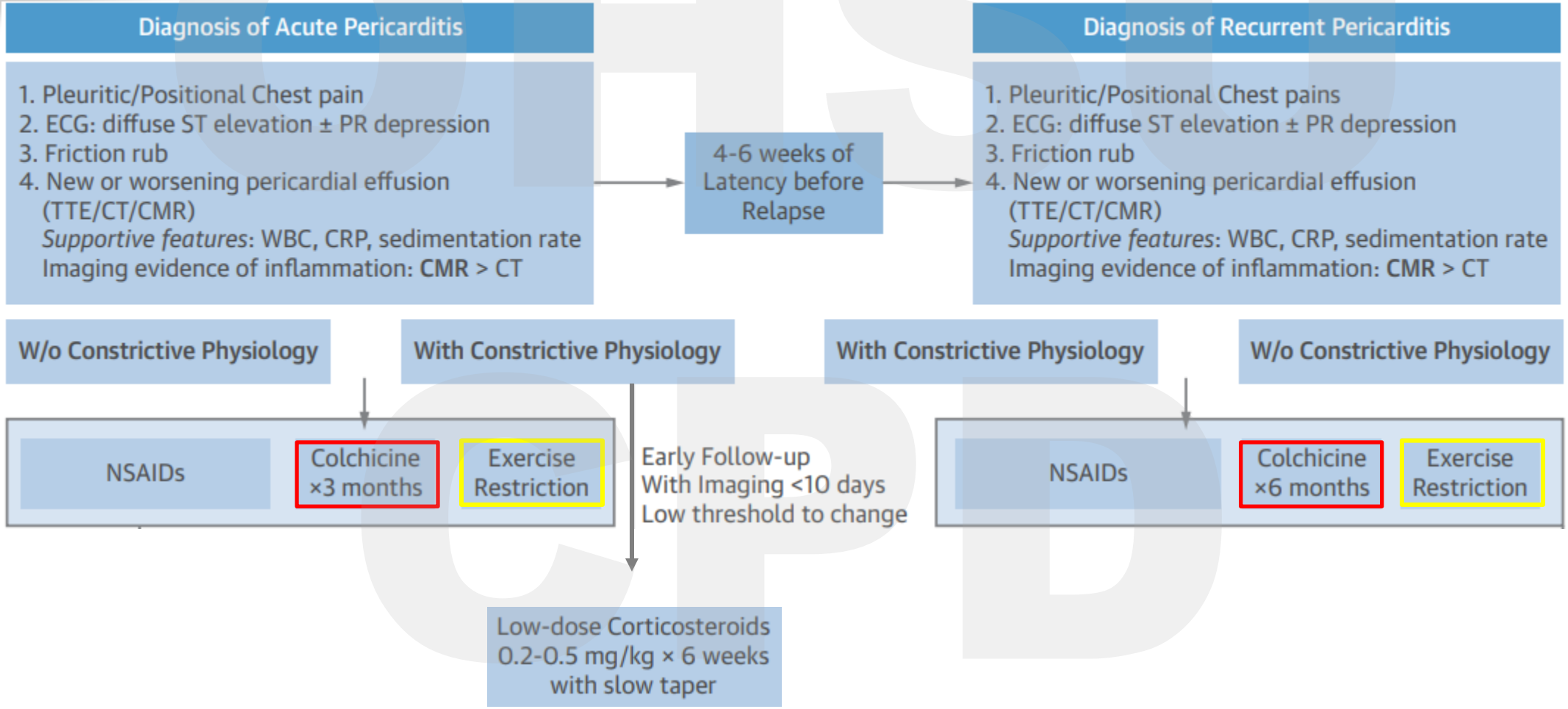
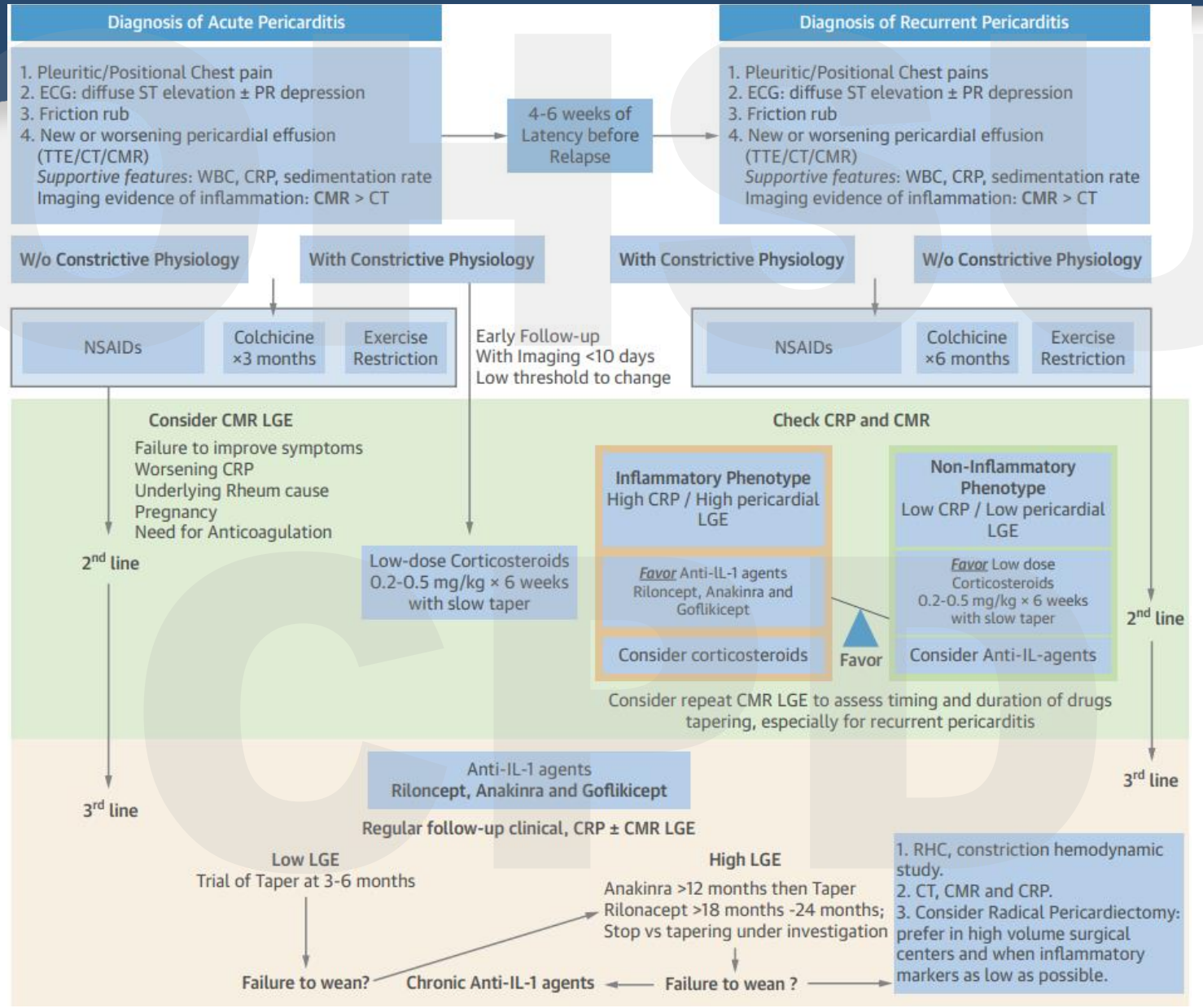
Diagnostic and Therapeutic Algorithm



Klein AL et al. JACC: Cardiovasc Imag. 2024;17:937

Diagnostic and Therapeutic Algorithm



Klein AL et al. JACC: Cardiovasc Imag. 2024;17:937

Anti-Inflammatory Treatments

Drug and dose	Duration	Tapering	Common adverse effects[a]
Acute or recurrent pericarditis			
Aspirin (500-1000 mg 3 times daily)	Until chest pain has resolved and CRP normalized (typically 1-2 wk for the initial episode) Weeks to months for recurrence	250- to 500-mg Decrease every 1-2 wk	Gastrointestinal (dyspepsia, peptic ulcer disease) Kidney (acute kidney injury) Cardiovascular (fluid retention, worsening of underlying hypertension)
Colchicine (0.5 to 1.2 mg daily) (<70 kg: 0.5 or 0.6 mg daily; >70 kg: 0.5 or 0.6 mg twice daily)	Acute: 3 mo Recurrence: ≥6 mo	Optional (eg, can decrease to once daily or every other day prior to discontinuation)	Gastrointestinal (diarrhea [23%], nausea, vomiting)
Ibuprofen (600-800 mg 3 times daily)	Until chest pain has resolved and CRP normalized (typically 1-2 wk for the initial episode) Weeks to months for recurrence	200- to 400-mg Decrease every 1-2 wk	Gastrointestinal (dyspepsia, peptic ulcer disease) Kidney (acute kidney injury, worsening of underlying hypertension)
Prednisone (0.25-0.5 mg/kg/d)	Weeks to months	Rapid dosage tapering to 25 mg/d Starting dose 15-25 mg: decrease 2.5 mg/d every 2-4 wk Starting dose <15 mg: decrease 1.25-2.5 mg/d every 2-6 wk Can taper more quickly (eg, 8 wk) in patients taking an IL-1 blocker	Cardiovascular (hypertension, fluid retention) Psychiatric (depression, agitation) Endocrine (cushingoid appearance, hyperglycemia, osteoporosis) Gastrointestinal (peptic ulcer, ulcerative esophagitis) Infections Myopathy Glaucoma

Cremer PC et al. JAMA 2024;332:1090

Colchicine Trials

Table 1. Pivotal Placebo-Controlled Randomized Clinical Trials of Colchicine in Pericarditis

	ICAP (n = 240)[37]	COPPS-2 (n = 360)[14]	CORP (n = 120)[3]	CORP-2 (n = 240)[4]
Cause of pericarditis, %	Idiopathic: 77.1 PCIS: 20.0 Connective tissue disease: 2.9	Not applicable	Idiopathic: 81.7 PCIS: 5.8 Connective tissue disease: 12.5	Idiopathic: 82.5 PCIS: 8.8 Connective tissue disease: 6.7
Pericarditis episodes	Acute	Prevention of PCIS	First recurrence	Multiple recurrences
Co-interventions, %	Aspirin or ibuprofen: 93.3 Prednisone: 6.7	None	Aspirin or ibuprofen: 92.5 Prednisone: 7.5	Aspirin or indomethacin: 93.3 Prednisone: 6.7
Primary end point	Incessant or recurrent pericarditis	PCIS	Recurrent pericarditis	Recurrent pericarditis
Follow-up, mo	18	18	18	18
Event rates (absolute risk reduction), %	37.5 vs 16.7 (absolute risk reduction, 20.8)	29.4 vs 19.4 (absolute risk reduction, 10.0)	55 vs 24 (absolute risk reduction, 31)	42.5 vs 21.6 (absolute risk reduction, 20.9)

Abbreviations: COPPS-2, Colchicine for Prevention of the Postpericardiotomy Syndrome and Postoperative Atrial Fibrillation; CORP, Colchicine for Recurrent Pericarditis; ICAP, Investigation on Colchicine for Acute Pericarditis; PCIS, post–cardiac injury syndrome.

Colchicine has not been studied in tuberculous or autoimmune pericarditis.

Cremer PC et al. JAMA 2024;332:1090;[37]Rodriguez de la Serna et al. Lancet 1987;2:1517; [14]Isiguzo G et al. Curr Cardiol Rep 2020;22:2;
[4]Imazio M et al. Lancet 2014;383:2232.

Anti-inflammatory Medications - Steroids

Starting dose 0.25–0.50 mg/kg/day[a]	Tapering[b]
>50 mg	10 mg/day every 1–2 weeks
50–25 mg	5–10 mg/day every 1–2 weeks
25–15 mg	2.5 mg/day every 2–4 weeks
<15 mg	1.25–2.5 mg/day every 2–6 weeks

- Triple therapy - add corticosteroids to ASA/NSAIDS and colchicine, not replacement
- Taper when asymptomatic or CRP is normal
- Calcium 1,200-1,500 mg/day
- Vitamin D 800-1,000 IU/day
- Bisphosphonates in men ≥ 50 years and post-menopausal women at initial prednisone dose ≥5-7.5 mg/day

Adler Y et al. Eur heart J. 2015;36:2921

IL-1 Blockers Trials

Table 2. Randomized Withdrawal Trials With IL-1 Blockers in Recurrent Pericarditis

	Anakinra (n = 21)[22] AIRTRIP	Rilonacept (n = 61)[23] RHAPSODY	Goflikicept (n = 20)[42]
Cause of recurrent pericarditis	Idiopathic	Idiopathic: 85% PCIS: 15%	Idiopathic
No. of prior recurrences for enrollment	At least 3 prior recurrences (mean, 6.8)	At least 2 prior recurrences (mean, 4.7)	At least 1 prior recurrence (45%, ≥3 recurrences)
Disease state at enrollment	Active (elevated CRP) >10 mg/dL	Active (elevated CRP)	Active: 41% Quiescent: 59%
Background therapy, %	Corticosteroids: 100 NSAIDs: 71.4 Colchicine: 85.7	Corticosteroids: 45.9 NSAIDs: 63.9 Colchicine: 86.9	Corticosteroids: 9.1[a] NSAIDs and/or colchicine: 90.9[a]
Tapering during run-in phase	NSAIDs stopped within 15 d; corticosteroids stopped by wk 7; colchicine discontinuation optional (57% continued)	Prespecified discontinuation of NSAIDs, colchicine, and corticosteroids by wk 10; median time to monotherapy 7-8 wk	NSAIDs and colchicine stopped on day 14 without tapering; corticosteroids stopped by wk 12
Primary end point	Recurrence (pericardial chest pain with CRP elevation)	Recurrence (pericardial chest pain with CRP elevation)	Recurrence (2 of the following: pericardial chest pain, CRP elevation, new or worsening pericardial effusion)
Randomized withdrawal follow-up	6 mo	Event driven; median time to recurrence with placebo was 8.6 wk	24 wk
Event rates, %	90.0 vs 18.2	74.2 vs 6.7	90.0 vs 0

Abbreviations: CRP, C-reactive protein; NSAID, nonsteroidal anti-inflammatory drug; PCIS, post-cardiac injury syndrome.

[a] For run-in period (n = 22).

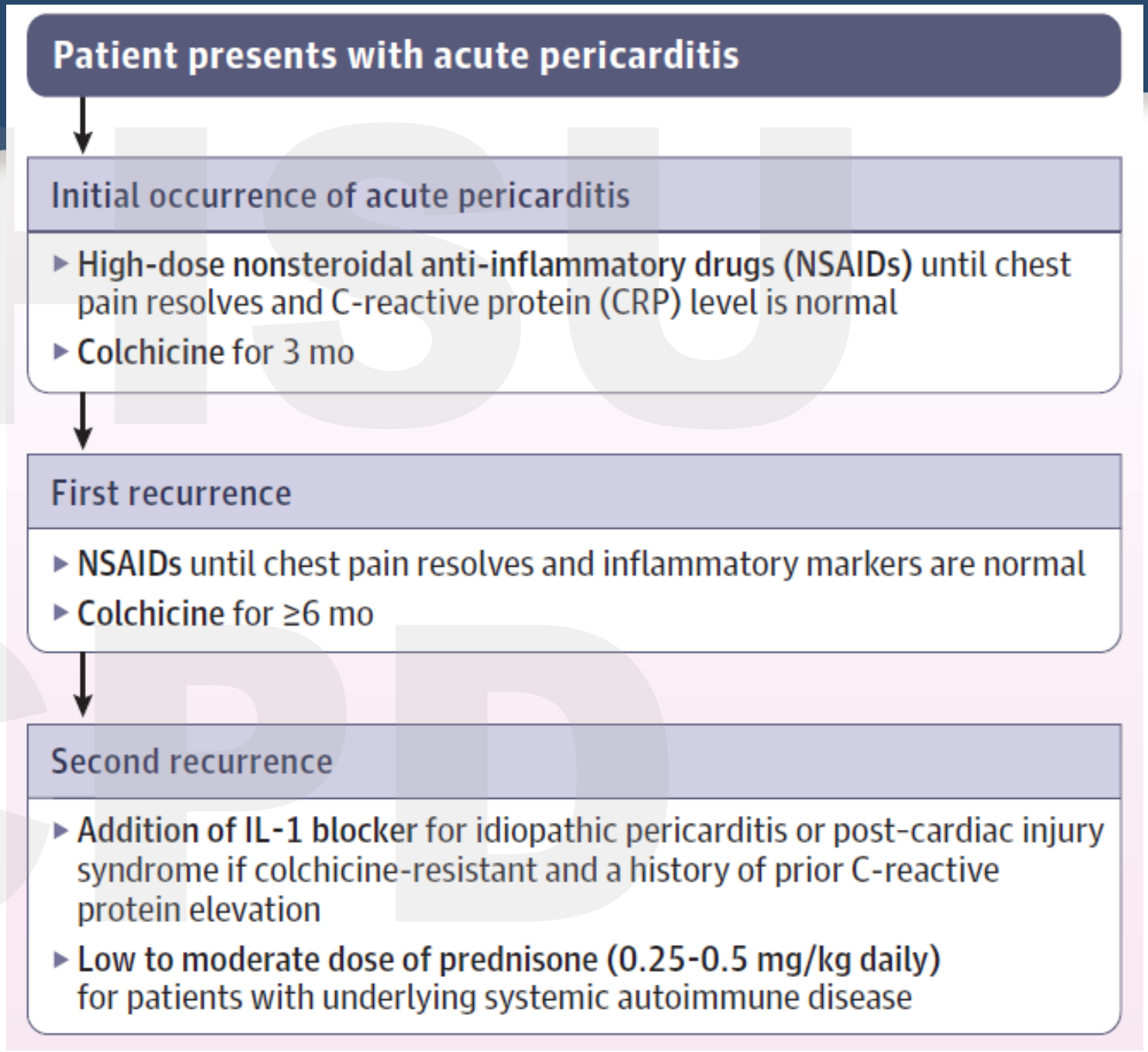
Cremer PC et al. JAMA 2024;332:1090; [22]Brucato A et al. JAMA 2016;316:1906;[23]Klein AL et al. NEJM 2021;384:31; [42]Myachikova VY et al. JACC 2023;82:30

Anti-Inflammatory Treatments

Recurrent pericarditis			
Anakinra (1-2 mg/kg/d, with a maximum dose of 100 mg subcutaneously daily)	At least 6-12 mo, with longer durations in multiple recurrent pericarditis	Optional (decrease by 100 mg per wk every month after several months of stability with daily therapy or decrease to every other day for 3 mo followed by half dose every other day for an additional 3 mo)[b]	Infection (39%; serious infection, 2%-3%; most commonly upper respiratory tract infections) Injection site reactions (71%)
Rilonacept (320 mg subcutaneously as a loading dose, followed by 160 mg weekly as a maintenance dose)	At least 6-12 mo, with longer durations in multiple recurrent pericarditis	Not investigated	Infection (34%-48%, most commonly upper respiratory tract infections) Injection site reactions (48%)

Cremer PC et al. JAMA 2024;332:1090

Treatment Approach



Cremer PC et al. JAMA 2024;332:1090

Myopericarditis

Diagnosis

- Pericarditis
- Positive troponin or CK-MB
- CMR
- No regional or global LV systolic dysfunction on echo or CMR

First-line Therapy

- Aspirin: 1,500-3,000 mg/d
- Ibuprofen: 1,200-2,4000 mg/d
- Indomethacin: 75-150 mg/d

Second-line Therapy

- Corticosteroids

Exercise

- Avoid exercise beyond sedentary activities
- Resume exercise after 6 months

Myocarditis with pericardial involvement

- Presence of regional or global LV systolic dysfunction

Etiology

- Cardiotropic virus
  - Coxsackie
- Cardiotoxic agents
  - Chemotherapy
  - Immune checkpoint inhibitors
  - Methamphetamine
  - Cocaine
- Systemic immune diseases
  - Lupus
  - Rheumatoid arthritis
  - Sarcoidosis
  - Hypereosinophilia

Adler Y et al. Eur Heart J. 2015;36:2921. Created in Biorender.com

Pericardial Effusion

Onset
- Acute
- Subacute
- Chronic (>3 months)

Size
- Small (<10 mm)
- Moderate (10-20 mm)
- Large (>20 mm)

Distribution
- Circumferential
- Loculated

Etiology
- Idiopathic (up to 50%)
- Malignancy (10-25%)
- Infection (15-30%)
- Connective tissue disease (5-15%)
- Iatrogenic (15-20%)
- TB (>60%) - *developing countries*

Presentation
- Asymptomatic/incidental finding on echo/CT/CMR
- CXR - enlarged cardiac silhouette
- Dyspnea, nausea, cough, hoarseness, dysphagia

Management
- Assess for tamponade
- If inflammatory signs, treat with anti-inflammatory medications
- Moderate and large - refer to cardiology
- Large effusion → pericardiocentesis
- Re-accumulation → pericardial window

Prognosis
- Moderate and large: 30-35% develop tamponade
- Mild - no surveillance echo unless symptoms
- Moderate - echo every 6 months
- Large - echo every 3-6 months

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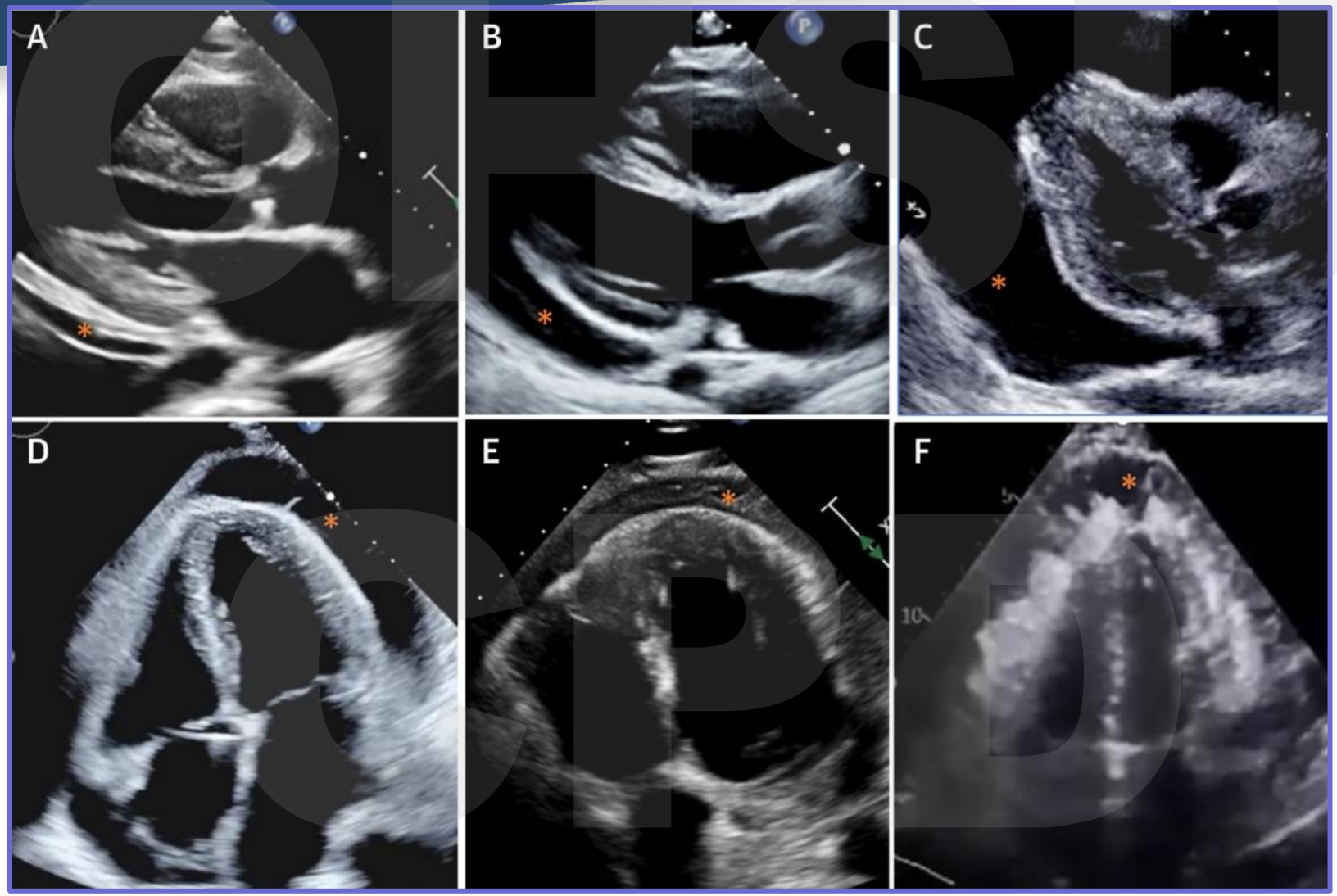
Pericardial Effusion Size



Klein AL. JACC: Cardiovasc Imag 2024;17:937

Constrictive Pericarditis

Risk of Progression
- Viral and idiopathic (<1%)
- Immune-mediated, neoplastic (2-5%)
- Bacterial, purulent (20-30%)

Prevalence
- Idiopathic or viral (42-49%)
- Post-cardiac surgery (11-37%)
- Post radiation therapy: Hodgkin's lymphoma and breast (9-31%)
- TB, purulent (3-6%) - developed countries
- Other (<10%)

Subtypes
- Transient
- Effusive-constrictive
  - RAP >10 mmHg or not decreased by 50% after pericardiocentesis
- Chronic: (Symptoms >3-6 months)
- End-stage chronic
  - CI <1.2 L/mm^2
  - Cirrhosis
  - Hypoalbuminemia from protein-losing enteropathy

Presentation
- Fatigue
- Peripheral edema
- Abdominal swelling
- Right heart failure symptoms with preserved right and left systolic function

Diagnosis
- Elevated LFTs, pro-BNP
- ECG
  - nonspecific ST change
  - atrial fibrillation
- CXR: 33% pericardial calcification
- **Echo**
  - septal bounce
  - medial e' >8 cm/s
  - hepatic vein end-diastolic expiratory reversal velocity/forward flow ratio: >0.8, annulus reversus
- CT
  - increased pericardial thickening
  - pericardial calcification
- **CMR**
  - increased pericardial thickening
  - septal shift
  - late gadolinium pericardial enhancement (LGE)
  - pericardial edema and inflammation (T2-STIR)
- Cardiac Cath
  - square root sign
  - RVEDP=LVEDP, ventricular interdependence

Management
- Transient
  - Anti-inflammatory therapy
- Effusive-constrictive
  - Pericardiocentesis →anti-inflammatory medications → visceral pericardiectomy (*perioperative mortality 6-12%*)
- Chronic
  - Visceral pericardiectomy

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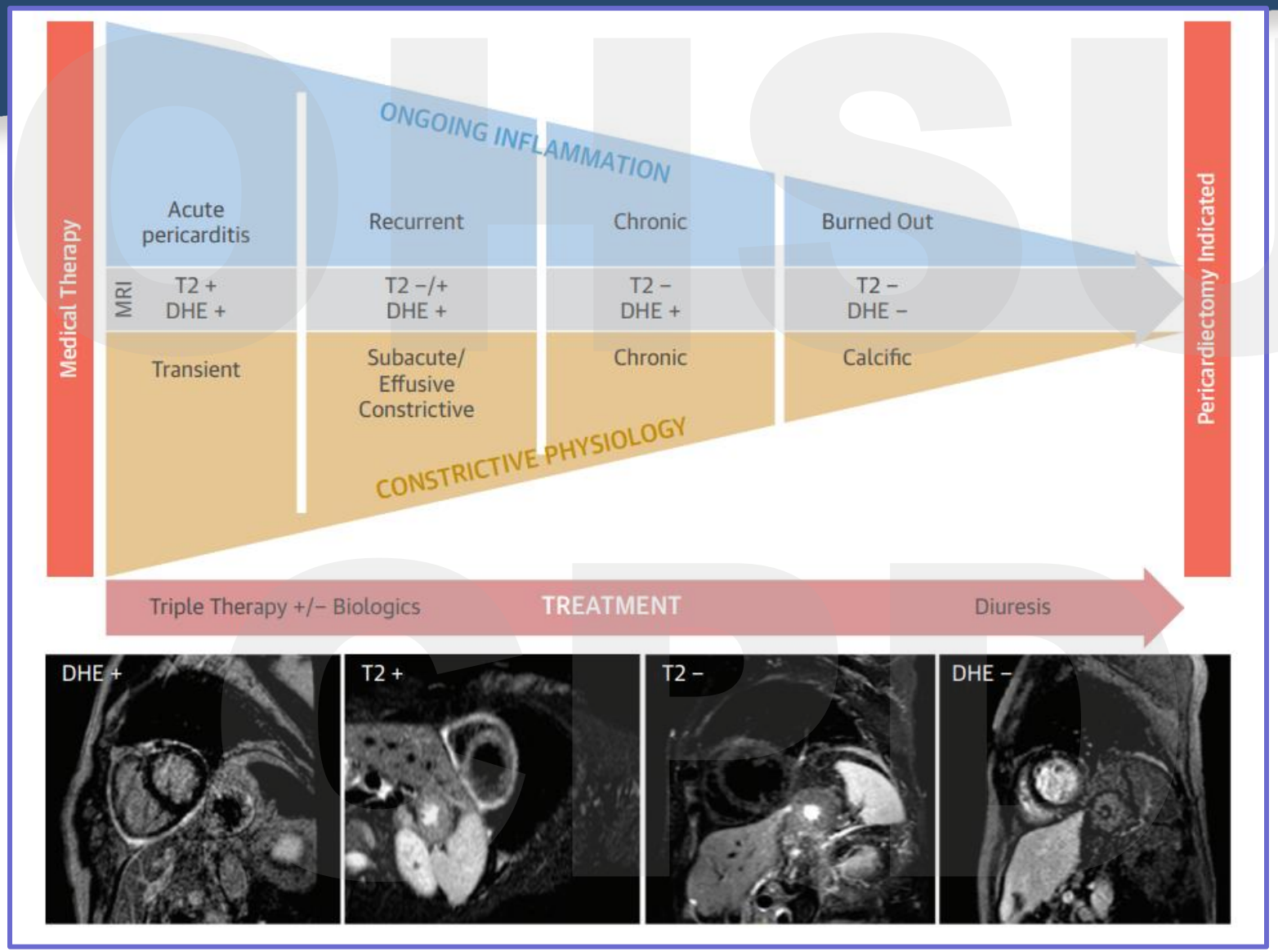
Spectrum of Pericardial Diseases and CMR Findings



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Uremic, Inflammatory, and Post Cardiac Injury Pericarditis

UREMIC

Subtypes
- Pre renal replacement therapy or within 8 weeks of initiation
- Dialysis pericarditis (2-21%)
- Constrictive pericarditis

Presentation
- 30% asymptomatic
- Lower rate of pleuritic chest pain
- Serosanguinous effusion

Management
- Dialysis
- NSAIDs and corticosteroids if dialysis ineffective
- Avoid colchicine
- May need to avoid anticoagulants

INFLAMMATORY

Characteristics
- 5-15%
- Pericardial involvement
  - Lupus
  - Rheumatoid arthritis
  - Sjogren syndrome
  - Scleroderma
- Not the first manifestation of disease

Presentation
- Acute or recurrent
- Periodic fevers

Management
- Treat underlying condition

POST CARDIAC INJURY

Characteristics
- Post myocardial infarction
  - Pericardial effusion
  - Early infarct-associated pericarditis
  - Late pericarditis/Dressler Syndrome: 1-2 weeks post infarction
- Surgical trauma
  - 22% asymptomatic pericardial effusion weeks post-op
  - ~ 3% constrictive pericarditis
- Iatrogenic (atrial fibrillation ablation)

Presentation
- Acute

Management
- Post myocardial infarction
  - Consider aspirin and colchicine
- Post-operation
  - No therapy if post-operative asymptomatic pericardial effusion
  - Anti-inflammatory medications if symptomatic
- Post Afib ablation
  - Colchicine prophylaxis post Afib ablation (OR 0.38)

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Neoplastic Pericarditis

NEOPLASTIC

Subtypes
- Primary
  - Benign
    - Lipoma
    - Fibroma
  - Malignant
    - Mesothelioma
    - Angiosarcoma
    - Fibrosarcoma
- Secondary/metastatic
  - Lung
  - Breast
  - Melanoma
  - Lymphoma
  - Leukemia

Presentation
- Any size
- Frequently tamponade

Management
- Drainage
- Pericardial window
- Intrapericardial cytostatic/sclerosing agents (cisplatin/tetracycline)
- Radiation therapy
  - Lymphoma
  - Leukemias
- Pleuropericardiotomy

PREGNANCY

Management
- Pregnancy
  - NSAIDs first and second trimester only
  - >20 weeks gestation → NSAIDs can cause ductus constriction
  - >20 weeks gestation → use aspirin
  - Colchicine contraindicated
- Breast feeding
  - Can use NSAIDs and steroids
  - Colchicine contraindicated

ELDERLY

Management
- Paucity of data
- Reduce colchicine dose by half

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Question 4

When would it be appropriate to refer your patient to cardiology?

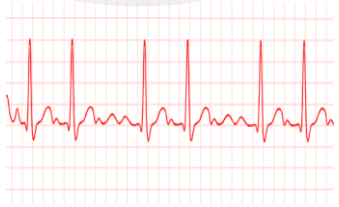
A. Lack of response to anti-inflammation medications
B. Third recurrent episode, incessant, or chronic pericarditis
C. Large pericardial effusion
D. Constrictive pericarditis
E. All of the above

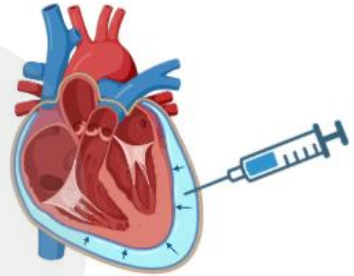
Knowledge Gaps

- Optimal treatment for
  - incessant pericarditis
  - severe first recurrence
  - Effuse constrictive pericarditis
  - Tuberculous pericarditis
- Efficacy of therapies in autoimmune disease
- Optimal treatment duration for multiple recurrent pericarditis
- Optimal tapering doses and duration of treatment
- Role of radical pericardiectomy in multiple recurrent pericarditis without constrictive physiology

Case – 1st Hospitalization

- 53 yo F with hypertension, chronic leukopenia with negative ANA, migraine headaches, hypothyroidism, and TIA x 2 provoked by oral contraceptive medications.





Vice-like chest pain at rest

3 wks prior

Extreme fatigue while cycling

2 wks prior

Extreme fatigue while rucking

1 wk prior

Intermittent chest pain
Palpitations
No SOB

Office

ED Admission

- Ibuprofen
- Colchicine

Pericarditis Rx

Case – Treatment and Labs

	Treatment	WBC	HB	HCT	PLT	ESR	CRP	Pro-BNP	GFR
1/26/22		3.14	13.2	38.9	309	7	0.2		106
8/24/23		2.19	12.3	35.4	257				
4/4/24 Hosp #1	Ibuprofen x 2 weeks Colchicine	8.2	12.2	35.6	336		85.6	942	112
4/15/24		10.13	12.5	37.1	507	51			
4/22/24							70.7		112
4/25/24 Hosp #2	Colchicine	8.01	10.6	31.8	504	56			
5/3/24	d/c colchicine Start anakinra	3.59	9.6	29	480	53	53		
5/8/24							39.8		
6/26/24		3.03	11.6	36.1	269	14	0.3		
9/17/24		2.58	11.9	34.6	249	2			112
12/15/24	Taper anakinra								

Key Points

- Echocardiography is the first line imaging modality in the evaluation of pericardial effusion and pericarditis
- Cardiac MRI and CT are second-line imaging modalities that can access pericardial calcification, characterization of effusion, and tissue inflammation
- NSAIDs and colchicine are the first-line pharmacotherapy for management acute pericarditis
- Corticosteroid and anti-IL-1 inhibitors are second and third-line pharmacotherapies for management of chronic or recurrent pericarditis
- Corticosteroid and IL-1 blockers discontinuation is associated with a high incident of recurrent pericarditis
- Radical surgical pericardiectomy for patients with chronic constrictive pericarditis