Cardiac Auscultation Revisited

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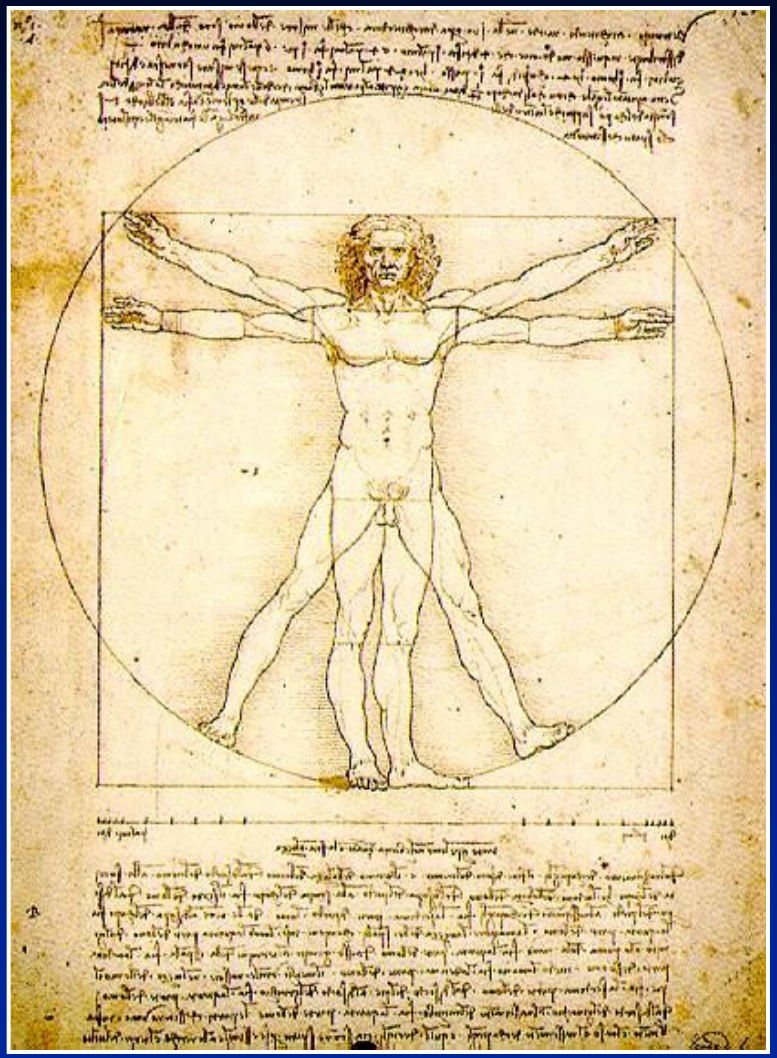
Philadelphia - Pennsylvania

BEDSIDE DIAGNOSIS

- Inspection
- Palpation
- Percussion (1761)*
- Auscultation (1819)**
- Contemplation…

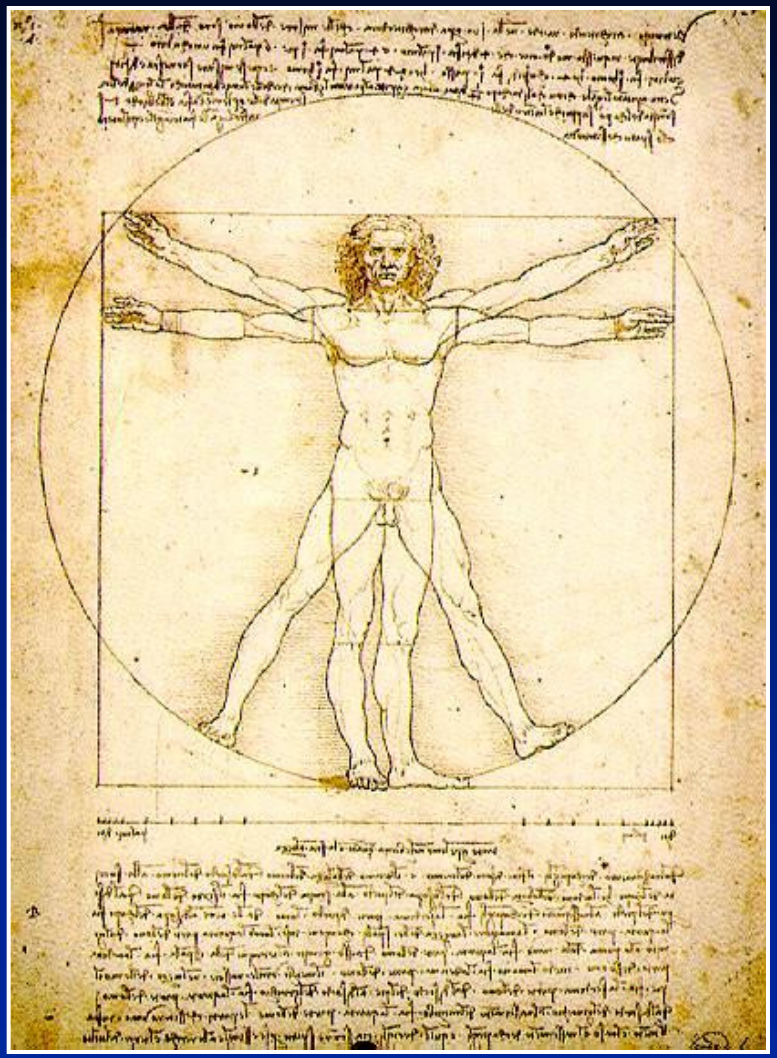


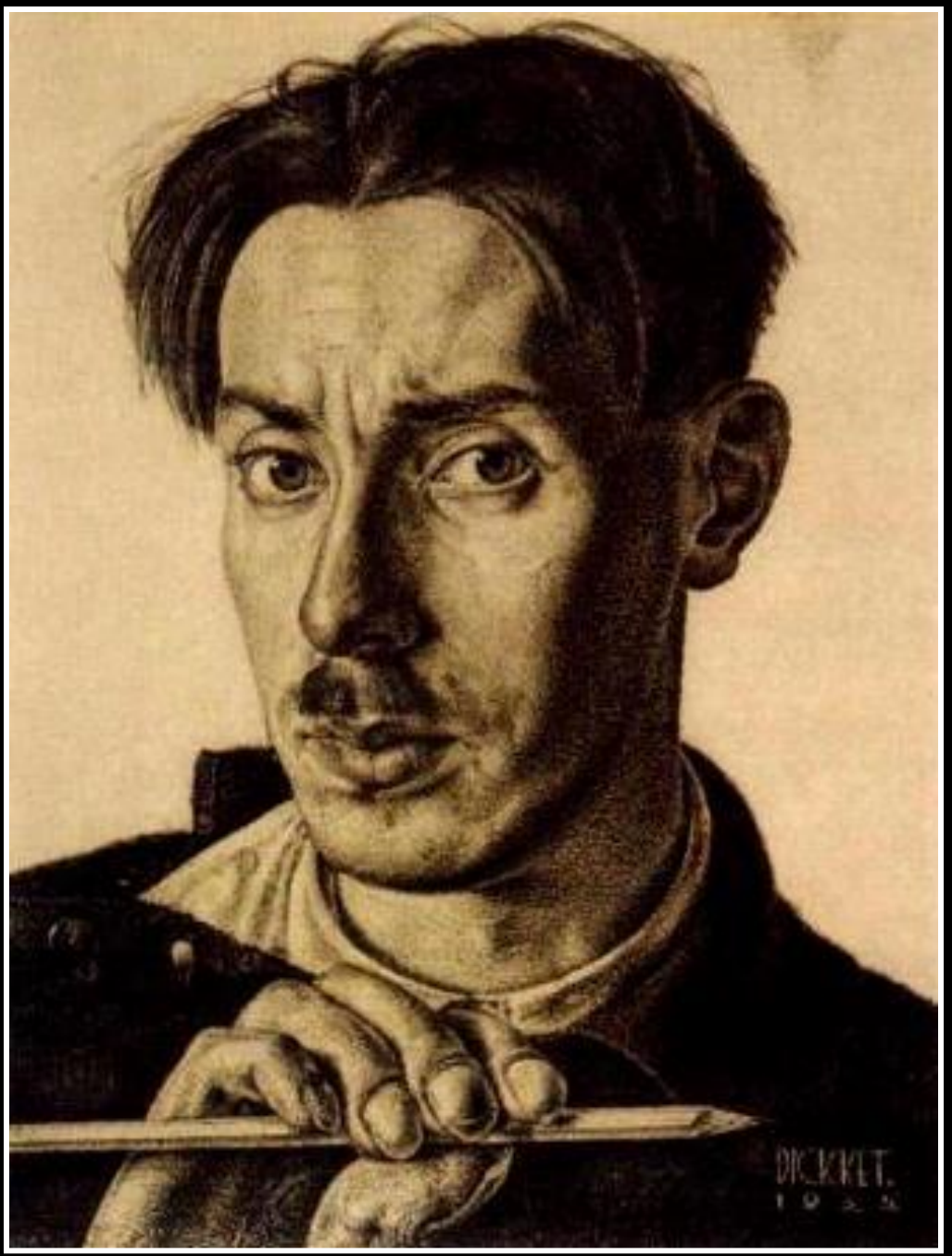
* Auenbrugger, *Inventum Novum*

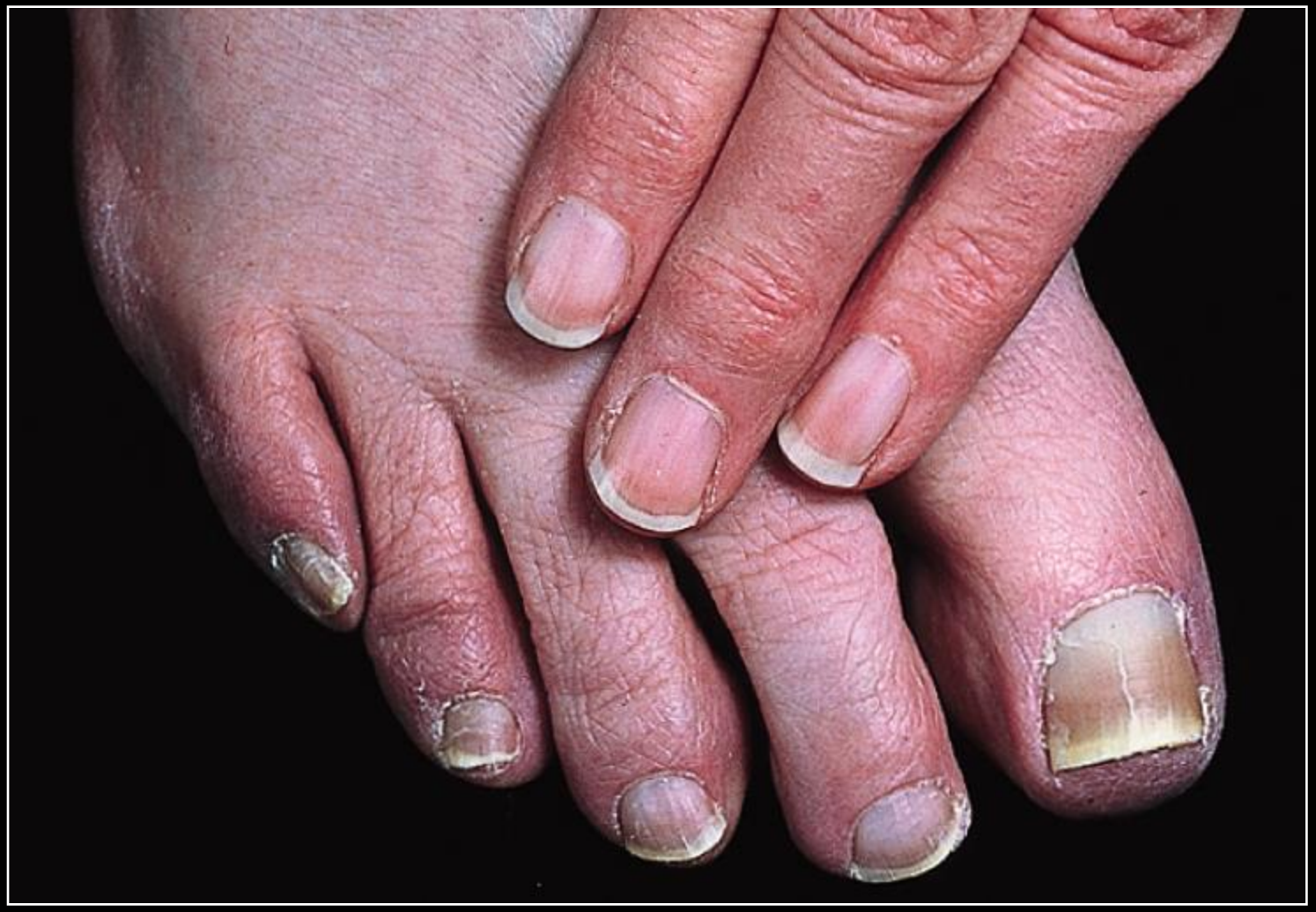
** Laennec, *De l'Auscultation Médiate*

CARDIAC DIAGNOSIS

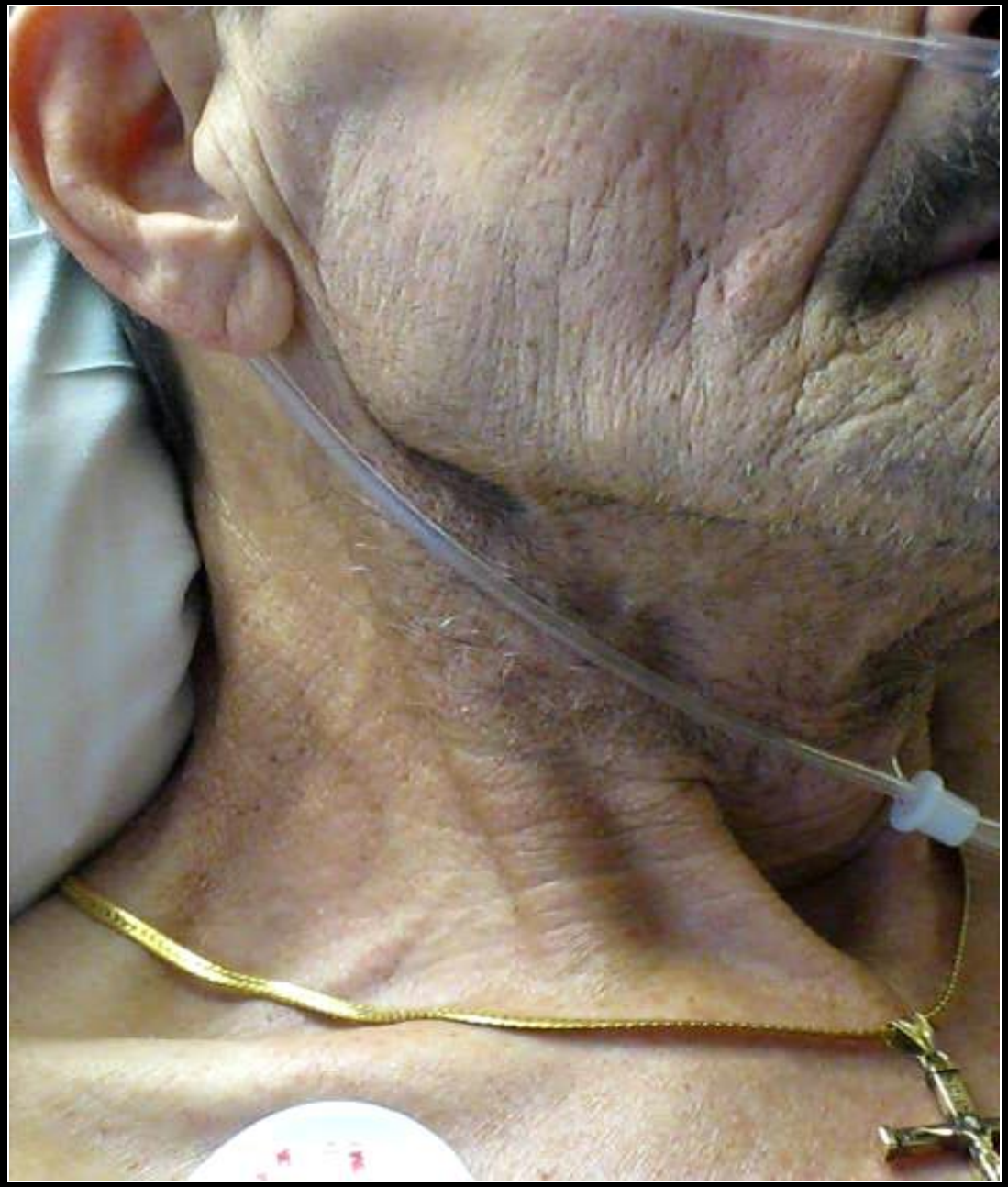
- General Look
- Feeding Pipe
- Exit Pipe
- PMI
- Auscultation…



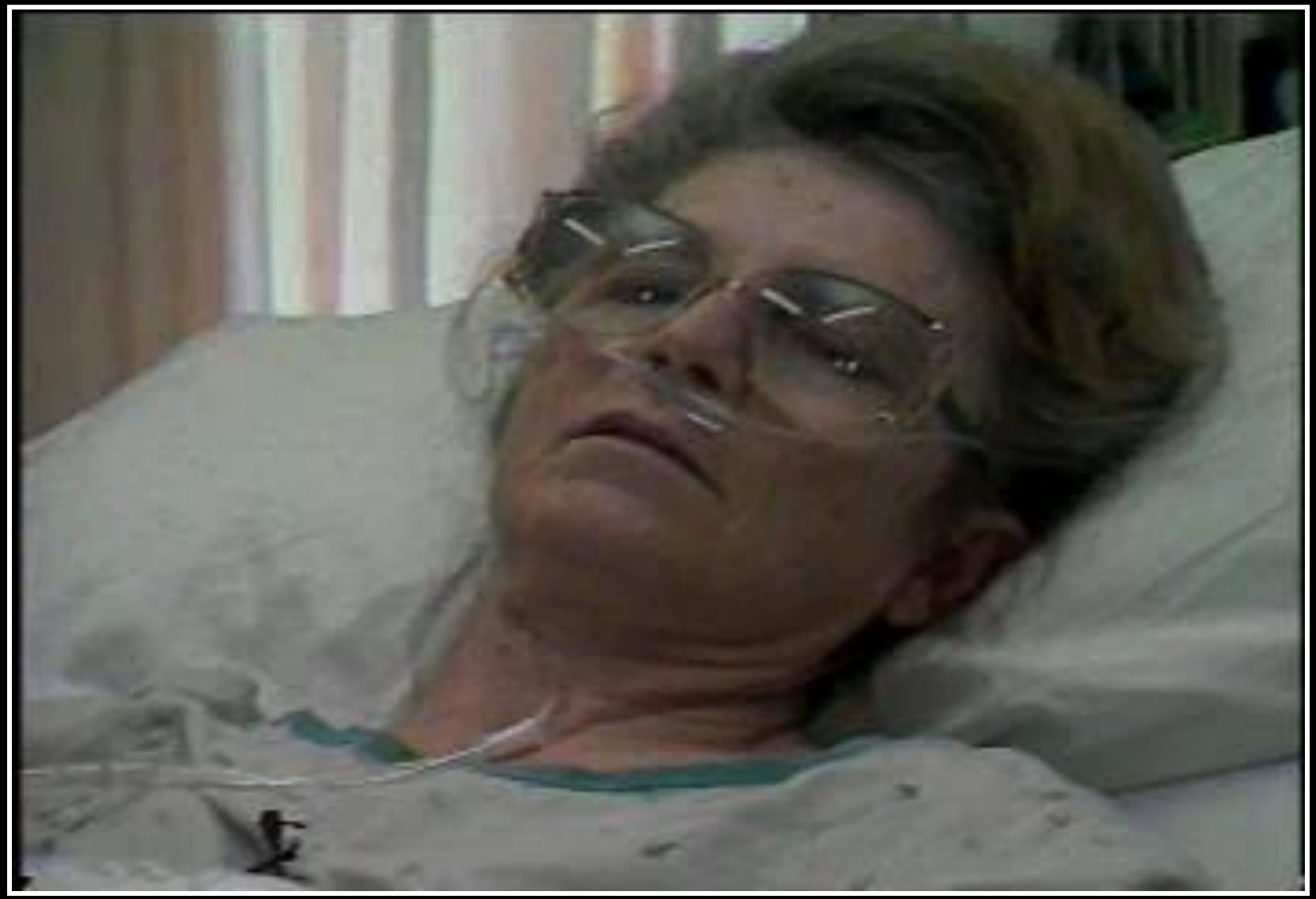




Differential Cyanosis and Clubbing



(1654-1720)

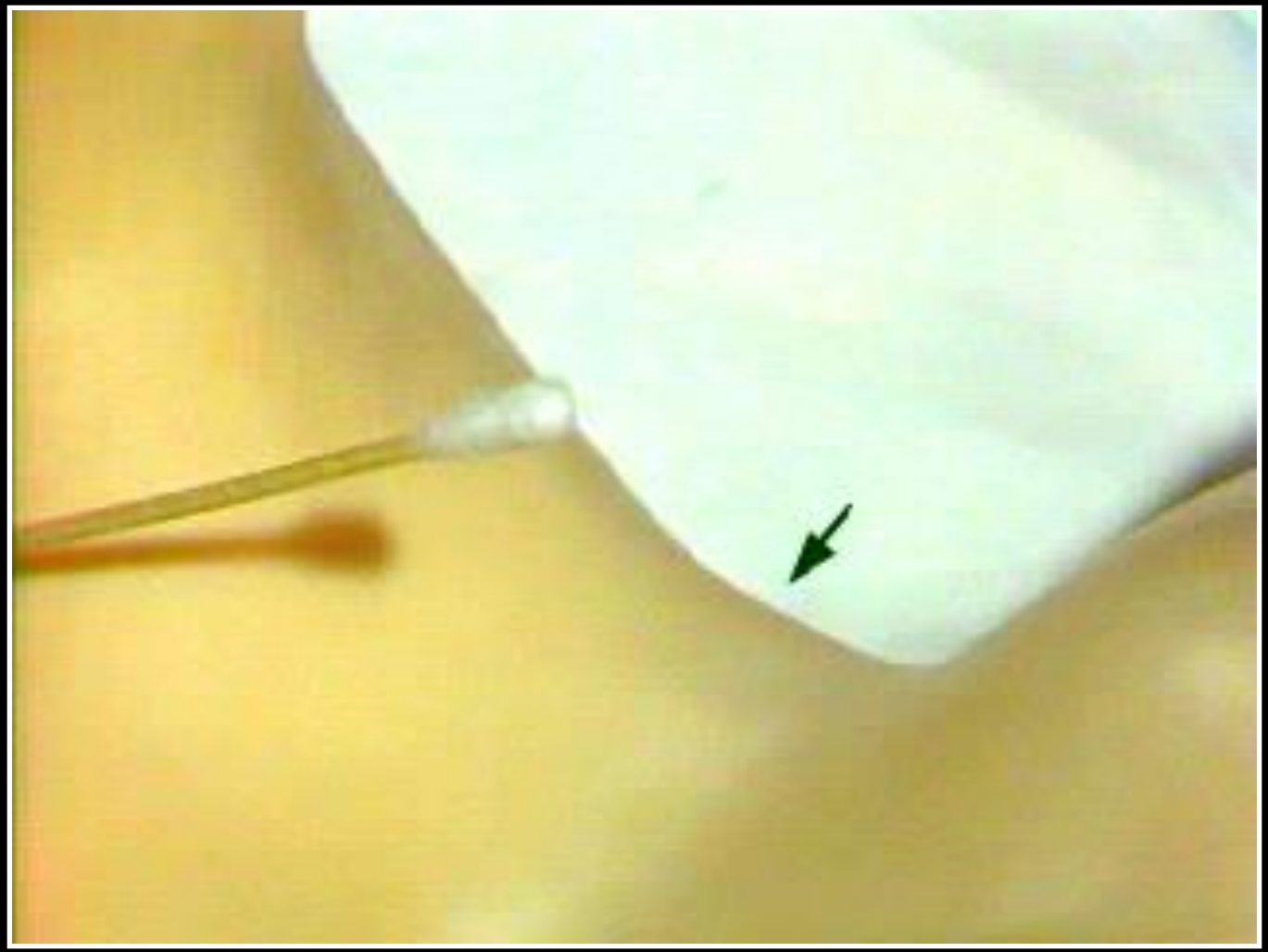


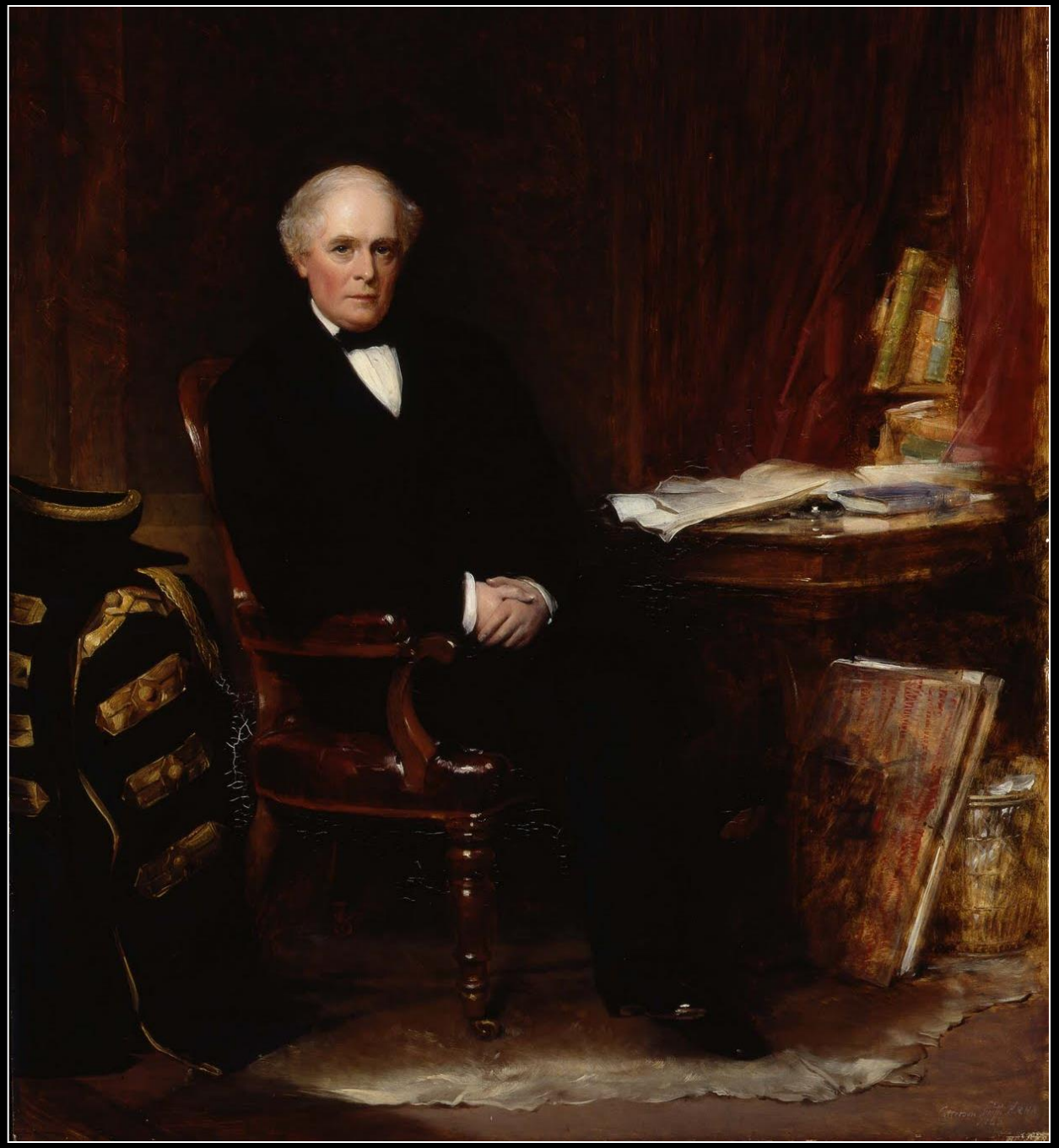

Lebedinskie Ludwig van Beethoven,

CASE 1

A 44-year body-builder of Austrian descent, later recycled as a semi successful action hero, presents to your office complaining of a throbbing headache. He blames it on his obsession to become one day governor of a large American state.

- His blood pressure is 160/50 mmHg
- Examination of the central arterial pulse reveals the following:

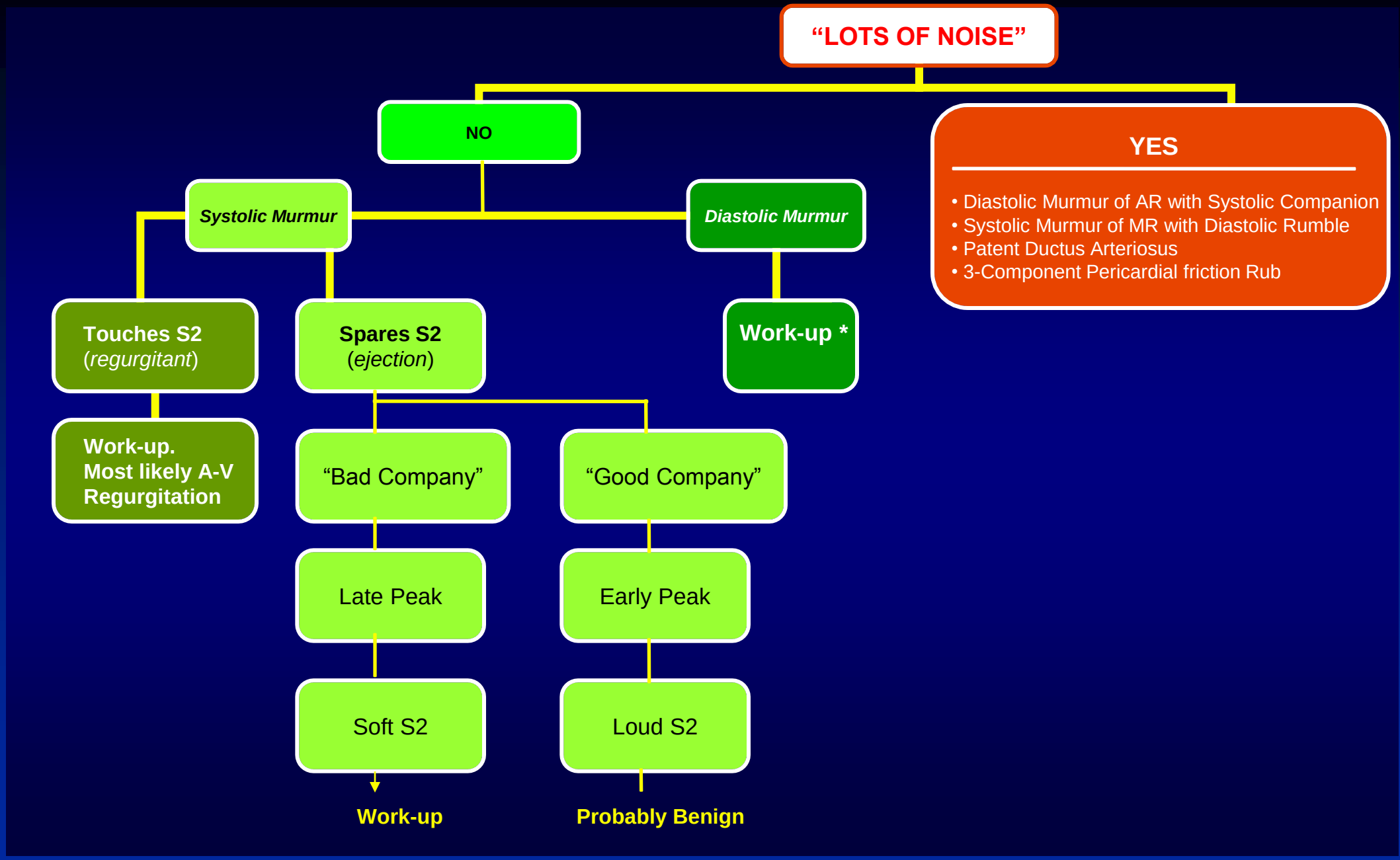




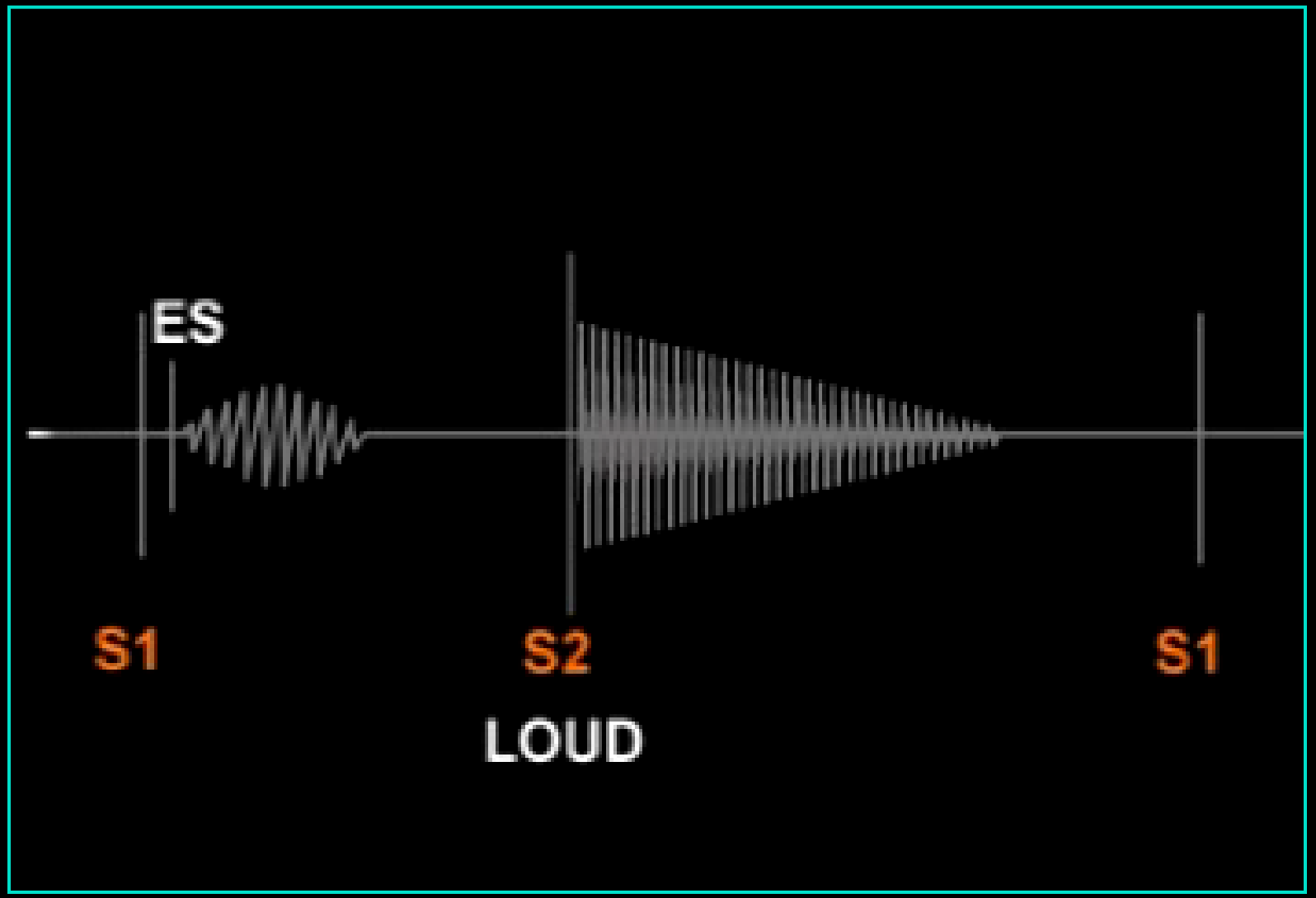
Dominic Corrigan

CASE 1 (cont)

Auscultation at the precordium reveals the following:



* There are no benign diastolic murmurs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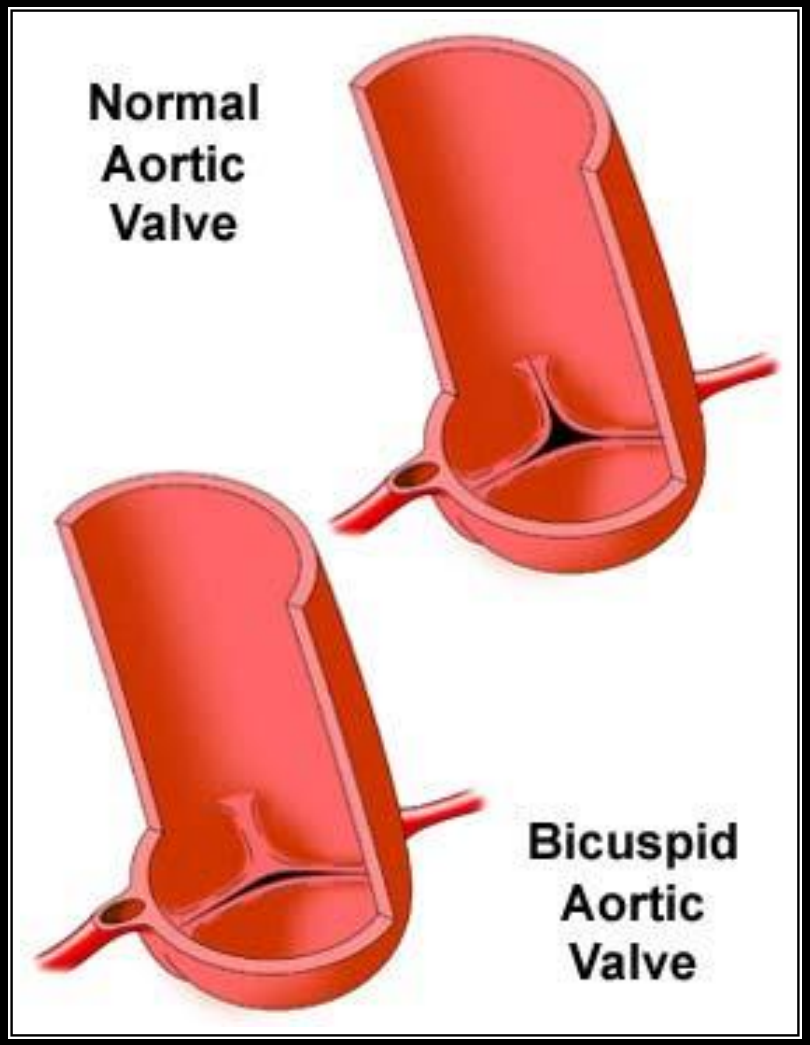
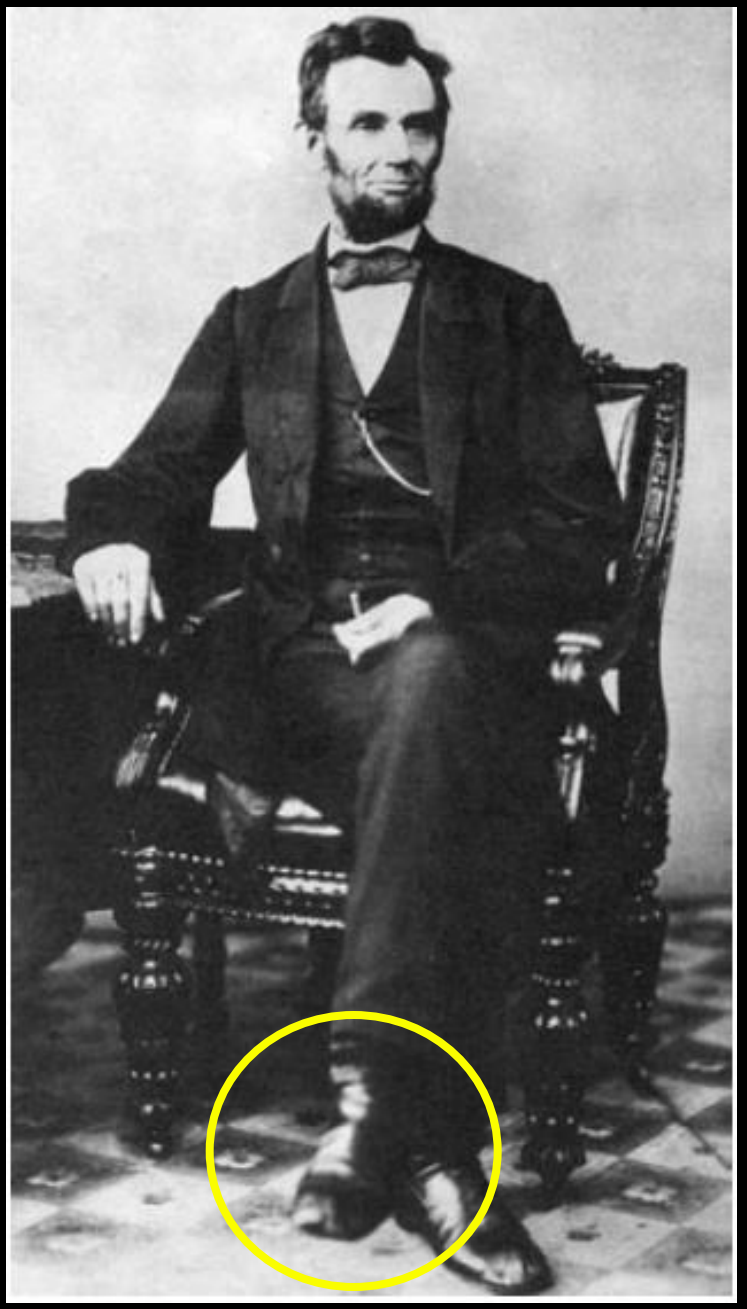
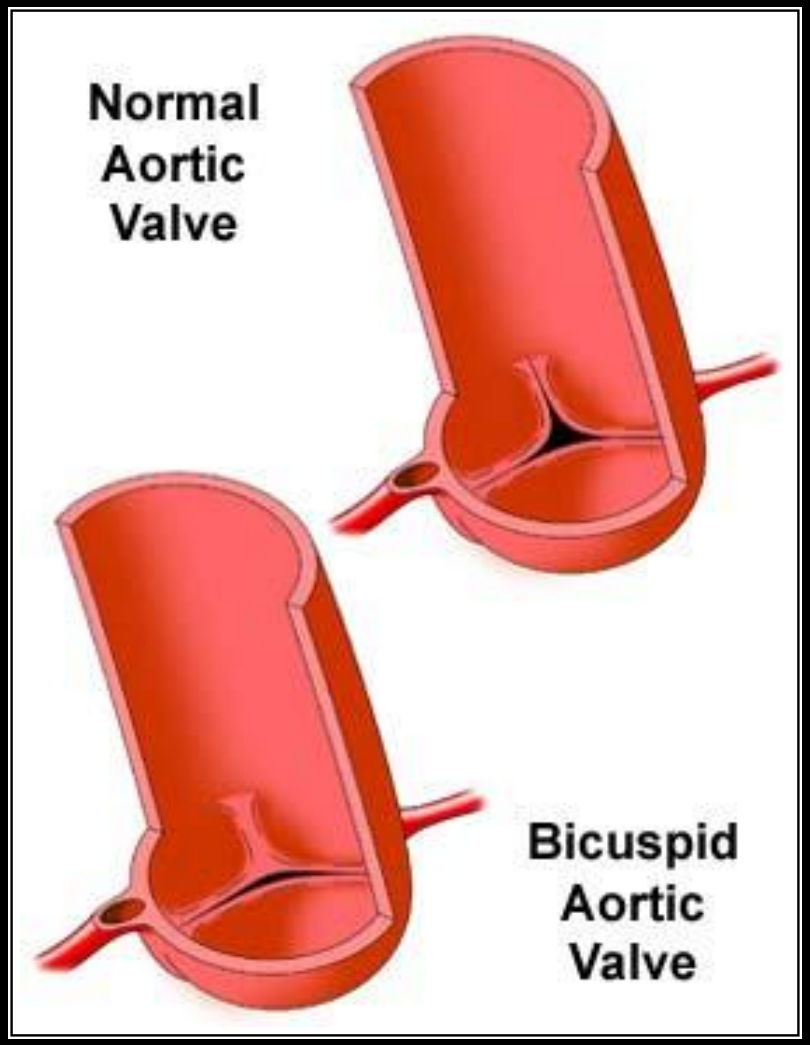
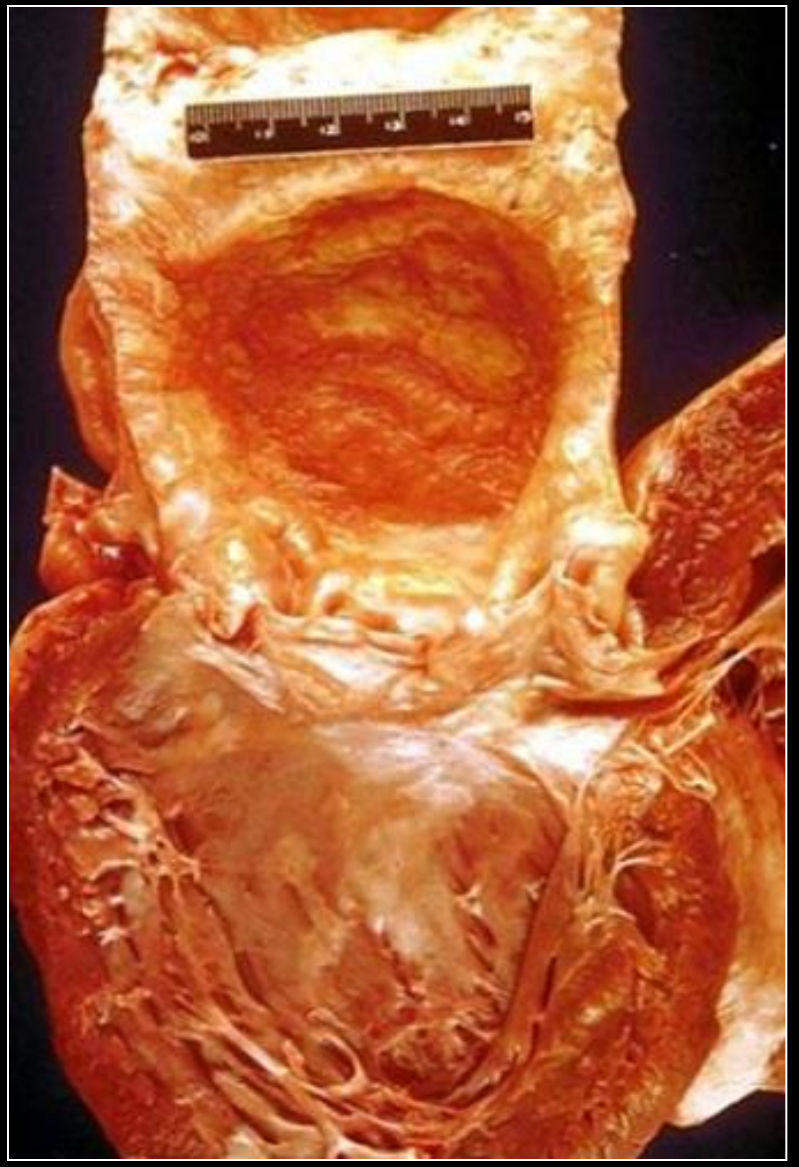
S1
S2
S1
LOUD

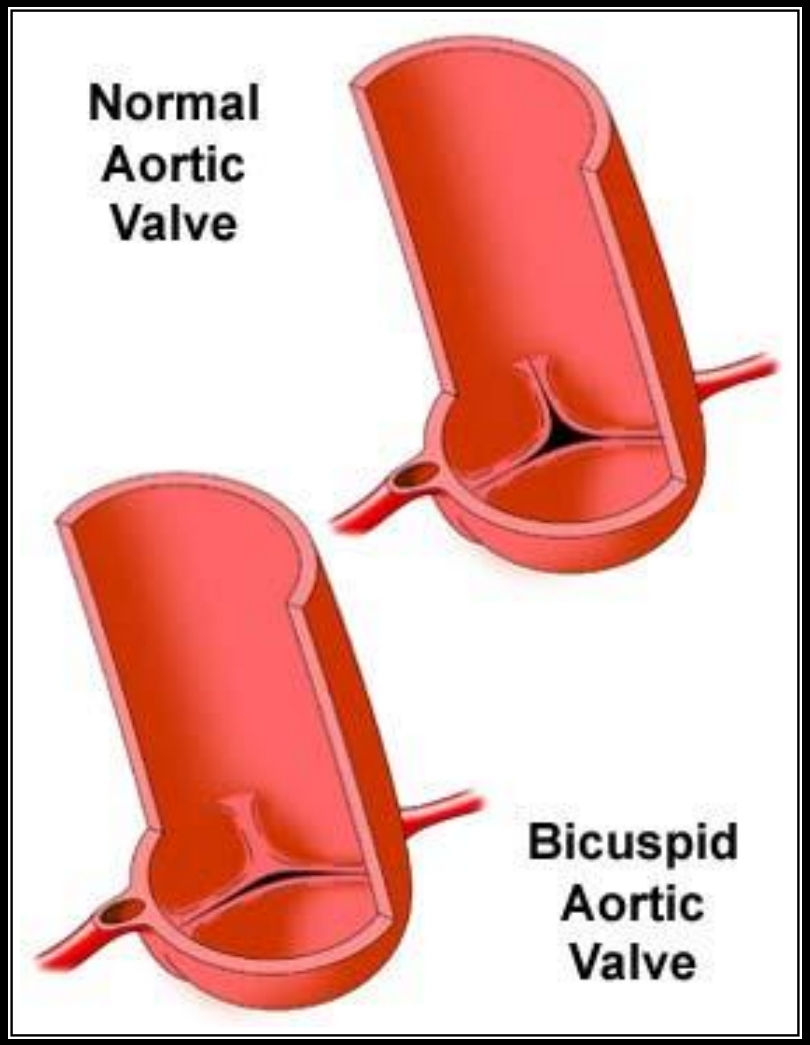




Alexander Gardner (Nov 8, 1863)


Normal
Aortic
Valve
Bicuspid
Aortic
Valve



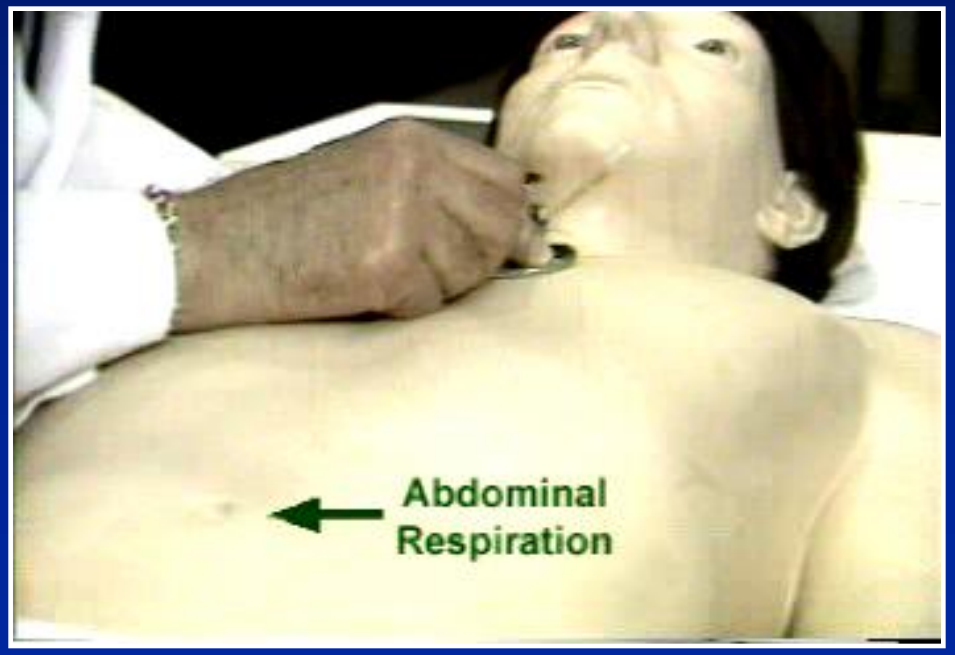

Normal
Aortic
Valve
Bicuspid
Aortic
Valve


ELCOME
HIP DAY
NY
083

CASE 2

A 24-year old medical student presents to you complaining of sharp and excruciating chest pain, worsened by swallowing and exhalation, and gradually developing after an upper respiratory tract infection.

Auscultation at the precordium reveals the following:

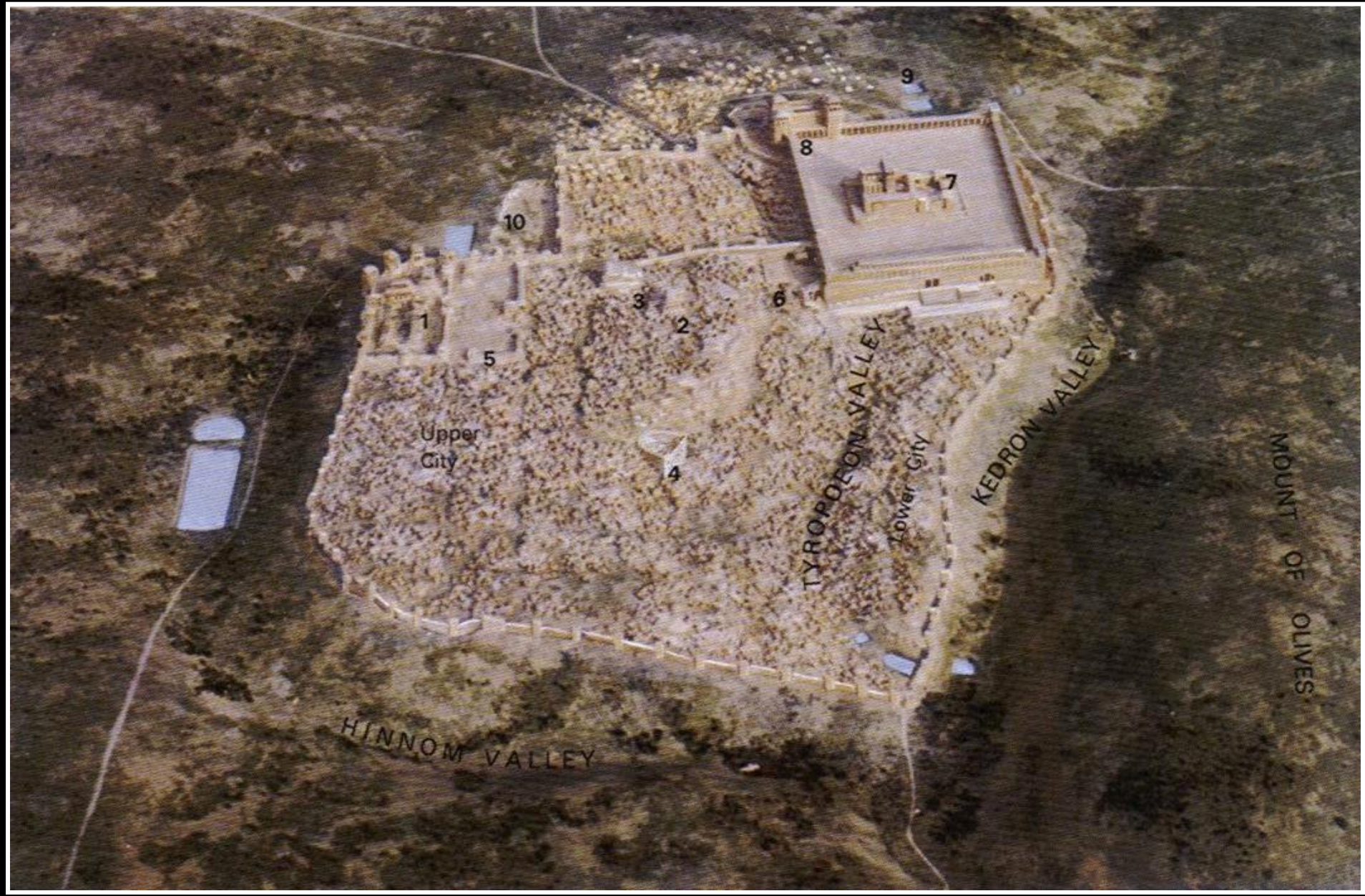


CASE 2 (cont.)

You also notice that the patient is both tachypneic and tachycardic, that her neck veins are distended, and the lungs are remarkably clear. You perform a *pulsus paradoxus* maneuver which yields a value of 22 mm Hg.

The most likely diagnosis is:

1. Constrictive pericarditis
2. Tension pneumothorax
3. Right ventricular infarction
4. Tamponade
5. Massive pulmonary embolism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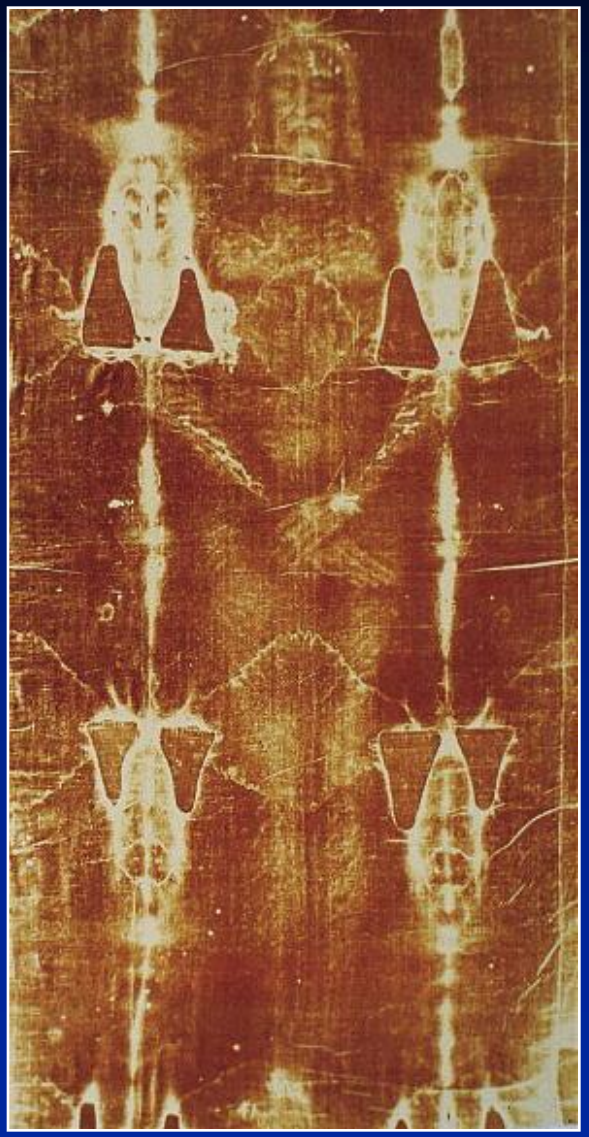
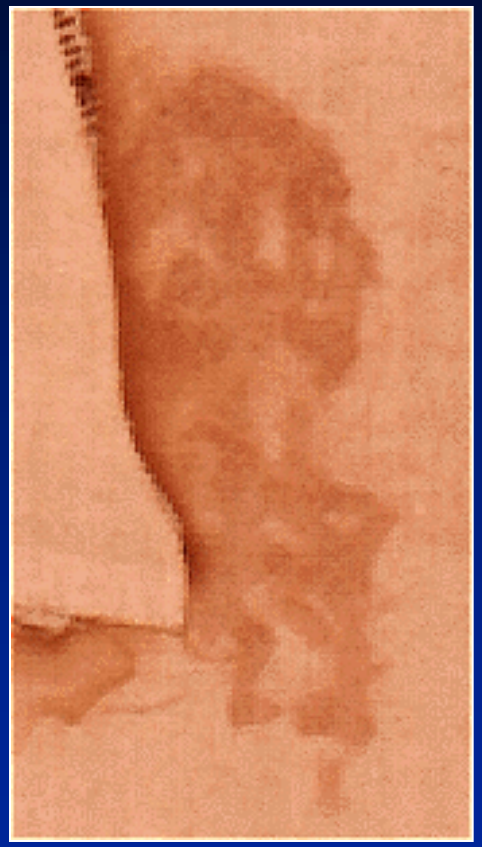
7
10
3
6
1
2
5
Upper City
4
TYROPOEON VALLEY
Lower City
KEDRON VALLEY
MOUNT OF OLIVES
HINNOM VALLEY

VERY IMPORTANT CASE

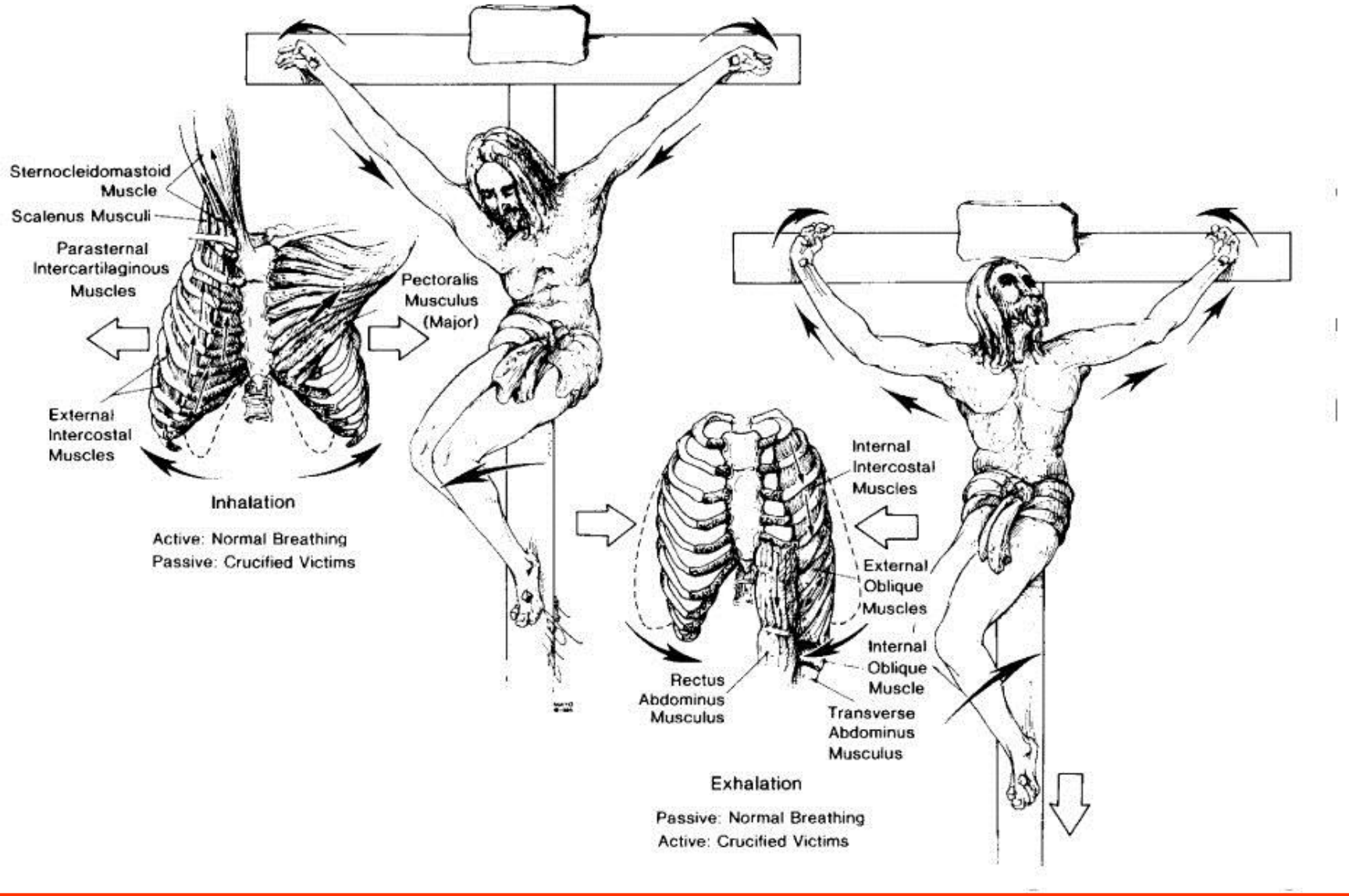
- It is April 7, 30 AD
- You are outside Damascus Gate in Jerusalem, watching three men being executed by an occupying imperial power.
- The execution has started at 9 AM, and has now been going on for close to six hours.
- One man suddenly cries a loud shout, and then expires.
- Two hours later one of the soldiers spears him on the side, and blood and water spring out.



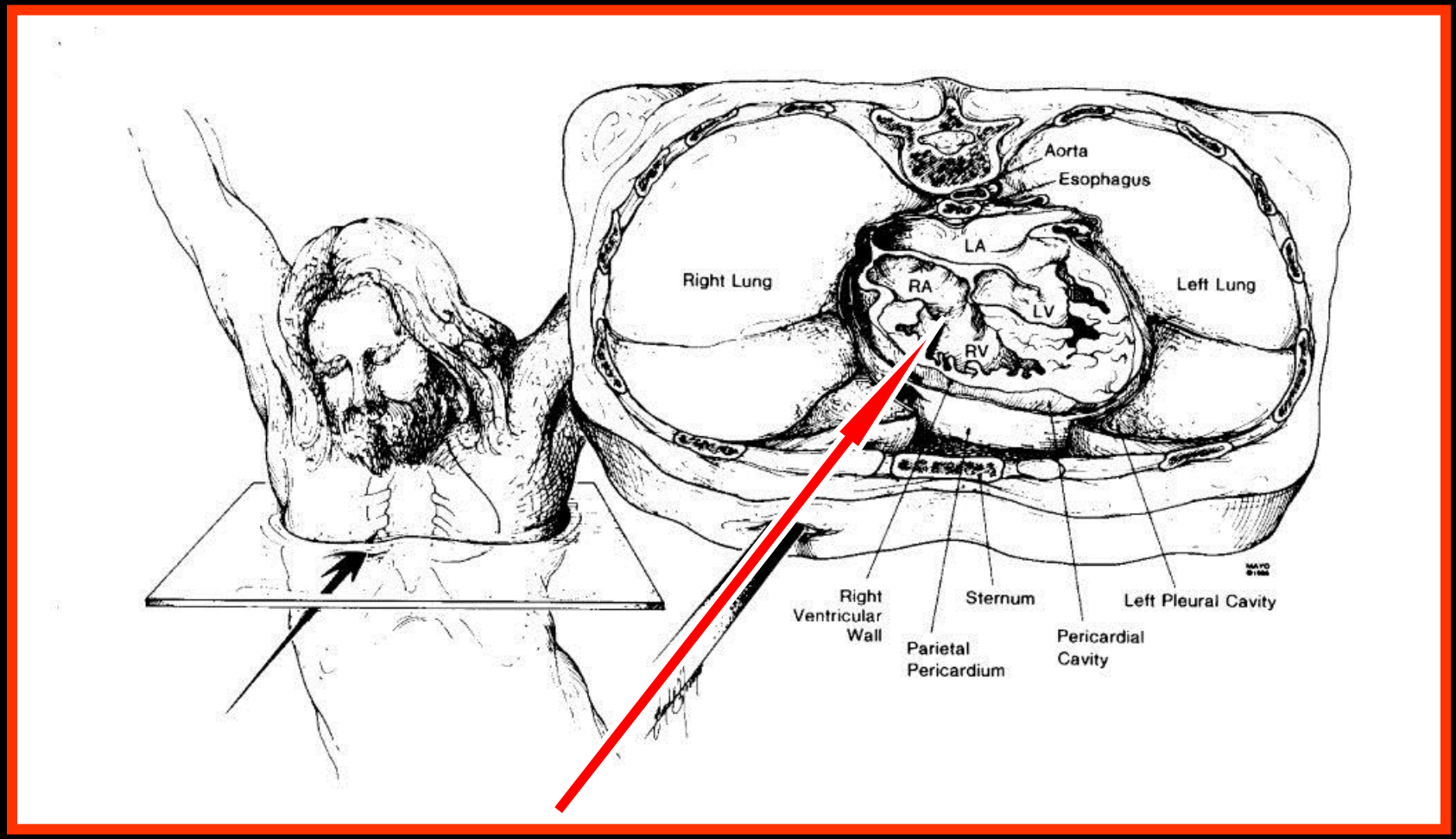
THE DNA OF GOD



- The bloodstains on the cloth are not artist's pigment but real blood.
- The densest stain is on the right side of the frontal chest, often referred to as the "side" or "spear" wound.
- Working independently, two different groups have identified the blood as AB, rare in Europe but common in the Middle-East. DNA testing has revealed a human *male* pattern (+ small amounts of female contamination from restoration work)
- Further analysis demonstrated high levels of bilirubin, consistent with hemolysis from severe concussive beating (→bright color)
- Albumin is present in the serum halo.



Impairment Of Normal Respiration
Hypoxia Secondary to Neuromuscular failure and Pulmonary Edema



"…So the soldiers came and broke the legs of the first and of the other who had been crucified with Him, but when they came to Jesus and saw that He was already dead, they did not break his legs, but one of the soldiers pierced his side with a spear and at once there came out blood and water."

(John 19:32-34)

CASE 4

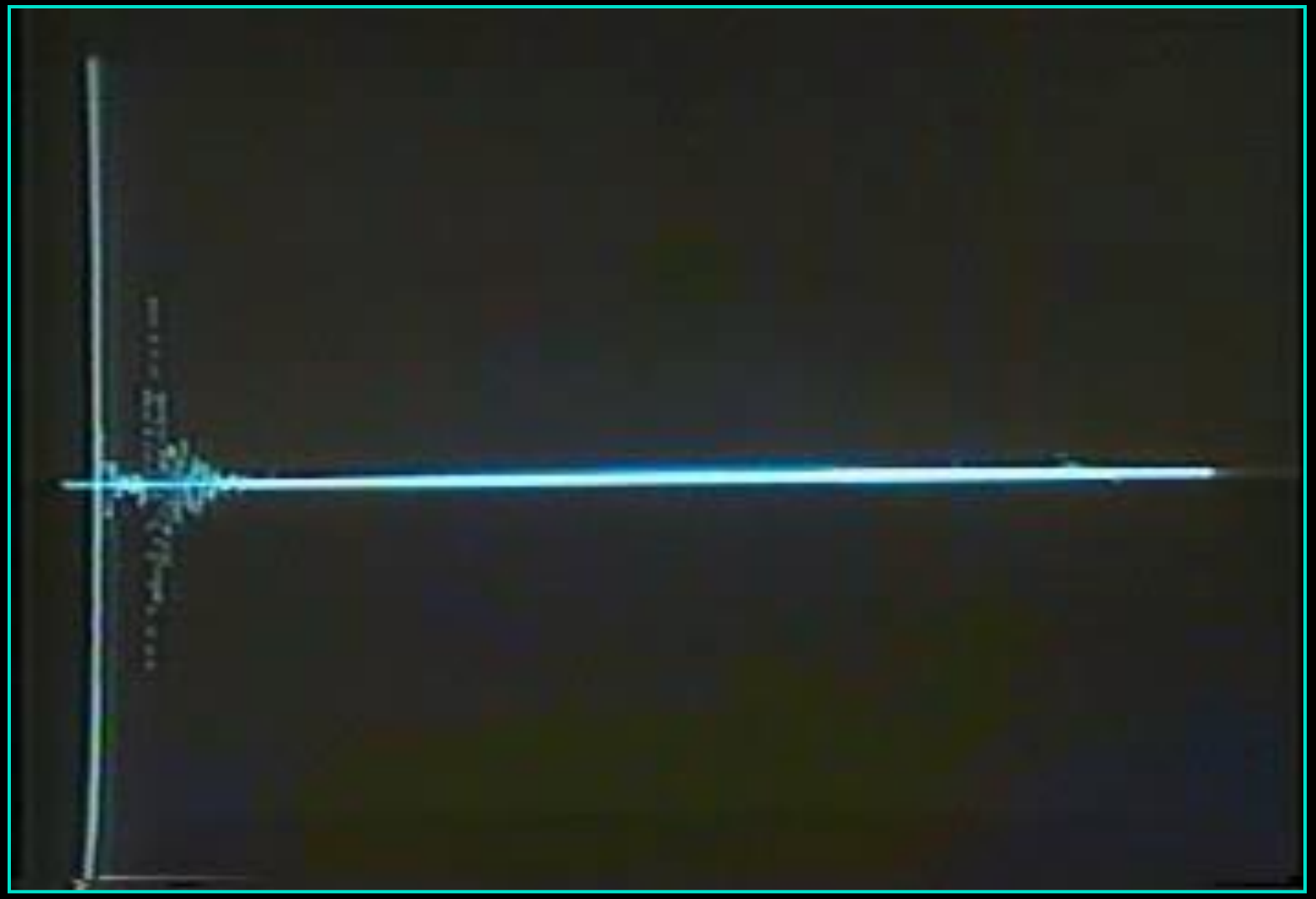
A 58-year old patient is admitted to your hospital because of progressive dyspnea and a “congested chest-x-ray”. He is given a presumptive diagnosis of pneumonia and placed in isolation. The admitting resident thinks she heard a murmur of aortic regurgitation, and the following morning asks you to examine the patient.

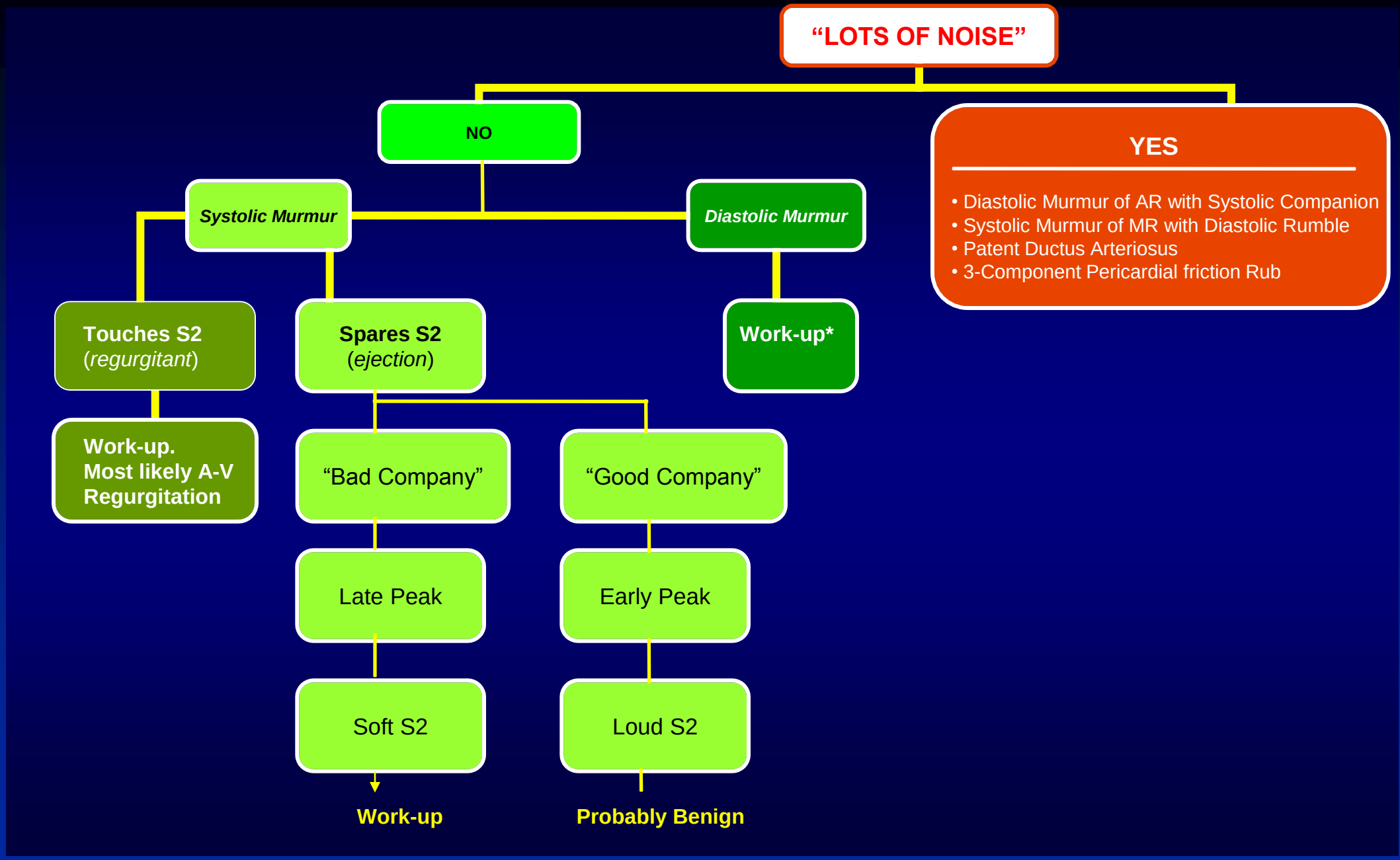
Over the pulmonic area you hear the following:

CASE 5

A 75-year old award-winning actor presents to your office complaining of increasing and debilitating shortness of breath.

Examination at the apex reveals the following:





* There are no benign diastolic murmurs

MITRAL REGURGITATION (MR)

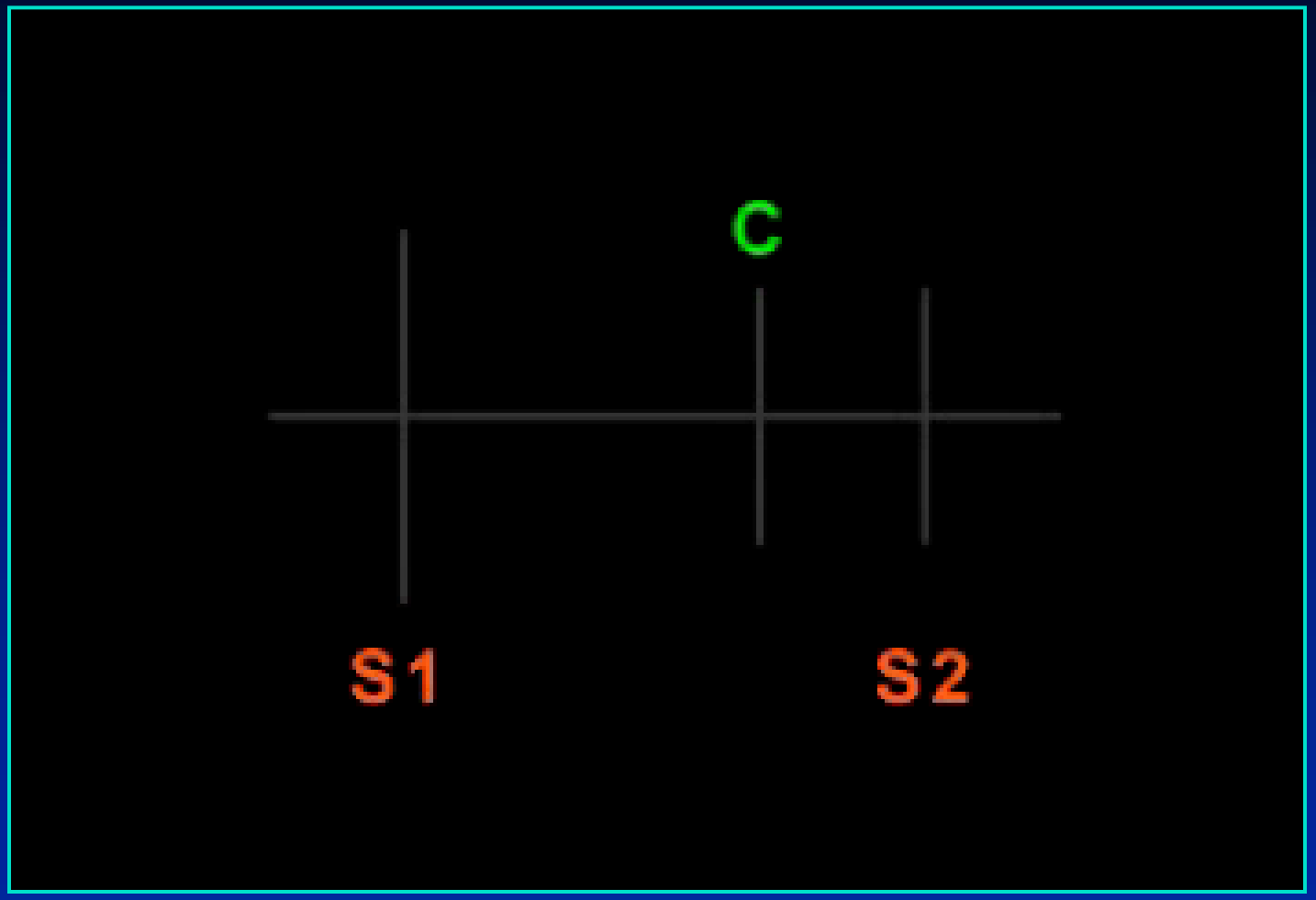
- 25-50% of patients with mitral regurgitation lack the murmur
- Presence of a murmur argues for moderate-to-severe MR
- Intensity of the murmur argues for severity, but only in rheumatic disease, not in ischemic or “functional’ mitral regurgitation (i.e due to dilatation of the valvular ring from cardiomyopathy)
- S3/early-diastolic rumble is present in 90% of cases with *severe* regurgitation

CASE 5 (Cont.)

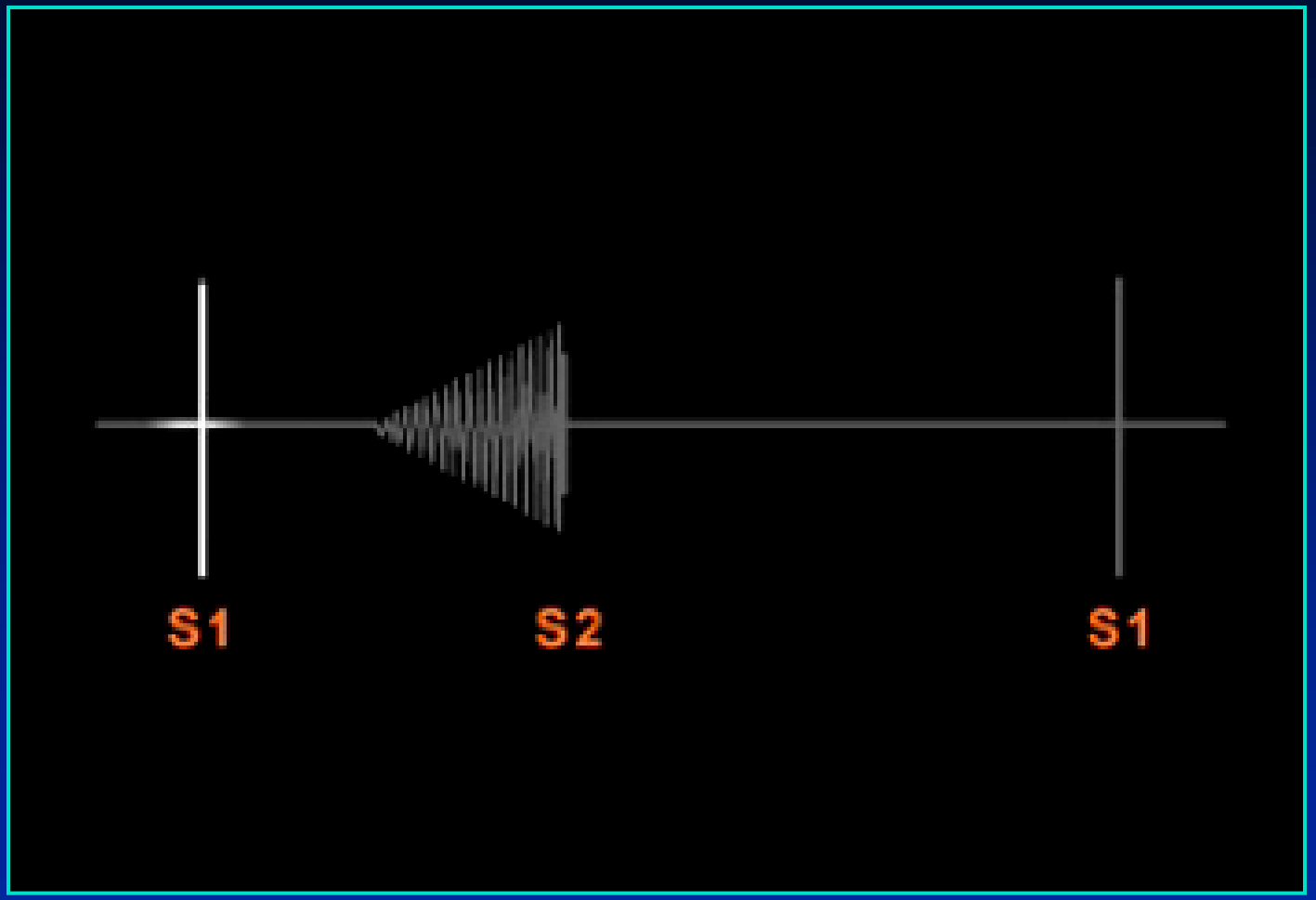
A 24-year old medical student presents to your office complaining of atypical chest pain prior to an important exam. Pain is fleeting, sharp, non-radiating and associated with neither dyspnea nor diaphoresis.

She has an entirely normal arterial, venous and precordial exam. Auscultation at the apex reveals the following:

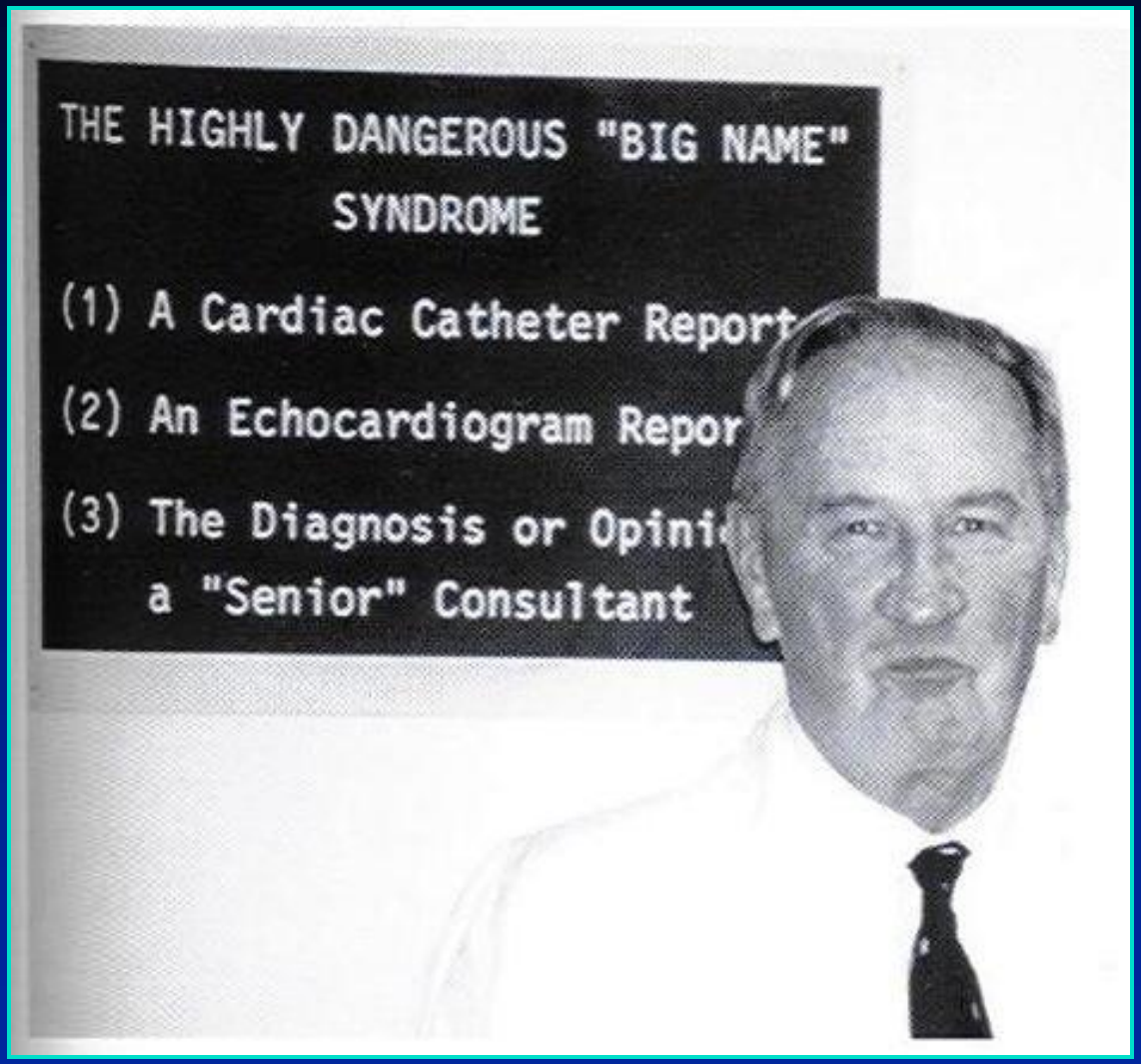
APICAL AREA

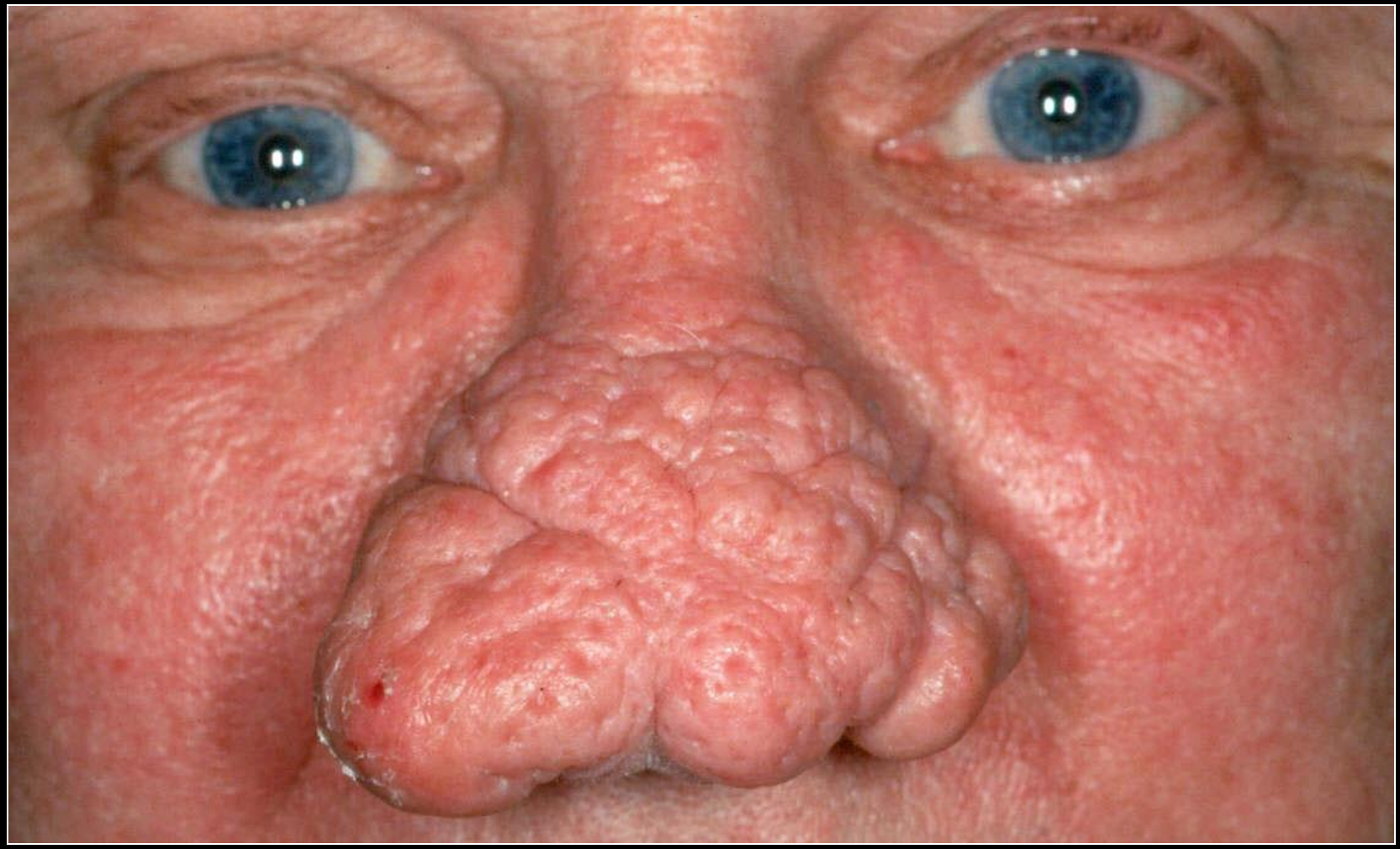


APICAL AREA

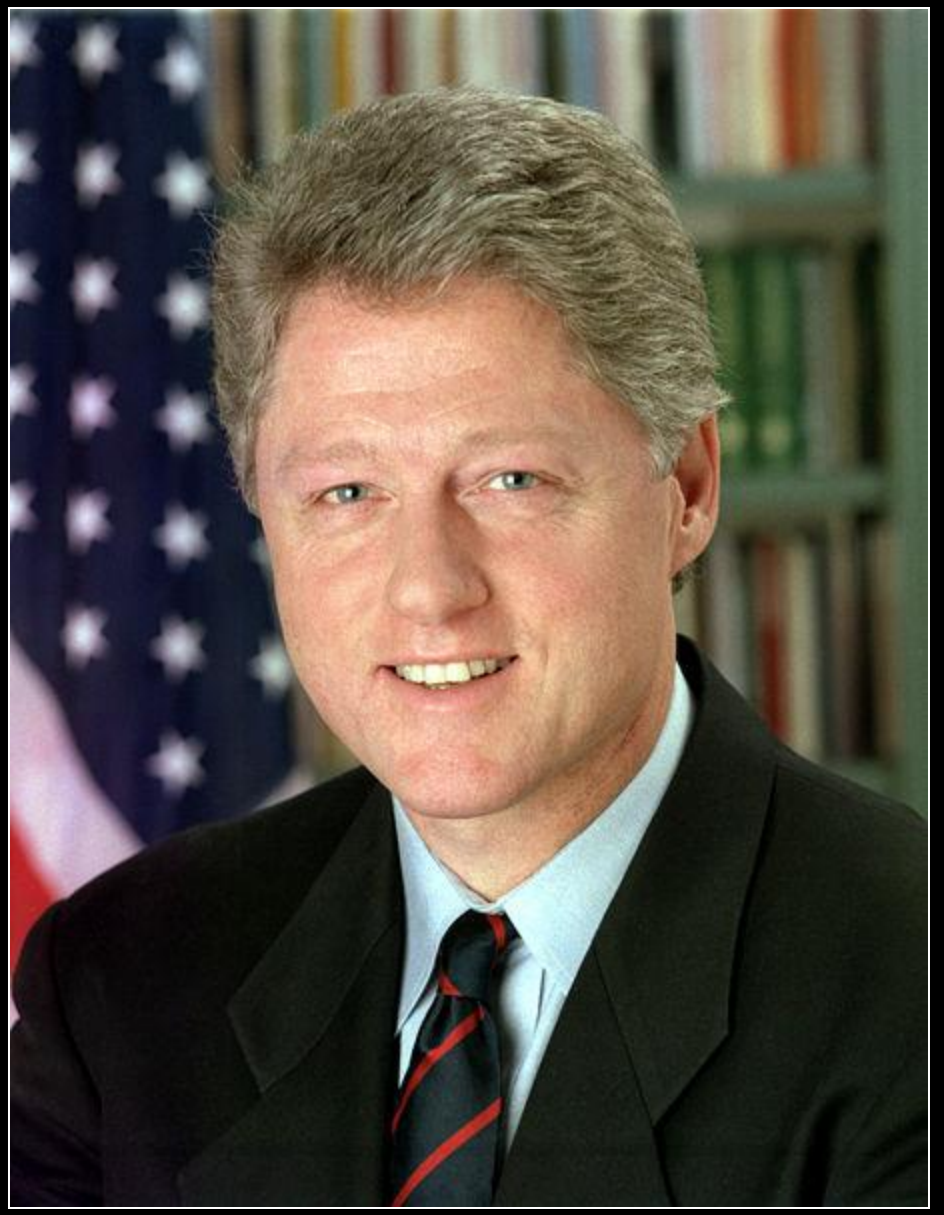


MITRAL VALVE PROLAPSE





J.P. Morgan



…At this third lie, his nose grew so extraordinarily long that poor Pinocchio could no longer run around. The Fairy looked at him and laughed.

“Why are you laughing?” the puppet asked her, quite embarrassed and worried about that nose of his that was growing before his very eyes.

“I’m laughing at the lie you told.”

“How do you know that I’ve told a lie?”

“Lies, my dear boy, are quickly discovered, because they are of two kinds. There are lies with short legs, and lies with long noses. Yours is clearly of the long-nosed variety”

(Carlo Collodi – The adventures of Pinocchio)

THE PINOCCHIO EFFECT

- The nose (and the penis) contain abundant vascular erectile tissue.
- Whenever a person lies, the nasal vessels involuntarily dilate, and by engorging with blood make the nose redder, *larger*, and pruriginous.
- These changes can then cause a telltale itch that eventually prompts liers to unconsciously touch their nose.
- Alan Hirsch, director of the Chicago-based and Rush-affiliated *Smell and Taste Research Foundation*, has gathered 23 giveaway signs (both verbal and nonverbal) of “mendacious speech”, and recently used them to analyze Bill Clinton's famous 1998 grand-jury testimony on the Monica Levinsky affair*.
- Although Clinton did 20/23 signs of lying, whenever he was being particularly untruthful (or "legally accurate"), he typically (and frequently) touched his nose.
- Hirsch’s observation was then extended to O.J. Simpson, who too, when describing Nicole’s murder, touched his nose quite frequently.

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* Hirsch A, Wolf. Practical methods for detecting mendacity; a case. *J Am Acad Psychiatry Law*. 29: 43844, 2001

“…He that has eyes to see and ears to hear will soon realize that no human being can keep a secret.

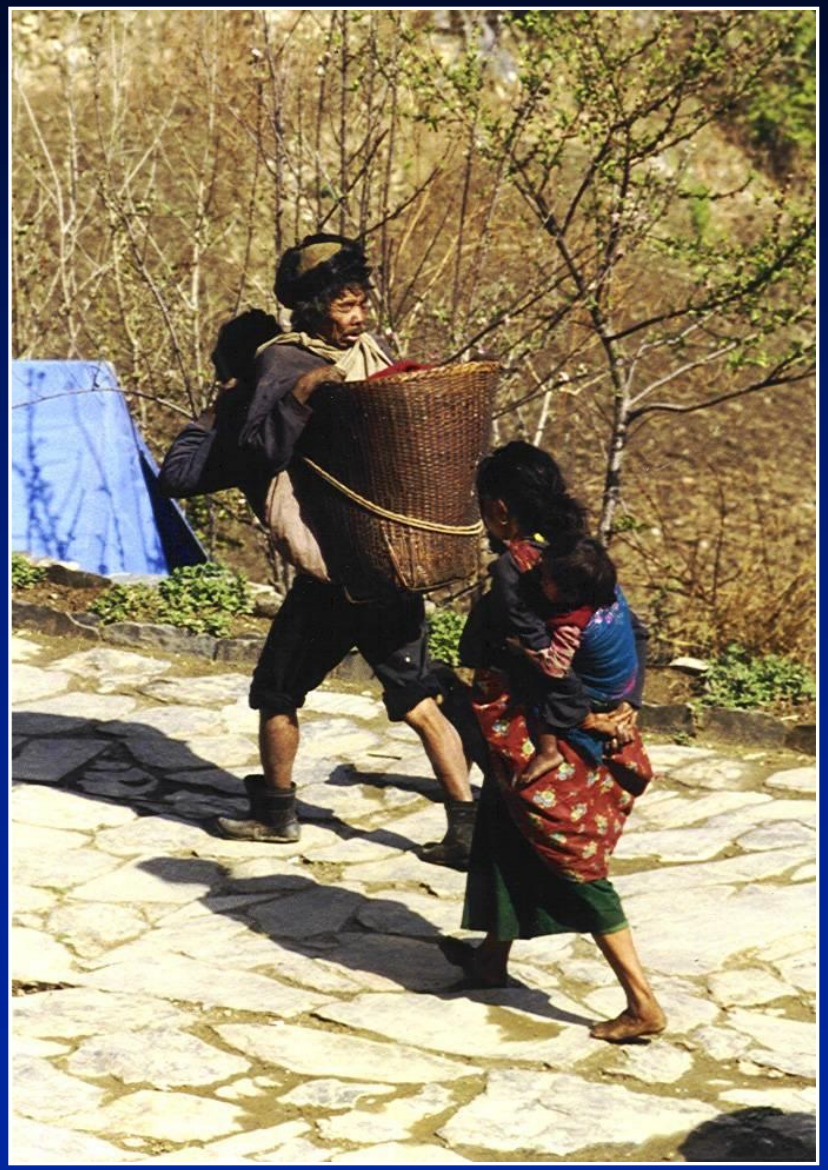
That’s because if his lips are silent, he still chatters with his fingertips, so that betrayal oozes out of him at every pore.”

(Sigmund Freud – Fragment of an Analysis of a Case of Hysteria, 1903)

“You can observe a lot by watching”

(Yogi Berra)

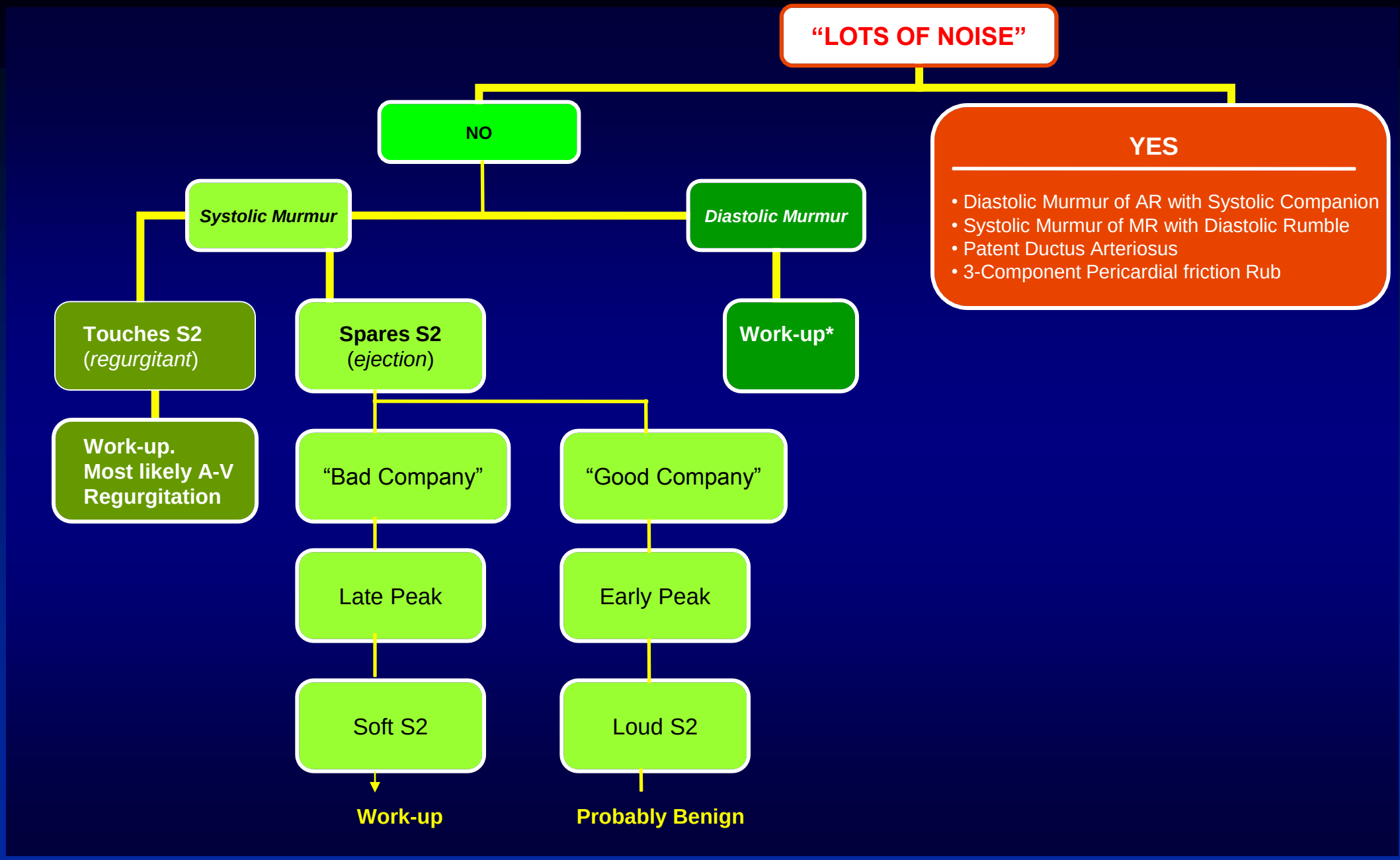
CASE 6



A 62-year old villager is brought by basket to your clinic in the mountains of Nepal.

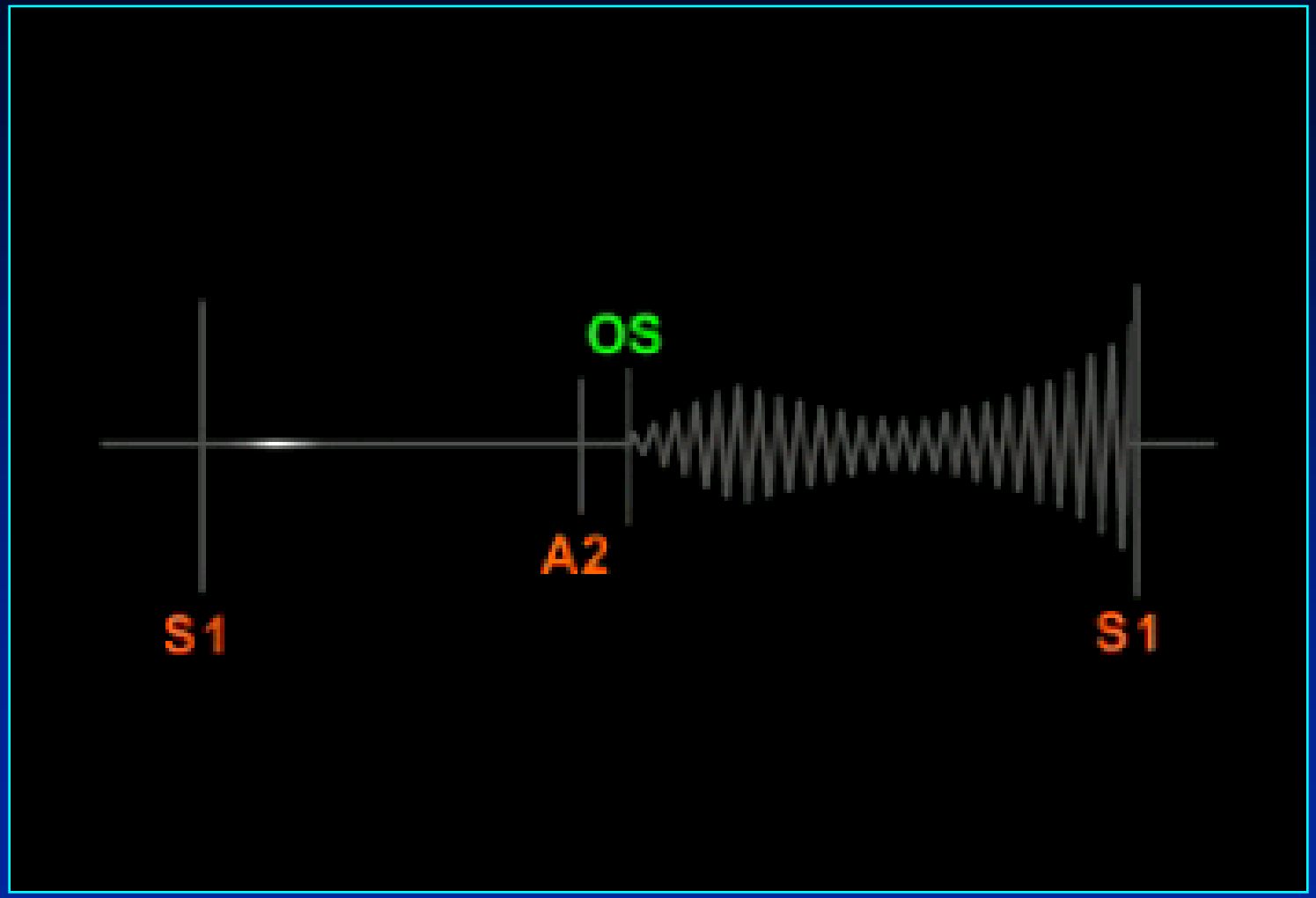
Thanks to a friendly translator you understand he has been having increasing and debilitating shortness of breath.

Examination at the apex reveals the following:



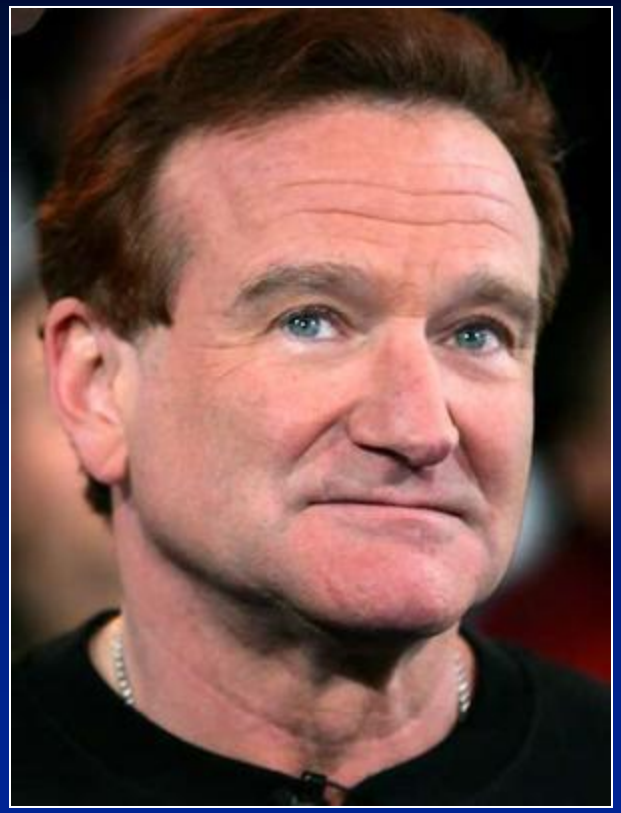
* There are no benign diastolic murmurs

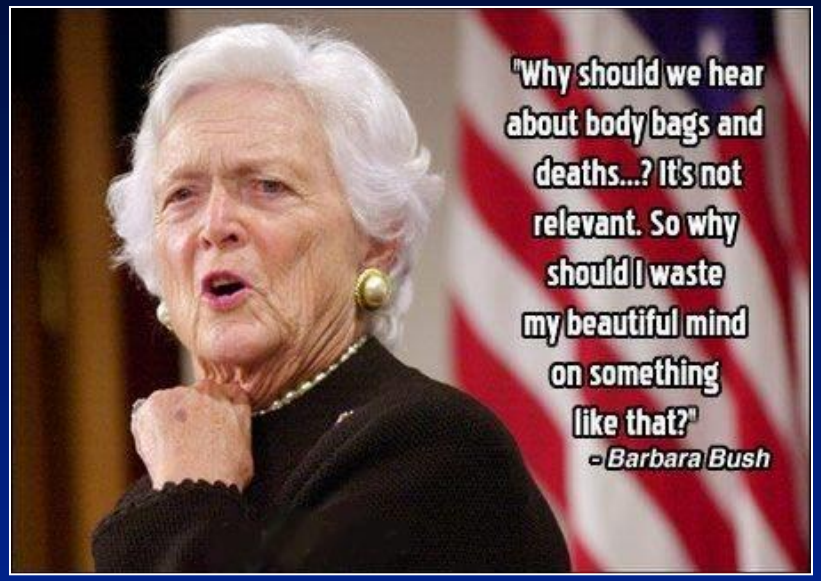
MITRAL STENOSIS



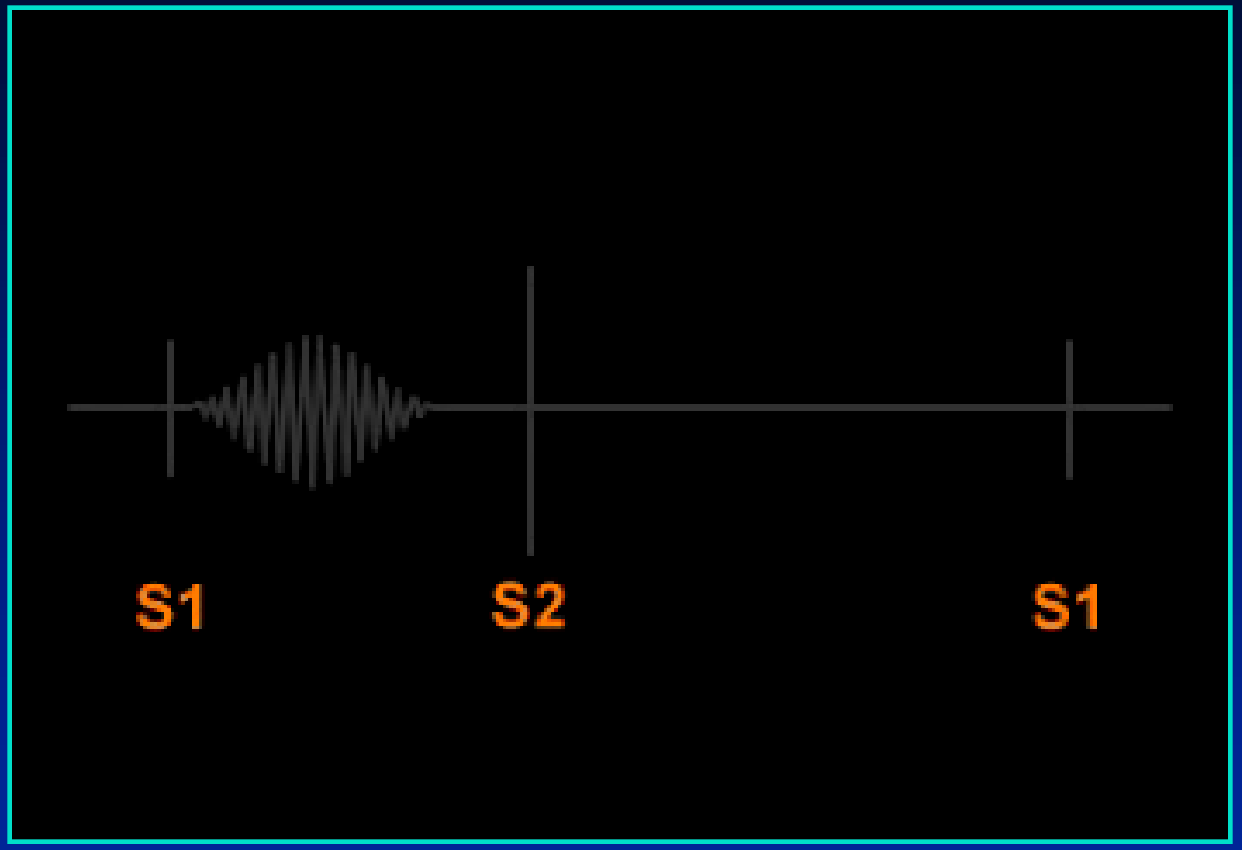
Facies Mitralica

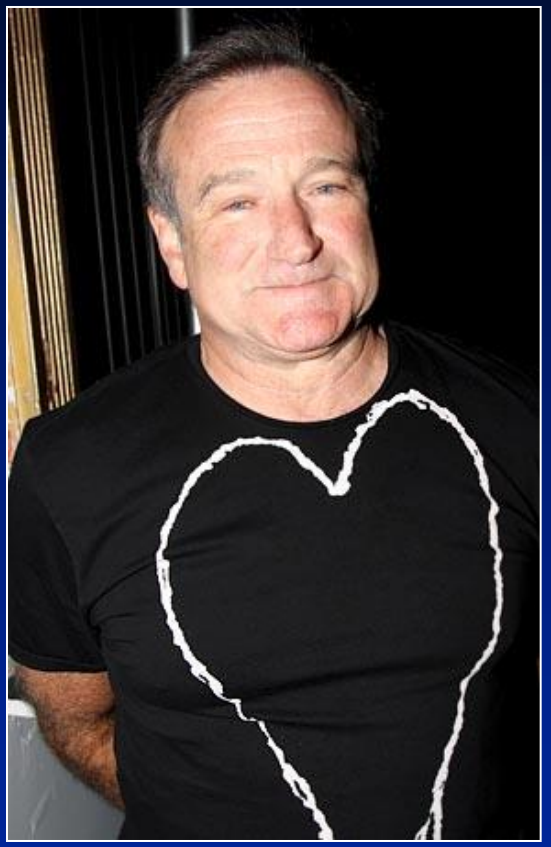
CASE 7 - THE INFAMOUS 3/6 SEM OVER THE LSB

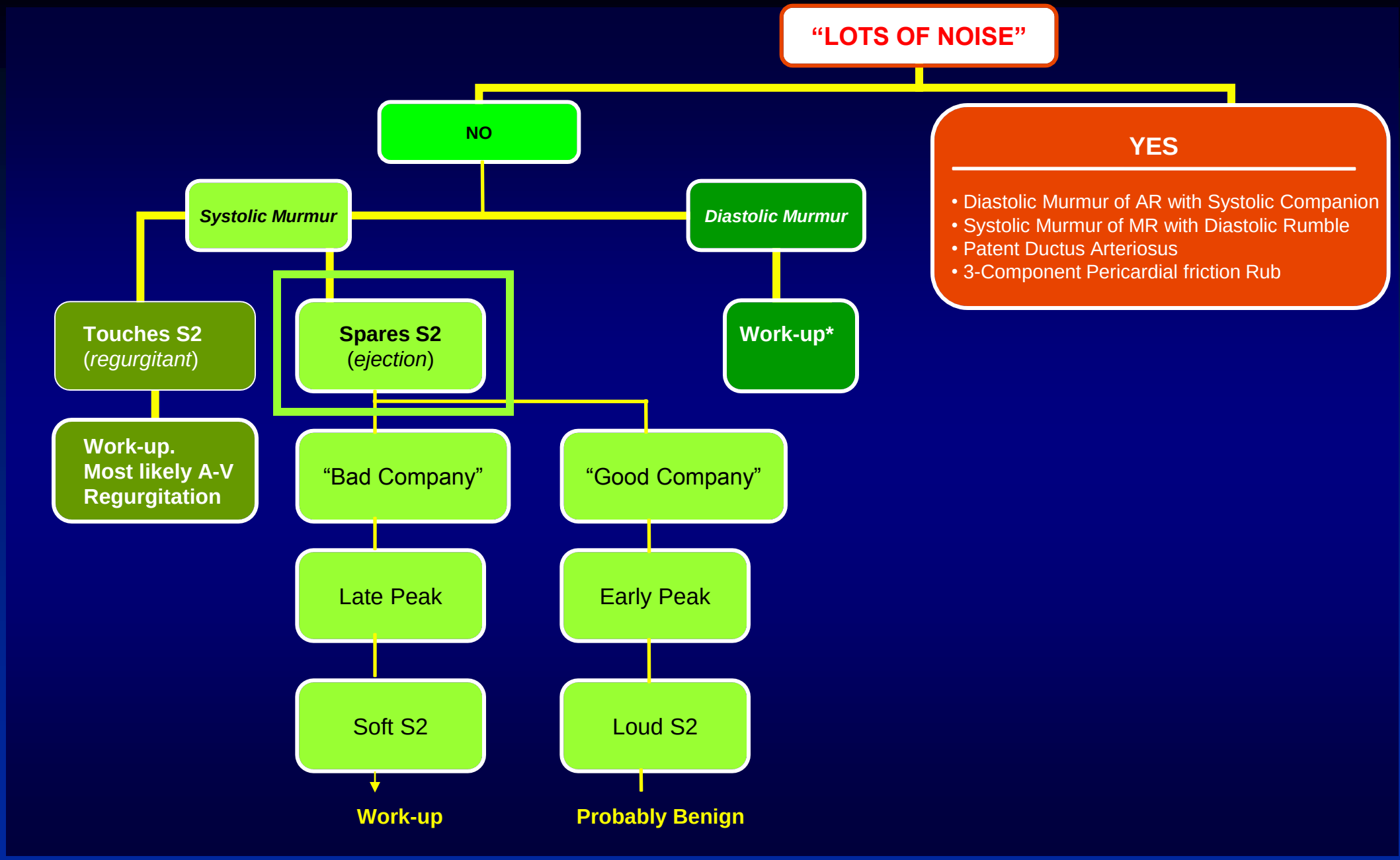




CASE 7 - THE INFAMOUS 3/6 SEM OVER THE LSB







*** There are no benign diastolic murmurs**

CASE 8

The above finding has been shown to predict all of the following except:

1. Response to digitalis
2. Worse post-operative outcome
3. Worse post-MI outcome
4. Higher level of B-Type Natriuretic Peptide (BNP)
5. Diastolic ventricular dysfunction

S3

- In patients with ventricular dysfunction, presence of S3 reflects an ejection fraction < 30% and a filling pressure ≥ 25 mmHg.
- In patients with congestive heart failure, S3 is the best predictor for response to digitalis and overall mortality.
- S3 is also the most significant predictor of cardiac risk during non-cardiac surgery, identifying patients at risk of peri- or post-operative failure and infarction
- If persistent after an infarction, S3 predicts greater myocardial damage, higher likelihood of congestive heart failure, and worse mortality.
- Presence of S3 has a 41% sensitivity and 97% specificity for detecting elevated BNP levels (with a positive predictive value of 96% and a negative predictive value of 49%)

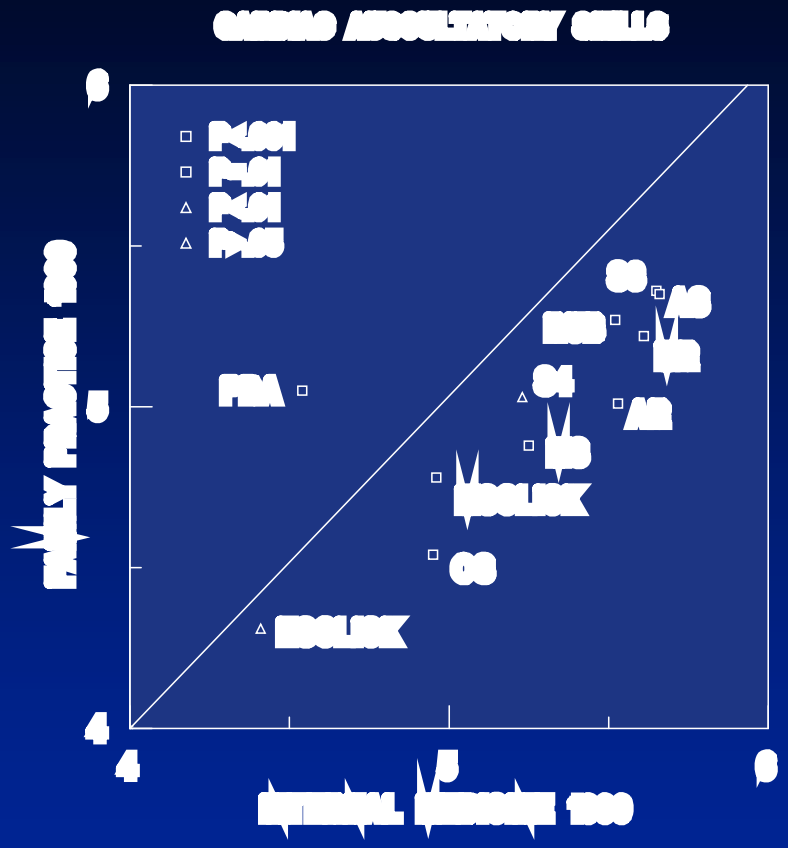
CASE 9

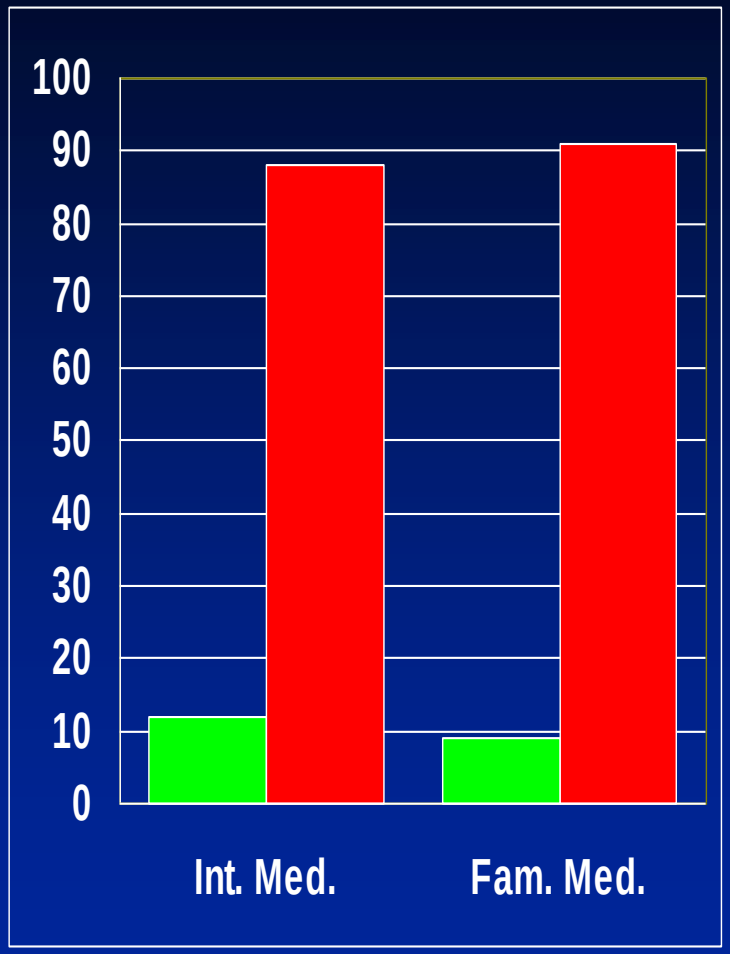
The presence of this finding in an asymptomatic patient would be consistent with any of the following conditions except:

1. Hypertension
2. Aortic Stenosis
3. Aortic Coarctation
4. Angina
5. Dilated cardiomyopathy

S4

- S4 indicates more a *diastolic* than a systolic dysfunction.
- S4 corresponds to an increase in *late* ventricular diastolic pressure, with the atrium being required to handle as much as 30-40% of the entire ventricular filling
- In contrast to S3, S4 usually reflects a normal atrial pressure, a normal cardiac output, and a normal ventricular diameter
- Presence of S4 does not predict worse cardiac output or higher filling pressures.
- It also carries no adverse implications in terms of post-operative complications, and it is questionable whether it predicts severity of aortic stenosis.

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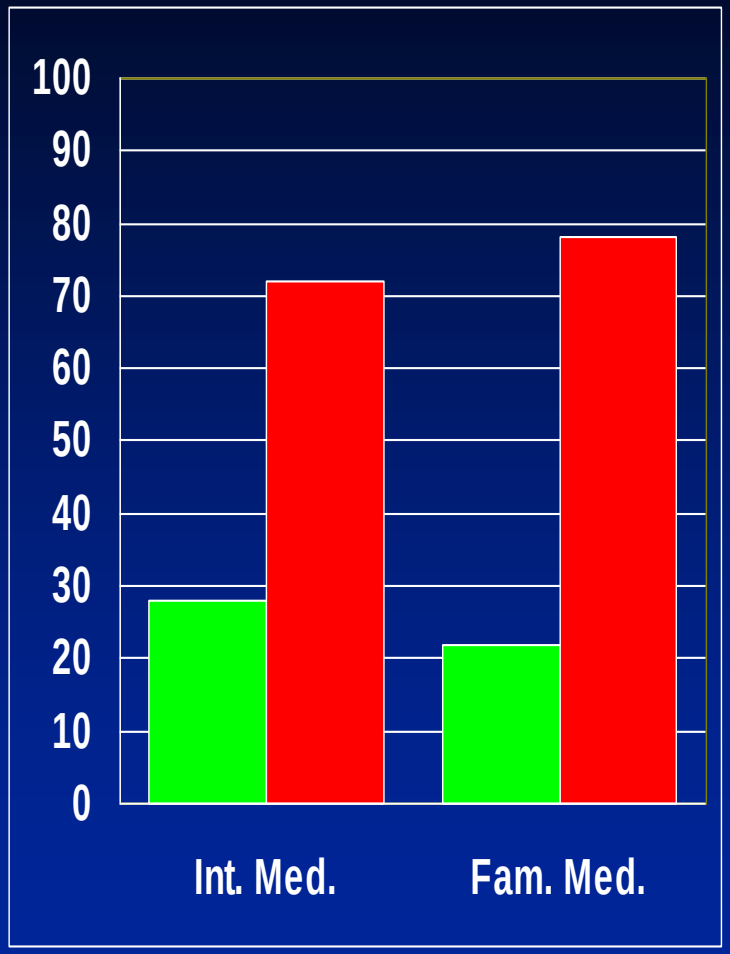
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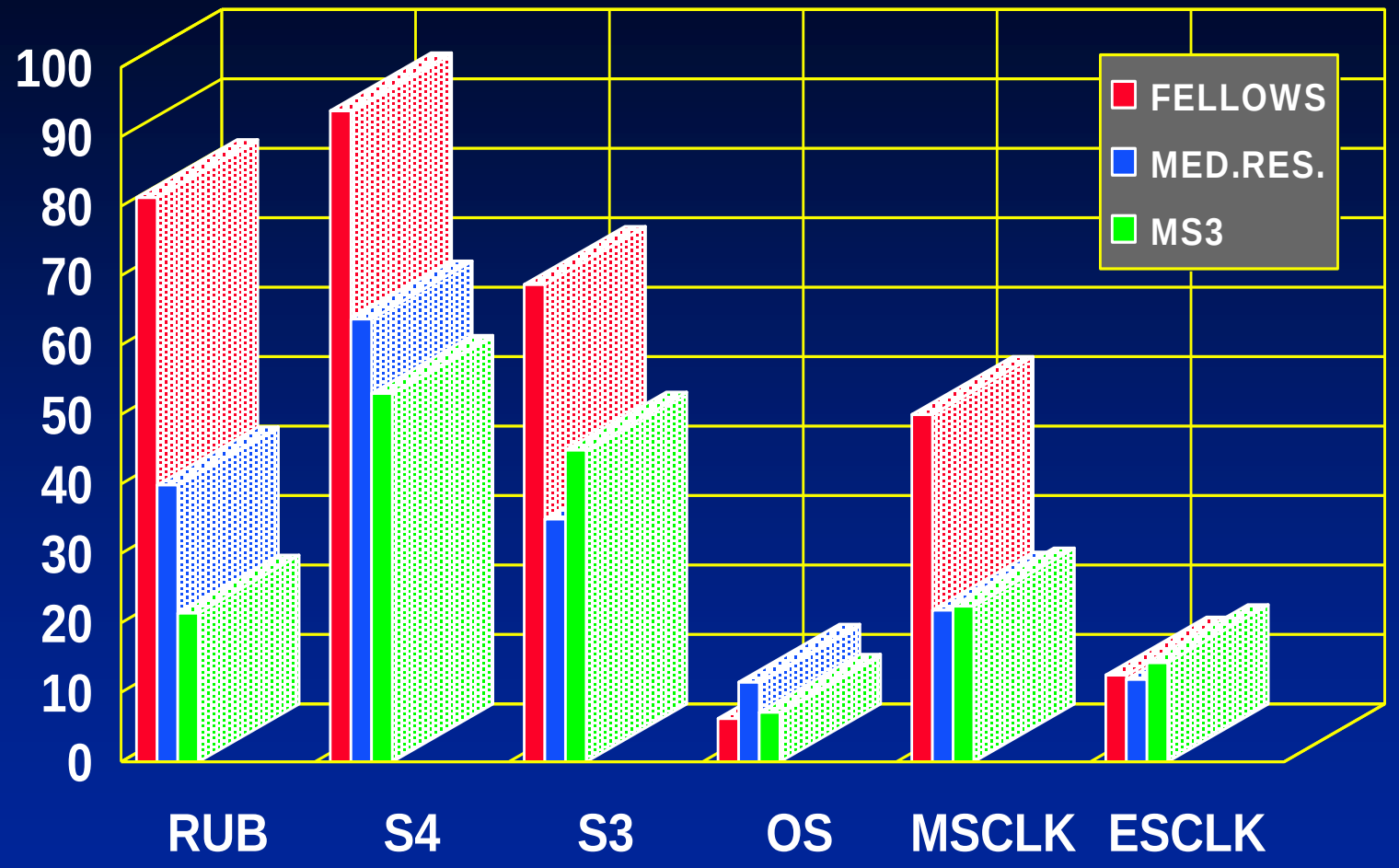
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FELLOWS
MED.RES.
MS3
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S4
S3
OS
MSCLK
ESCLK

… Appreciate this survey. I do not know what to do about the increasing lack of diagnostic skills in our fellows.

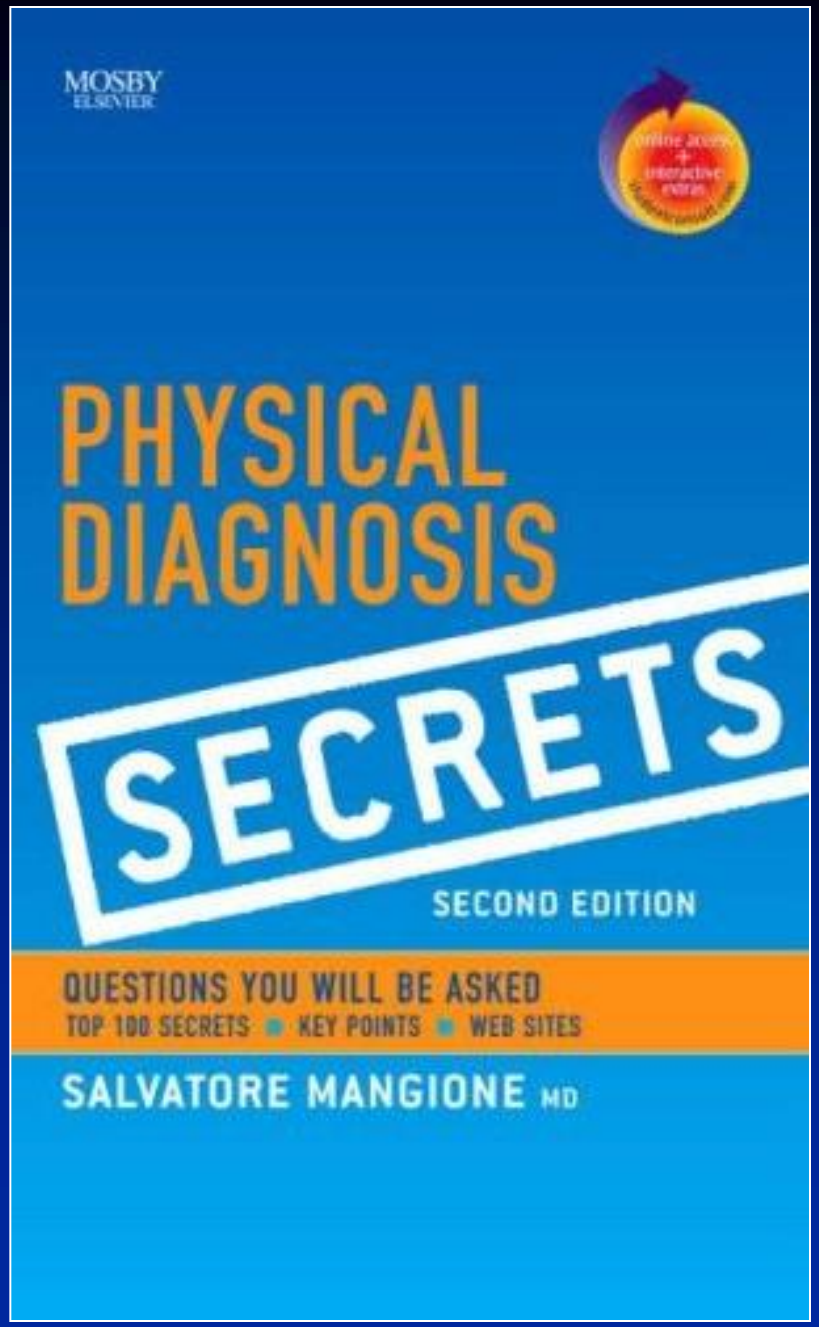
…Our fellows are uniformly expert at this. A structured repeat of what we teach vigorously to students would be unproductive and even insulting

…After filling this form I am committed to a structured course in clinical auscultation

…I was well trained in clinical auscultation, including time in England, but I have to admit that Echo/Doppler have largely replaced the need for astute bedside clinical diagnosis”

… Meticulous auscultation is an old art but gone:

Would you rather have a fellow with a 2-D echo or a faculty member with only the stethoscope?


MOSBY
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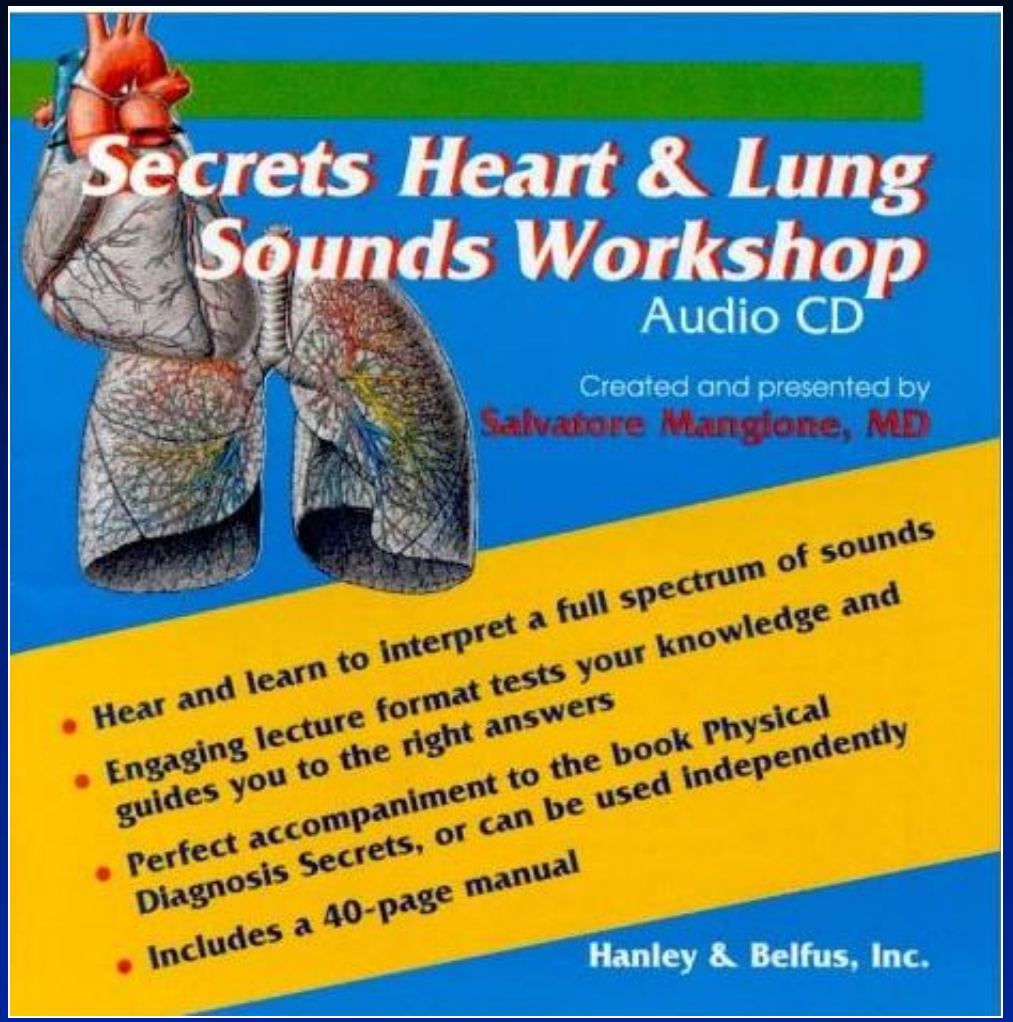
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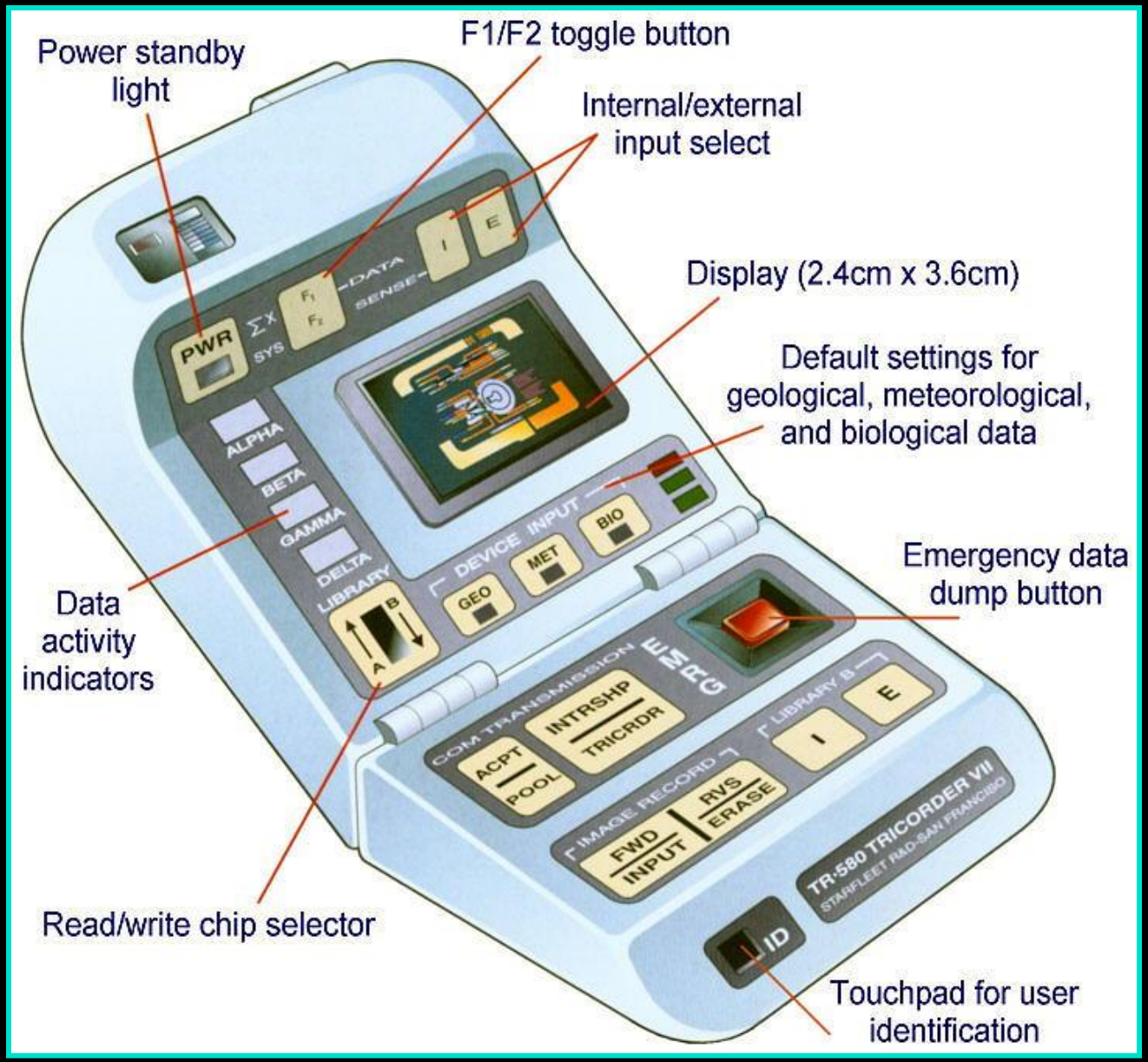
… The stethoscope is largely a decorative instrument as its value in diagnosis is concerned. Nevertheless it occupies an important place in the Art of Medicine: apprehensive patients feel relieved as soon as they sense the chestpiece over their pectoral muscles”

Rubin EH and Rubin M. Thoracic Disease. Philadelphia and London: WB Saunders, 1961


Power standby light
F1/F2 toggle button
Internal/external input select
Display (2.4cm x 3.6cm)
Default settings for geological, meteorological, and biological data
Emergency data dump button
Data activity indicators
Read/write chip selector
Touchpad for user identification
PWR
SYS
DATA
SENSE
ALPHA
BETA
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DEVICE INPUT
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THE STETHOSCOPE

… Over young woman abdomen tense

I have heard the sound of creation

And over a dead man’s chest

The silence before creation began.

Danny Abse, MD