



ECOCARDIOCHIRURGIA
CORSO DI ELETTROCARDIOGRAFIA
PEDIATRICA



Milano, 21/5/2015

L'ECG come strumento diagnostico
per svelare la presenza di una
cardiopatía congenita

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L'ECG neonatale/pediatrico

E' patologico?

Come orientarsi?

Quali criteri?

E' diagnostico?

Quale ECG per
quale cardiopatia?

Quanto serve l'ECG
nel follow up?

Diagnosi di cardiopatia congenita

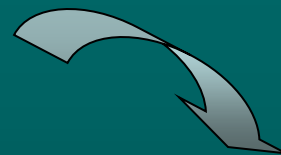
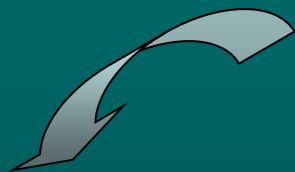
Sospetto clinico



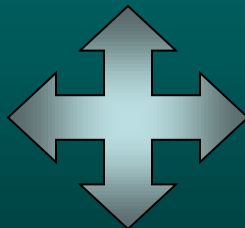
ECG Rx torace



ECO



TAC



RMN

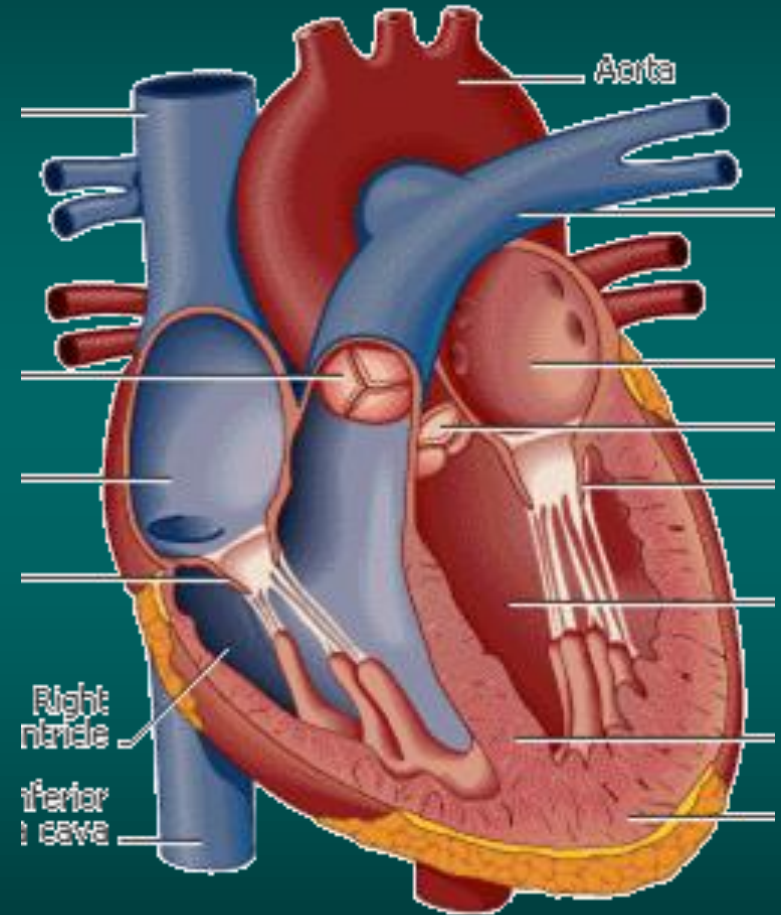


Cateterismo



L'ECG come tecnica diagnostica

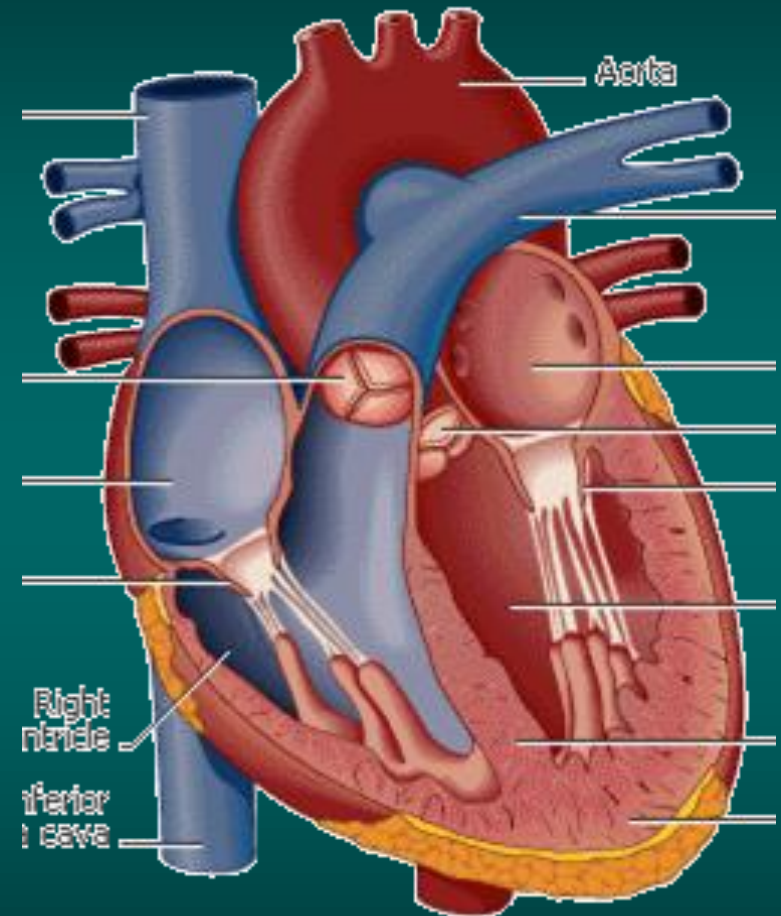
- ❖ L'ECG **non è** una tecnica di immagine, ma mostra l'effetto elettrico dell'attività miocardica
- ❖ Quadri anatomici diversi possono generare effetti elettrici uguali



L'ECG come tecnica diagnostica

❖ Correlazione anatomica

- **scarsa** con la struttura della massa cardiaca
- **nulla** con le connessioni dei grandi vasi
- **discreta** con gli aspetti funzionali ed evolutivi

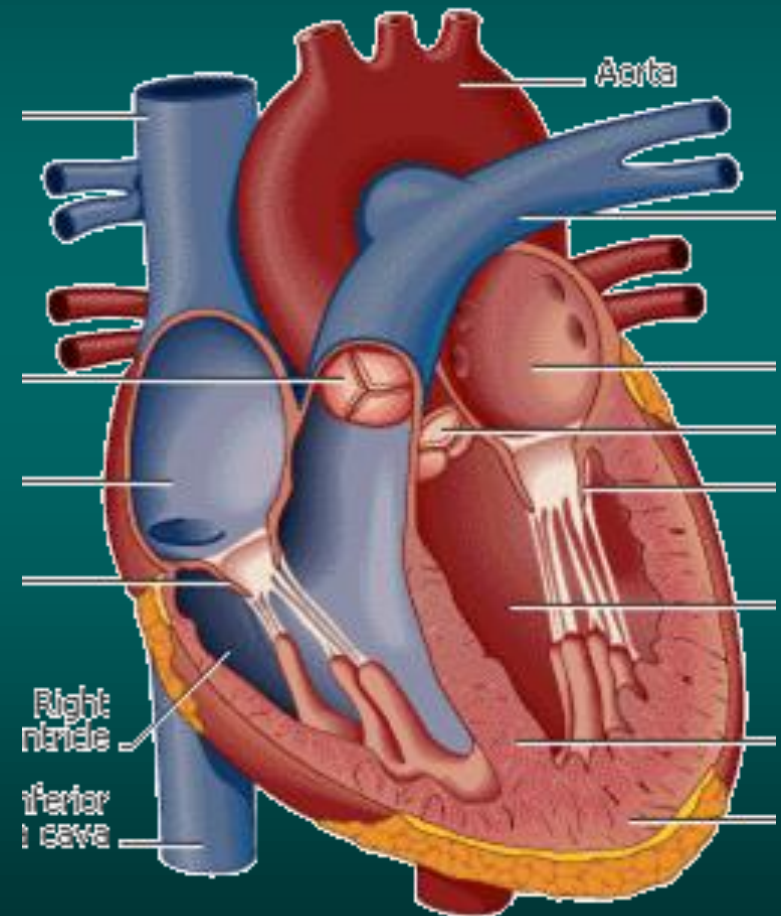


I quadri tipici/patognomonicici sono pochi

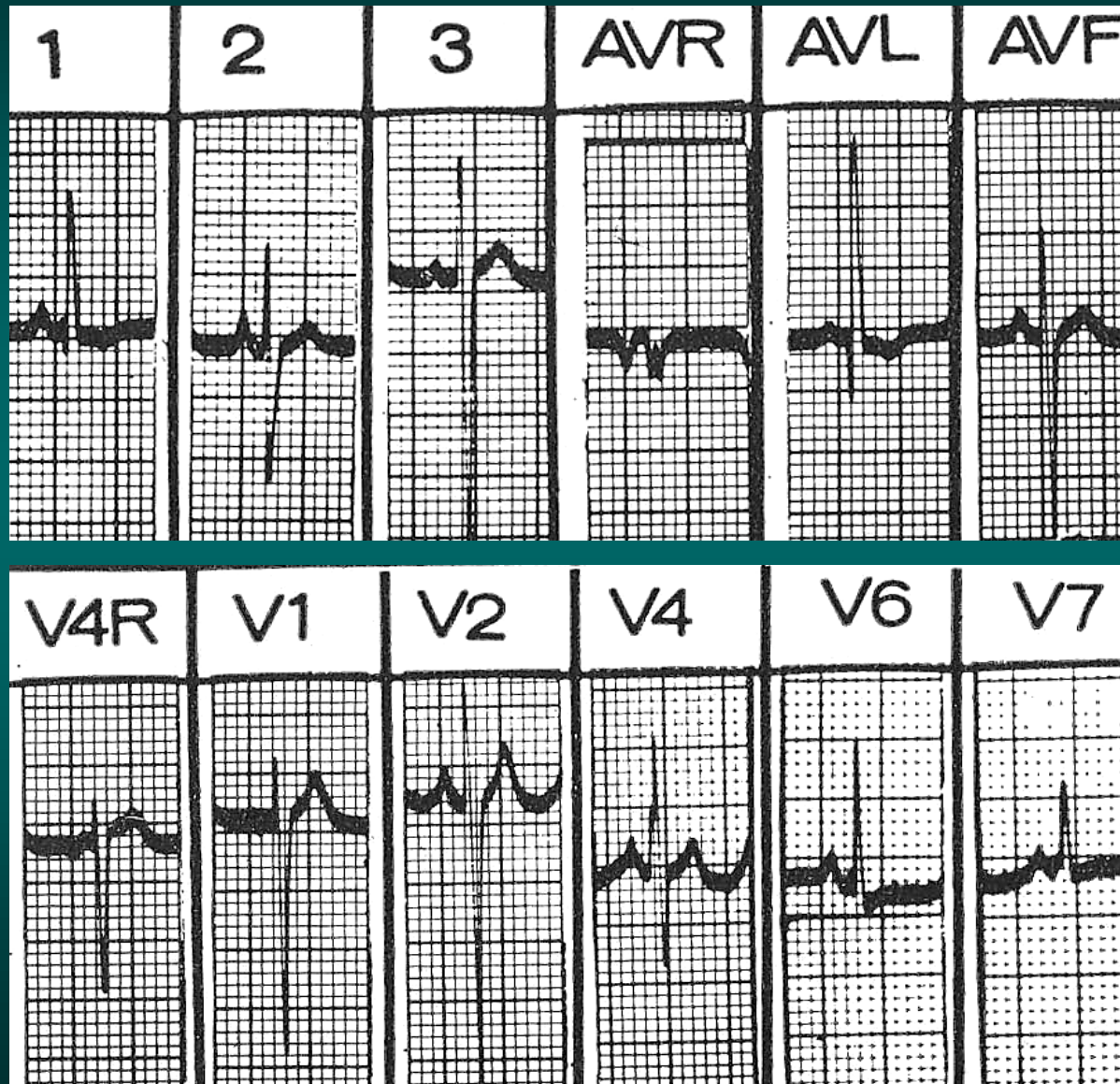
Regole generali

Normale evoluzione dell' ECG con l'età:

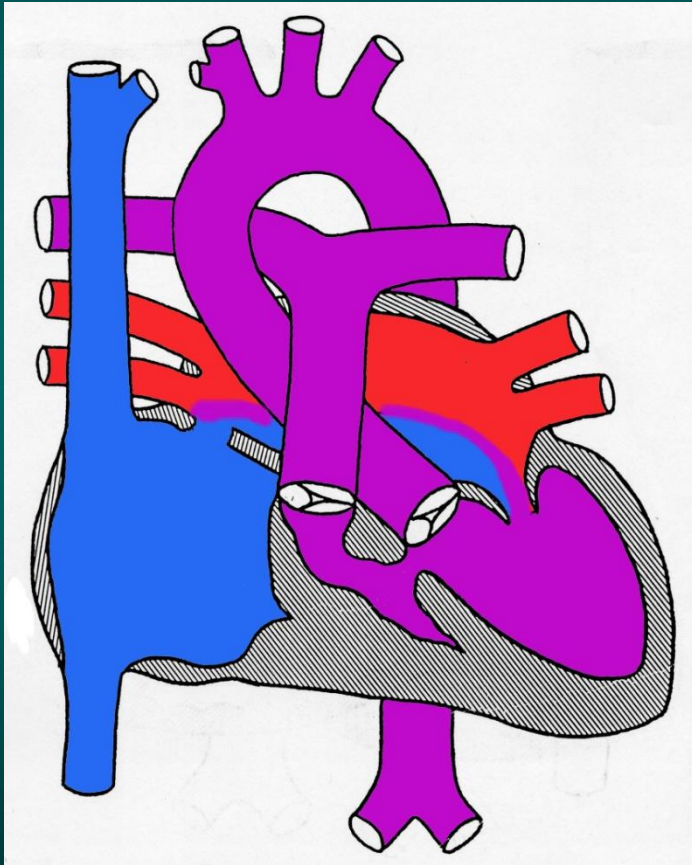
- ❖ Graduale transizione da una sostanziale dominanza destra ad una sostanziale dominanza sinistra
- ❖ Le regole del ritmo non cambiano



Atresia della tricuspide



Atresia della tricuspide

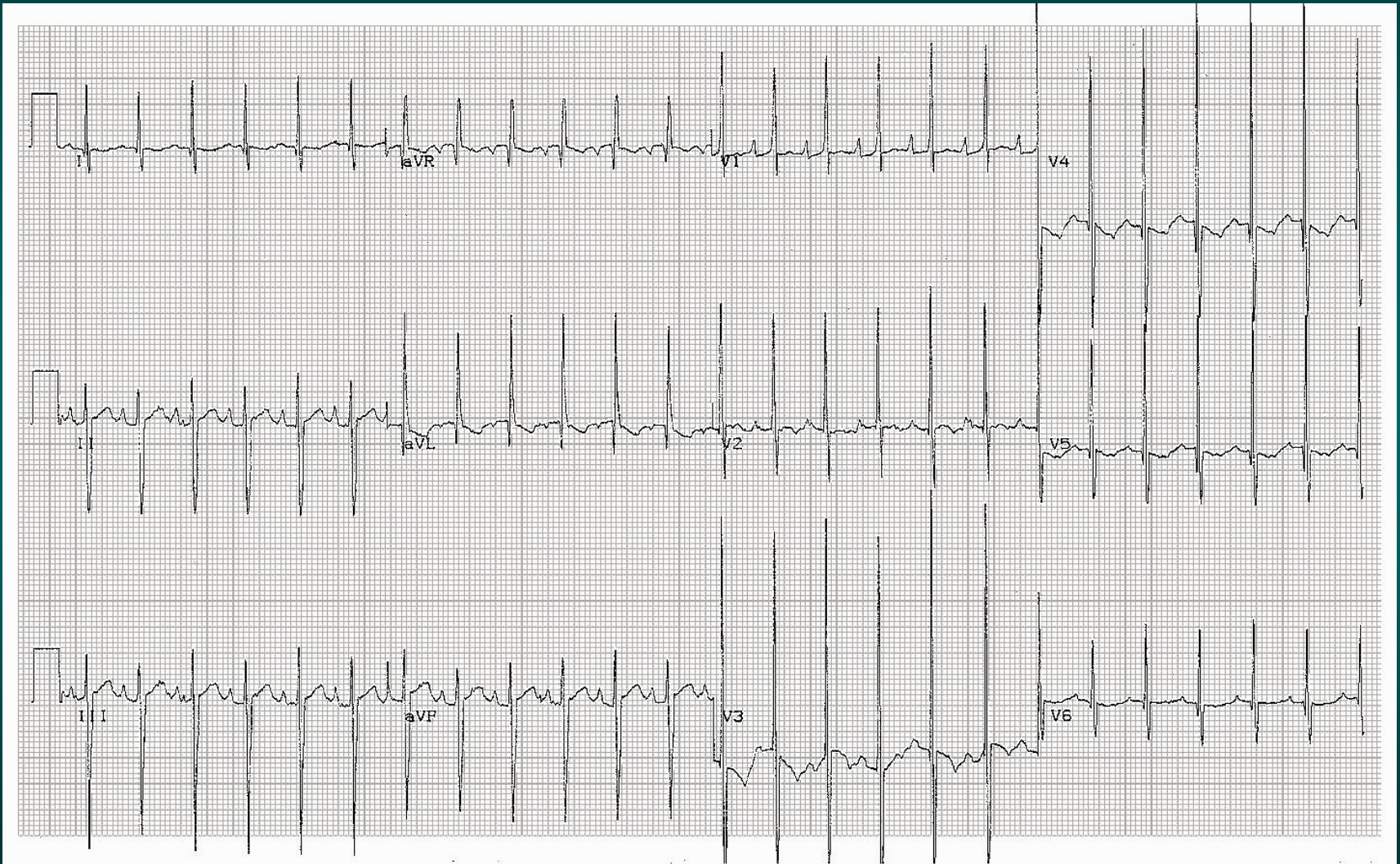


- ❖ Asse QRS a sinistra
- ❖ q D₁ e aVL
- ❖ rS in V₁
- ❖ qRs in V₆

Dominanza sinistra

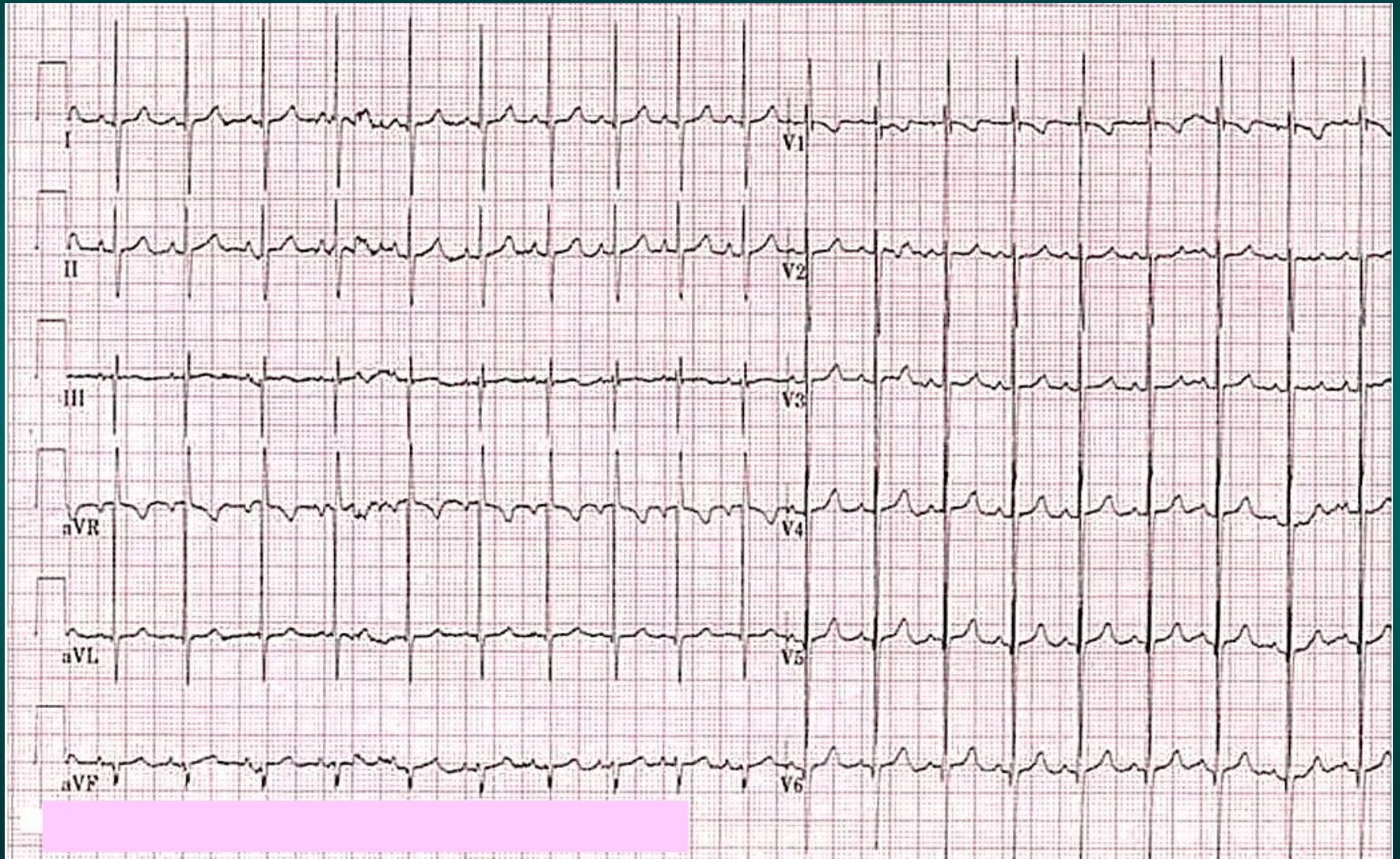
CAV completo

2 mesi

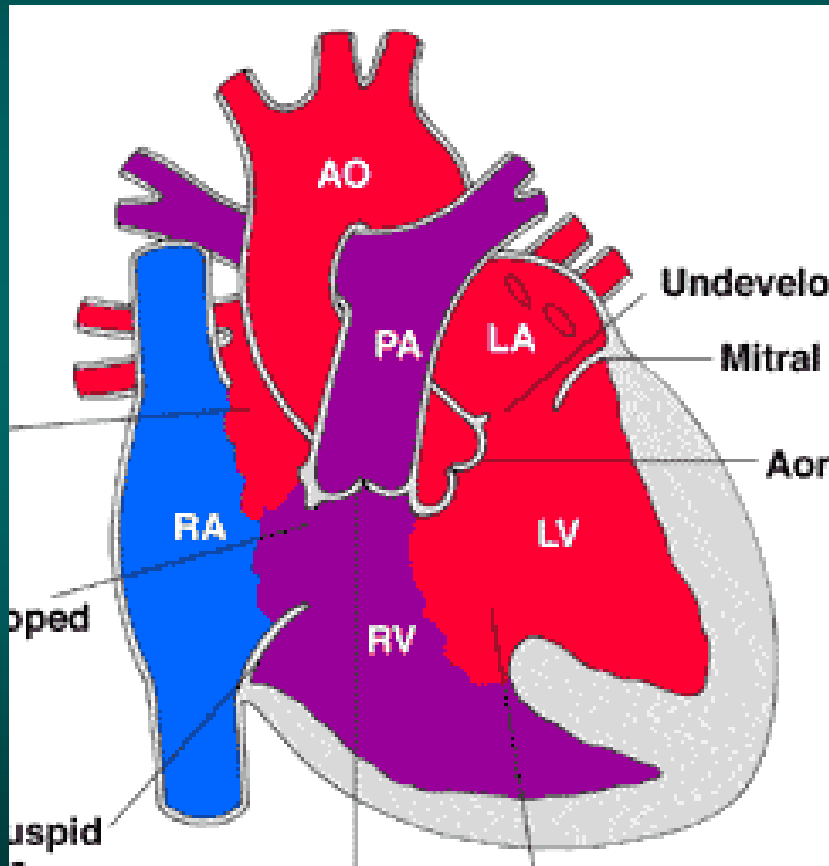


CAV completo

3 mesi



Difetti del setto AV (CAV)



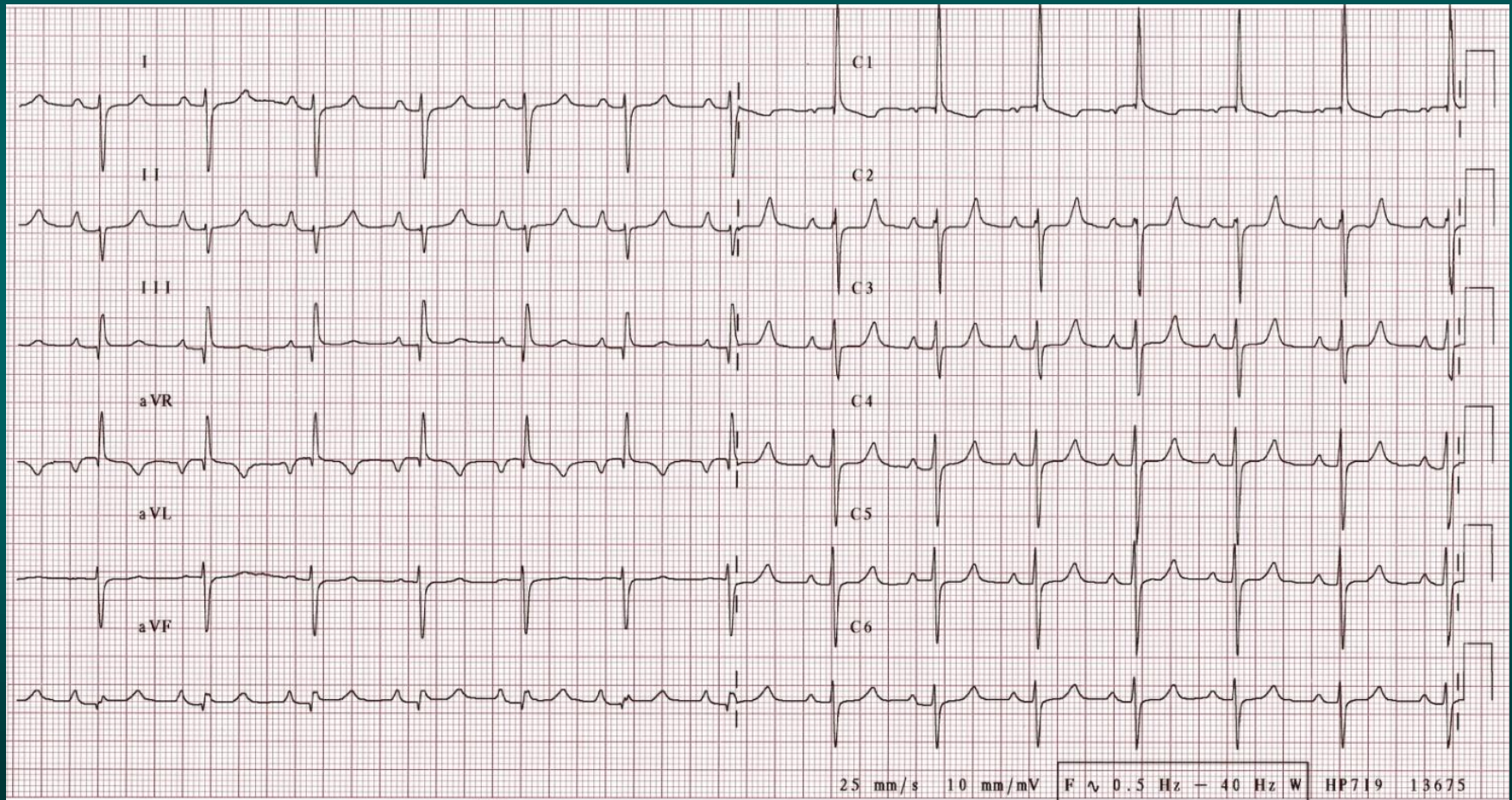
- ❖ Asse QRS a sinistra (tipo EAS)
- ❖ rsR_1 in V_1 (tipo BIBD)
- ❖ qRs o qRS in V_6
- ❖ Frequente BAV I

Codominanza

CAV completo non operato

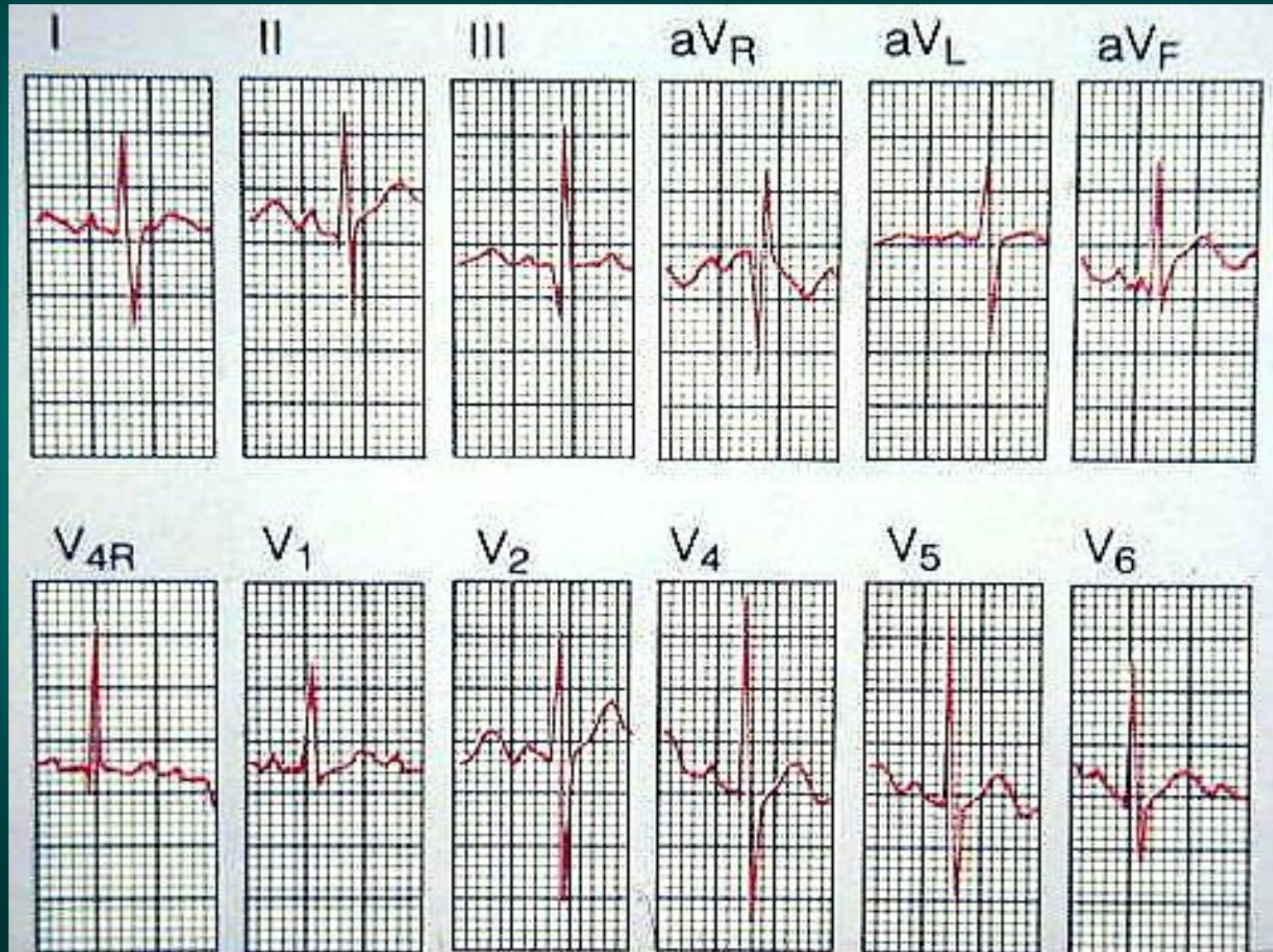
Eisenmenger

18 anni



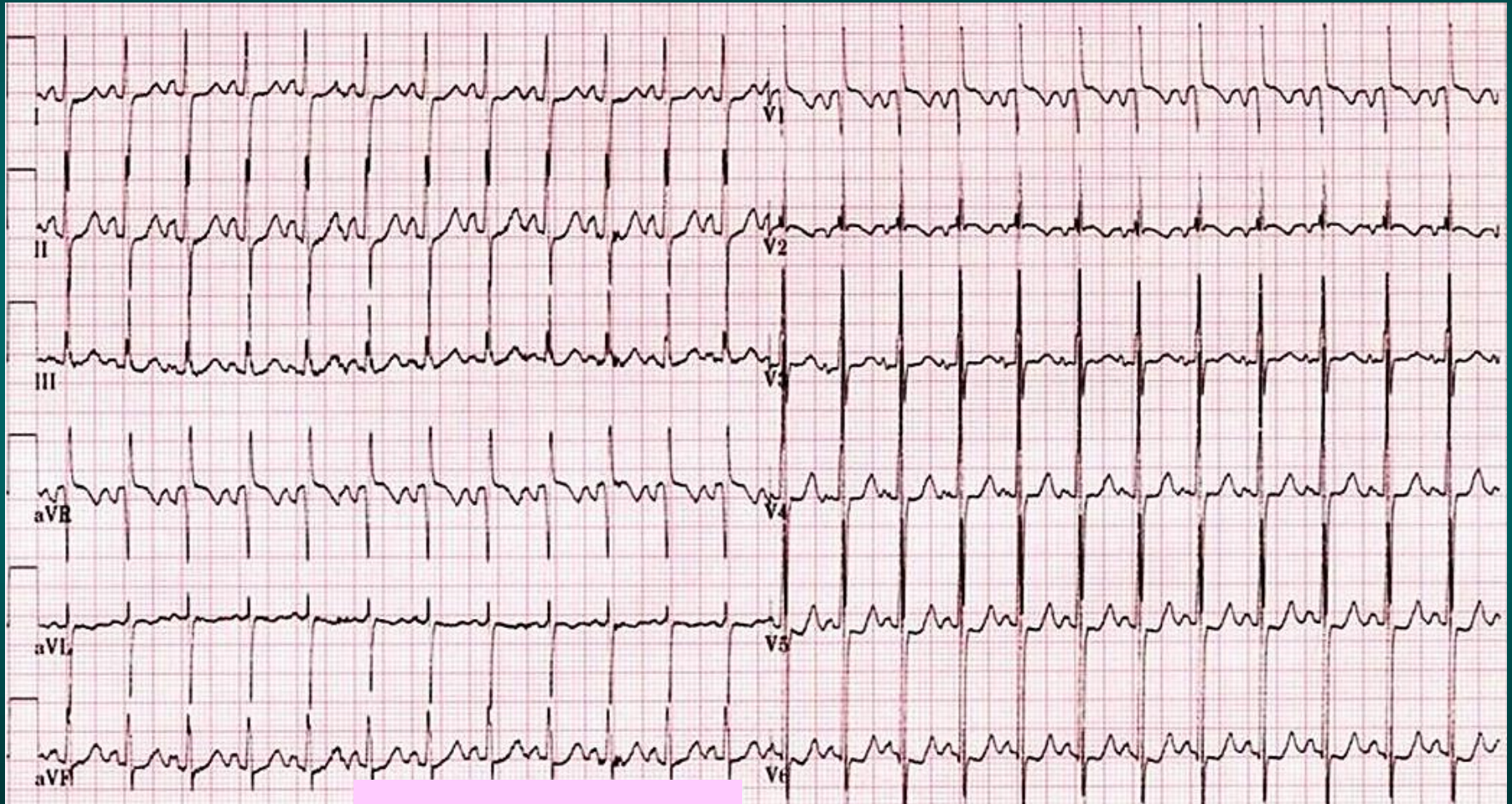
Tetralogia di Fallot

neonato

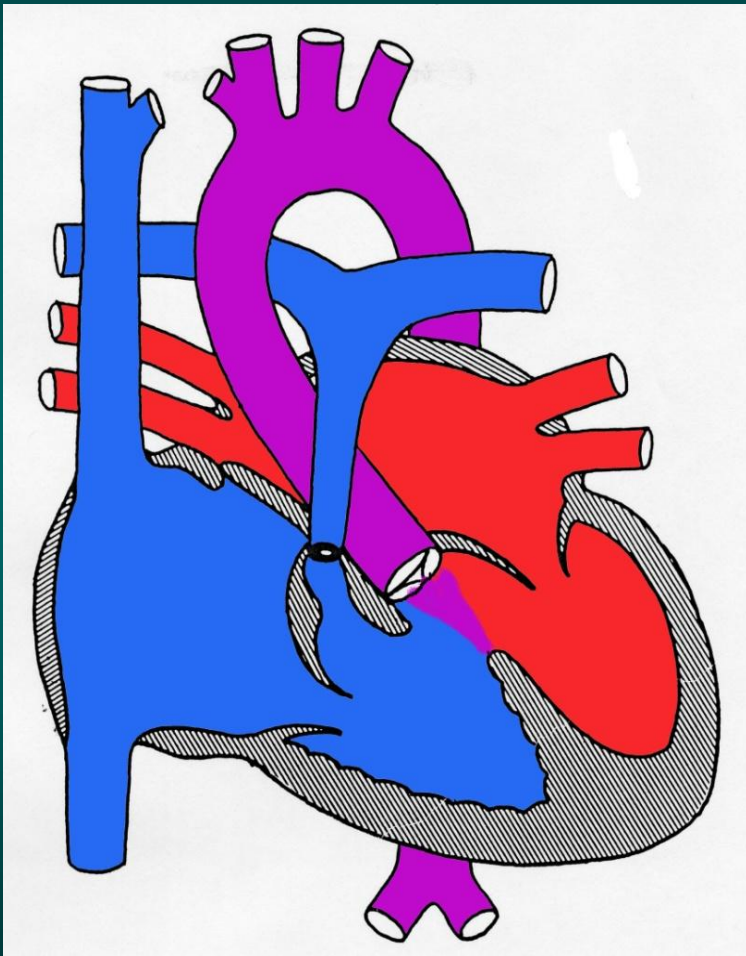


Tetralogia di Fallot

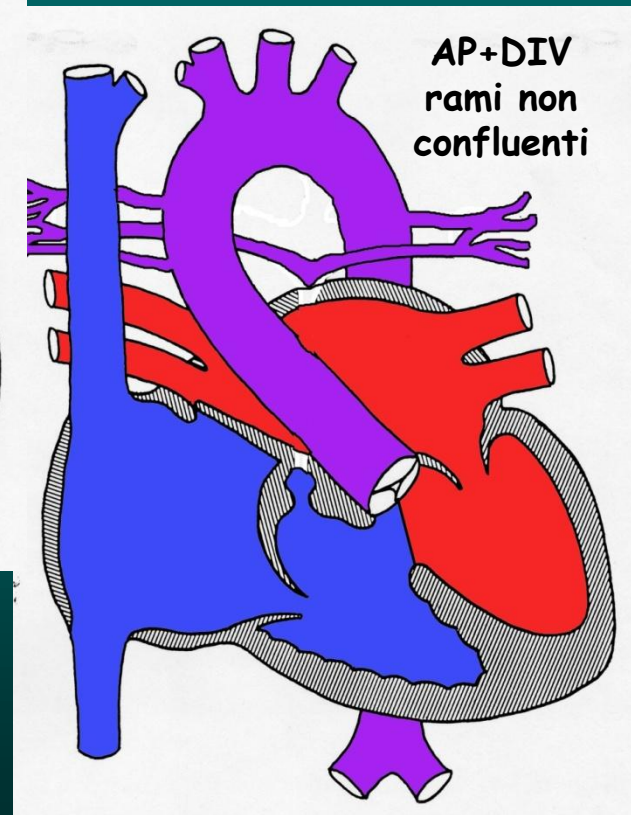
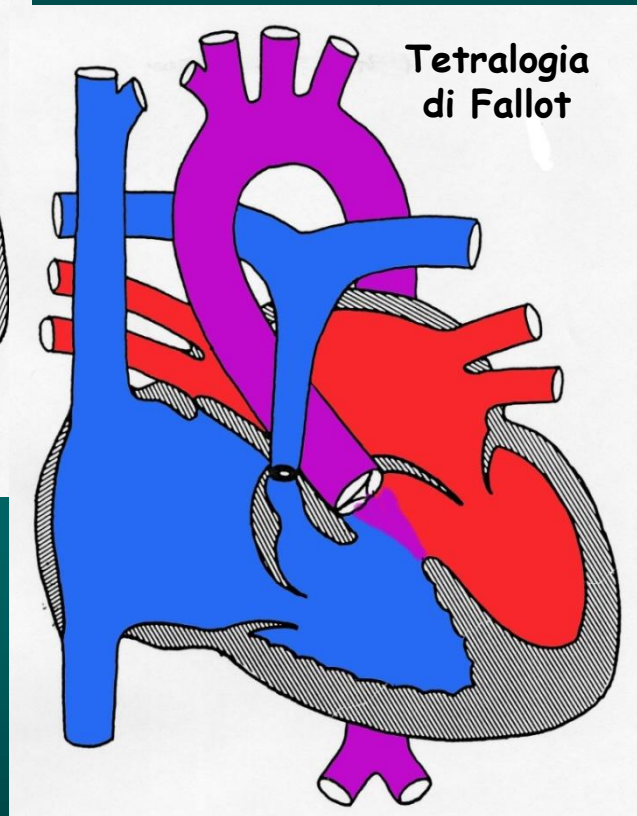
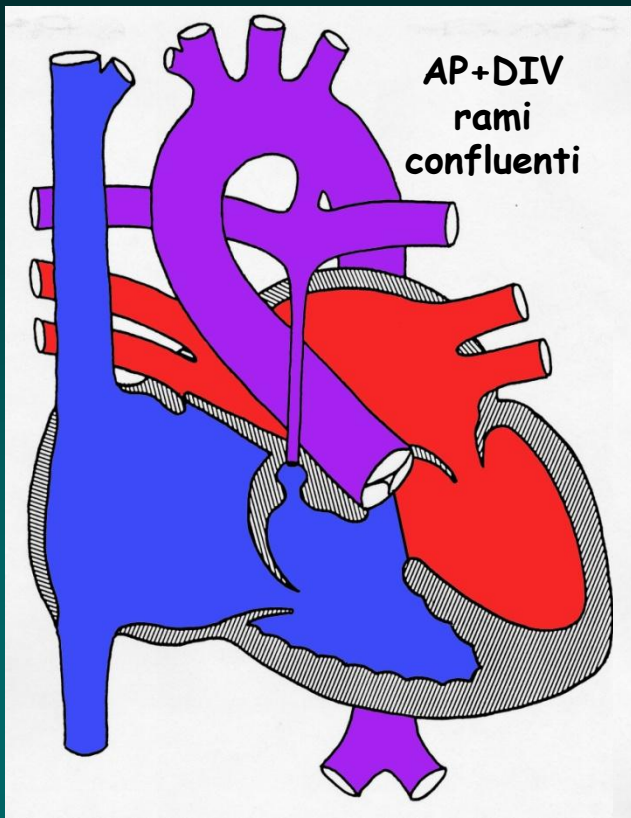
4 mesi



Tetralogia di Fallot



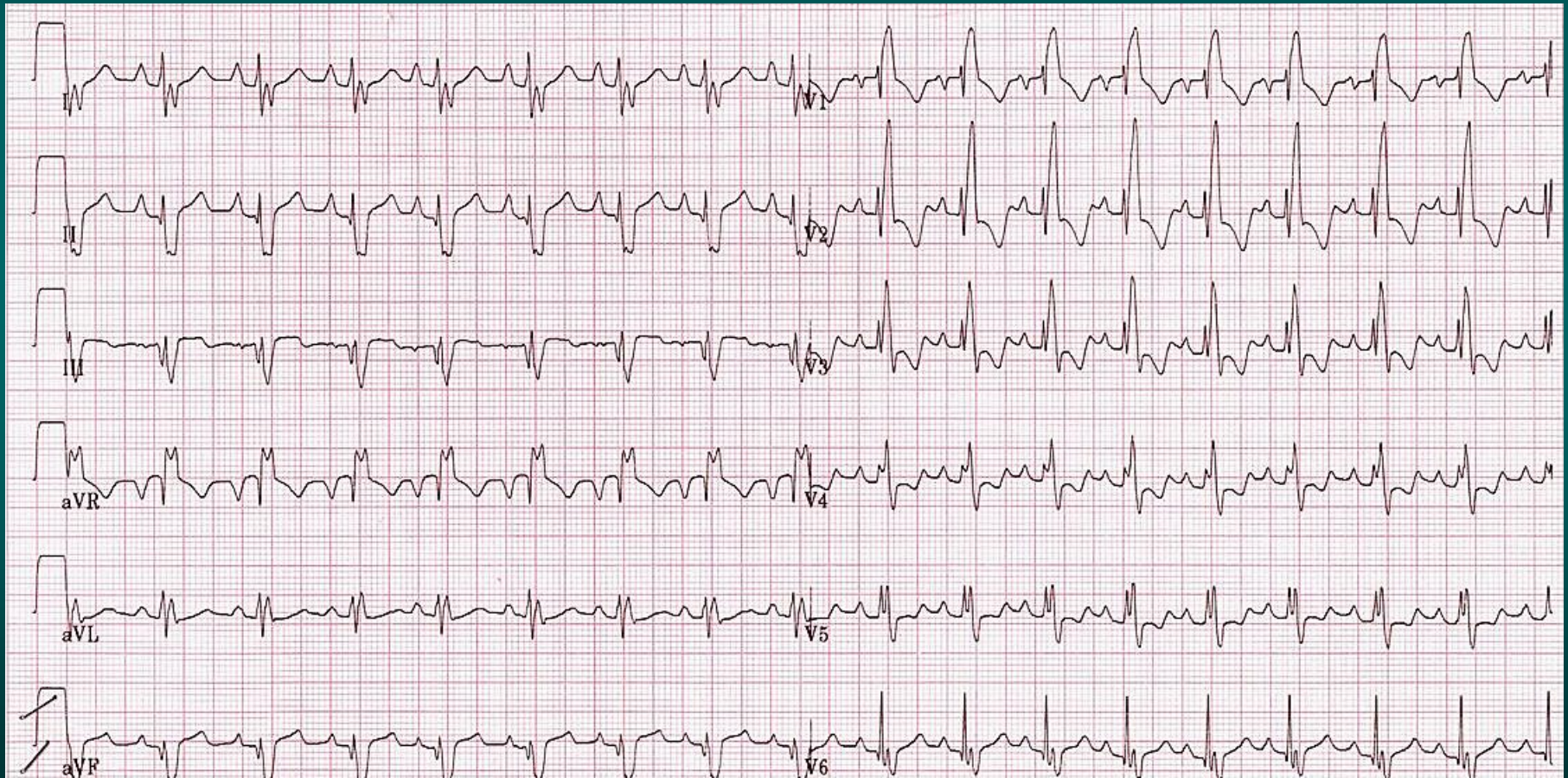
- ❖ Frequente IAD
- ❖ Asse QRS a dx
- ❖ qR con T positiva o negativa in V_1
- ❖ R/S in V_2
(transizione rapida)
- ❖ qRs o qRS in V_6



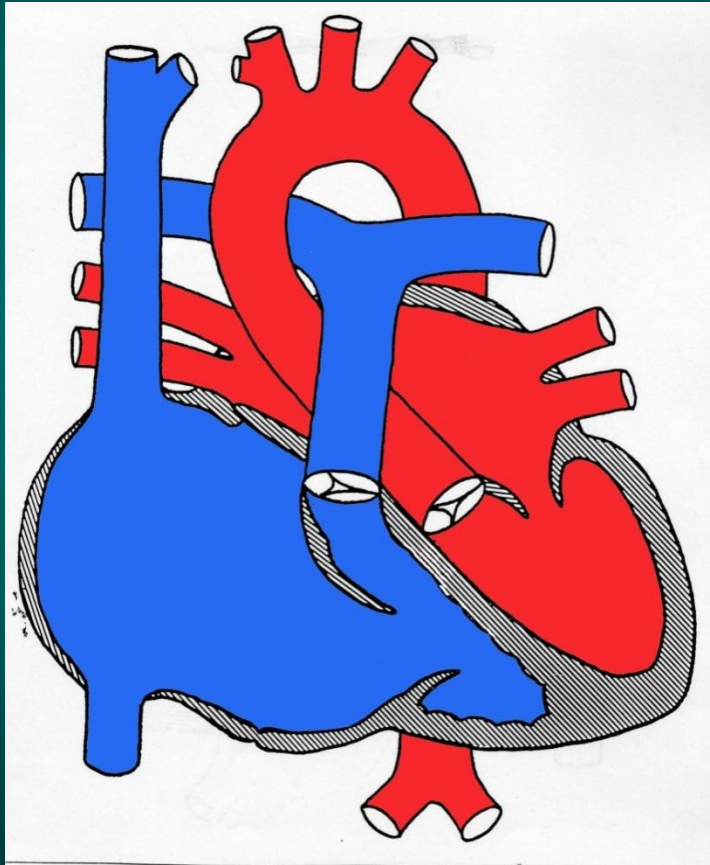
ECG identici

Anomalia di Ebstein

30 anni



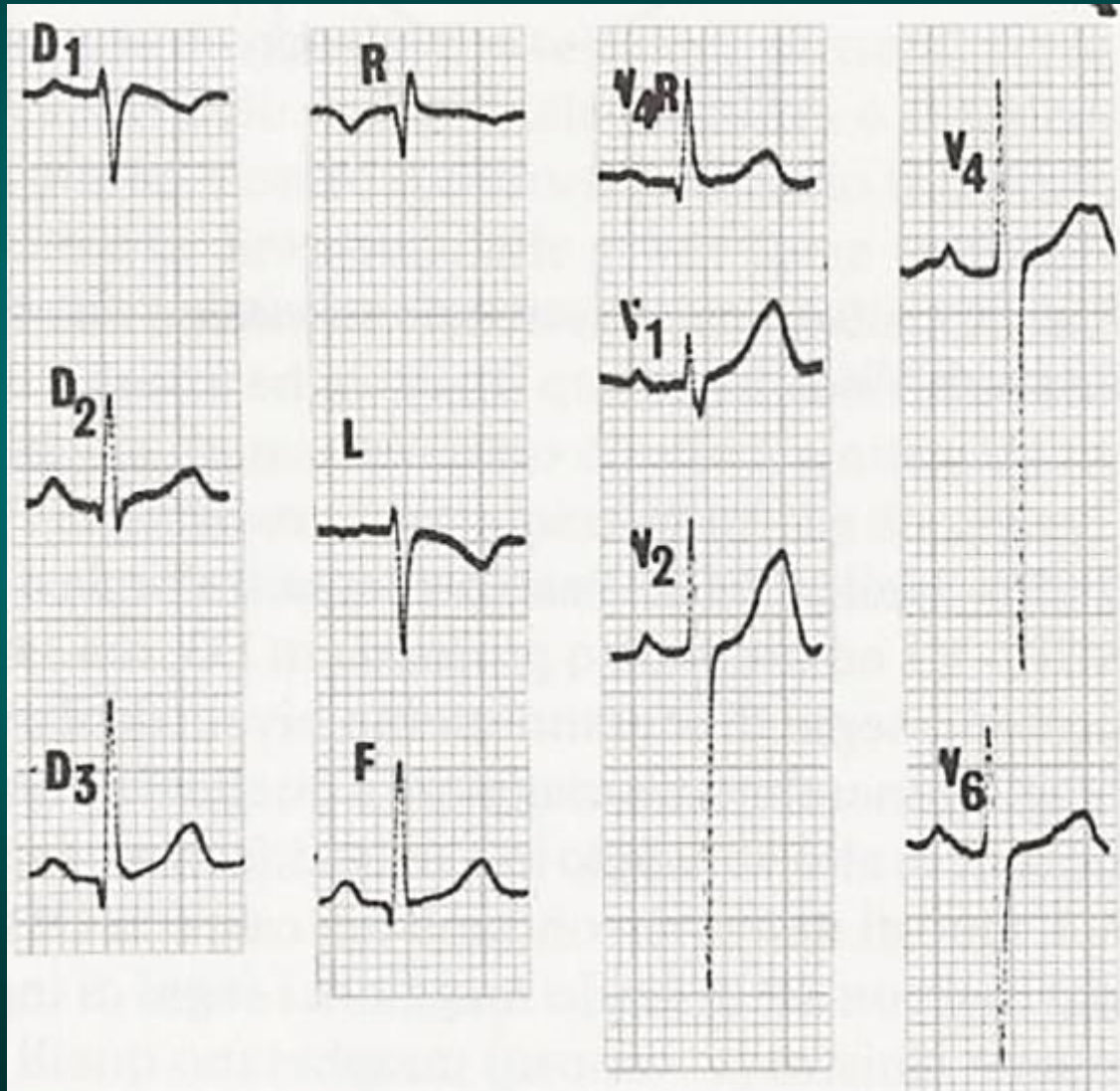
Anomalia di Ebstein



- ❖ IAD
- ❖ Frequente BAV I
- ❖ Frequente BBD polifasico o bizzarro
- ❖ Possibile WPW

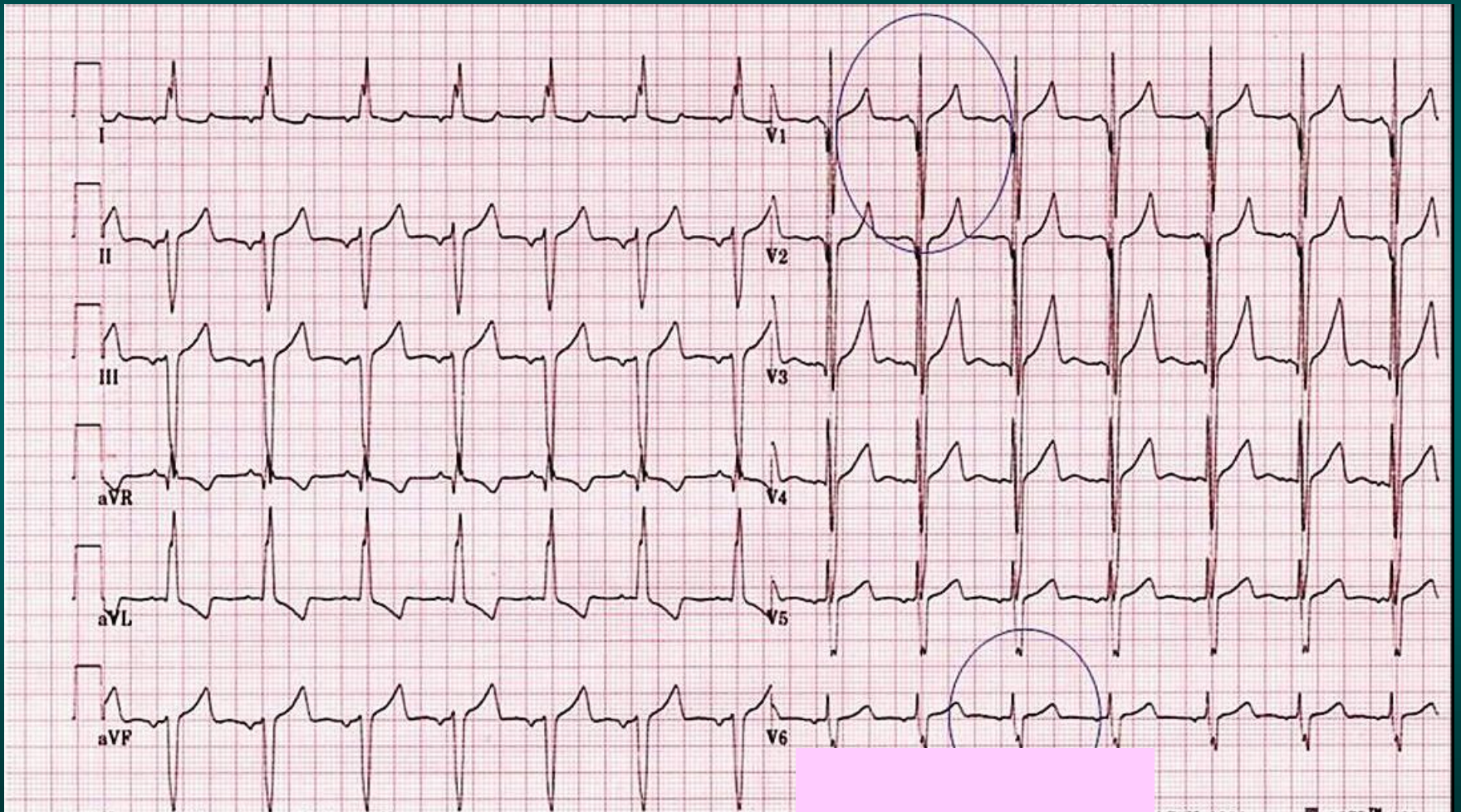
TCGA

6 mesi

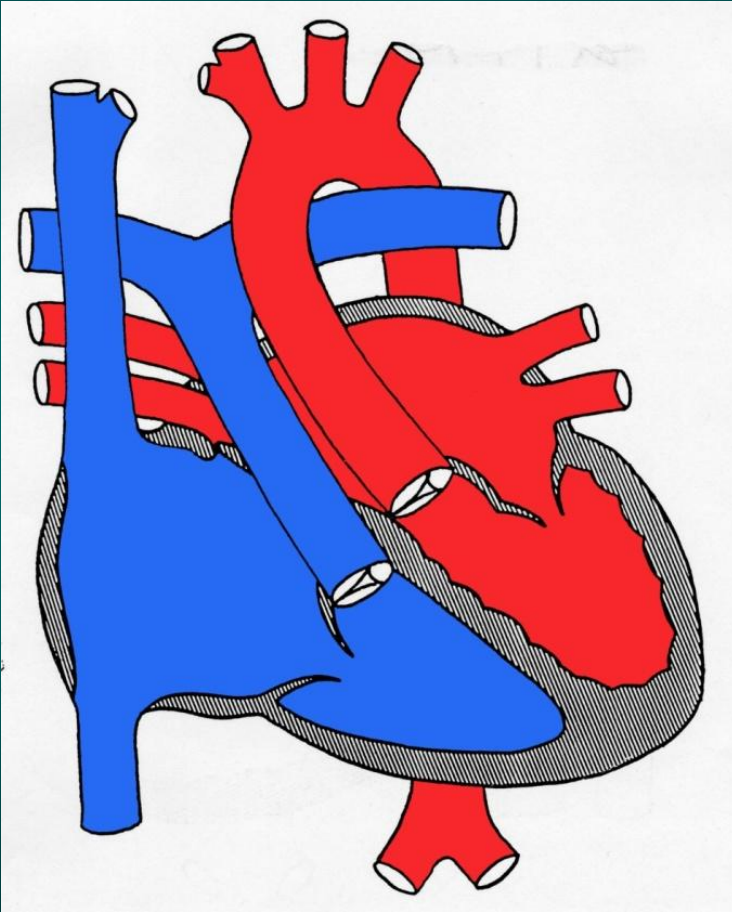


TCGA

3 anni



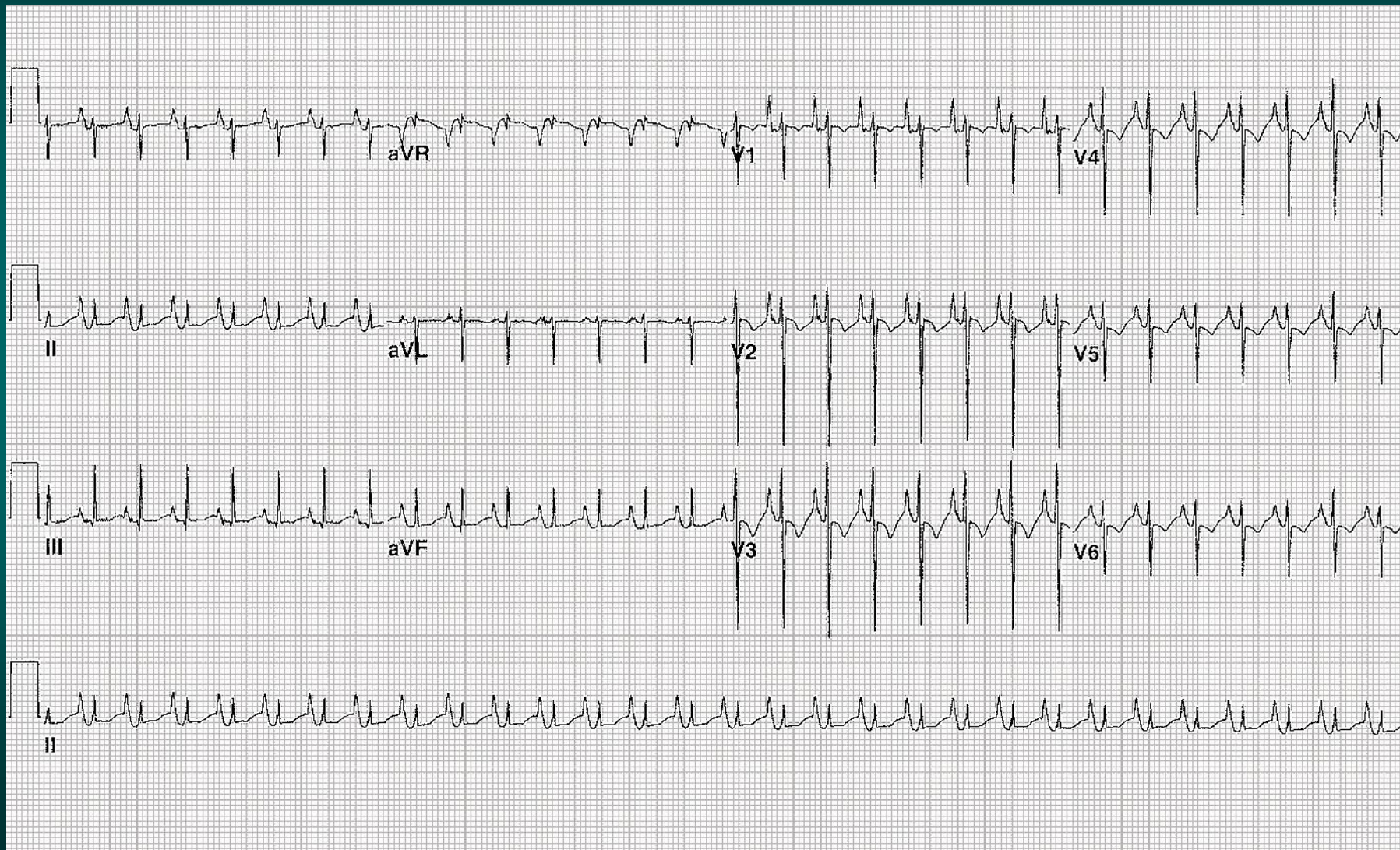
TCGA



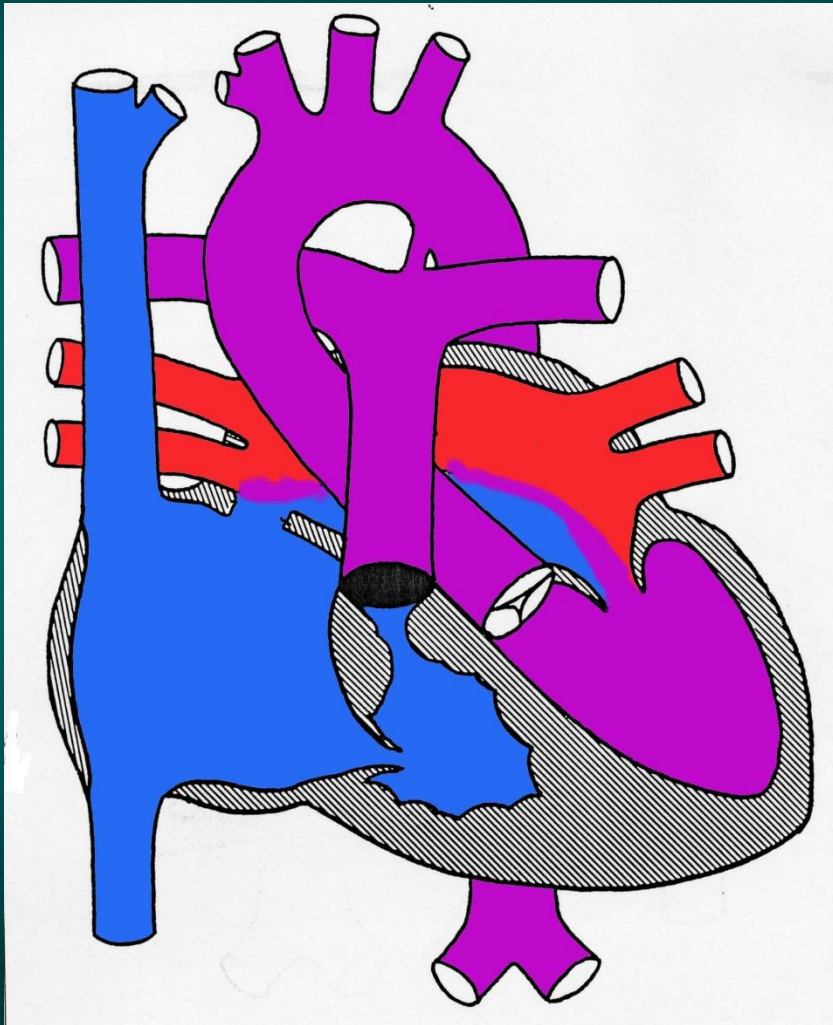
- ❖ Frequente BAV
- ❖ Frequente WPW
- ❖ Asse QRS variabile
- ❖ Anomalie del vettore settale
 - rS V₁-V₂
 - Rs, qRs o qS V₆

AP a setto integro

2 giorni



AP a setto integro

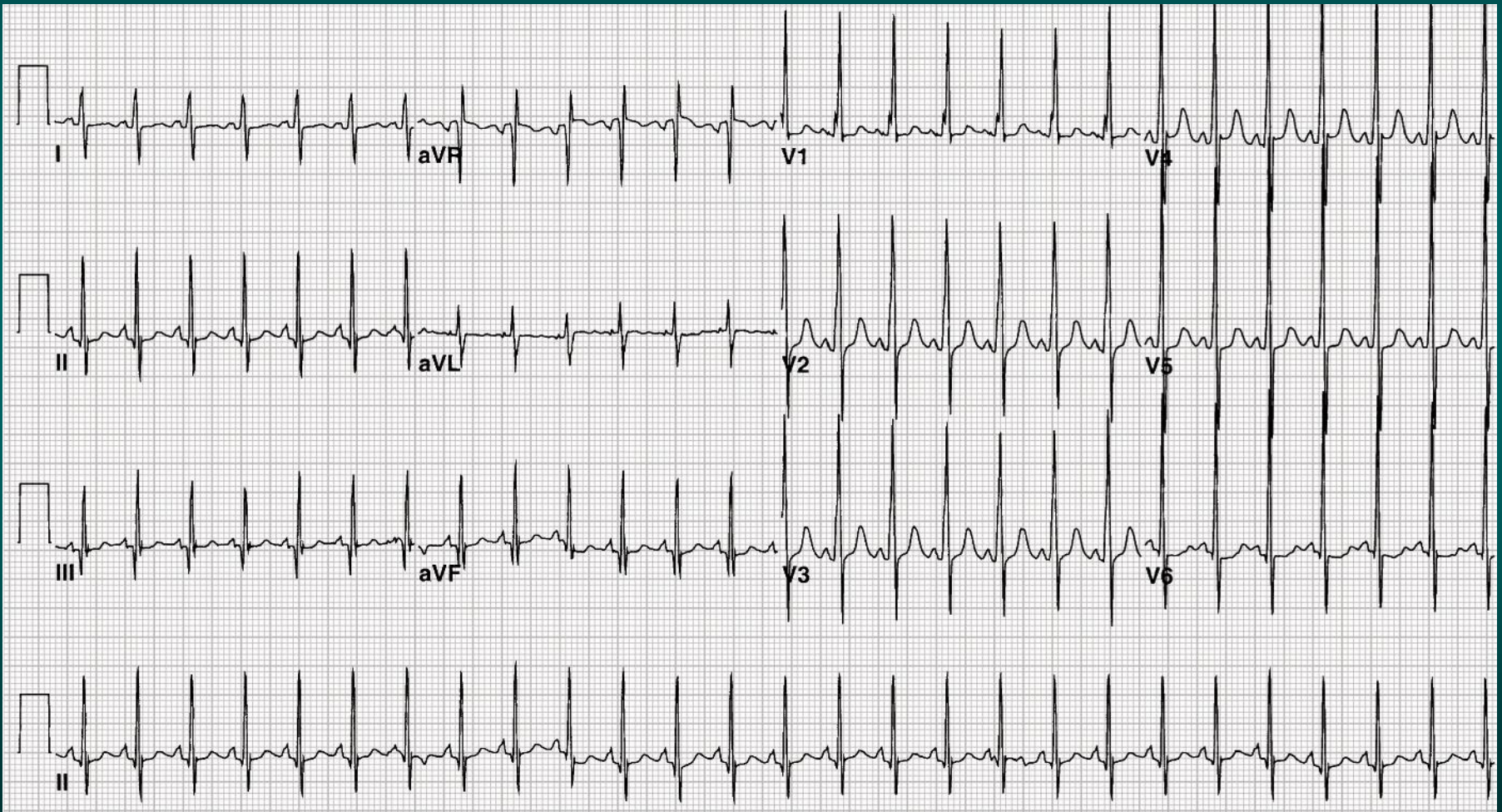


- ❖ IAD
- ❖ Asse QRS a dx
- ❖ rS in V_1
- ❖ RS in V_6

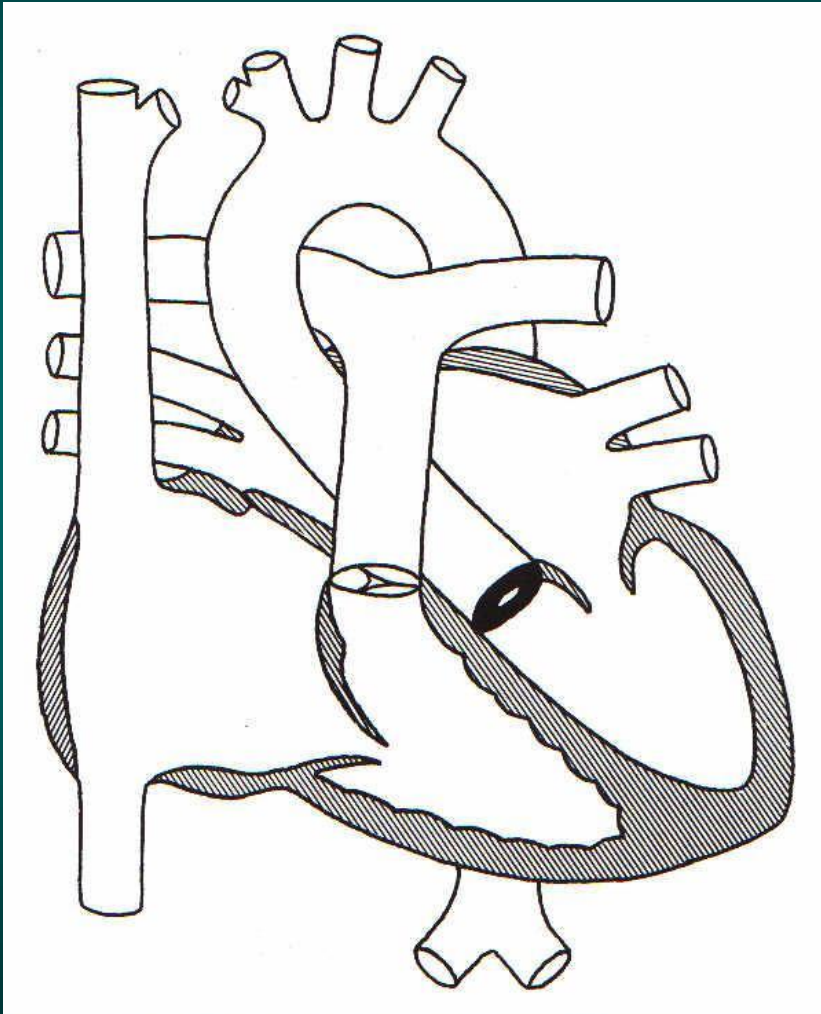
Dominanza sinistra

Stenosi aortica

neonato



Stenosi aortica neonatale

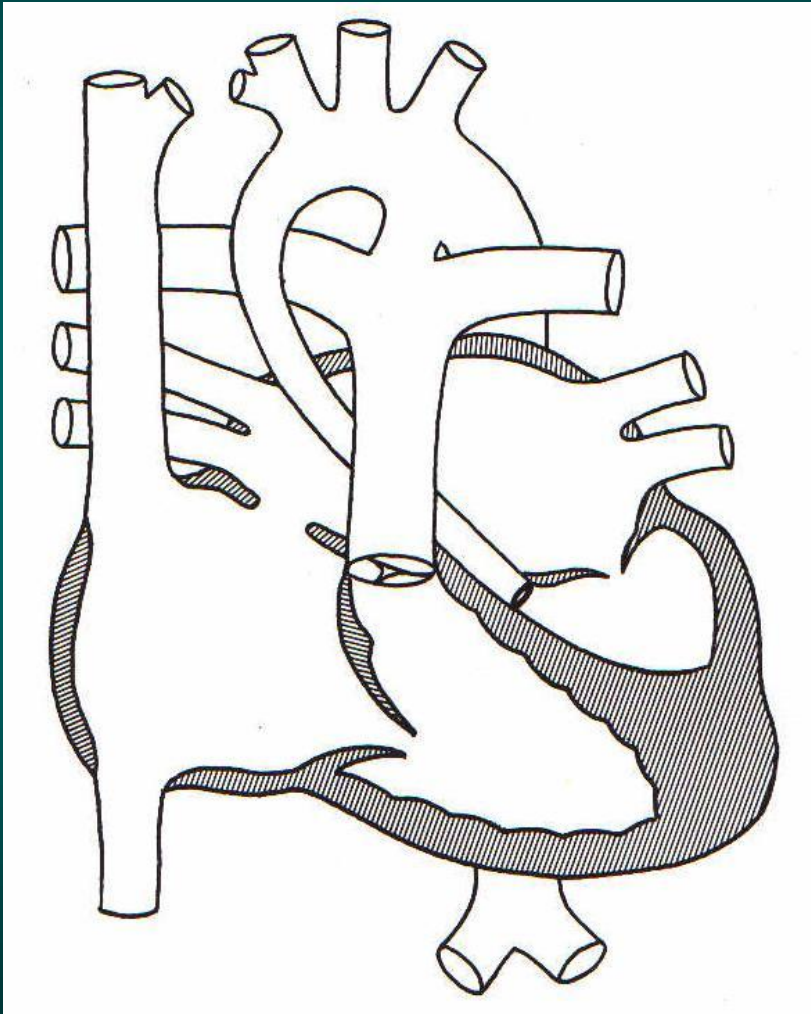


- ❖ Asse QRS verticale o dx
- ❖ rsR' o qRs V₁
- ❖ qRs o qRSin V₆

Codominanza

Stenosi aortica neonatale

con VS ipoplasico



- ❖ Frequente IAD
- ❖ Asse QRS a dx
- ❖ qR o qRs V_1
- ❖ qRS o qrS in V_6

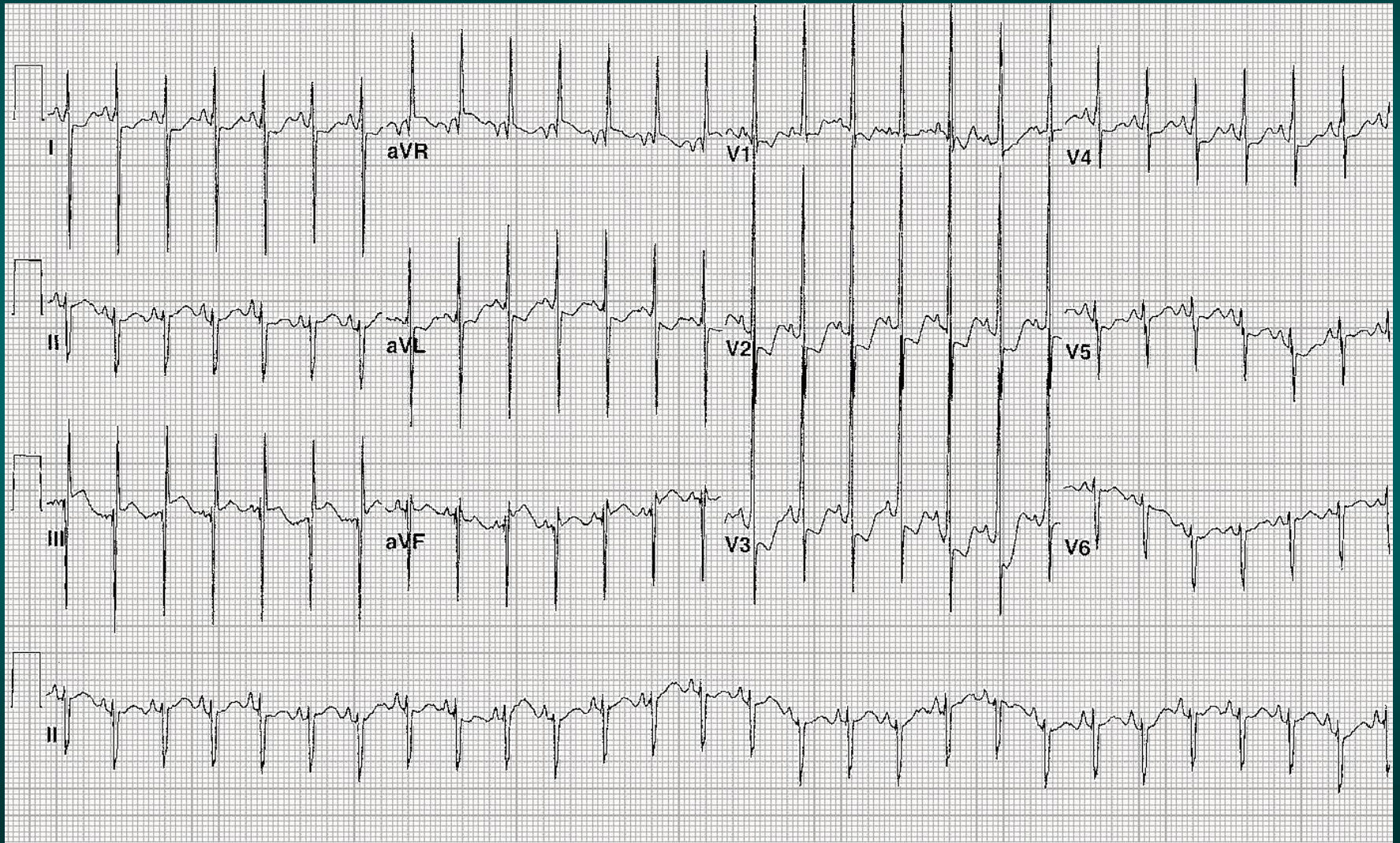
Codominanza



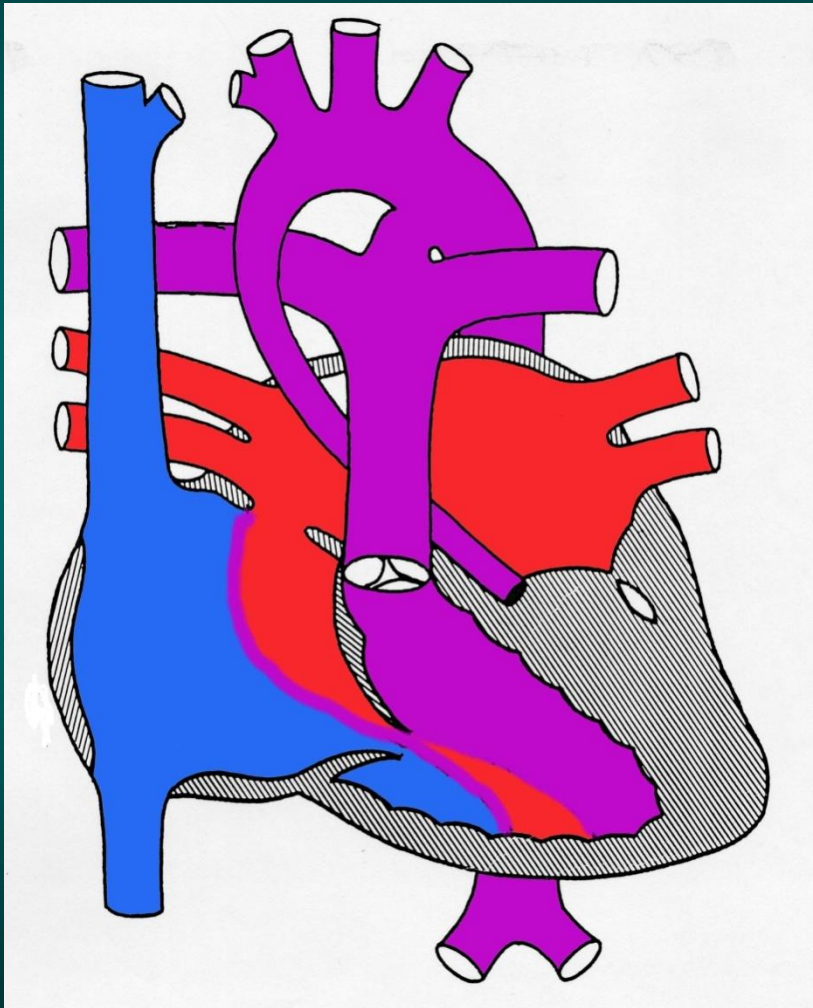
Dominanza destra

Cuore sinistro ipoplasico

1 giorno



Cuore sinistro ipoplasico

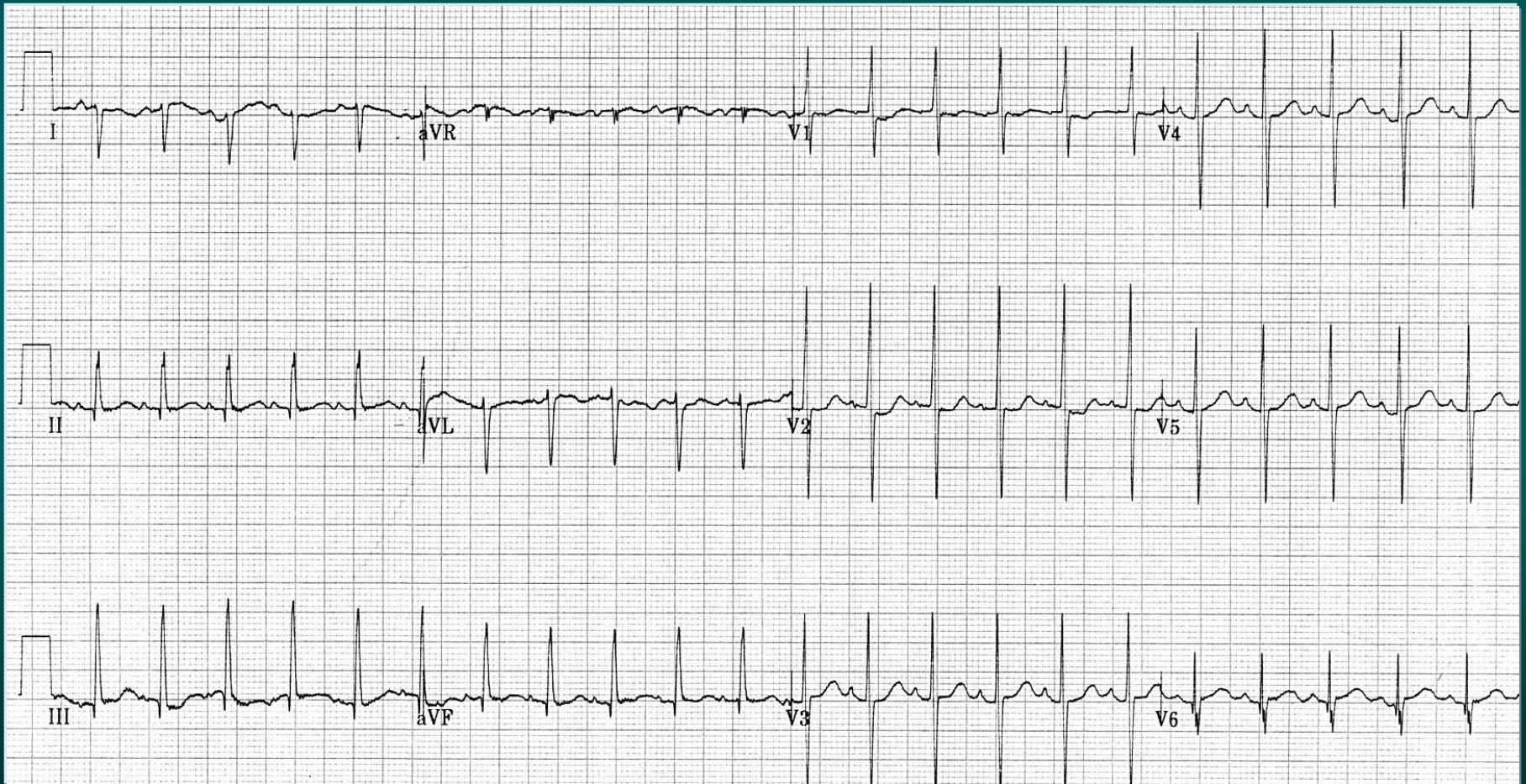


- ❖ Frequente IAD
- ❖ Asse QRS a dx
- ❖ qR o qRs V_1
- ❖ rS in V_6

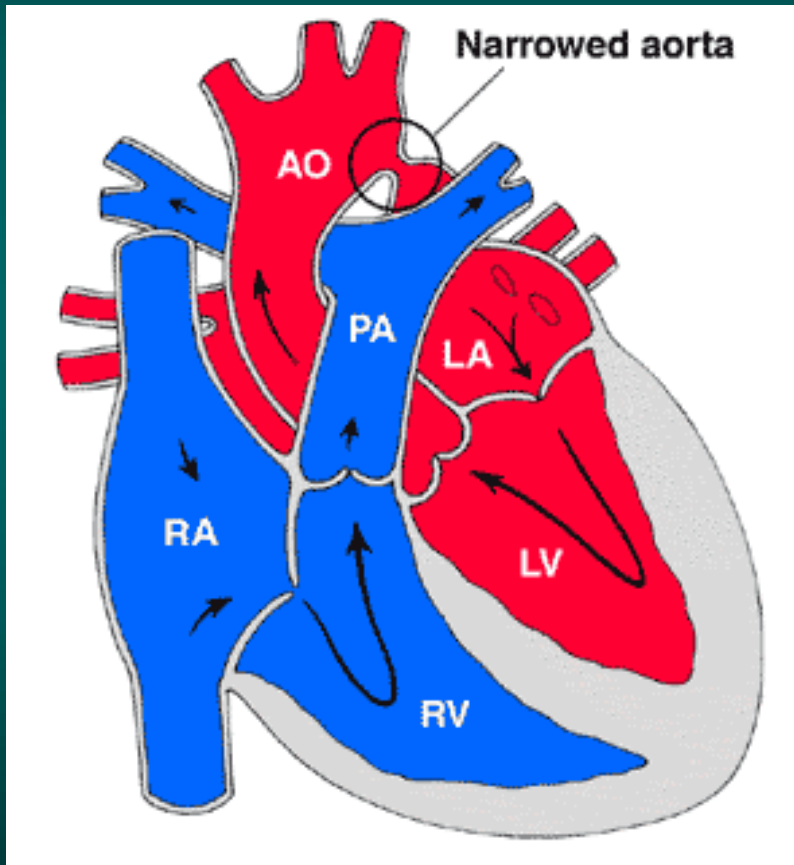
Dominanza destra

Coartazione aortica

1 giorno



Coartazione aortica

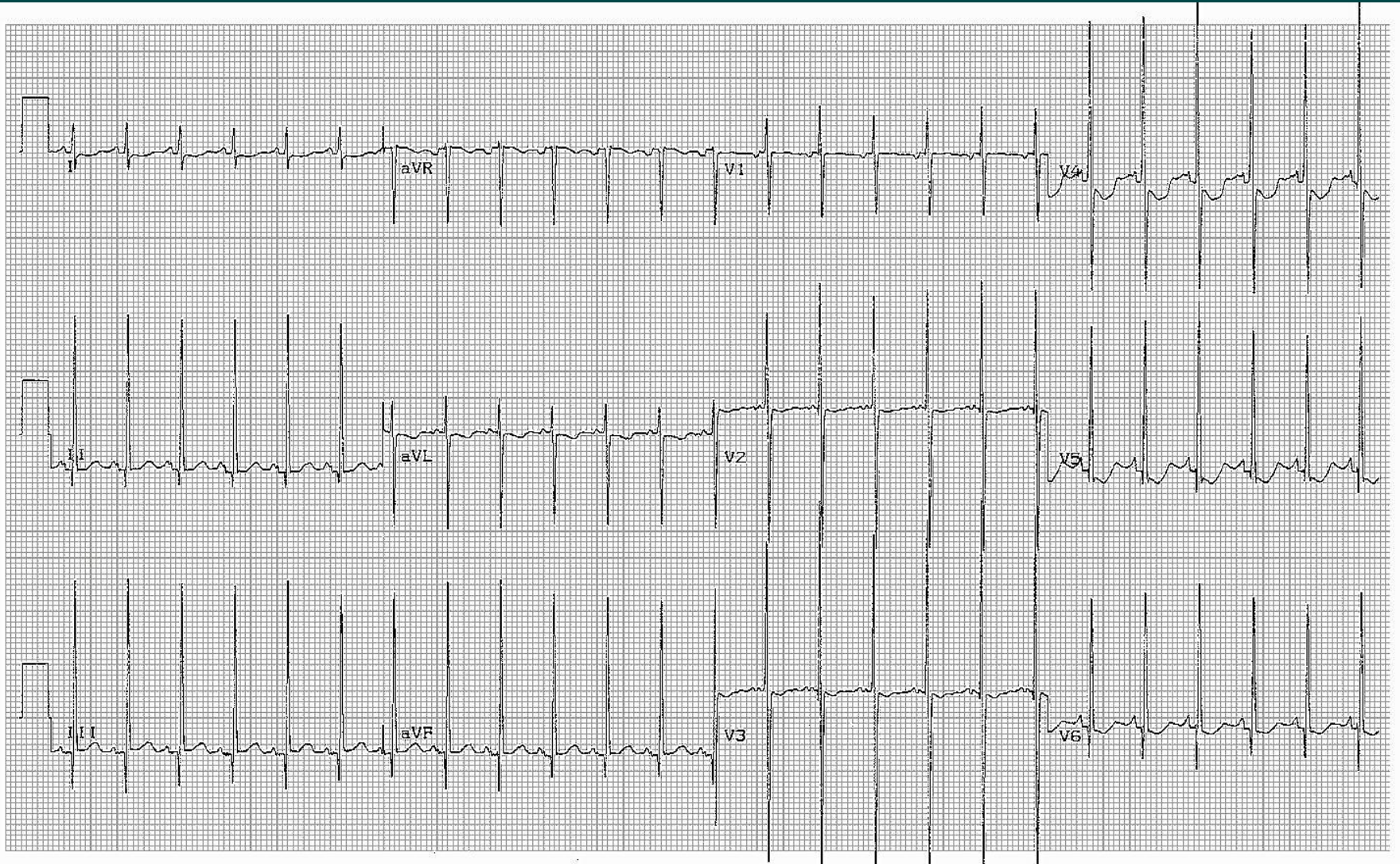


- ❖ Asse QRS a dx
- ❖ Rs o RS in V_1
- ❖ qRS o qRs in V_6

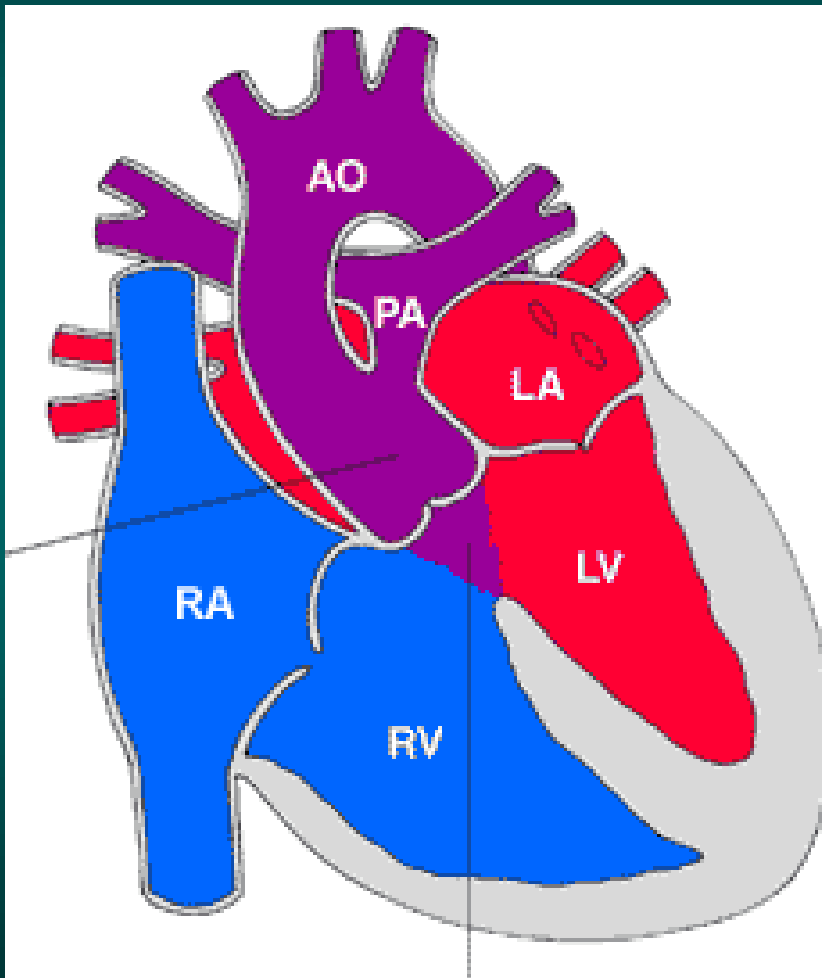
Codominanza

Truncus

20 giorni



Truncus

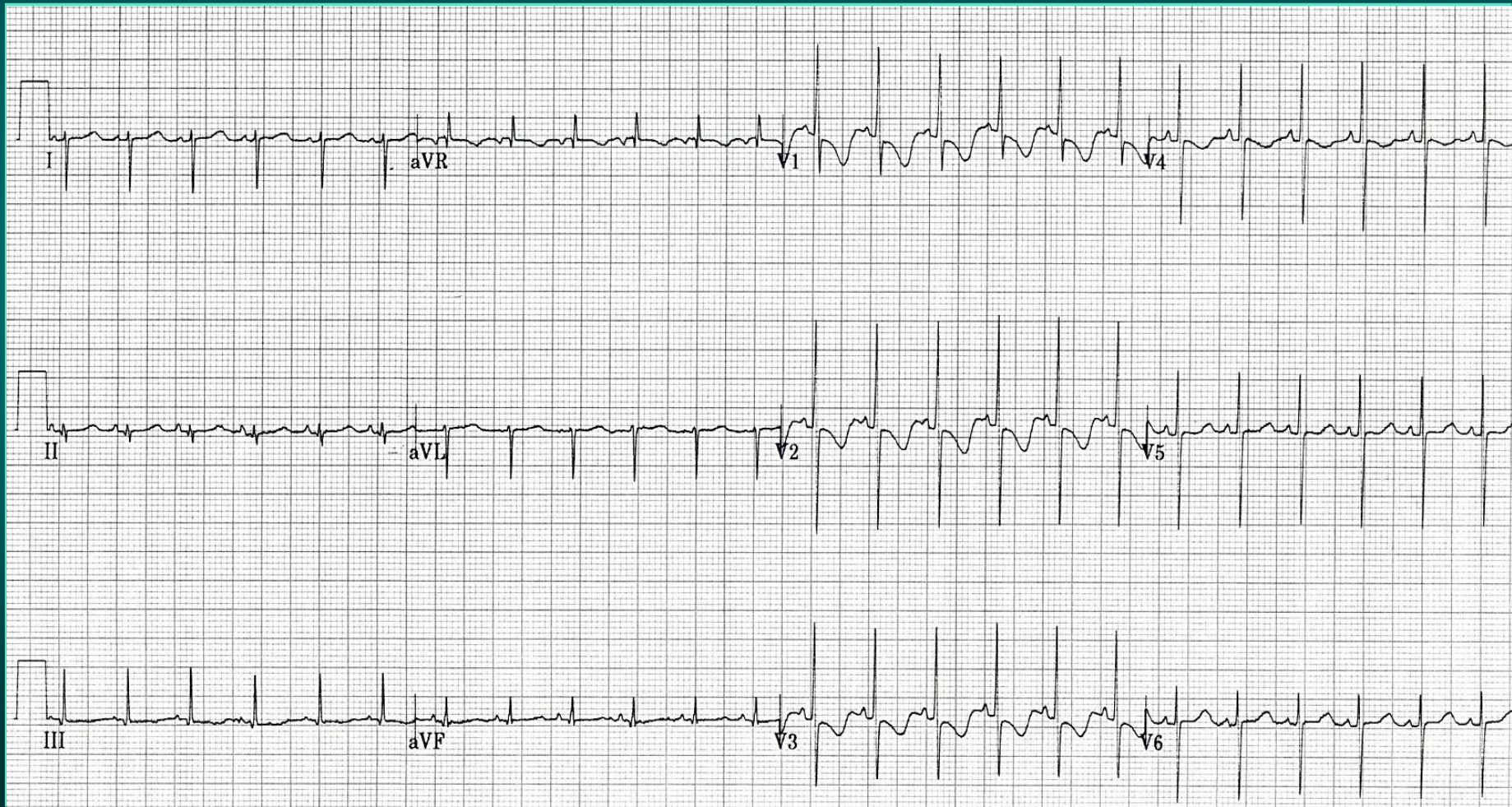


- ❖ Asse QRS verticale o dx
- ❖ R/S in V_1
- ❖ qR o qRs in V_6

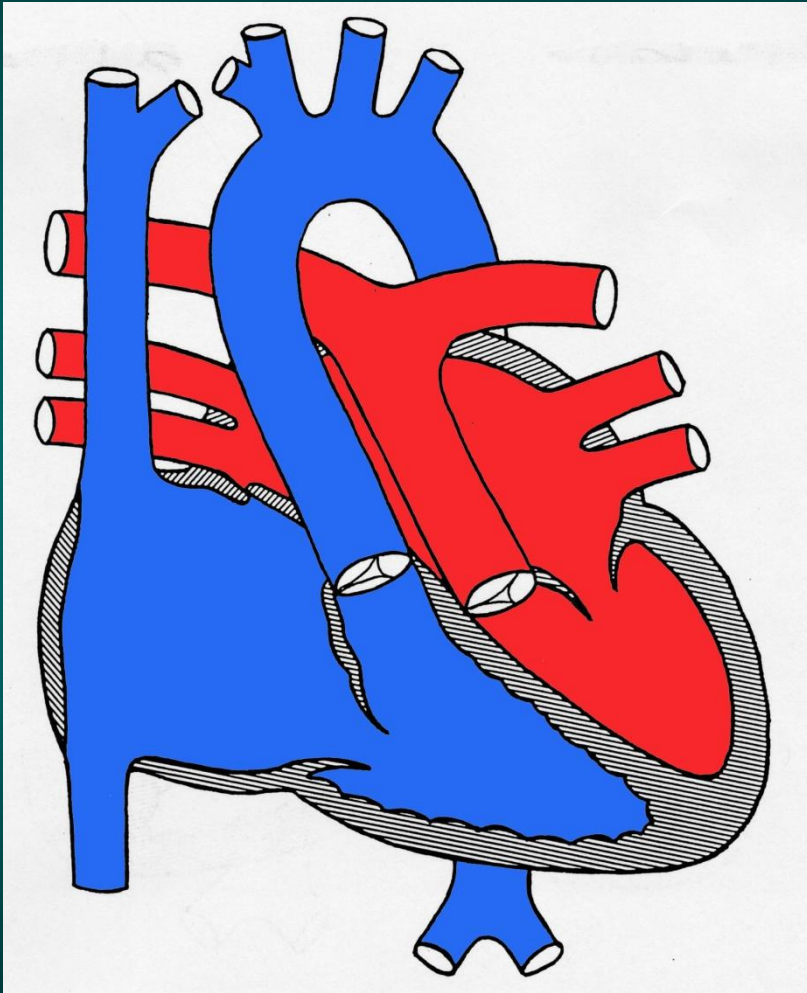
Codominanza

TGA a setto integro

9 giorni



TGA a setto integro

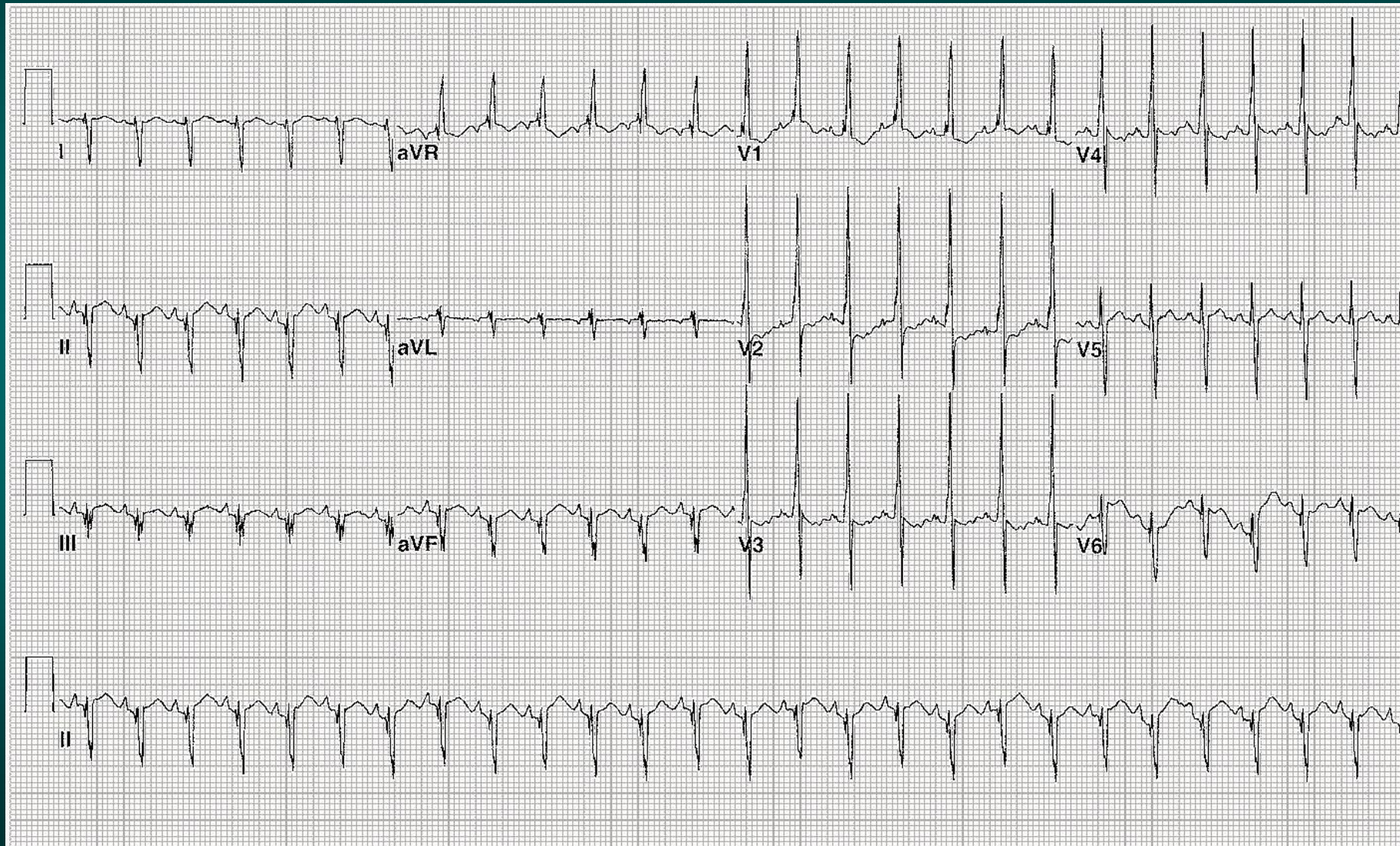


- ❖ Asse QRS a dx
- ❖ qR o qRS V_1
- ❖ rS in V_6

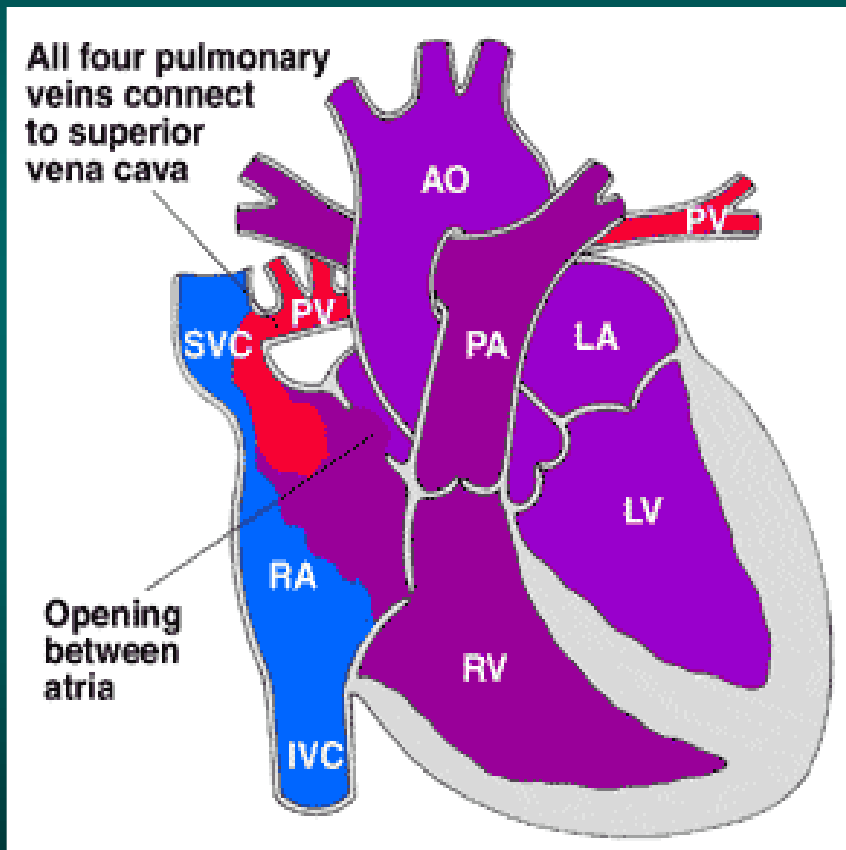
Dominanza destra

RVAPT

5 giorni



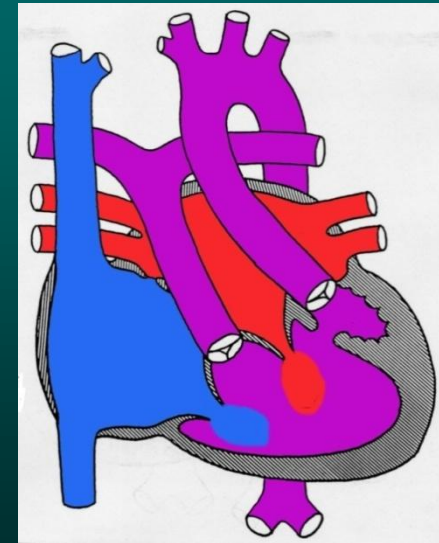
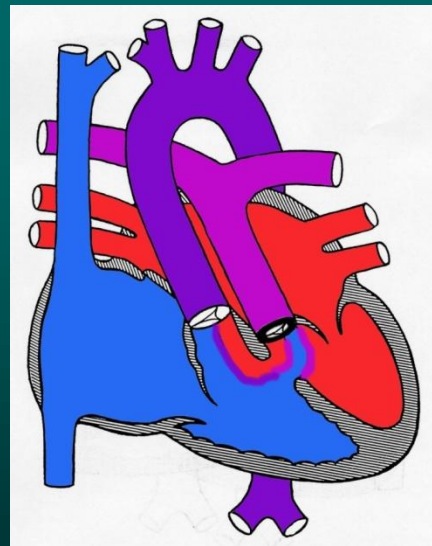
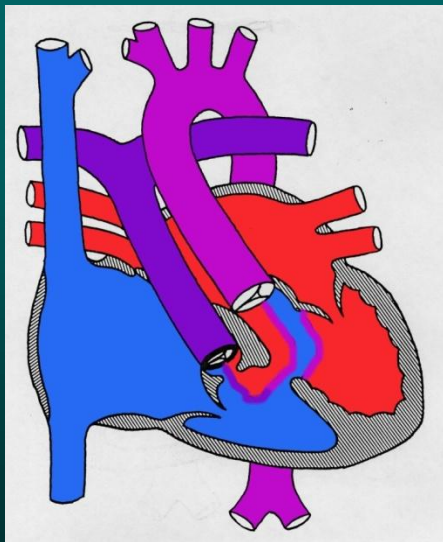
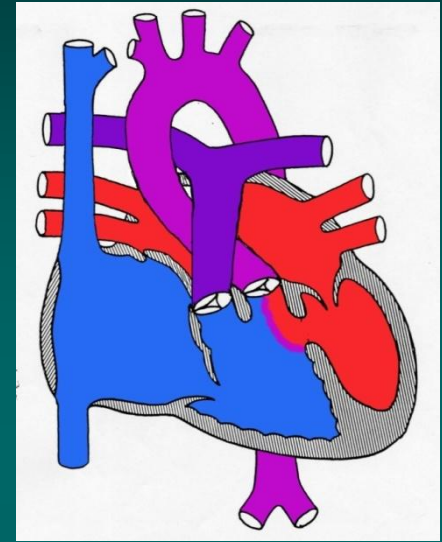
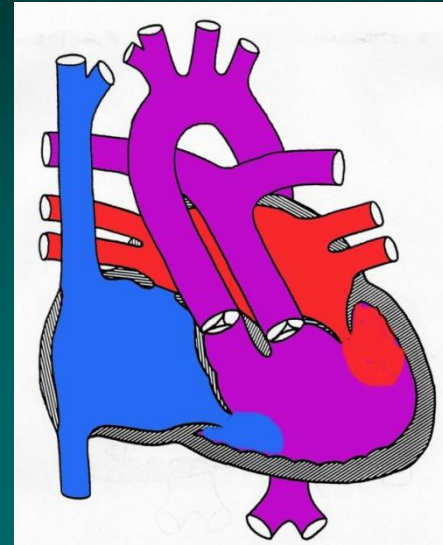
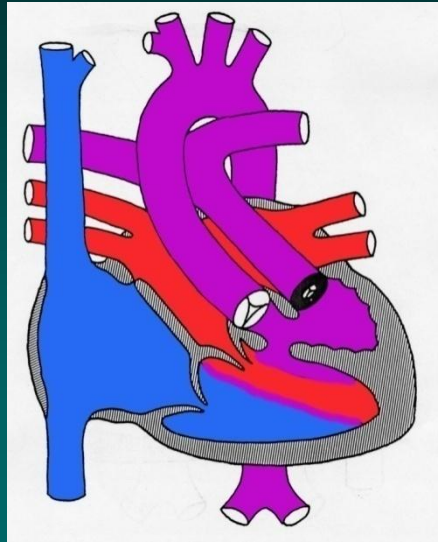
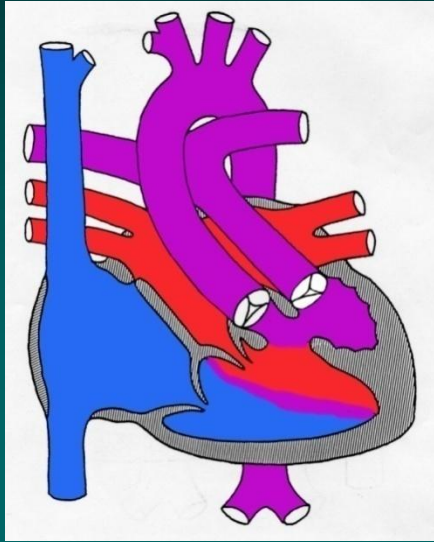
RVAPT



- ❖ Frequente IAD
- ❖ Asse QRS su aVR
- ❖ qR o R con T negativa in V_1
- ❖ qrS in V_6

Dominanza destra

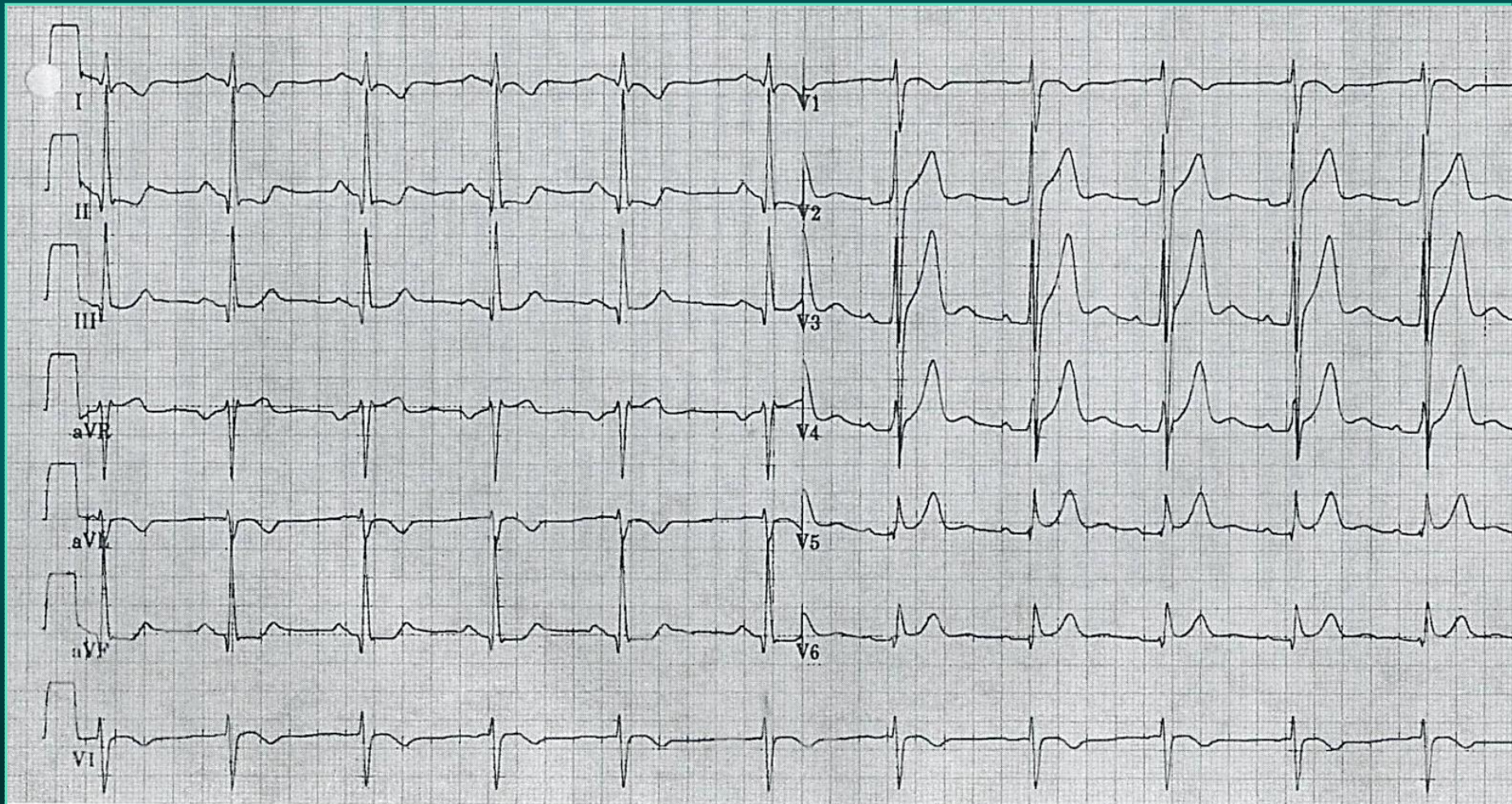
Le cardiopathie complexe



SVS dxcardia TCGA + SP

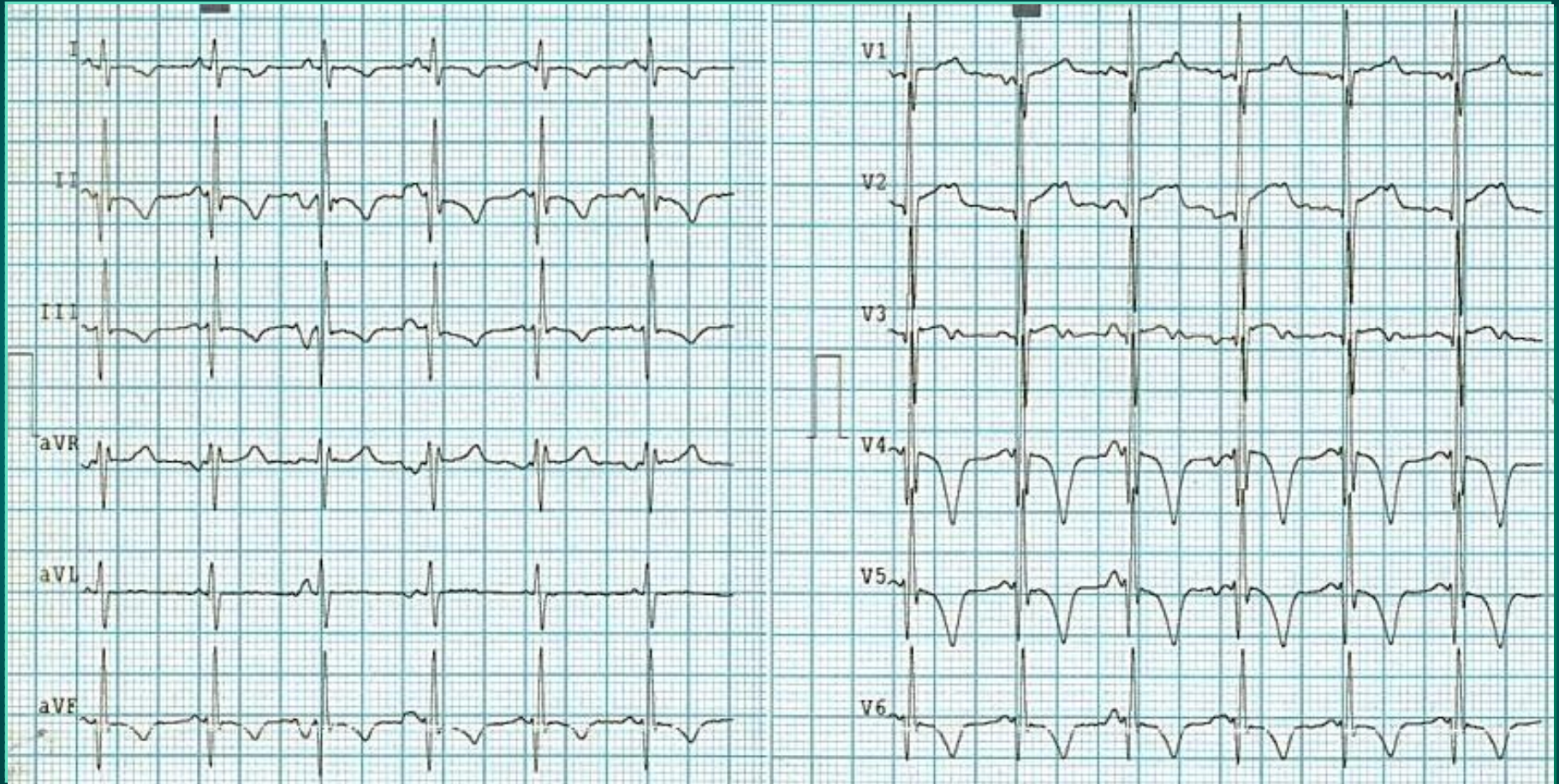
in storia naturale

12 anni



CMIO? IVS? Ischemia?

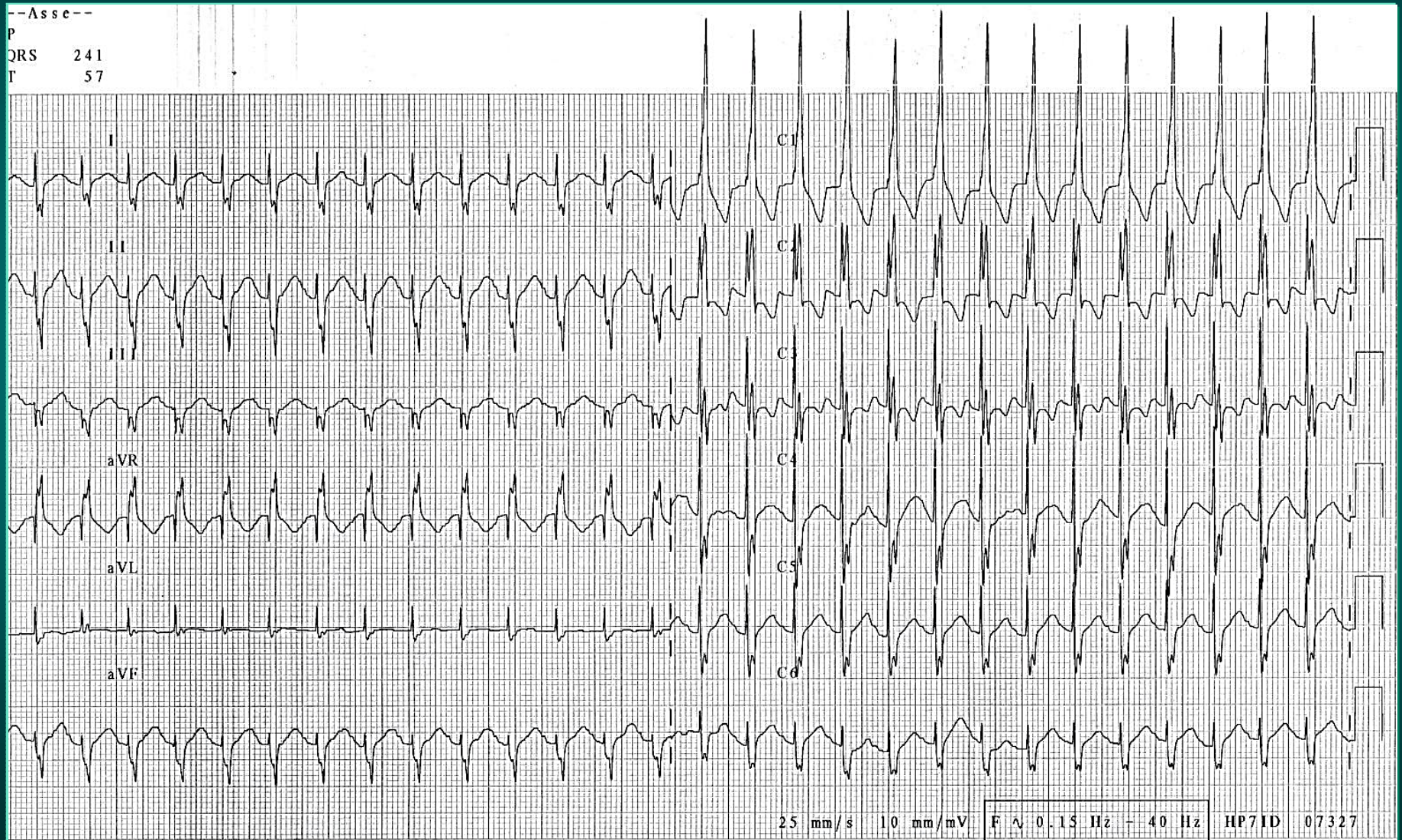
5 mesi



Massa tumorale (fibroma) della parete laterale del VS

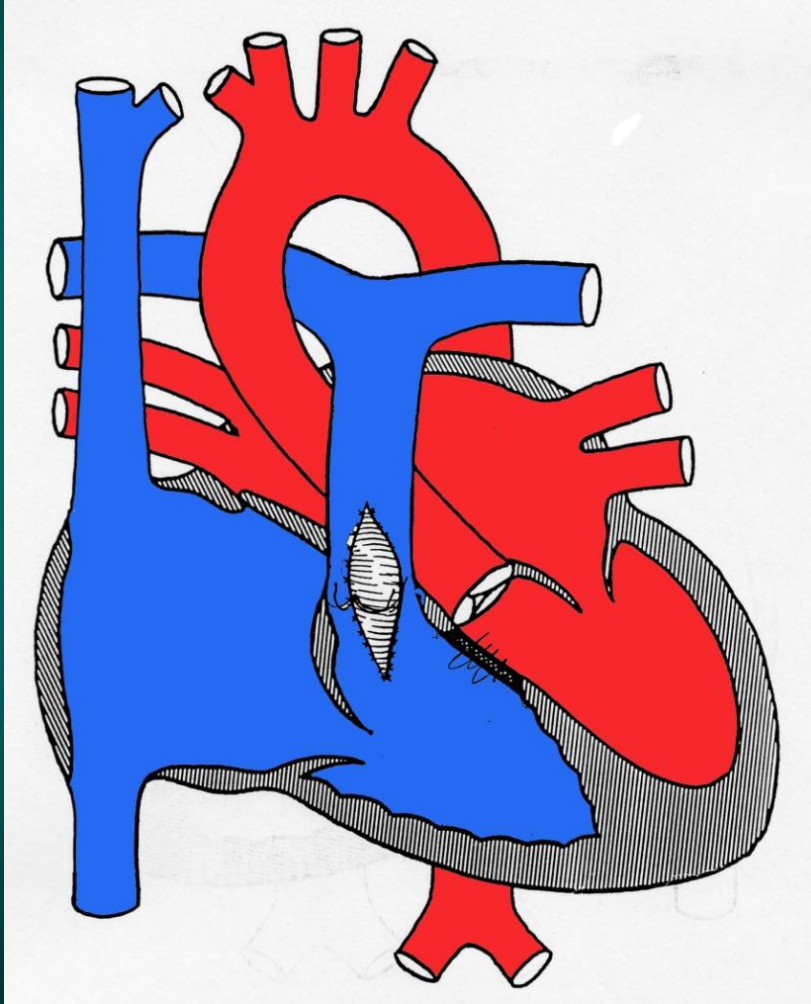
CAV completo

1 anno - s/p correzione



Tetralogia di Fallot

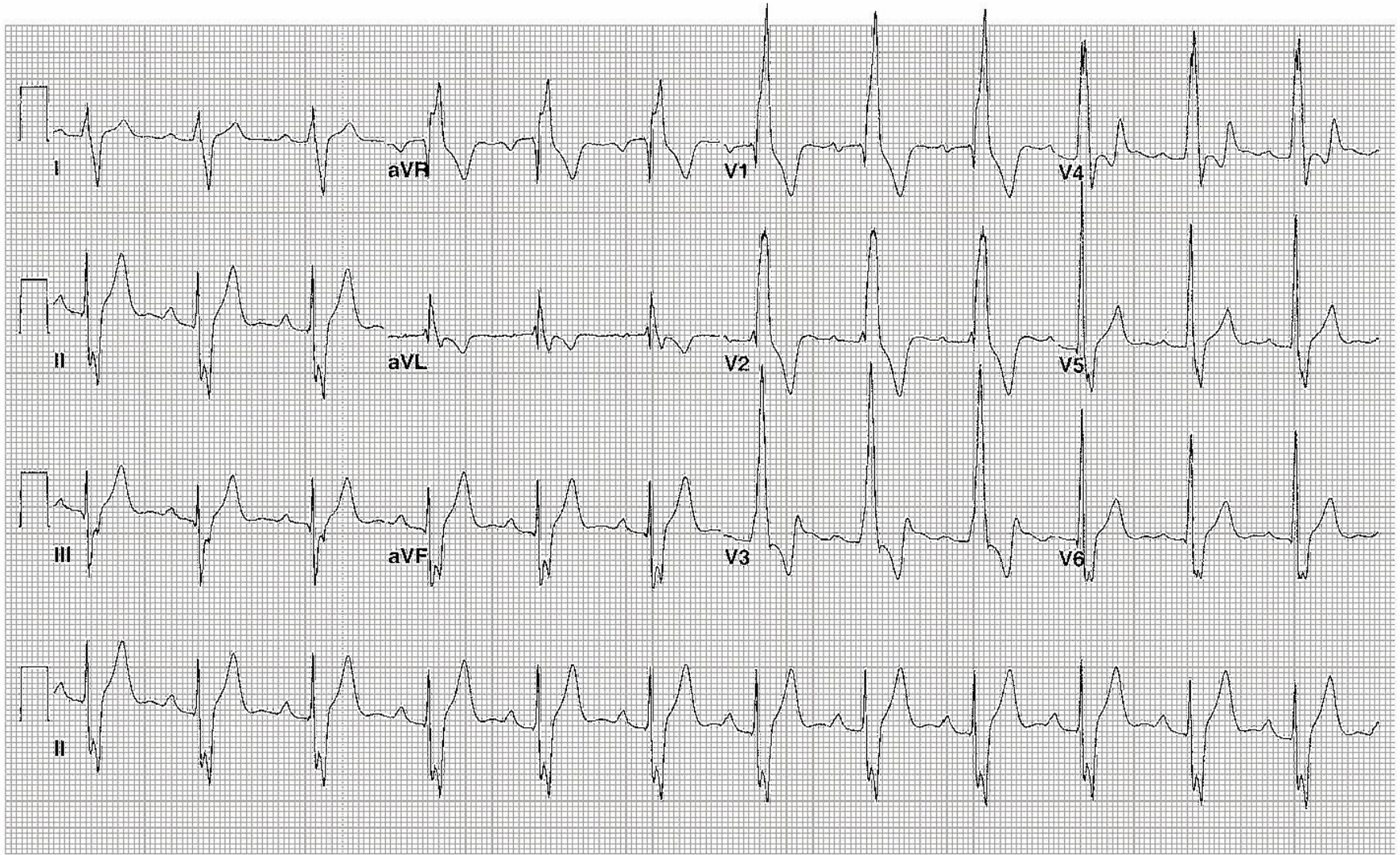
Evoluzione postoperatoria



- ❖ RVOTO residuo
- ❖ Disfunzione del VD
- ❖ Insuff. Tricuspidale
- ❖ Insuff. Polmonare
- ❖ Aritmie
 - Sopraventricolari
 - Ventricolari
 - BAV

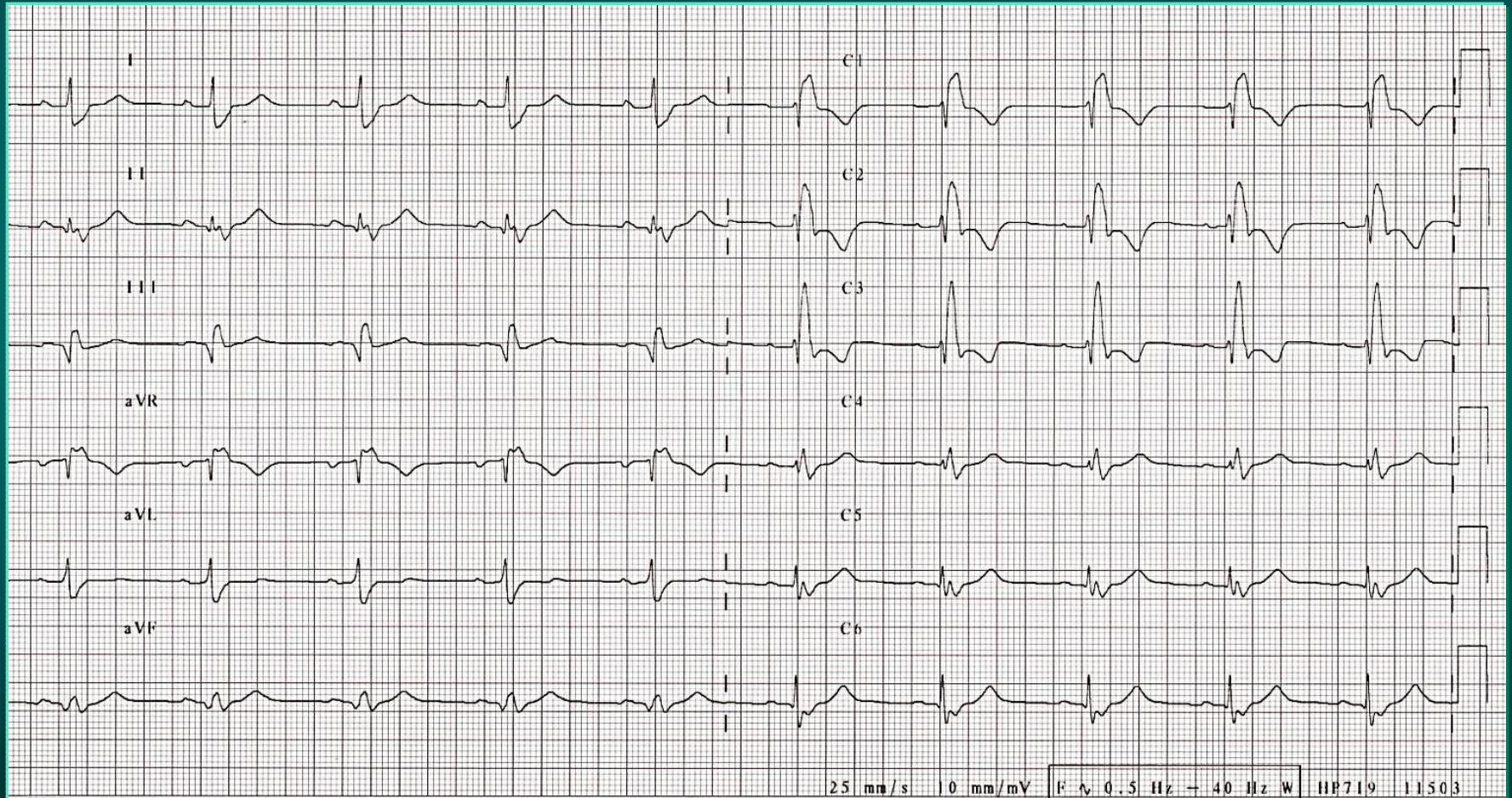
Tetralogia di Fallot

14 anni - s/p correzione



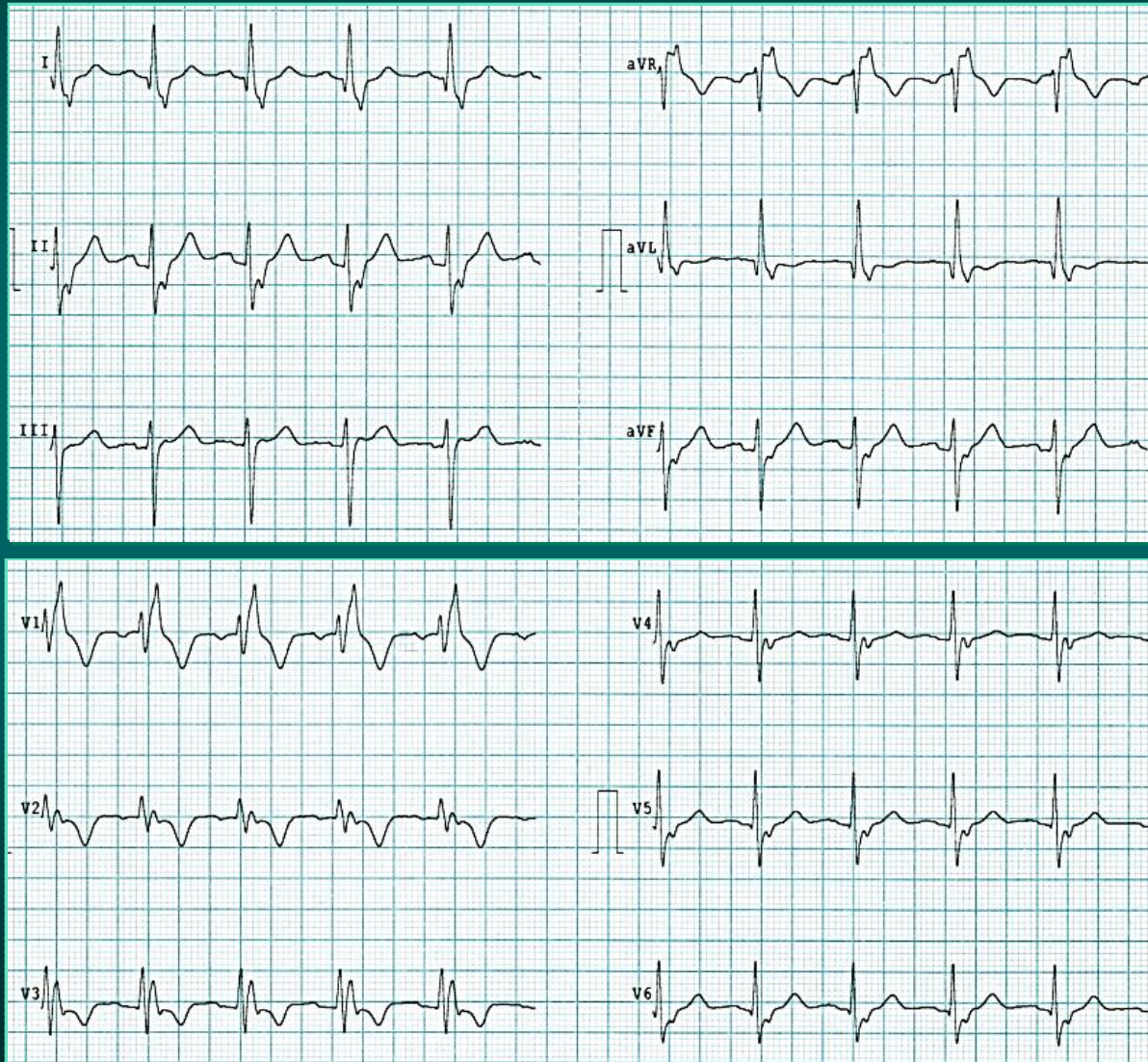
Tetralogia di Fallot

48 anni - s/p correzione



AP + DIV operata

30 anni - s/p correzione



Memento

- ❖ La dominanza destra neonatale è fisiologica, ma può essere patologica
- ❖ La dominanza sinistra neonatale è sempre patologica
- ❖ La codominanza è generalmente patologica
- ❖ I quadri patognomonicici sono virtualmente assenti
- ❖ I quadri tipici sono pochi e relativamente variabili

Tips & Tricks

- ❖ Malformazioni che comportano IVS nell'adulto (SVAo, CoAo) presentano spesso all'ECG neonatale dominanza dx, tanto più evidente quanto più il VS è compromesso
- ❖ Malformazioni che comportano sovraccarico del VD o VD sistemico (RVAPT, TGA setto integro) presentano all'ECG neonatale dominanza dx evidente, ma non sempre distinguibile dalla normalità

Tips & Tricks

- ❖ Le cardiomiopatie, le malattie metaboliche, i tumori cardiaci primitivi possono presentare ECG particolarmente confondenti e difficili da interpretare
- ❖ Facili falsi positivi:
 - BIBD isolato (scarsa correlazione con DIA)
 - Ripolarizzazione di tipo ischemico (l'ischemia vera è molto rara in età pediatrica, ma esiste)

Memento

- ❖ Valutare *tutti i parametri ECG*
 - In relazione all'età
 - In relazione alla clinica (anamnesi, cianosi, soffi, polsi...)
 - In relazione alla evolutività
 - In relazione agli altri dati strumentali



Memento

- ❖ Le insidie diagnostiche principali:
 - La variabilità fisiologica
 - Le cardiopatie complesse
 - Le cardiopatie con malposizioni, anomalie di situs etc.
- ❖ Le insidie diagnostiche diaboliche:
 - La malposizione degli elettrodi
 - I tracciati con taratura/velocità non standard



GRAZIE...

...e buona fortuna!