

Miocardite, una patologia che lascia il segno

Dr. med

Gabriele Casso

Cardioanestesia e Terapia intensiva

Cardiocentro Ticino



Congresso Infermieristico
17 aprile 2016_Lugano

*Associated Institute
of the University of Zurich*



**University of
Zurich** ^{UZH}



CARDIOCENTROTICINO



Miocardite

1. Introduzione, definizione

2. Fisiopatologia

3. Clinica

4. Esami complementari e algoritmo decisionale

5. Terapia

6. Conclusione

Miocardite: definizione

La miocardite un processo infiammatorio a carico del tessuto miocardico.

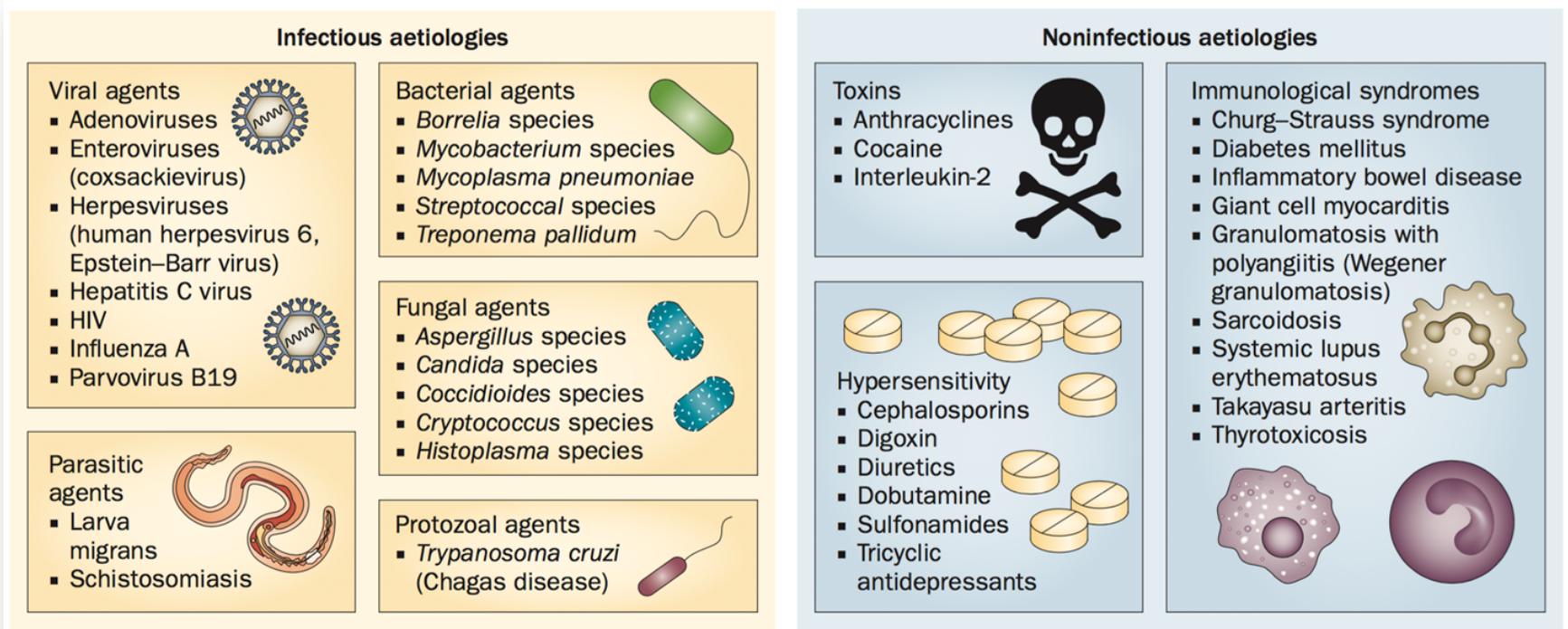


Figure 1 | Common causes of myocarditis. Viral infection is the most common aetiology, but several other aetiologies of myocarditis have also been implicated.

Miocardite: definizione

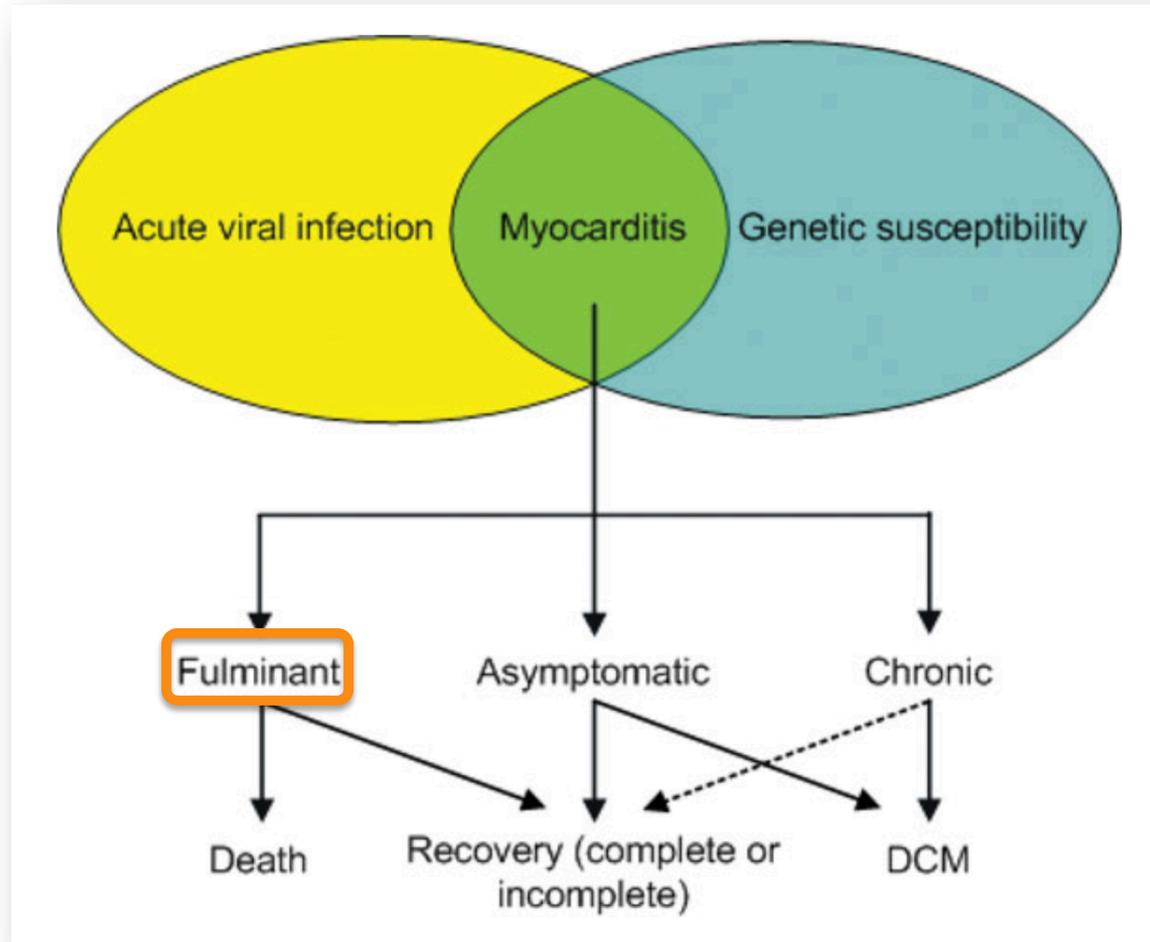
Myocarditis (WHO /ISFC):

Inflammatory disease of the myocardium diagnosed by established **histological***, **immunological** and **immunohistochemical criteria****.

*N.B. established histological Dallas criteria defined as follows: histological evidence of inflammatory infiltrates within the myocardium associated with myocyte degeneration and necrosis of nonischaemic origin.

**N.B. unspecified immunohistochemical criteria, we propose an abnormal inflammatory infiltrate to be defined as follows: ≥ 14 leucocytes/mm² including up to 4 monocytes/mm² with the presence of CD3 positive T-lymphocytes ≥ 7 cells/mm

Miocardite: riassunto

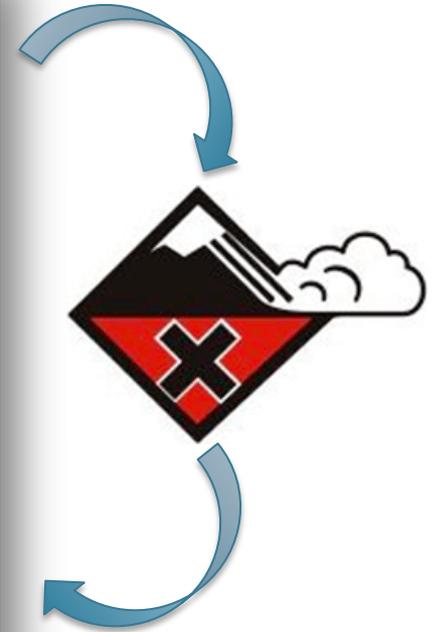
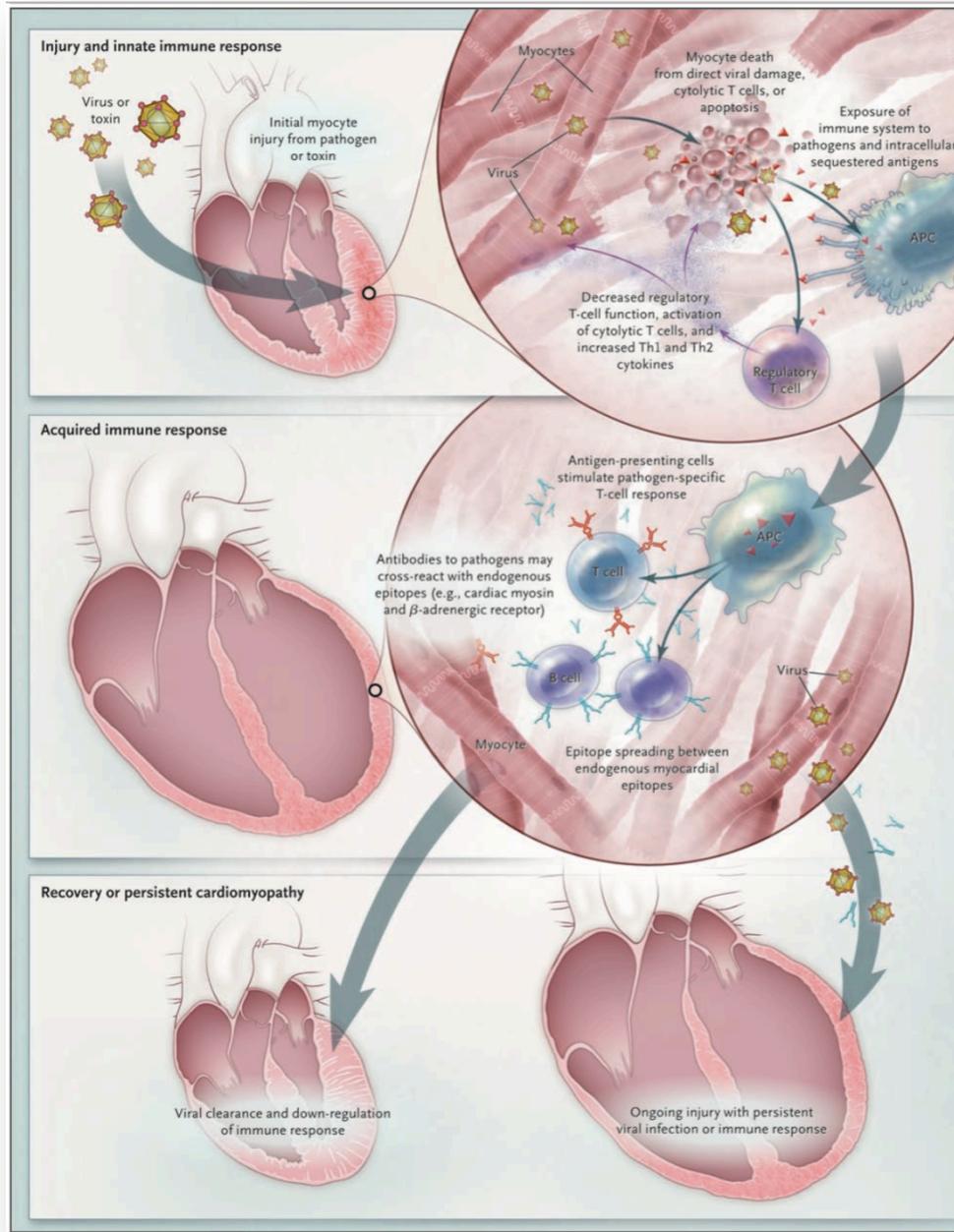


Miocardite: forme cliniche

- **Miocardite fulminante** – insufficienza cardiaca acuta nelle 2 settimane dopo un'infezione virale. Necessita nei pazienti più gravi d'un sostegno emodinamico meccanico. Istologicamente miocardite linfocitica attiva, buona speranza di recupero nei pazienti che sopravvivono alla fase acuta.
- **Miocardite acuta** – meno chiaro l'inizio della patologia, disfunzione ventricolare sistolica dichiarata, possibile progressione verso una cardiomiopatia dilatativa.
- **Miocardite cronica attiva** – inizio poco chiaro, sviluppo di una disfunzione ventricolare sistolica associata ad infiammazione cronica con riattivazioni frequenti. Fibrosi lieve – moderata alla biopsia endomiocardica
- **Miocardite cronica persistente** – inizio poco chiaro, infiltrati istologici persistenti, spesso zone di necrosi, sintomi (dolori retrosternali, palpitazioni, ...) ma assenza di disfunzione ventricolare significativa

Miocardite: sintomatologia

- In casi lievi, assenza di sintomi clinici. Si possono avere dei sintomi generali di un'infezione virale (cefalee, dolori muscolari ed articolari, febbre, odinofagia, diarrea,...) in assenza di sintomi cardiaci.
 - In casi più severi:
 - Dolori toracici
 - Aritmia
 - Dispnea
 - Edemi
 - Astenia fatica
- Ischemia miocardica?**
- Insufficienza cardiaca?**



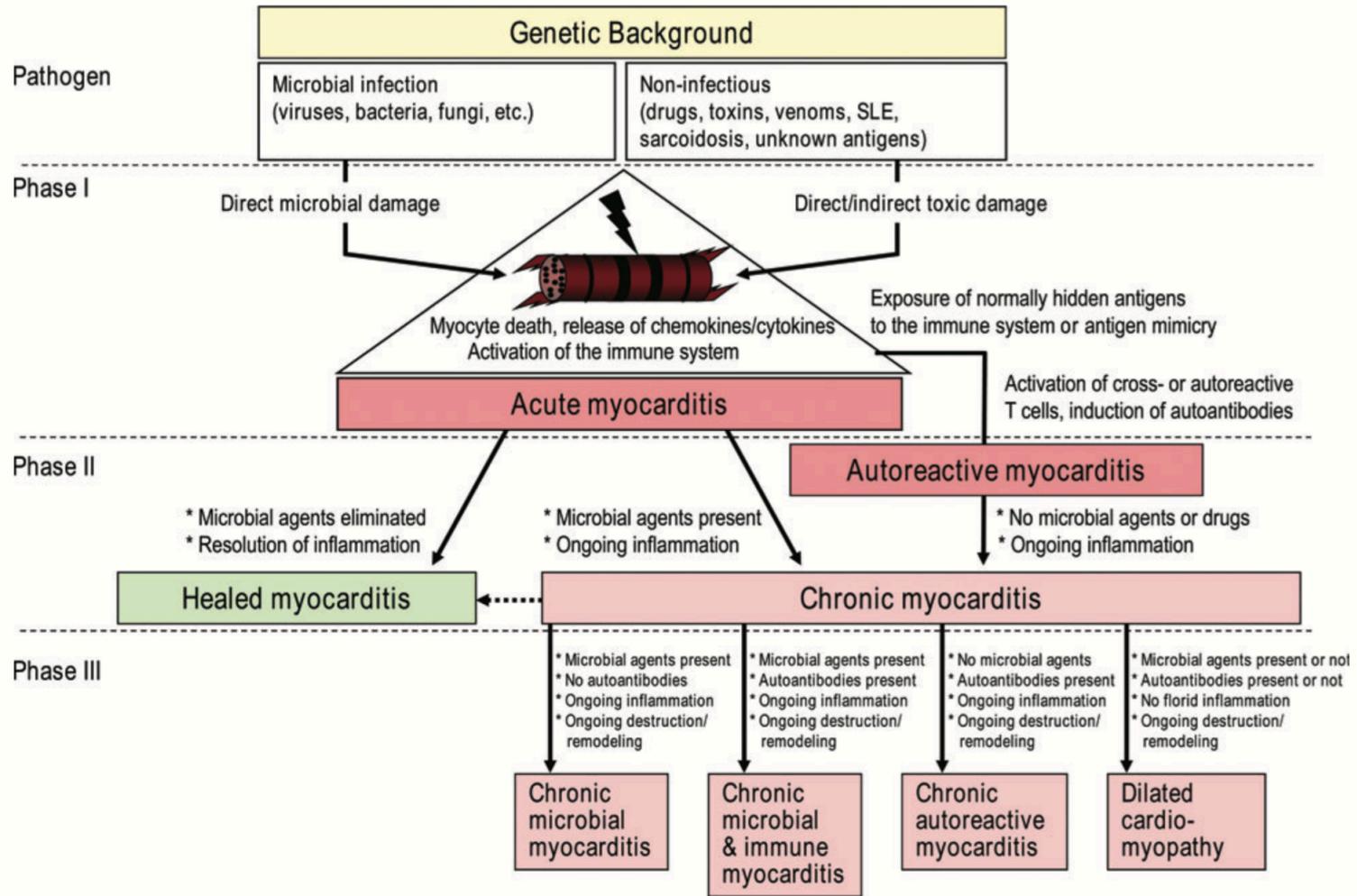


Figure 2 The picture shows the pathogenetic mechanisms involved in myocarditis and progression to dilated cardiomyopathy.

Miocardite: esami complementari

- EGC 12 derivazioni («infarto-like», aritmie-blocchi, irritazione pericarditica, ...)
- Enzimi di miocardionecrosi (CK, CK-MB, troponina, ...)
- BNP, NT-proBNP
- PCR, VS
- Serologie virali (++++)
- Autoanticorpi cardiaci sierici
- Radiografia del torace
- Ecocardiografia
- Risonanza magnetica cardiaca
- Coronarografia diagnostica
- Biopsia endomiocardica



Table 1 Causes of myocarditis/inflammatory cardiomyopathy**1. Infectious myocarditis**

Bacterial	<i>Staphylococcus</i> , <i>Streptococcus</i> , <i>Pneumococcus</i> , <i>Meningococcus</i> , <i>Gonococcus</i> , <i>Salmonella</i> , <i>Corynebacterium diphtheriae</i> , <i>Haemophilus influenzae</i> , <i>Mycobacterium</i> (tuberculosis), <i>Mycoplasma pneumoniae</i> , <i>Brucella</i>
Spirochaetal	<i>Borrelia</i> (Lyme disease), <i>Leptospira</i> (Weil disease)
Fungal	<i>Aspergillus</i> , <i>Actinomyces</i> , <i>Blastomyces</i> , <i>Candida</i> , <i>Coccidioides</i> , <i>Cryptococcus</i> , <i>Histoplasma</i> , <i>Mucormycoses</i> , <i>Nocardia</i> , <i>Sporothrix</i>
Protozoal	<i>Trypanosoma cruzi</i> , <i>Toxoplasma gondii</i> , <i>Entamoeba</i> , <i>Leishmania</i>
Parasitic	<i>Trichinella spiralis</i> , <i>Echinococcus granulosus</i> , <i>Taenia solium</i>
Rickettsial	<i>Coxiella burnetii</i> (Q fever), <i>R. rickettsii</i> (Rocky Mountain spotted fever), <i>R. tsutsugamushi</i>
Viral	RNA viruses: Coxsackieviruses A and B, echoviruses, polioviruses, influenza A and B viruses, respiratory syncytial virus, mumps virus, measles virus, rubella virus, hepatitis C virus, dengue virus, yellow fever virus, Chikungunya virus, Junin virus, Lassa fever virus, rabies virus, human immunodeficiency virus-1 DNA viruses: adenoviruses, parvovirus B19, cytomegalovirus, human herpes virus-6, Epstein-Barr virus, varicella-zoster virus, herpes simplex virus, variola virus, vaccinia virus

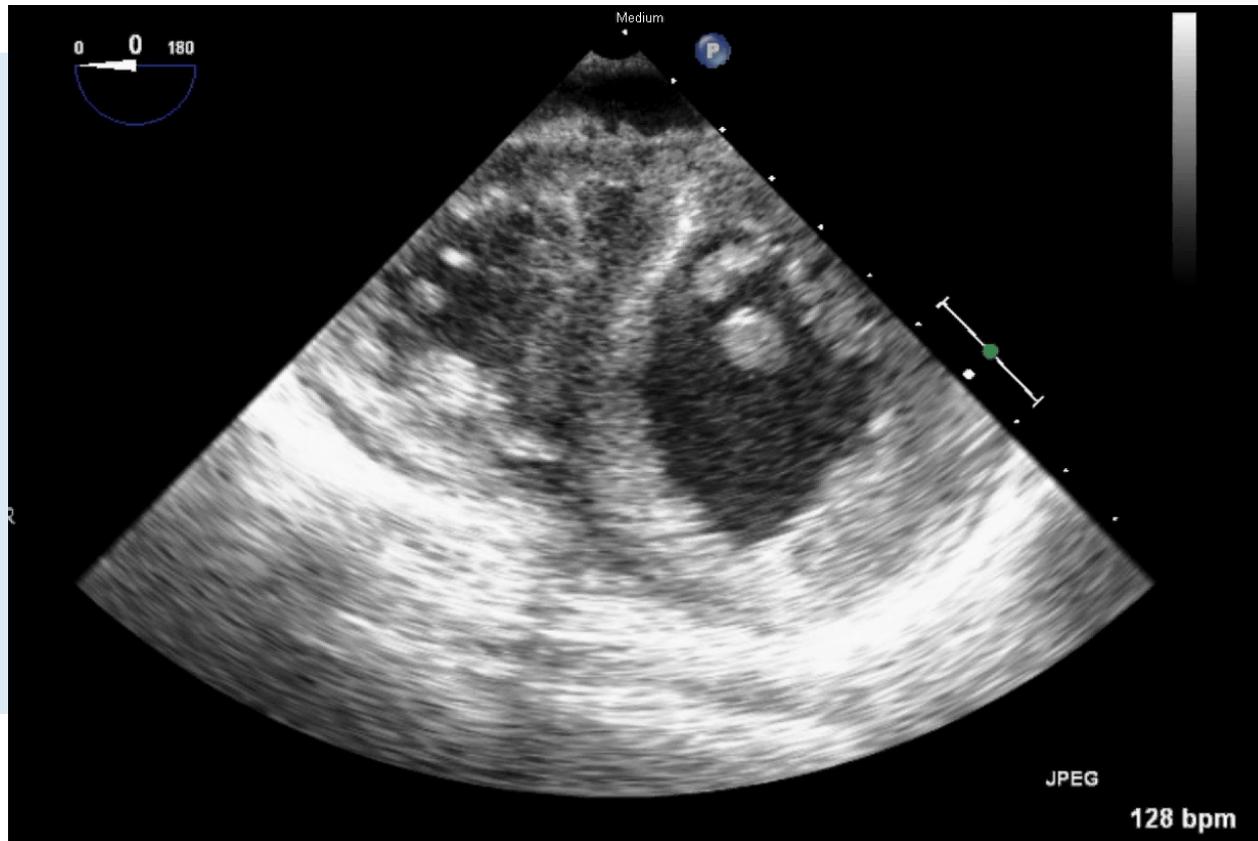
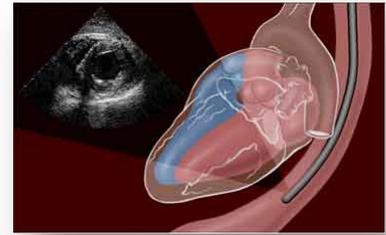
2. Immune-mediated myocarditis

Allergens	Tetanus toxoid, vaccines, serum sickness Drugs: penicillin, cefaclor, colchicine, furosemide, isoniazid, lidocaine, tetracycline, sulfonamides, phenytoin, phenylbutazone, methyl dopa, thiazide diuretics, amitriptyline
Alloantigens	Heart transplant rejection
Autoantigens	Infection-negative lymphocytic, infection-negative giant cell Associated with autoimmune or immune-oriented disorders: systemic lupus erythematosus, rheumatoid arthritis, Churg-Strauss syndrome, Kawasaki's disease, inflammatory bowel disease, scleroderma, polymyositis, myasthenia gravis, insulin-dependent diabetes mellitus, thyrotoxicosis, sarcoidosis, Wegener's granulomatosis, rheumatic heart disease (rheumatic fever)

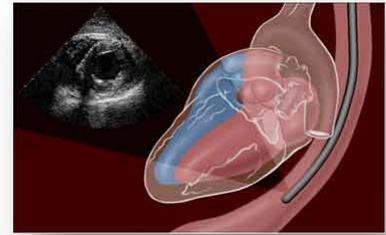
3. Toxic myocarditis

Drugs	Amphetamines, anthracyclines, cocaine, cyclophosphamide, ethanol, fluorouracil, lithium, catecholamines, hemetine, interleukin-2, trastuzumab, clozapine
Heavy metals	Copper, iron, lead (rare, more commonly cause intramyocyte accumulation)
Miscellaneous	Scorpion sting, snake, and spider bites, bee and wasp stings, carbon monoxide, inhalants, phosphorus, arsenic, sodium azide
Hormones	Phaeochromocytoma, vitamins: beri-beri
Physical agents	Radiation, electric shock

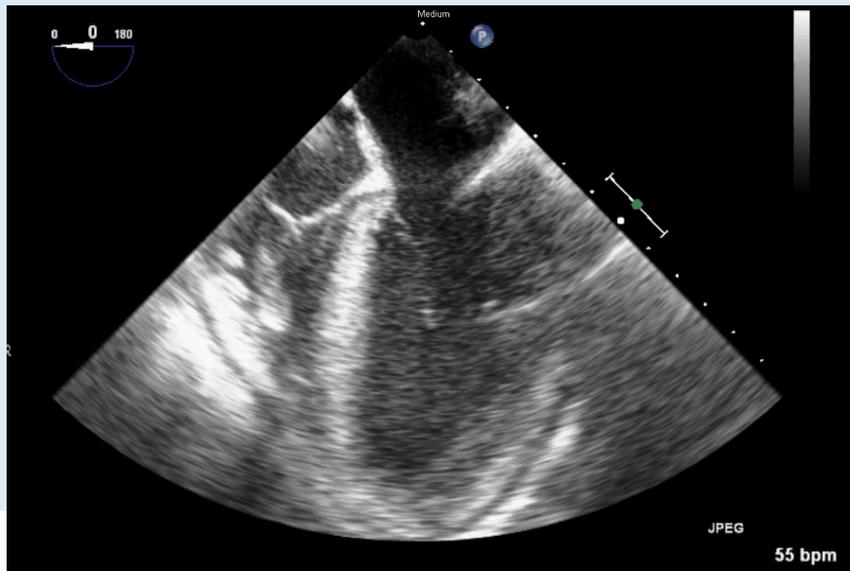
Miocardite: ecocardiografia



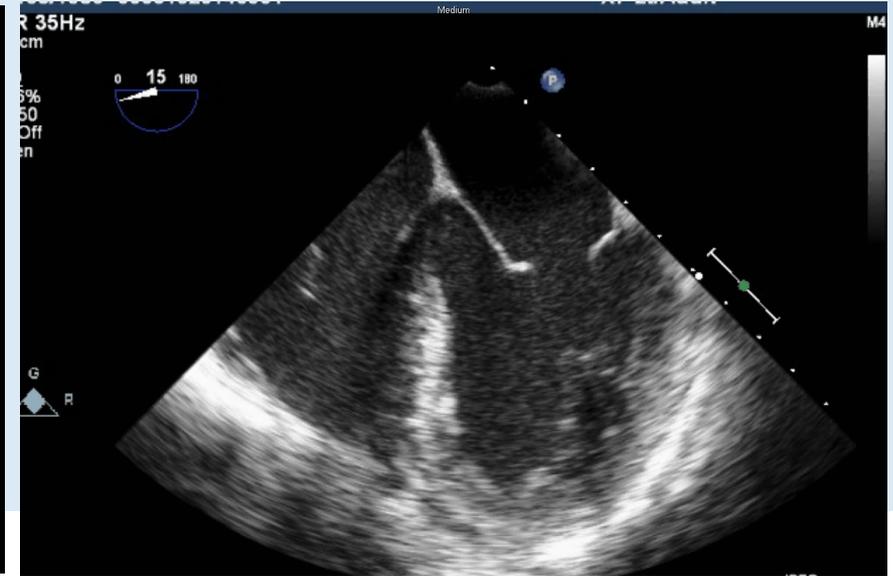
Miocardite: ecocardiografia



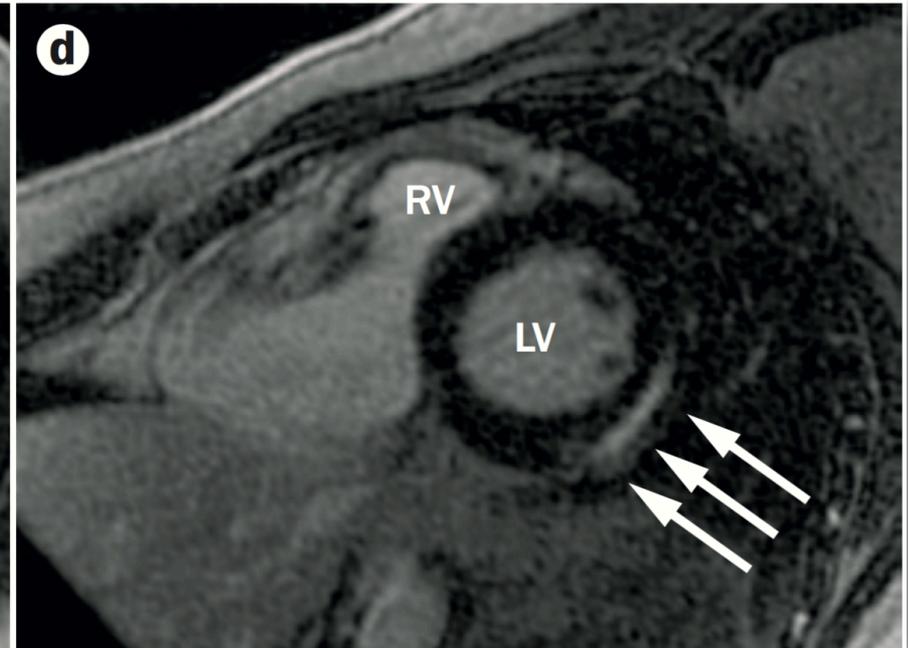
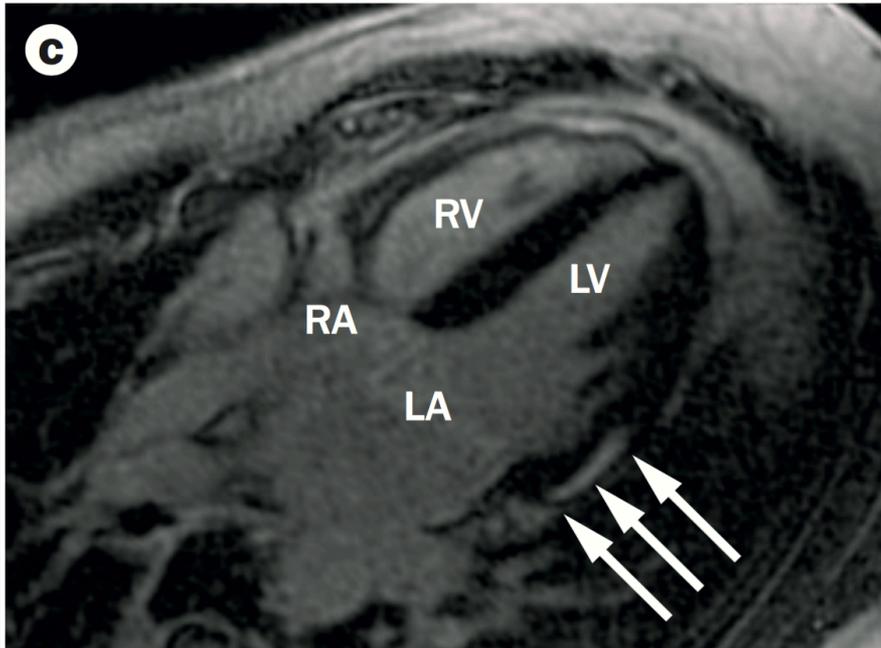
Fase acuta miocardite fulminante



Recupero post miocardite



Risonanza magnetica cardiaca



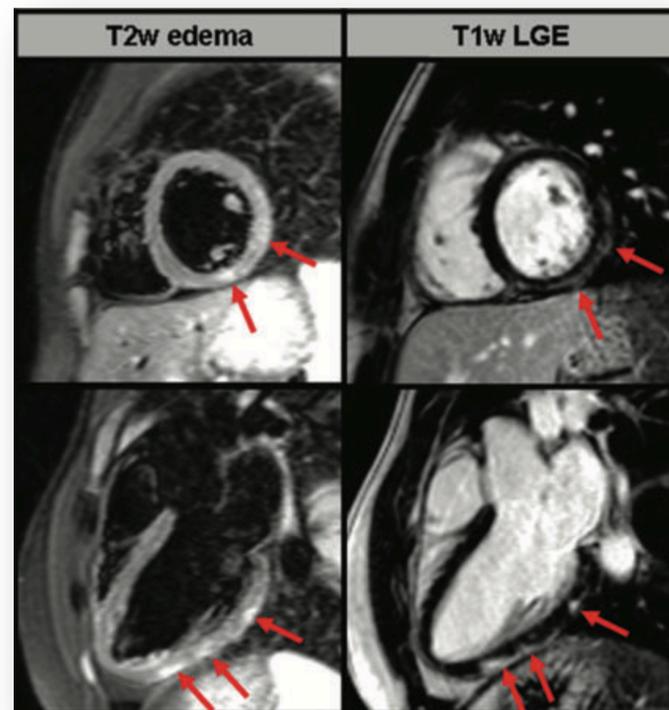
Segni infiammatori, edema, necrosi miocardica, cambiamento nella geometria e nella contrattilità regionale e globale del ventricolo, versamento pericardico

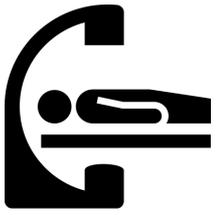
Risonanza magnetica cardiaca



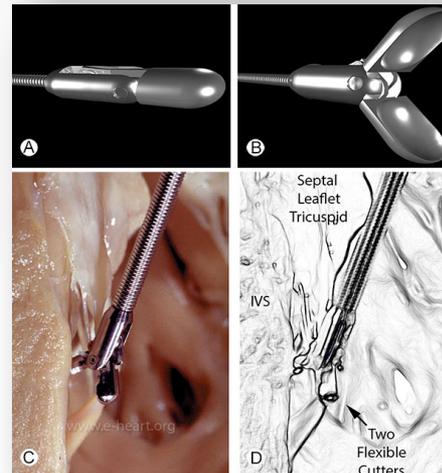
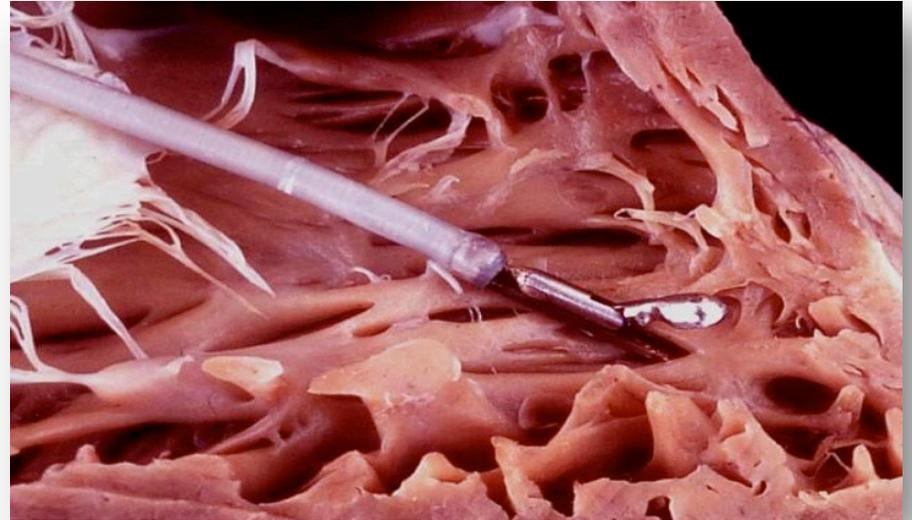
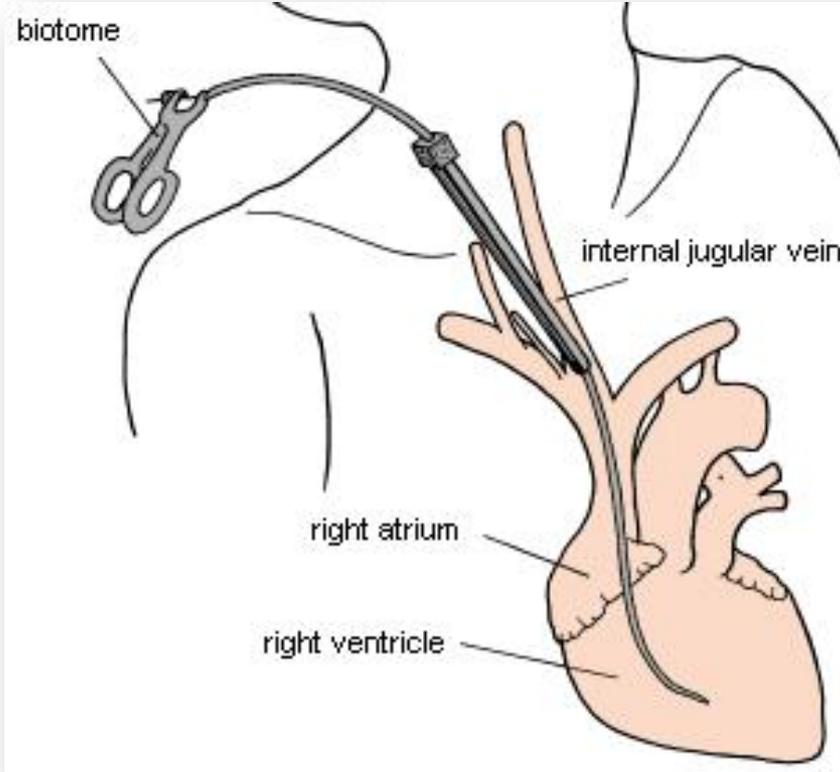
I **criteri di Lake Louise** indicano che 2 su 3 **segni RMN** summenzionati devono essere presenti per mostrare una infiammazione miocardica compatibile con una **miocardite** :

- aumentata intensità regionale o globale del segnale miocardico nelle immagini in T2 (*segno di edema miocardico*)
- aumentato gadolinium enhancement (EGE) ratio tra il miocardio e il muscolo scheletrico in T1 (*iperemia e capillary leak miocardico*)
- almeno una lesione focale di distribuzione non ischemica nelle immagini late gadolinium enhanced (LGE) in T1 (*lesione irreversibile/necrosi cellulare*)

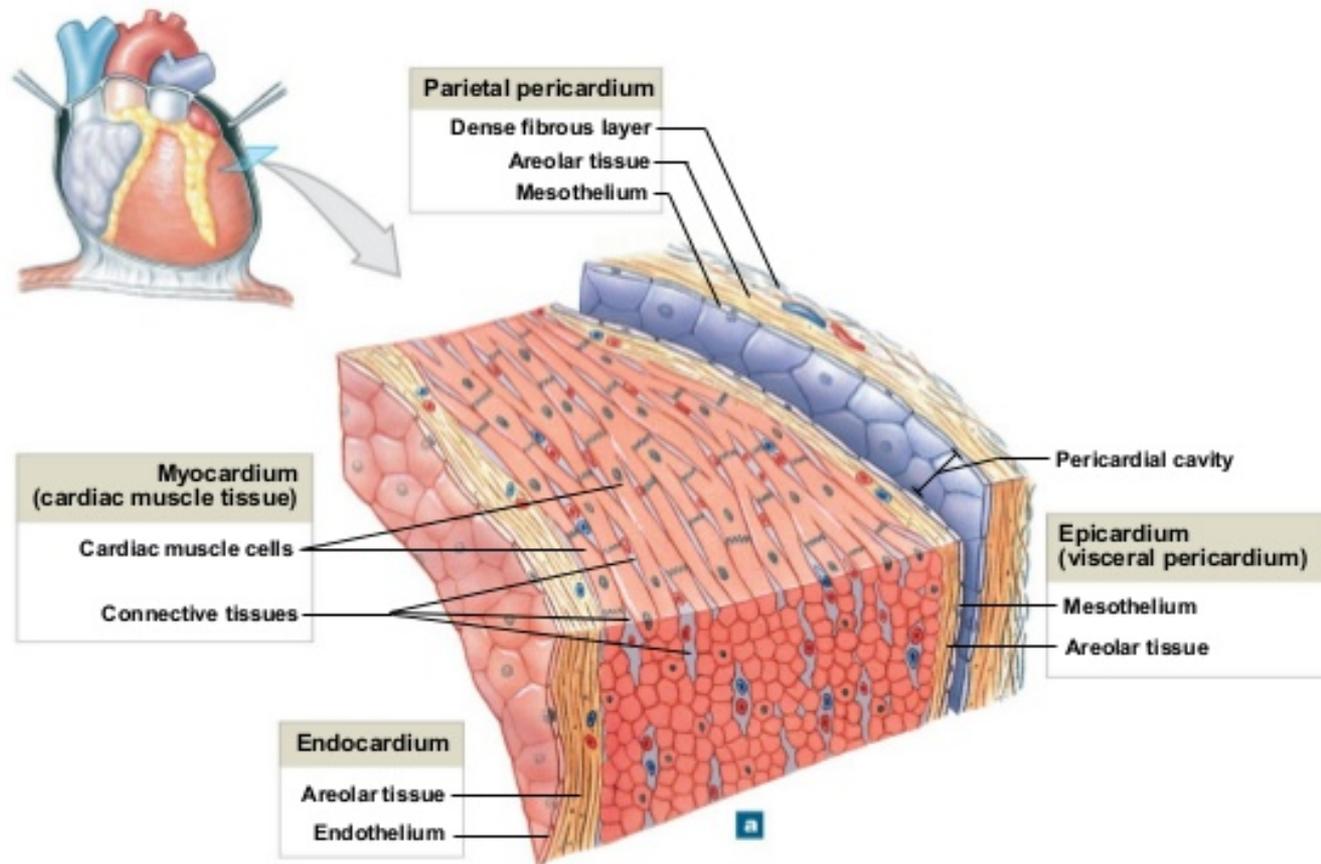




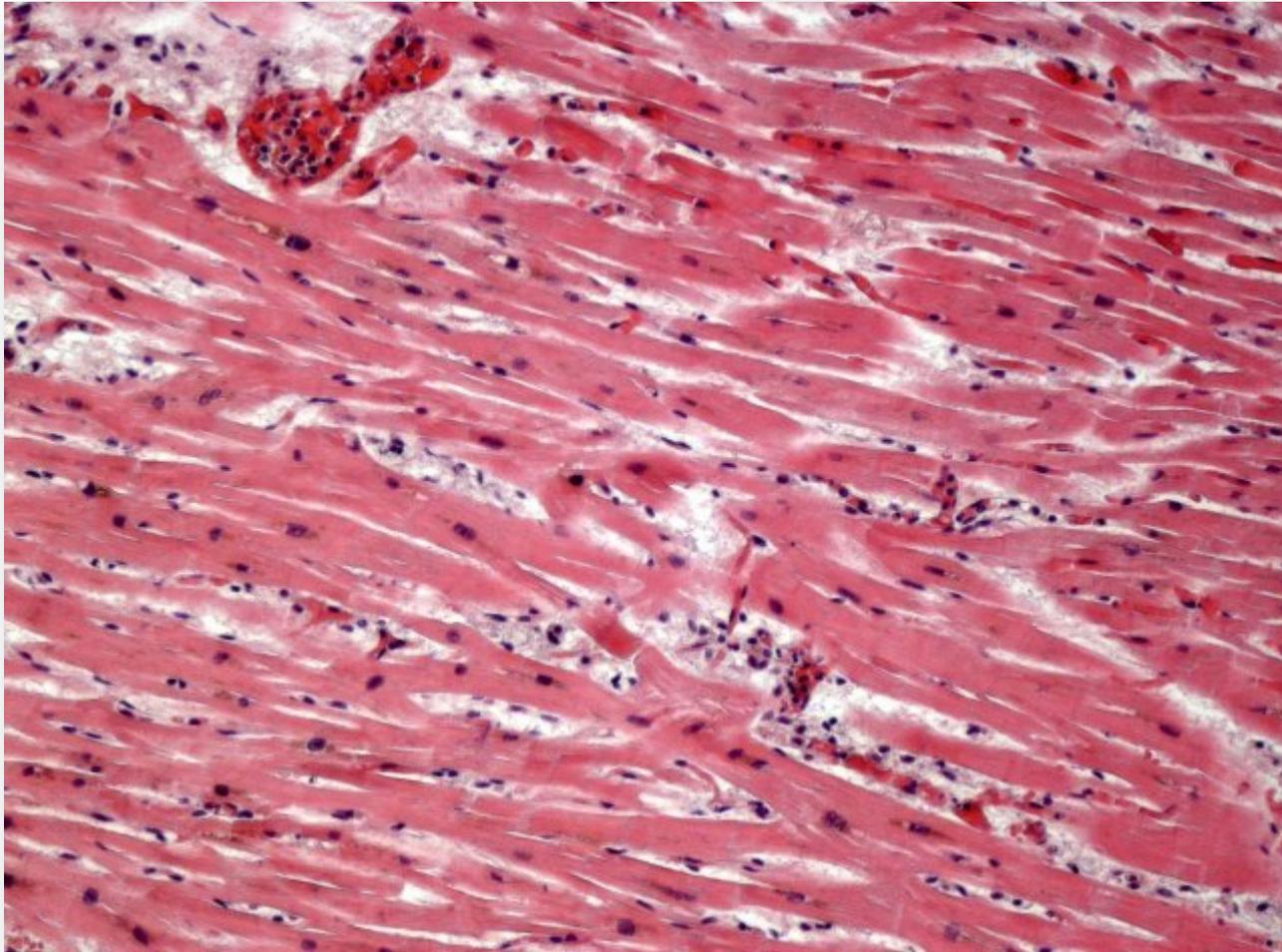
Biopsia endomiocárdica



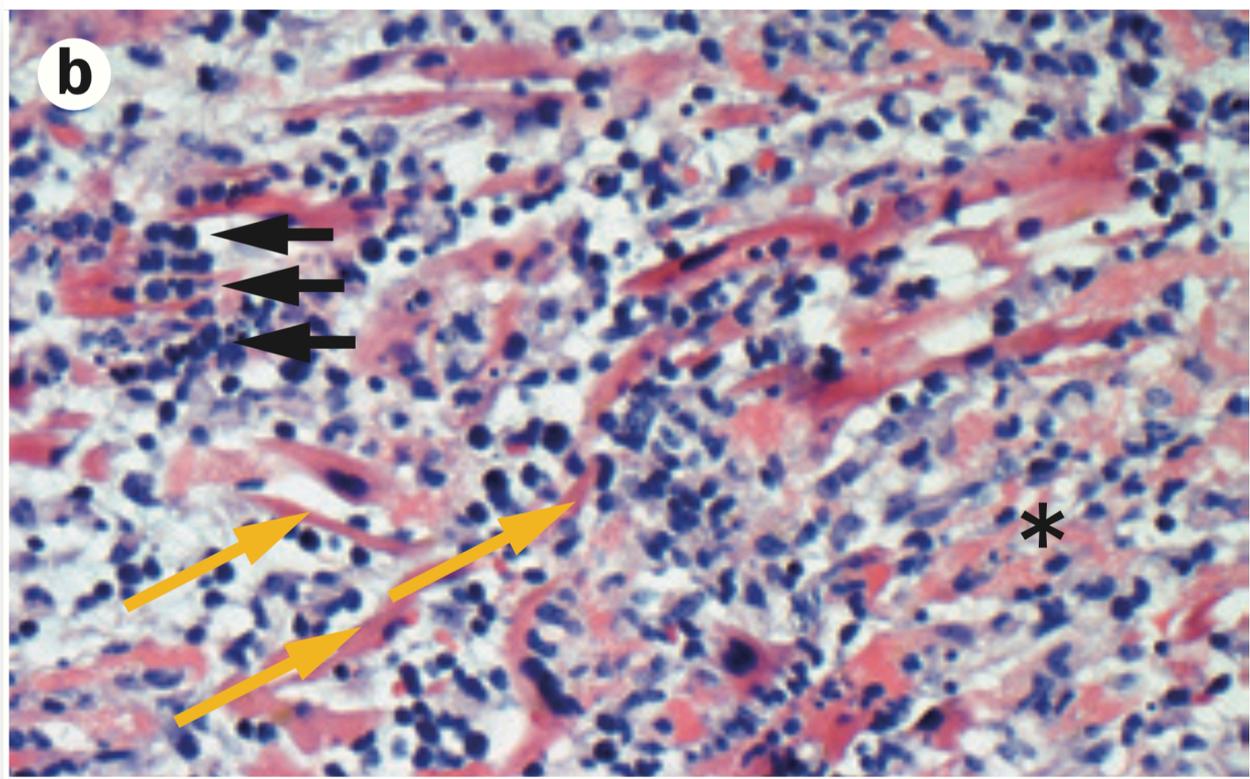
Miocardio: istologia



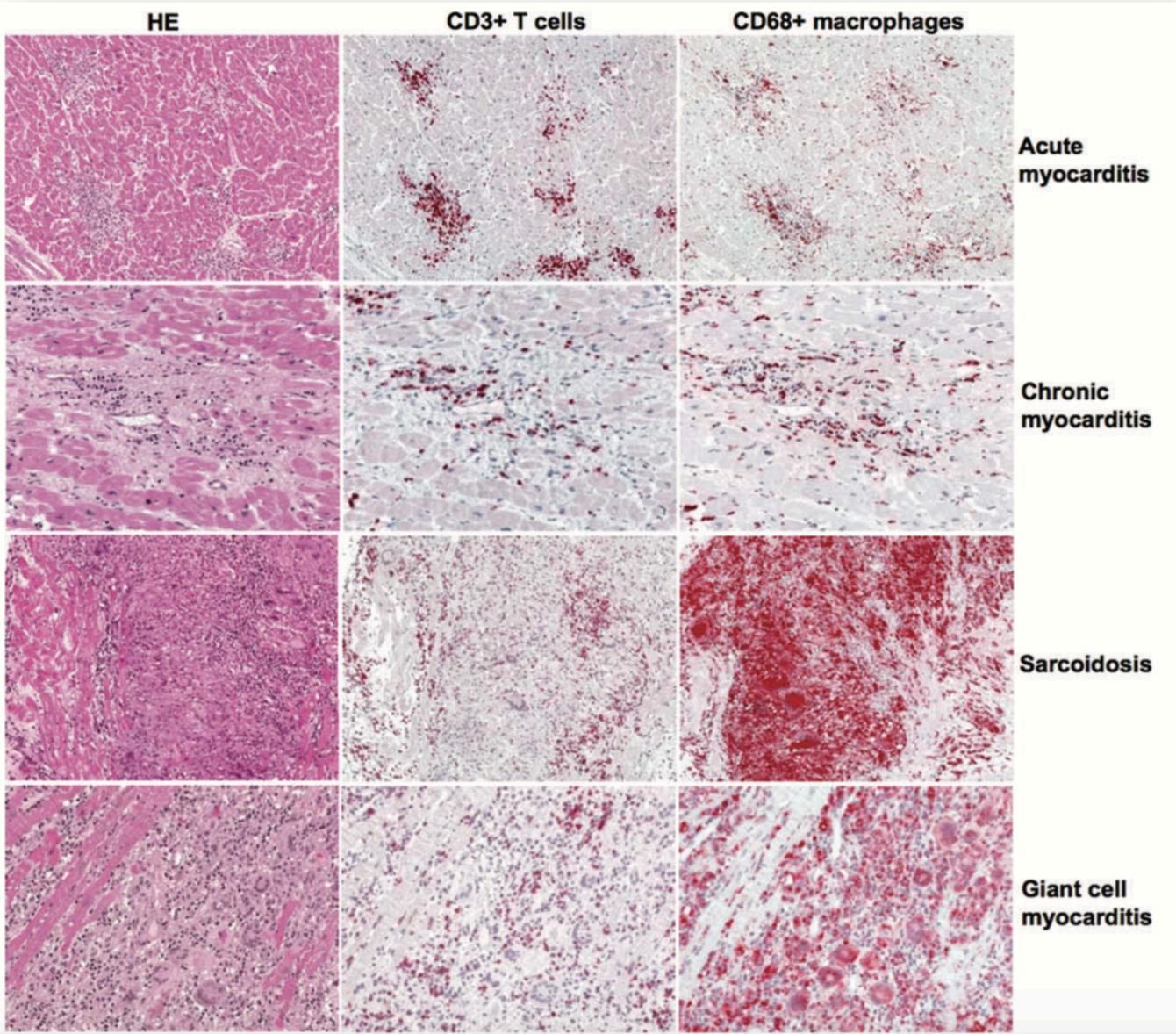
Miocardio: istologia



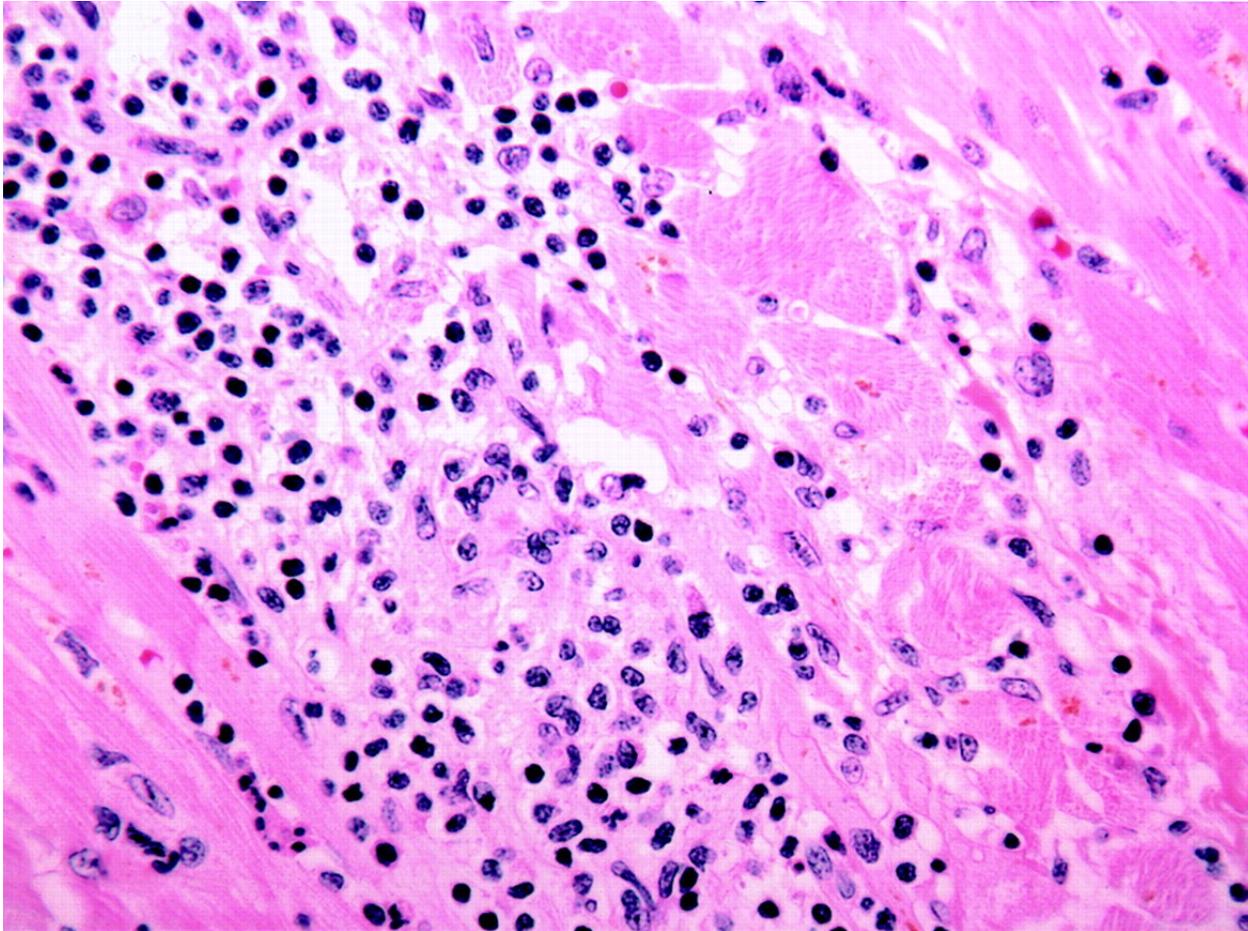
Miocardite: istologia



Profound lymphocyte and macrophage intrusion (black arrows), myocyte destruction (asterisk), derangement of myocardial architecture (yellow arrows), and intracellular oedema

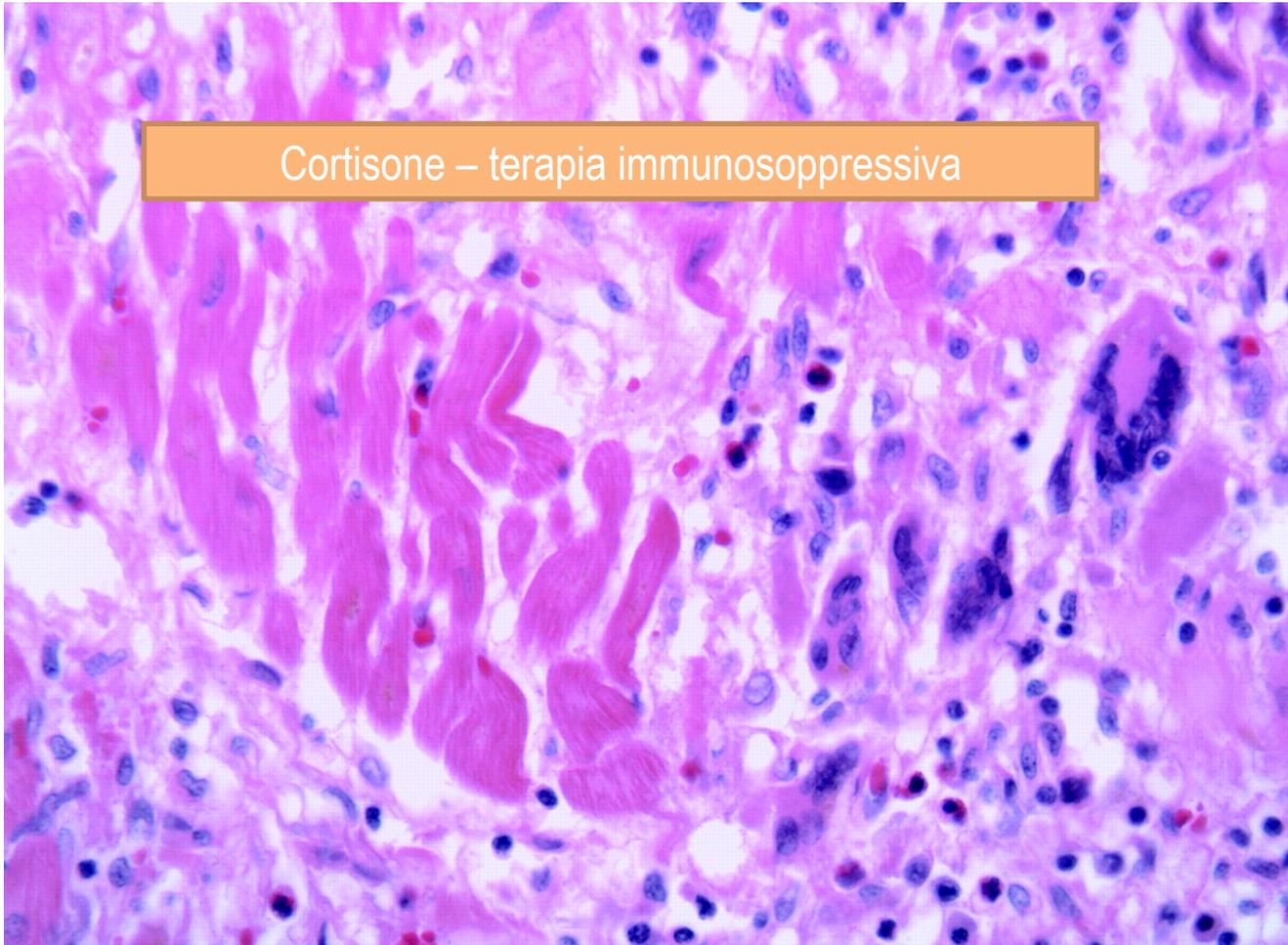


The pathological diagnosis of **lymphocytic (viral) myocarditis** requires the presence of a lymphocyte-rich inflammatory infiltrate associated with myocyte degeneration or necrosis.

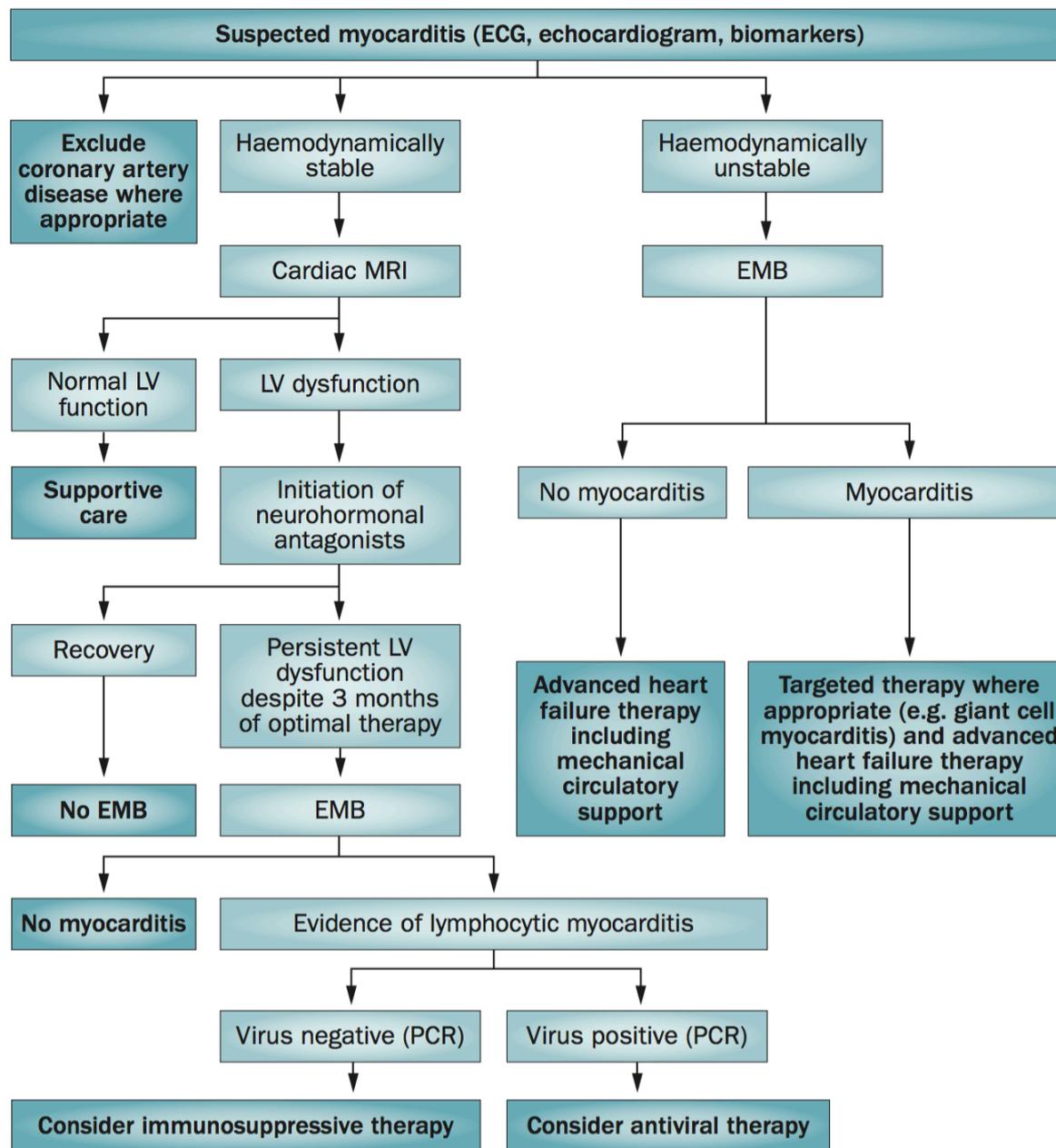


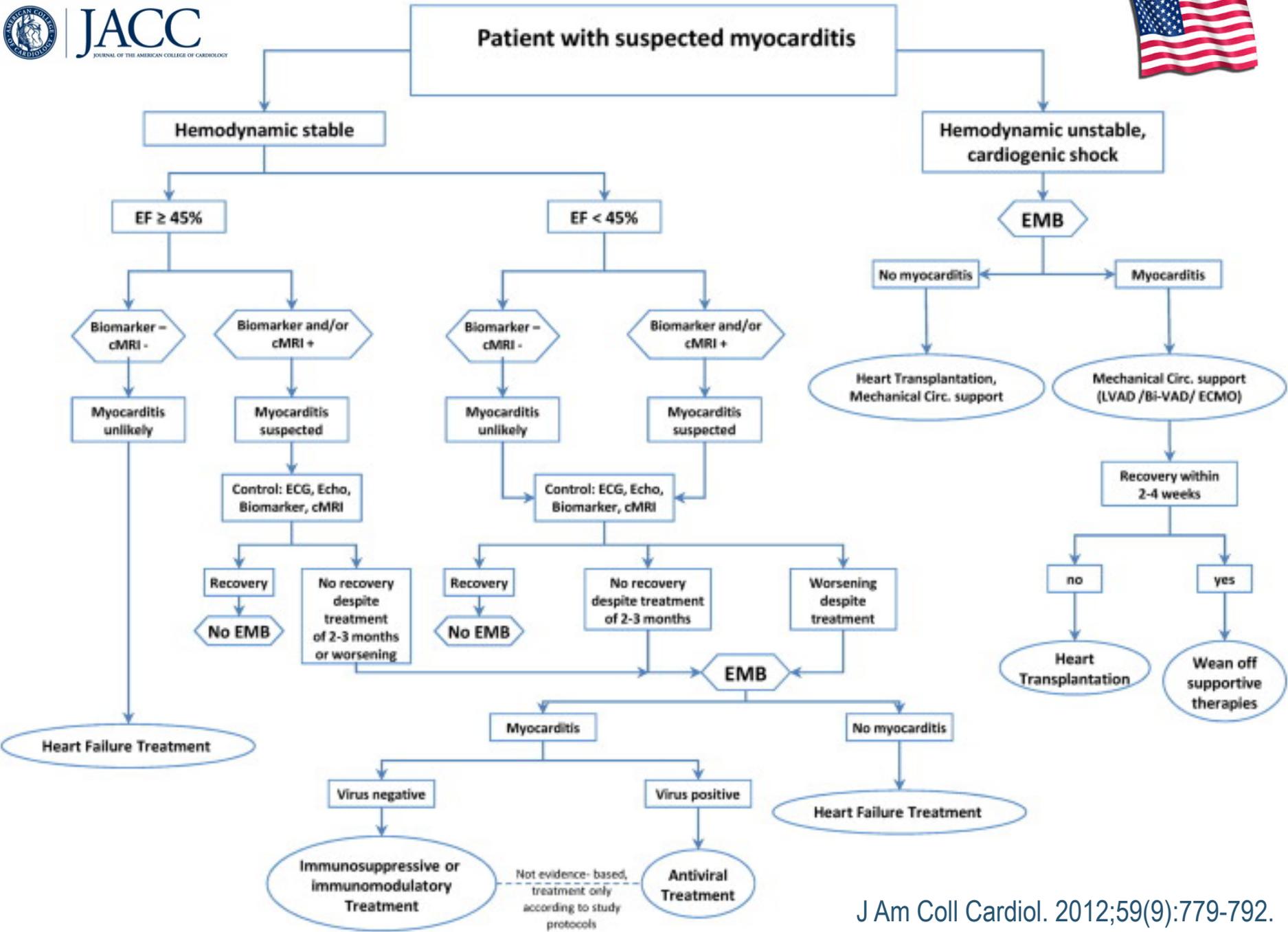
Jared W. Magnani, and G. William Dec *Circulation*. 2006;113:876-890

Giant cell myocarditis is a rare disorder characterized pathologically by the presence of a mixed inflammatory infiltrate containing lymphocytes, plasma cells, macrophages, and eosinophils along with numerous giant cells.



Jared W. Magnani, and G. William Dec *Circulation*. 2006;113:876-890





Miocardite: terapia

- Terapia dell'insufficienza cardiaca acuta / cronica
- In certi casi terapia antivirale o antibiotica
- In certi casi somministrazione d'immunoglobuline altodosate
- In certi casi terapia cortisonica / immunosoppressiva
- Terapia di sostegno emodinamico invasivo nelle forme più severe, indirizzare precocemente il paziente in un centro specializzato (in Ticino al Cardiocentro)

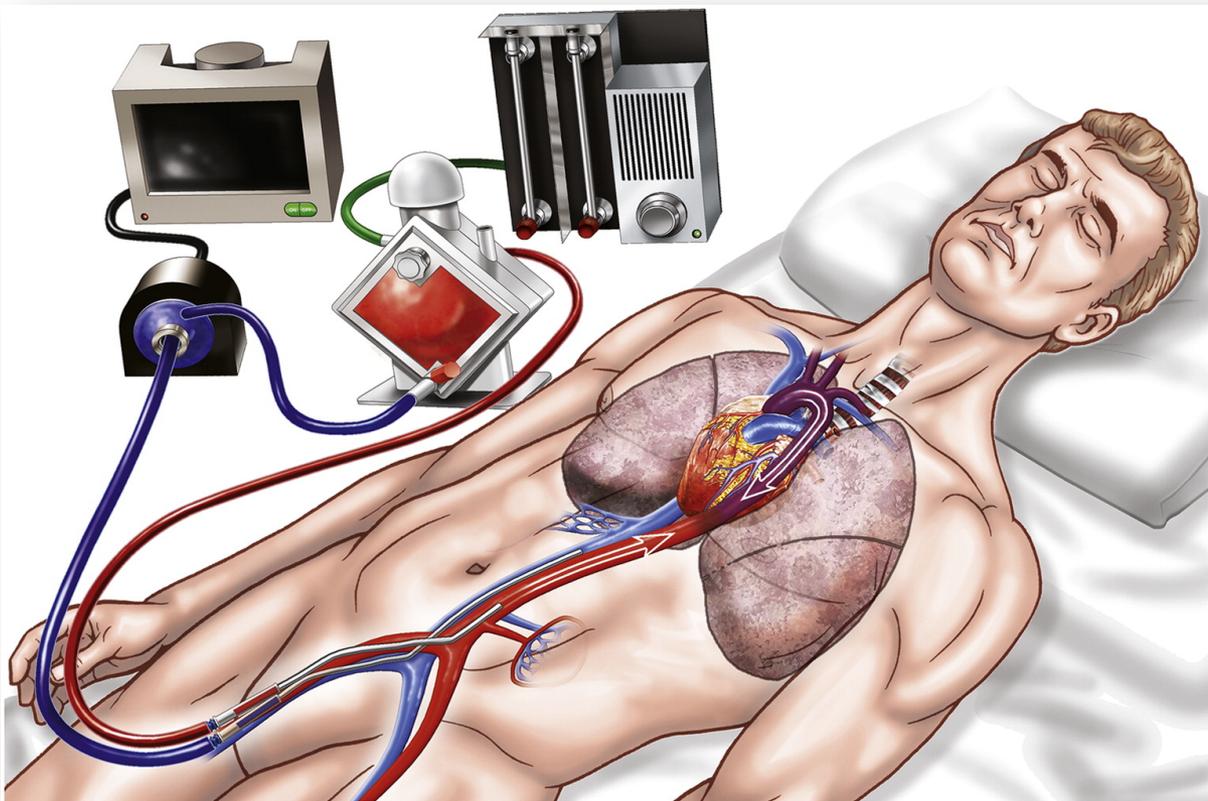
Myocarditis? What?
I thought it was just
a cold.



Miocardite

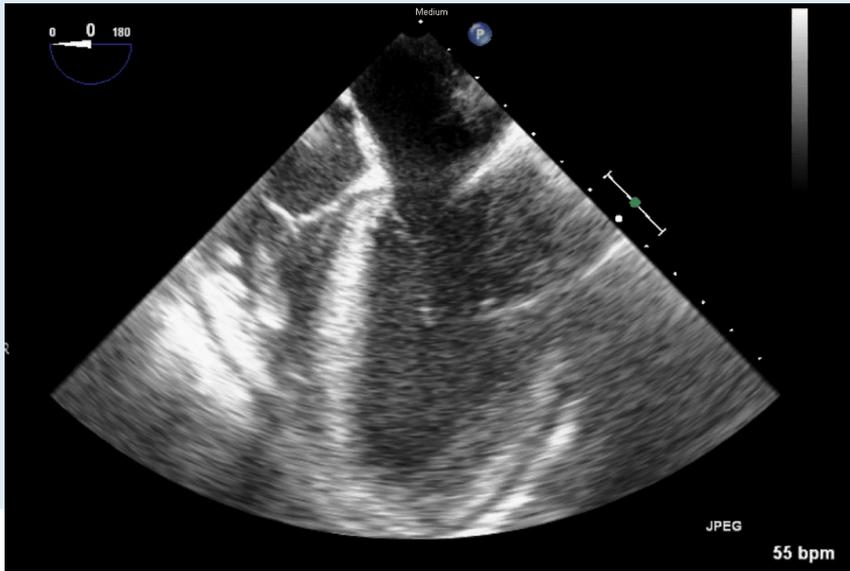
Miocardite: terapia di sostegno

ECMO veno-arterioso femoro – femorale(periferico) o femoro - succlavia dx (centrale)

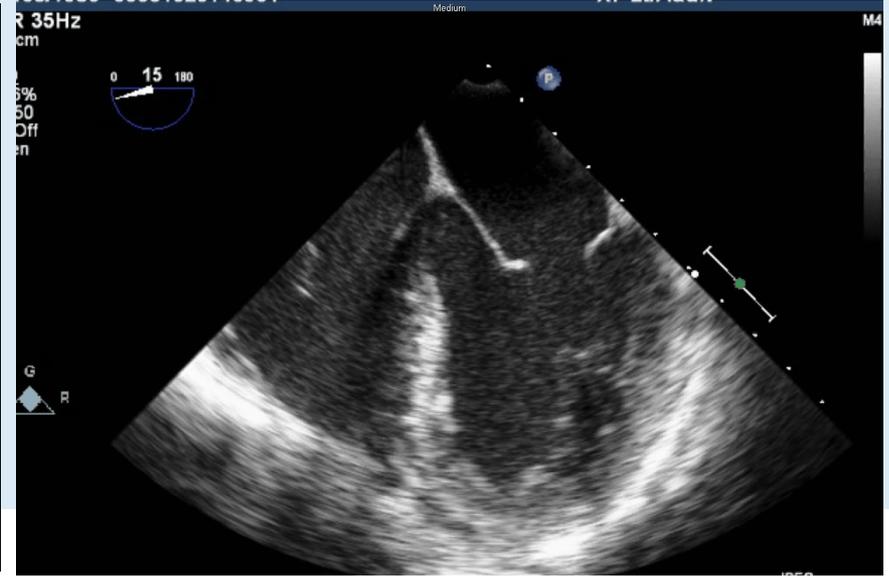


Miocardite acuta severa: take home message

Fase acuta miocardite fulminante



Recupero post miocardite



Bisogna sapere tenere duro ... il tempo cura!!!

... E ORA LA PAROLA AI NOSTRI INFERMIERI
DI TERAPIA INTENSIVA

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