

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

*Lost Pearls of Clinical Cardiology
Clinical Medicine still valuable in the
high technology world*

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Comment

- All my tutors who worked with high technology were first and foremost shrewd clinicians.
- My professors as well as myself had full training in general medicine, then general cardiology before working in highly technical investigations.
- That's why I am astonished and disappointed of early specialization in a high technology field, ignoring general medicine and clinical cardiology before specialization in a country with limited resources.
- From HO to split his bundle thesis , how come ??

Prologue

I would like to thank my professors, colleagues, trainees and especially my patients in Egypt, USA and the Arab world with whom I spent more than 50 years. Without their help, I would have not been able to stand and give this lecture in this great event, in the Egyptian Society of Cardiology 2017 .

Clinical cardiology is still valuable in the high technology world

Outline

- Example (1) Proper use of technology guided by proper clinical evaluation
- Evolution of cardiology practice
- Glimpses of the value of clinical evaluation in high technology world
 - History taking
 - Physical examination
 - ECG and Chest X-ray
 - Example (2) Simple technology versus advanced technology
 - Example (3) Proper evaluation by simple clinical tools
 - Determination of prognosis by ECG
- Limitations of high technology; SPECT as an example
- Could guidelines replace clinical judgment?
- Benefits of proper care by proper cardiovascular specialist
- Example (4) A true funny case demonstrating negligence of physical examination
- Historical enduring statements which I like
- To conclude

Example 1

Proper use of technology guided by proper clinical evaluation

- 48 year-old male
- Admitted complaining of chest pain to a so-called “five-star hospital”
- ECG showed minor changes
- The easy diagnosis was “acute coronary syndrome”
- Heparin + anti-ischemic medications
- No improvement of chest pain
- Discharged against medical advice because of no improvement and was referred

Example 1 (cont.)

- Examination revealed water hammer pulse in the right arm (BP 150/60) with weak pulse in the left arm (BP 90/60)
- Auscultation revealed faint AI murmur
- TEE was done immediately → aortic dissection with AI
- Multislice CT → no significant coronary stenosis → surgery done the same night

Evolution of Cardiology practice

- In the first half of the 20th century:
 - Elicit expert medical history
 - Examine the heart
 - Interpret ECG & plain X-ray
- Mid-century:
 - Elicit expert medical history
 - Examine the heart
 - Interpret ECG & plain X-ray
 - Phonocardiography + other external graphic recordings
- Echocardiography in the 1960s:
 - Great opportunity to refine, and not eliminate, clinical examination.

Evolution of Cardiology practice (cont.)

- Unfortunately, reliance on echo and more recent imaging techniques (e.g. nuclear, MRI, MSCT) surpassed clinical examination.
- Disappearance of phonocardiography reduced opportunity to develop physical examination skills
- By mid 1990's skills in cardiac auscultation had plummeted.
- Decline in auscultatory skills coincided with:
 - Reduction in length of hospital stay
 - Increasing complexity in CV medicine
- As a consequence :
 - Cardiologists focused on a single aspect of the patient (who usually had multiple problems)
 - Clinical interaction with patient and colleagues became abbreviated

The end result

- **Only 8% of Cardiovascular Trainees intended a career of "Clinical Cardiology" (ACC Statistics)**
- **Clinical Cardiologists resemble Radiologists: high specialized technical expertise and minimal commitment to clinical care**

Short glimpses of the value of clinical evaluation in the high technology world

- **History**
- **General Examination**
- **Precordial Examination**
- **ECG and Chest X-ray**

History

- **The most valuable information obtained in clinical cardiology comes from proper history taking**
- **Reconstruct of truth from incomplete or misleading information**
- **Actually, Sherlock Holmes was “created” by a physician.**
- **Proper history allows a skillful physician, not a computer, to discard inaccurate information and arrive at logic conclusions.**

Obtaining a Medical History

- **Can't be delegated**
- **Listen to the patient's narrative**
- **Subsequent focused questioning**
- **Review available records**
- **Differential diagnosis during the interview**
- **Pathophysiological thinking – does this story make sense?**
- **Family history increasingly important because of genetic diseases**
- **Establish doctor-patient bond**

Chest Pain

- **Classic history of angina pectoris has greater diagnostic accuracy than most forms of stress testing**
- **Angina pectoris associated with dyspnea or fatigue reflects elevation of LV diastolic pressure, acute fall in cardiac output, or left main coronary artery critical obstruction**
- **Angina occurring during exercise versus angina after exercise differentiates CAD from HOCM**
- **Chest pain of ACS or AMI waxes and wanes due to intermittent coronary occlusion and recanalization. The pain of acute aortic dissection starts severe and persists with the same severity as it started.**
- **Specific radiation of chest pain to trapezius ridge is diagnostic of pericardial disease.**

Syncope

- In most cases, the etiology of syncope can be made from history, physical examination and ECG.
- Further testing is reserved for those with abnormalities in physical examination.
- Considerable resources are wasted searching for unlikely causes of syncope when good clinical examination is not performed.

General Examination

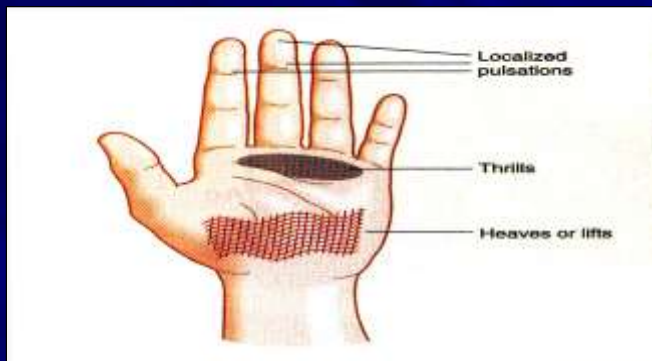
- **General appearance:**
 - Disproportionate pallor is diagnostic of rheumatic activity (A.EISherif)
 - Heart failure with hyperactive patient is diagnostic of hyperthyroidism (M Ibrahim)
- **Basic measurements:**
 - Weight gain or loss critical in management of patients with CHF
 - Waist circumference is a strong risk factor for CAD
- **Pulse**
 - Character of pulse determines the severity of valve lesions
 - Ankle/brachial index strong determinant of prognosis

General examination (cont.)

Specific cardiac abnormalities can be detected by general examination

- Marfan syndrome
- Turner syndrome
- Pickwickian syndrome
- Friedreich ataxia
- Duchenne muscle dystrophy
- Ankylosing spondylitis
- Sickle cell disease
- Hereditary hemorrhagic telangiectasia
- Holt Oram Syndrome
- Down Syndrome
- Scleroderma
- Rheumatoid arthritis
- Carcinoid syndrome
- Pheochromocytoma
- Lupus
- Sarcoidosis
- Tuberosus sclerosis
- Myxedema

Palpation of the precordium

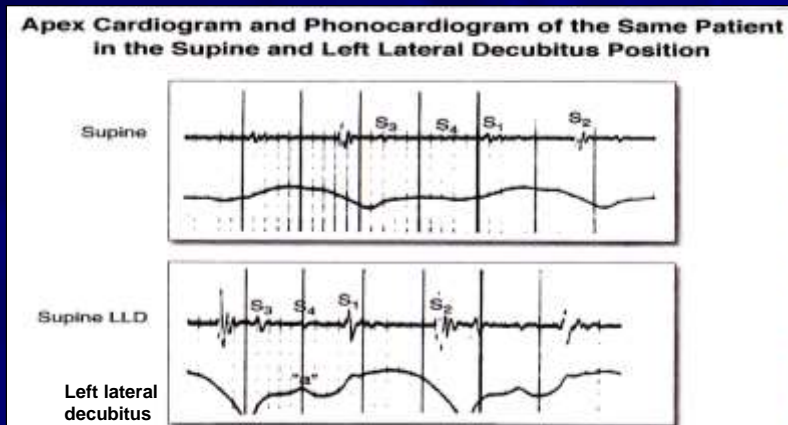


Small localized movements are best perceived by the distal tips of finger pads, thrills are best felt by the distal portion of the palm and heaves or lifts are best felt with the proximal part of the palm. (From Constant J: Bedside Cardiology, 4th edition)

Palpation of the Precordium

- **Characteristics of the apical impulse:**
 - Diffuse in LV dilatation
 - Hyperdynamic and diffuse in AR and MR
 - Discrete and lifting in AS and hypertension
 - Palpable gallops
 - Dyskinetic apex: apical aneurysm
- **Parasternal lift:**
 - Presence of a large anterior MI
 - Combined LA and RV enlargement and pulmonary hypertension
 - RV volume overload
- **Biventricular disease in cardiomyopathy**

How many can recognize this tracing?

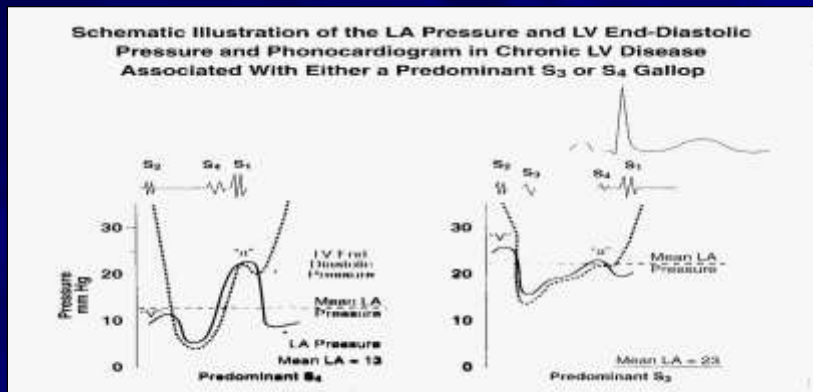


The settings of the recording devices were unchanged. Note the striking increase in audibility of the heart sounds and increased pulsations of the apex in the left lateral decubitus position.

Cardiac Auscultation

- Quiet environment
- Systematic approach
 - Valve areas
 - Cardiac cycle-focus on individual components
 - Use of both bell and diaphragm pieces
- Focused search based upon the history
- Supplemental techniques:
 - Posture
 - Exercise
- If you think you hear – you probably do
- The stethoscope connects the doctor to the patient
- Sadly, auscultation is currently widely neglected and fast becoming a lost art
- Much of this is due to lack of experience and interested teachers busy in starting patients

Hemodynamics of cardiac auscultation



A loud S_4 is heard when there is powerful atrial pre-systolic contraction (a wave). When the atrium fails, the mean left atrial pressure rises and the v wave height increases, resulting in a high LV filling pressure in early diastole, producing a loud S_3 gallop.

- **the stethoscope of the future??**

It seems it will be a largely decorative Instrument insofar as its value in diagnosis with its function mainly limited to provide comfort to apprehensive patients with functional complaints who are often relieved as soon as they feel the chest piece on their pectoral muscles

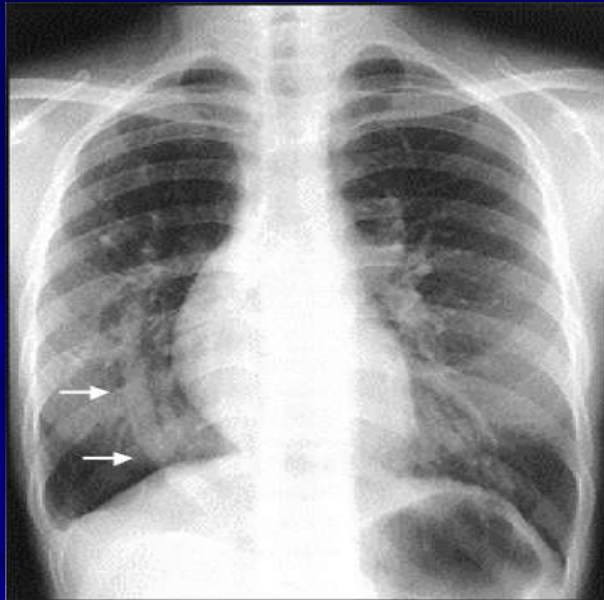
ECG and Chest X-ray

- **Integral components of the physical examination**
- **In spite of being very valuable tools in clinical cardiology, they are the most frequently neglected or carelessly interpreted nowadays.**
- **A combination of physical examination, plain X-ray and ECG detects hemodynamically significant heart diseases.**
- **Also in most cases, the prognosis can be adequately determined from the combination of history, physical examination, ECG and chest X-ray; all simple and inexpensive tools.**

Example (2)

High technology versus simple technology

- A resident is worried about a 30 year-old patient with progressive shortness of breath and non-specific findings on physical examination with echo diagnosis of dilated RA and RV without ASD or pulmonary hypertension even by TEE.
- Did he see the chest X-ray? No!!!!!!



Scimitar Syndrome

Example (3)

Proper evaluation by simple tools

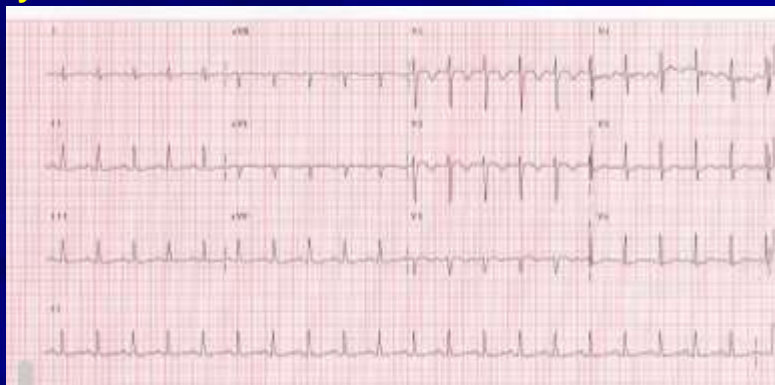
- **A 53 year-old female presents with acute severe shortness of breath associated with left precordial chest pain**
- **On physical examination, she was tachypneic with non-specific findings on precordial examination.**

ECG of case # 3

Sinus tachycardia

ST/T wave changes in V1 – V4

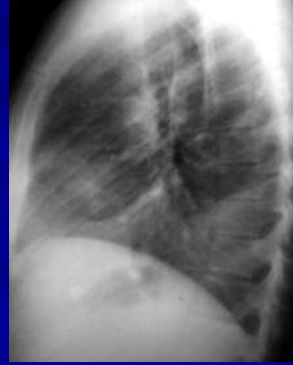
The ready diagnosis is always acute coronary syndrome



X-ray of case # 3

Left basal opacities with apical
relative oligemia

Pulmonary embolism

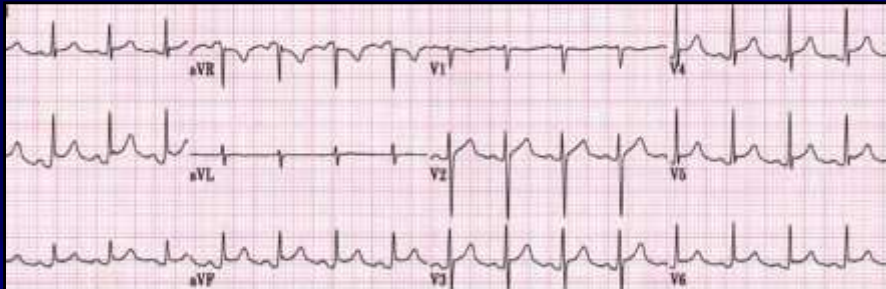


Case # 3 : Multislice CT confirmed the
diagnosis



ECG

- The practice of reading the ECG by trainees then confirmed and signed by senior staff has disappeared from Egypt but still present in the USA ???
- ECG provides collective data that cannot be obtained by any other diagnostic tool in cardiology
 1. Cardiac position
 2. Ventricular morphology
 3. Chamber enlargement
 4. Origin and propagation of electrical impulse
 5. Nature of arrhythmia
 6. Myocardial ischemia
 7. Localization of infarct related artery in AMI
 8. Estimates pulmonary artery pressure
 9. Normal resting ECG → normal ejection fraction
 10. Can determines the cause of sudden cardiac death



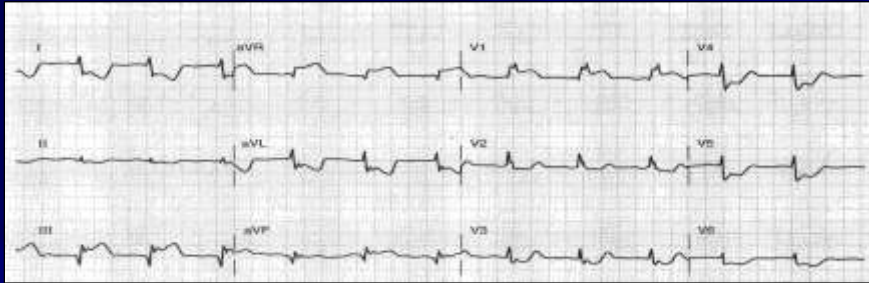
Sinus tachycardia with ST elevation

Differential diagnosis Acute Coronary Syndrome

Look at aVR

PR segment elevation with ST depression is diagnostic of

PERICARDITIS



Sinus tachycardia with ST elevation

Differential diagnosis Acute Coronary Syndrome; Inferior MI

Look at aVR again

ST elevation in aVR and V1

SEVERE LMCA

Necessitating immediate intervention



Differential diagnosis Ventricular tachycardia

Wide QRS complex tachycardia 135/min

Superior QRS axis

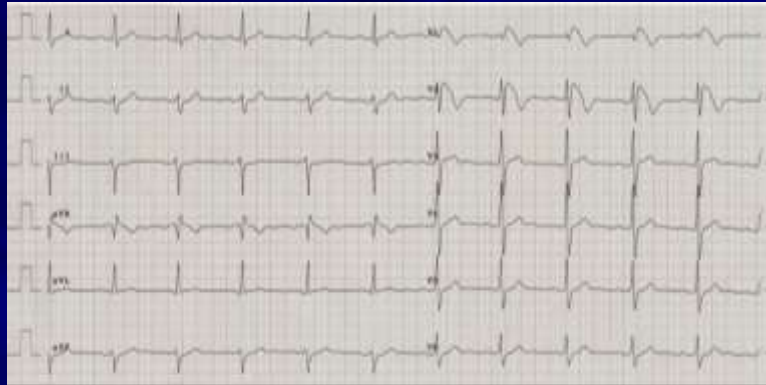
P wave not discerned

No clear separation of QRS from J point

Sine wave configuration

No distinct isoelectric baseline

The sine wave contour makes hyperkalemia more likely than VT. Management will change.



39 year-old male

Complaints of attacks of dizziness

Atypical RBBB

ST elevation in V1 and V2

Brugada syndrome

Nuclear Imaging

An example of limitations of a high technology test that is frequently and unnecessarily ordered

- **Expensive**
- **Accurate Nuclear Cardiology requires:**
 - **Applications in patients who have appropriate indications.**
 - **Well qualified and experienced personnel in all stages:**
 - **Acquisition**
 - **Processing**
 - **Interpretation**

Limitations of SPECT

Sensitivity and Specificity of SPECT for detecting CAD

Test	Sensitivity (%)	Specificity (%)
Exercise SPECT	87	73
Vasodilator SPECT	89	75

Limitations of SPECT

- **False positive and false negative results.**
- **SPECT myocardial imaging is subject to misleading by soft tissue attenuation artifacts in**
 1. **Obese people**
 2. **Women with large breasts**
 3. **Men with increased abdominal girth as in the Metabolic Syndrome.**
- **Patient specific attenuation correction can be utilized but at the expense of lowering the sensitivity**
- **SPECT images only show relative blood flow, not absolute flow, from the intensities of the regional radioactivity.**
- **It is possible to miss CAD if all three branches of the coronary arteries are occluded and reduce the flow to a similar extent**

Guidelines will never replace clinicians

Problems in Applying Randomized Clinical Trials to Routine Clinical Care

- 1- Highly selected non-representative patient populations**
- 2- Sponsor bias (few negative trials and excessive “hype” for positive trials)**
- 3- Out of date therapies or methodologies**
- 4- Class effects of drugs are assumed- few head-to-head comparisons**
- 5- Inadequate study duration to determine long-term effects**

Benefits of Proper Care by Proper Cardiovascular Specialist

- Proof of clinical competence then employing new information technology.**
- Higher patient satisfaction**
- Less morbidity**
- Lower mortality**
- Less cost**
 - Earlier diagnosis**
 - More effective use of new technologies and therapy**

كلمات مأثورة تاريخية

Historical Enduring statements which I like

Prof. Mohamed Ibrahim

To be a successful leader, don't focus on your personal interests

Prof. Ali Sorour

A responsible senior must help his juniors to learn and progress

Prof. AbdelAziz ElSherif

Was accustomed to teach in the outpatient clinic and always said
"....we must evaluate clinically before the patient is admitted for investigations

Prof. Khalid Sorour

El-Said trainees never miss coarctation or PVD because he trained us to start examination by feeling the dorsalis pedis pulse

Prof Aziz Madkour

The easiest echo to do is the one referred from El-Said because a diagnosis is suggested

Example 4 A true funny case

The fatal fault: Missing the monster !

ER:

- 11 year-old girl in an Arabic country came with fever and deterioration of consciousness
- Doctor advised the family to take the girl home because there is no significant problem
- The doctor was advised by the nurse to admit the girl to the hospital
- Young girl admitted to room, not examined waiting for investigations.
- Following day:
 - Girl found dead in bed
 - On removing her clothes a large scorpion emerged !
 - The doctor who told me the story was very happy because he listened to the nurse. If the girl had died at home, he would have been in jail according to the laws of that country!

To conclude

- Post-graduate training must go in proper sequence; general medicine → clinical cardiology → investigative cardiology → specialize in addition to clinical cardiology in one high technology field only after mastering it.
- In USA the country of Vemto second and Nano Medicine no one can take the board of interventional cardiology before the board of internal medicine and the board of cardiology .
- Learn and never ignore proper meticulous clinical evaluation including plain X-ray and ECG
- Establish a friendly bond between you and your seniors, colleagues, juniors and especially your patients
- New technologies can mislead the clinician and the patient if not used in the proper way.
- Learn and work in a high technology field but only after proper training and use it in the context of proper clinical judgment

THANK YOU