

Case-Based Clinical Cardiology

Majid Maleki
Azin Alizadehasl
Editors

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Majid Maleki
Rajaie Cardiovascular Medical and
Research Center
Iran University of Medical Sciences
Tehran
Iran

Azin Alizadehasl
Head of Cardio-Oncology Department
and Research Center, Rajaie Cardiovascular
Medical and Research Center
Iran University of Medical Sciences
Tehran
Iran

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Preface

There are many good books on case-based cardiovascular disorders but what distinguishes case-based clinical cardiology from the rest is a strong emphasis on its practical points. All the chapters deal with a specific group of cardiovascular problem and several diagnostic tools. The particular problem depends on the clinical presentation, and once a diagnosis is made, there will be an issue of determining different aspects of the disorder by different diagnostic tools and respective practical points. Almost all of the figures are not simply a single good illustration, but rather they are a sequence of images prepared and gathered from our patients with the problem being demonstrated showing the necessary features for the diagnosis and its severity and how to manage it.

The target group of this book is both those who are new to the field of cardiology and those who are experienced in different areas of this field. This is not intended to be a textbook, but it is a practical guide to all medical students, cardiology residents, and fellows in different aspects of cardiology such as electrocardiography, echocardiography, electrophysiology, interventional cardiology, congenital heart diseases, peripheral disease, and even experienced cardiologists and cardiac surgeons.

Any work has a number of contributors both direct and indirect. Most of the images used in this book were collected by the authors of different chapters to whom we owe a great debt. Expert secretarial help was provided by Sara Tayebi and Arefeh Ghorbani.

Our thanks go to all our families and children who understand the importance of the time spent for preparing and writing this book.

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Tehran, Iran

Majid Maleki
Azin Alizadehasl
Feridoun Noohi
Ata Firouzi
Bahram Mohebbi
Zahra Khajali
Mohammad Javad Alemzadeh-Ansari
Md. Sedigheh Saedi
Zahra Hosseini

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Chapter 1

Electrocardiography Cases



Majid Maleki

Abstract The electrocardiogram (ECG) is one of the most important and one of the first tools for diagnosis and management of cardiovascular and sometimes systemic disorders.

Abbreviations

BAA	Batrial abnormality
Bpm	Beat per minute
DOE	Dyspnea on exertion
Dx	Diagnosis
LAA	Left atrial abnormality
LAD	Left axis deviation
LVH	Left ventricular hypertrophy
MI	Myocardial infarction
NPJT	Non-paroxysmal junctional tachycardia
NSR	Normal sinus rhythm
PRWP	Poor R wave progression
RAA	Right atrial abnormality
RVH	Right ventricular hypertrophy

M. Maleki (✉)

Rajaie Cardiovascular Medical and Research Center, Iran University of Medical Sciences, Tehran, Iran

Introduction

The electrocardiogram (ECG) is one of the most important and one or first tool for diagnosis and management of cardiovascular and sometimes systemic disorders.

Also, it can help to diagnose some abnormalities such as electrolyte abnormalities thyroid disease, hypothermia, drug effects, and systemic disease effects on the heart.

Our goal in *this* chapter is just focusing on ECG interpretation in both simple and complex cases with some comments on final diagnosis and if necessary differential diagnosis.

Electrocardiography has its greatest role in diagnosis, treatment, and follow-up the cardiac and noncardiac patients. Not only the diagnosis of abnormality is essential but it is also important to know that ECG may mimic heart disease falsely and can lead to unnecessary medical actions. The presentation and form of this chapter are directed primarily at the clinicians such as cardiologist, internist, and different cardiology fellows in echocardiography, electrophysiology, interventional cardiology, and so on.

The text consists of the case summary, illustrative case studies, interpretation of electrocardiogram, and some important point as a take-home message.

This chapter is not a detailed presentation of the electrocardiographic manifestation and mechanism of the various ECG abnormalities. But it is intended to be familiar with common ECG abnormalities and their clinical points.

The chapter is rather aimed to be familiar with the genesis, and clinical significance of certain comment electrocardiographic and arrhythmia with focusing on their diagnosis and management.

In summary, the analysis of abnormal rhythm includes three basic steps:

1. Identification and analysis of P wave in ECG
2. Finding out the P.QRS relation
3. The QRS complex analysis

If a bipolar chest leads is used for heart rhythm monitoring, then the modified CL1 (MCL1) lead is a more useful MCL1 lead that has the advantages of not interfering with cardiac physical examination and probable administration of precordial electric shock.

Case 1

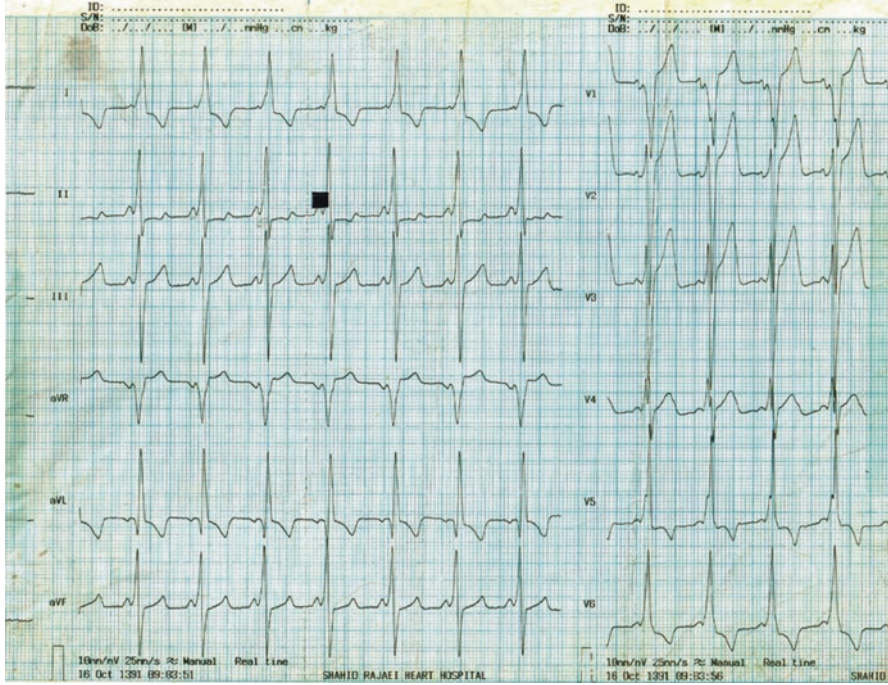
Thirty years old man with a history of mitral stenosis



- ECG: atrial flutter with 4:1 conduction
- LAD
- Atrial rate: 300 bpm
- Ventricular rate: 75 bpm
- PRwp
- Diagnosis: atrial flutter with 4:1 conduction

Case 2

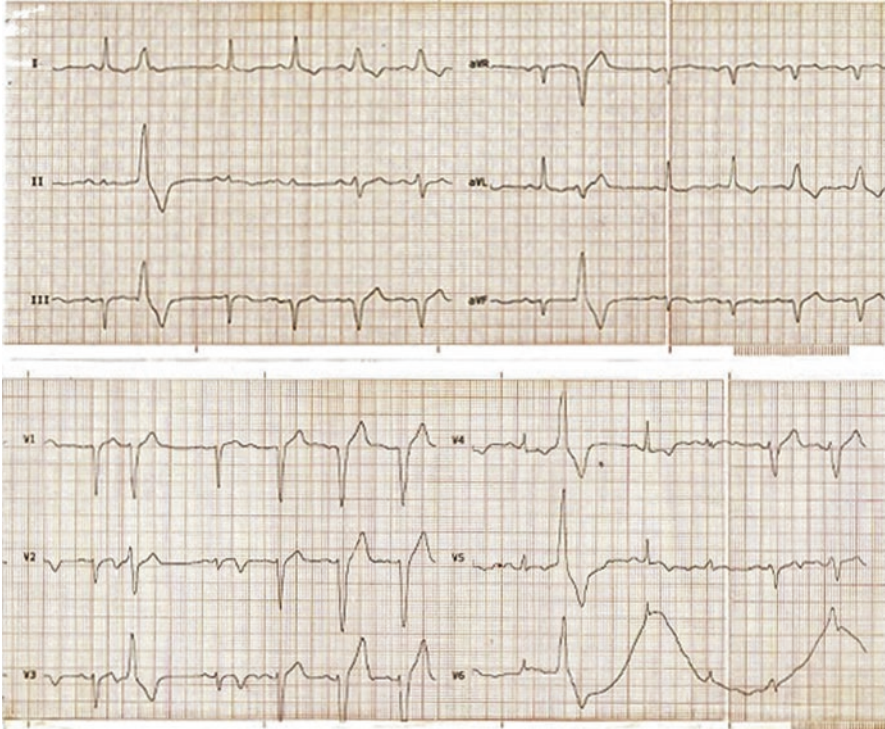
Thirty years old man with history of frequent palpitation



- ECG: NSR
- Normal axis
- 90 bpm
- Short PR interval
- Delta wave presence
- Secondary ST T changes
- Diagnosis: pre-excitation syndrome with accessory pathway probably from RV free wall [1]

Case 3

Thirty-five years old man with history of dilated cardiomyopathy since 1 year age



- ECG: NSR
- LAD
- Variable rate between 75 and 77
- Occasional PVC
- Rate-dependent LBBB with fusion beat
- Dx: occasional PVC with tachycardia dependent LBBB pattern [1]

Case 4

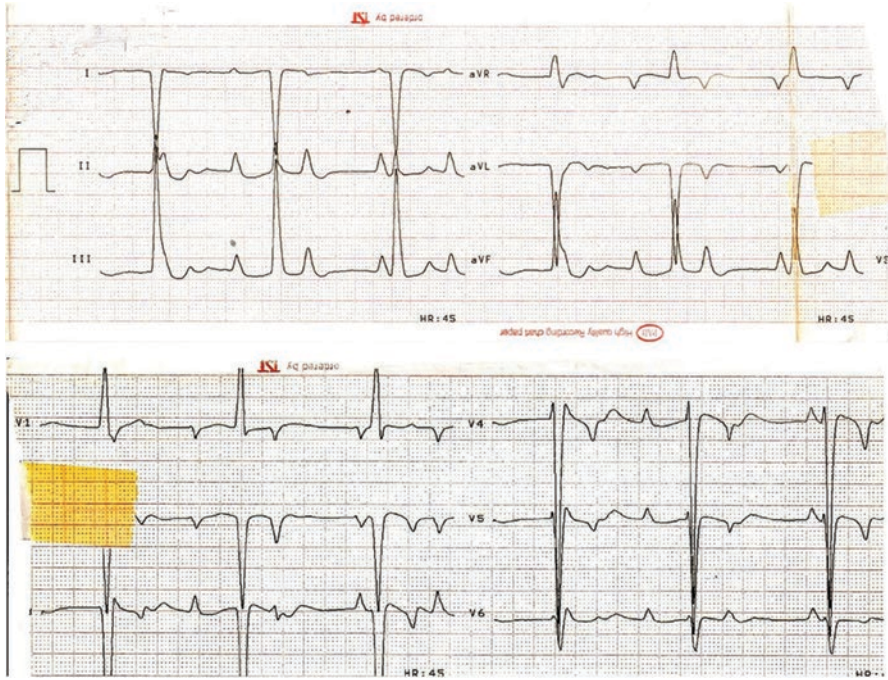
Twenty-five years healthy man with atypical chest pain



- ECG: Sinus bradycardia
- Normal axis
- Concave st elevation in inferolateral leads
- Dx: early repolarization [2]

Case 5

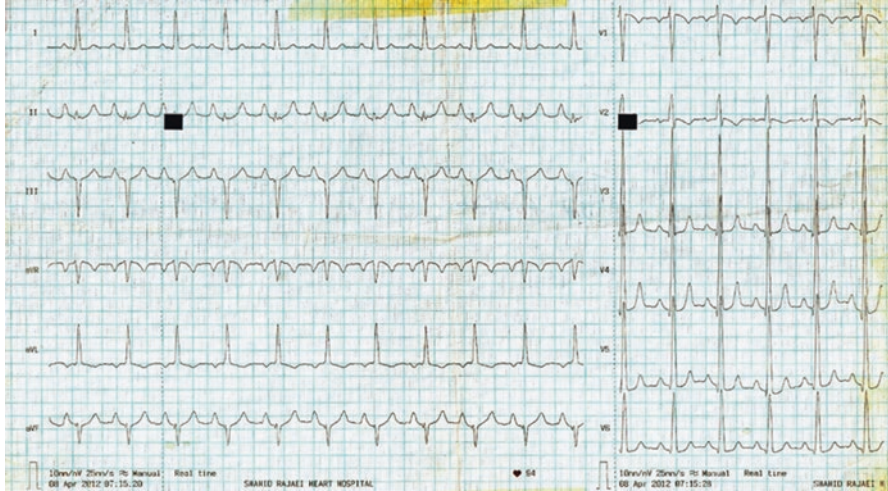
Seventy years old man with vertigo since 1 month ago



- ECG: Sinus rhythm
- Atrial rate 90 bpm
- Ventricular rate 43 bpm
- AV dissociation
- Dx: complete heart block

Case 6

Sixteen years old girl with clubbing fingers since birth.



- ECG: NSR.
- HR 80 bpm.
- LAD.
- RAA.
- LVH.
- Dx: NSR, RAA, LVH.
- NOTE: LVH and RAA in a young cyanotic patient are strongly suggestive of Tricuspid Atresia [2].

Case 7

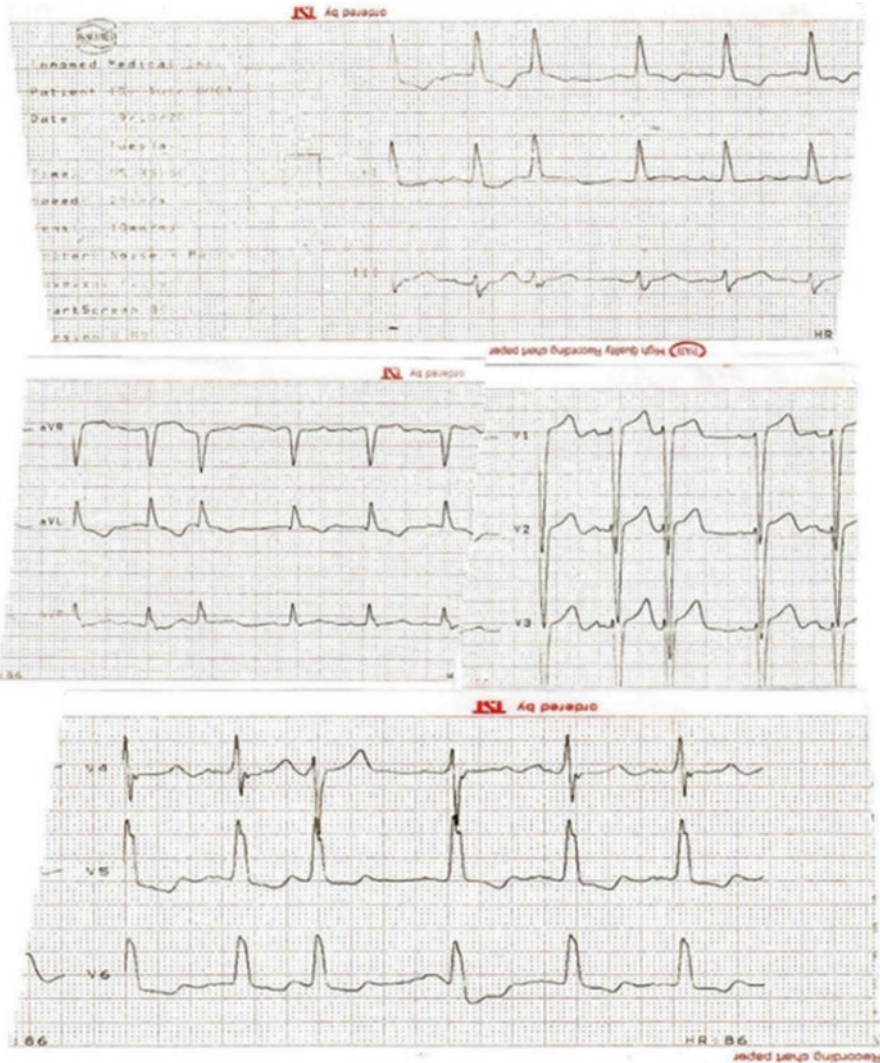
Thirty years old man with history of frequent palpitation since many years ago



- ECG: NSR
- LAD
- 75 bpm
- Short PR interval
- Delta wave
- Dx: pre-excitation syndrome with accessory pathway originated from mid-septal [3]

Case 8

Fifty years old man with history of valvular heart disease



- ECG: NSR
- Normal axis
- 75 bpm
- LBBB pattern with secondary st. T changes occasional PAC.

Case 9

Sixty years old man with history of valvular heart disease.



- ECG.
- AF with rapid ventricular response.
- LAD.
- Long pause, short pause with RBBB pattern (Ashman phenomenon).
- Dx: AF, LBBB pattern, with Ashman phenomenon.
- NOTE: sometimes it is difficult to distinguish PVC with RBBB pattern from aberrancy (Ashman phenomenon) in atrial fibrillation with rapid ventricular response. PVC usually has its coupling interval and compensatory and Ashman phenomenon is distinguished in AF with preceding long pause short pause with RBBB pattern [2].

Case 10

Sixty years old man with history of CABGS 1 week ago.



- ECG: Lead II.
- Sinus rhythm.
- PVC (second beat in the first row).
- Fusion beat (sixth beat in the first row).
- Short run of ventricular tachycardia with concealed conduction to AV node and subsequent prolonged PR interval after VT [3].

Case 11

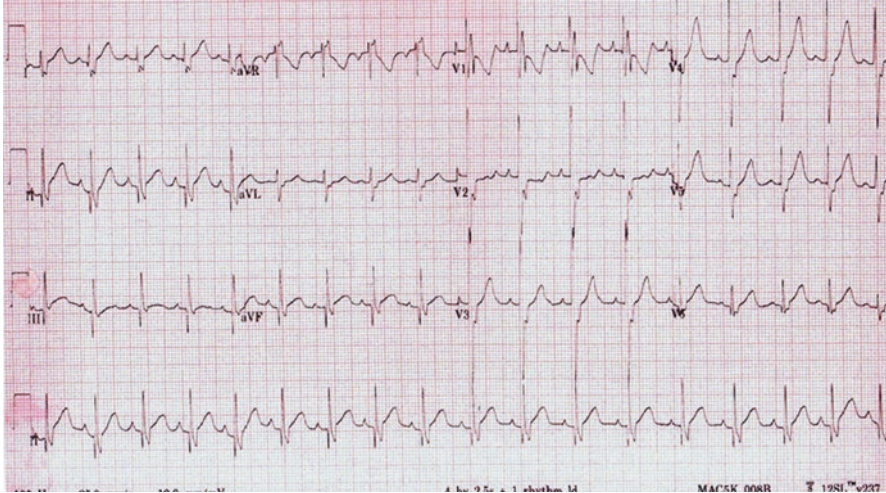
Thirty-eight years old lady with history of Rheumatic heart disease.



- ECG: Sinus rhythm.
- PVC with compensatory pause junctional escape beat after PVC.
- NOTE: sinus node in patient with sick sinus syndrome may not recover after a compensatory pause with pvc and unusual recovery of the sinus node is suggestive of sinus node disease.

Case 12

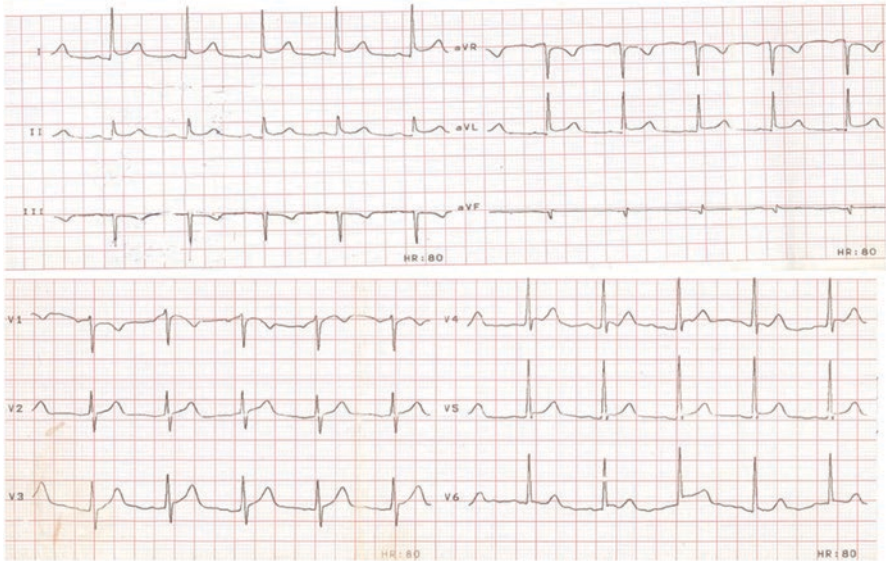
Sixteen years old asymptomatic boy with III/VI murmur at lower left sternal border and sail sound due to Ebstein anomaly.



- ECG.
- NSR.
- RAD.
- HR: 100/min.
- RAA.
- RBBB, rsr'.
- Fragmented QRS in V.
- Note: This ECG pattern and Fragmented QRS may be due to atrialization of parts of the right ventricle. Fragmented QRS in right precordial leads may be due to abnormal depolarization of residual right ventricle [2].

Case 13

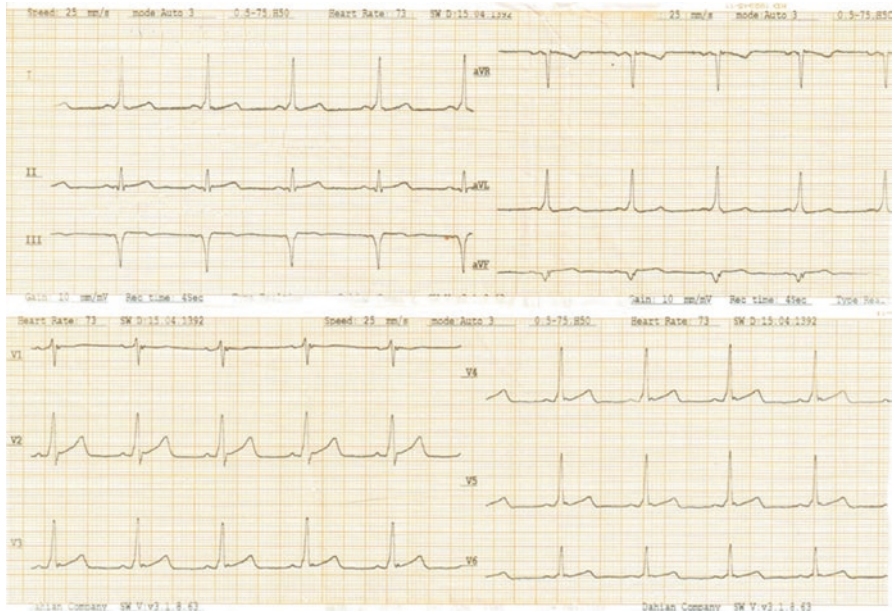
Thirty years old man with chest pain aggravation by respiration since 1 week ago. He had history of influenza 20 weeks ago.



- ECG.
- NSR.
- HR: 80/min.
- LAD.
- ST. elevation in all leads except AVR and V1.
- ST Depression in AVR and V1.
- Note concave st. Elevation in all except AVR and V1 which in characteristics for pericarditis [2].

Case 14

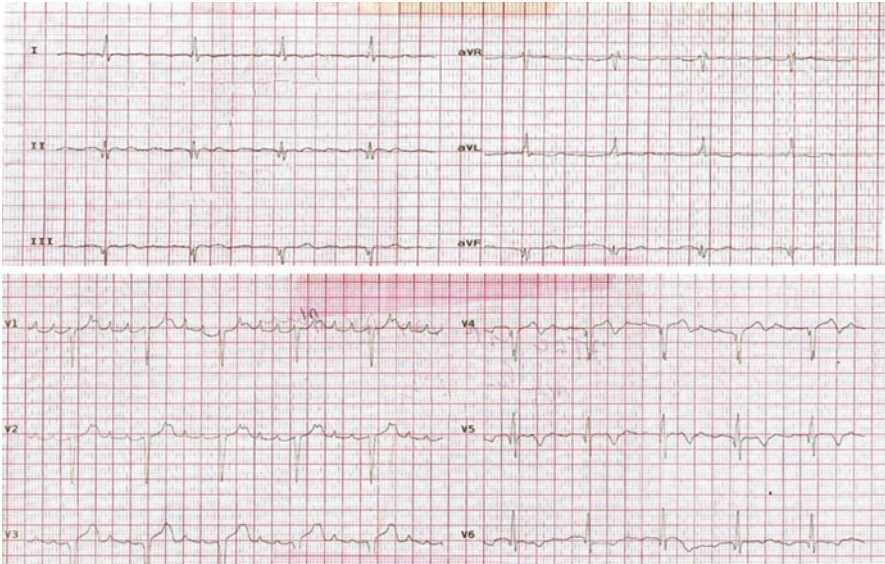
Twenty-three years old man with history of frequent palpitation



- ECG: NSR
- 75/min
- LAD
- Short PR
- Delta wave
- Tall R in V1-V2
- Diagnosis pre-excitation syndrome (WPV)

Case 15

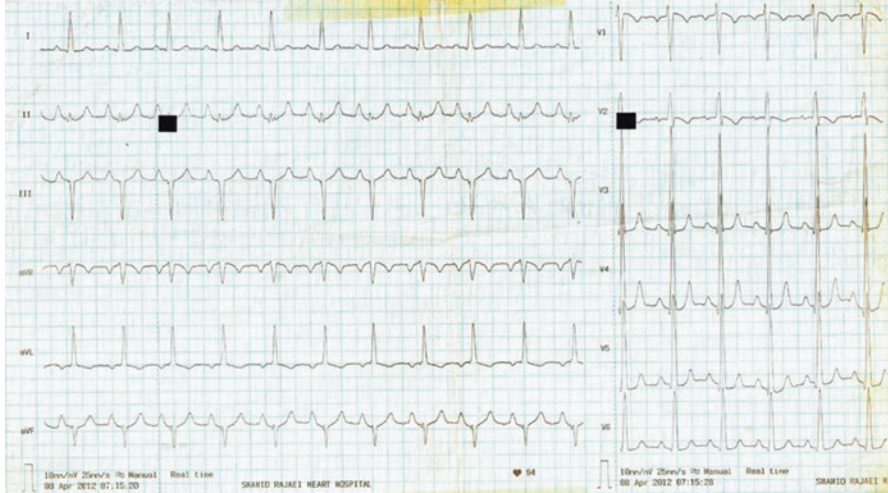
Fifty years old man with history of myocardial infarction and congestive heart failure. Echocardiography showed enlarged cardiac chambers and reduced Ejection fraction.



- ECG: Narrow QRS regular rhythm.
- 75/min.
- Q wave in II, III, AVF.
- ST.t change in, AVL, v4-v6.
- QS pattern in precordial leads with inverted T wave in v4-v6.
- Atrial rate 300/min.
- Ventricular rate 75/min.
- Diagnosis, Atrial flutter with 4:1 conduction, old inferior myocardial infarction [4].

Case 16

Twenty years old cyanotic man with dyspnea on exertion (Fc, II, III) since childhood.



- ECG.
- NSR.
- HR: 100/min.
- LAD.
- RAA.
- High voltage QRS in the precordial lead.
- Diagnosis, RAA, LVH most probably due to Tricuspid Atresia.
- Sometimes thin pattern is seen in a single ventricle too [2].