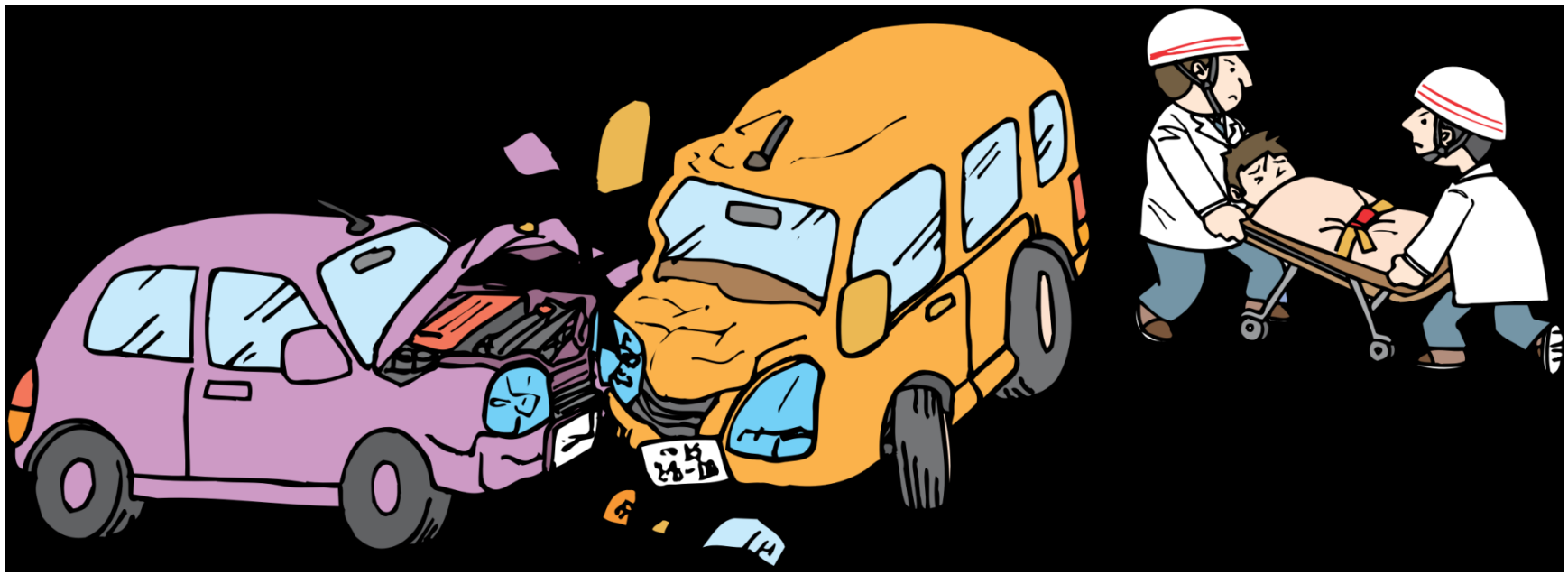
Differential diagnosis of acute thoracic disorders



Acute disorders

TRAUMATIC – 20-25% mortality

- Respiratory insufficiency
- Hemorrhage

NON-TRAUMATIC

Trauma

Penetrating

Blunt

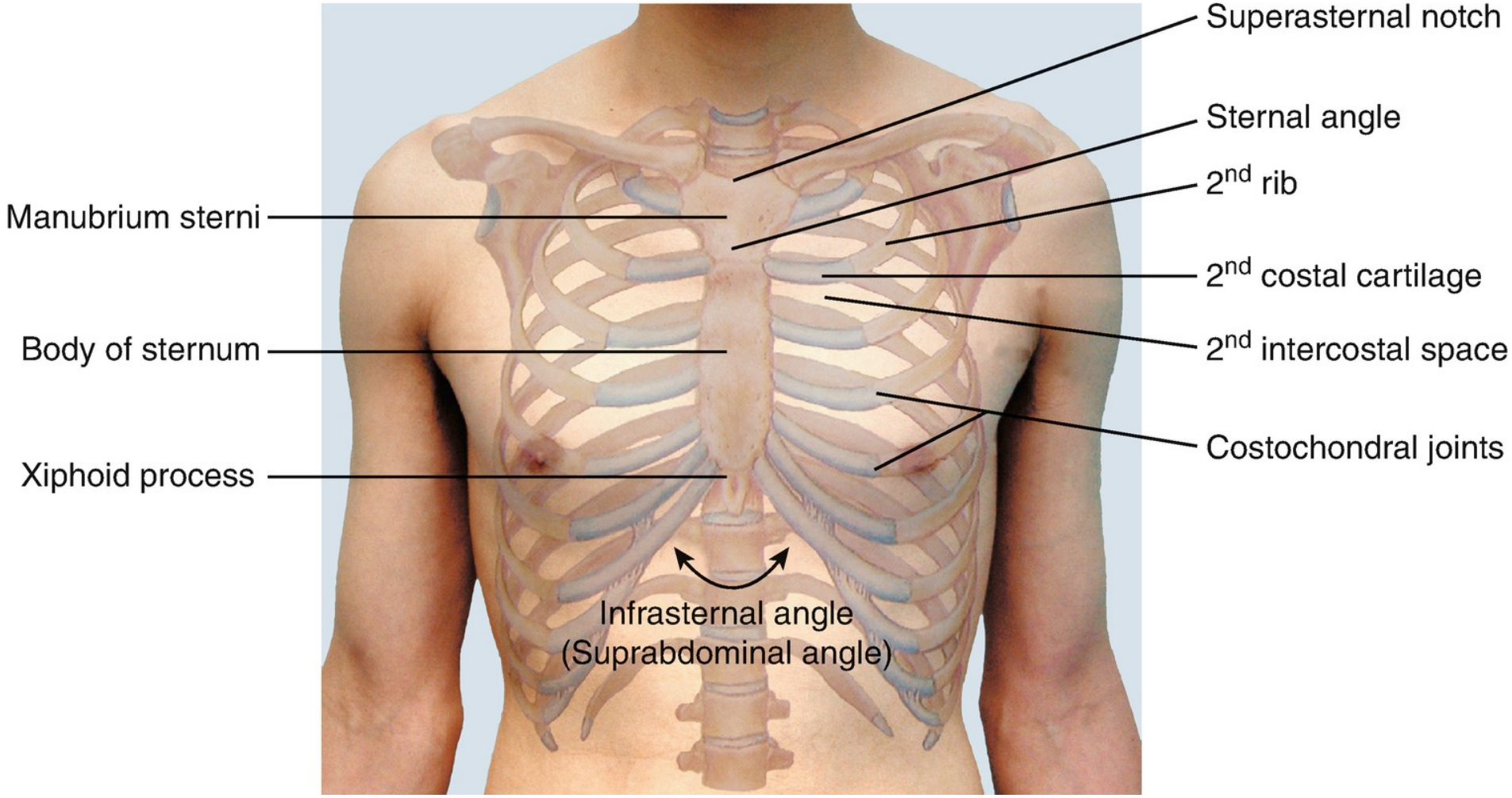
Traumatic

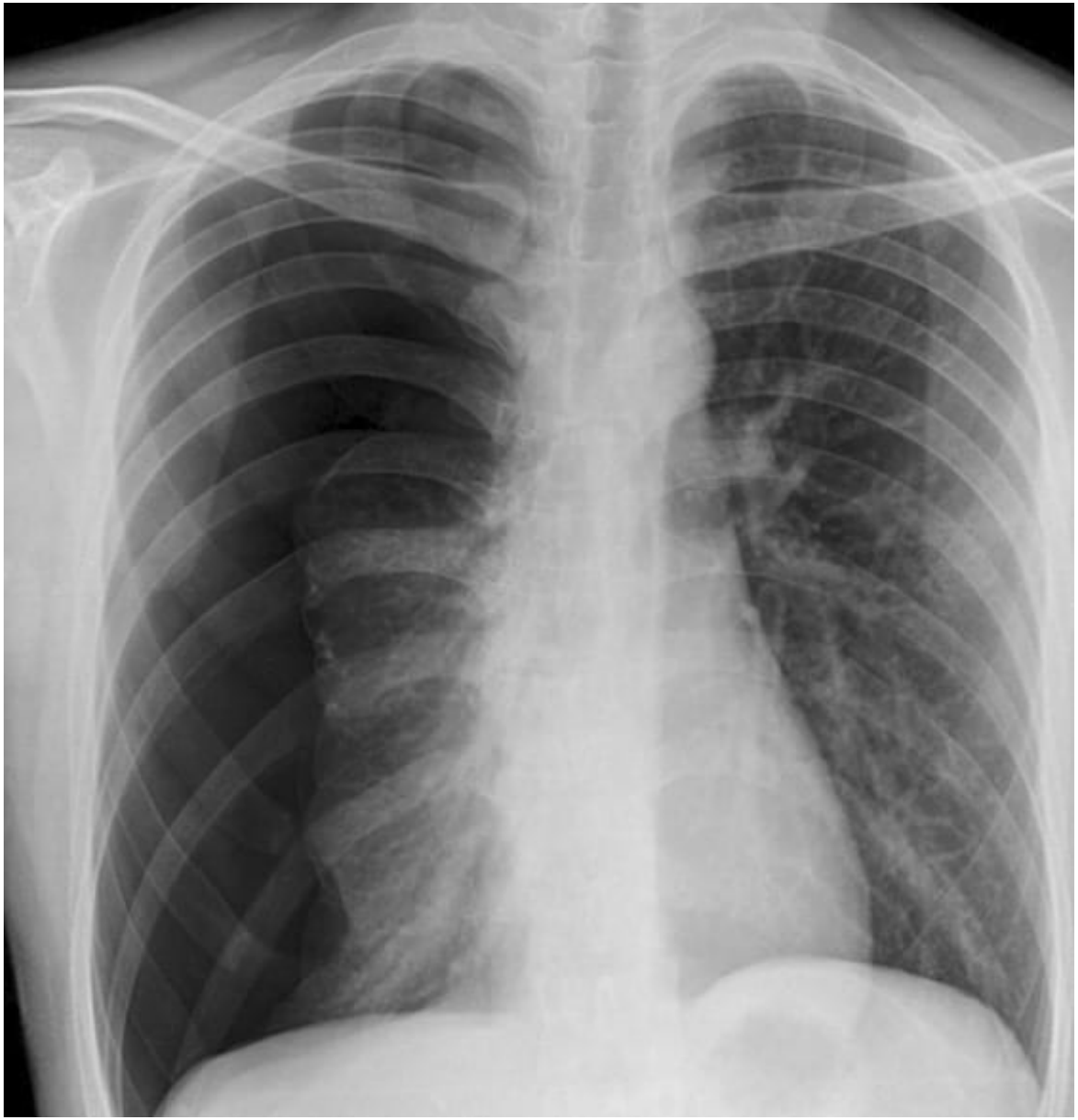
Clinical examination – ABCD

- Inspection, palpation, auscultation, percussion

Imaging

Blood tests

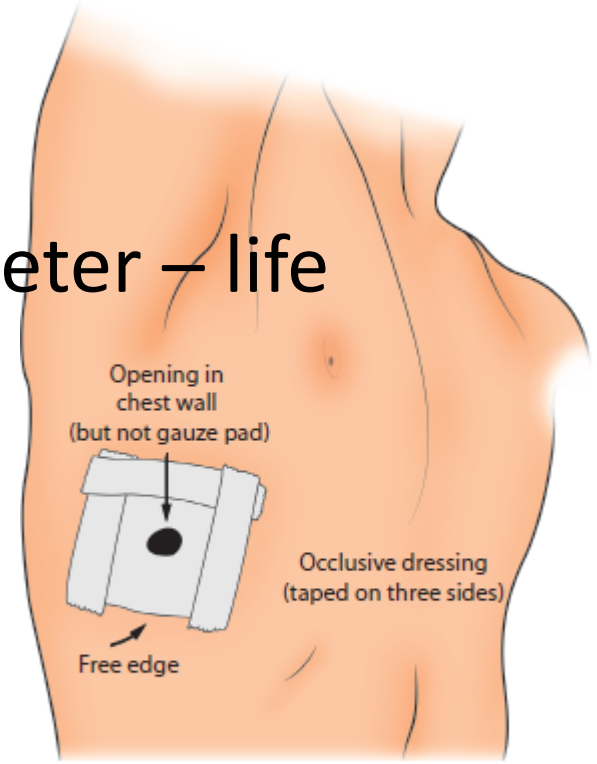

Superasternal notch
Sternal angle
2nd rib
Manubrium sterni
2nd costal cartilage
Body of sternum
2nd intercostal space
Costochondral joints
Xiphoid process
Infrasternal angle
(Suprabdominal angle)



Open pneumotorax

Management – closure of defect on thoracic tube

CAVE: defect > 2/3 of trachea diameter – life threatening



Closed pneumothorax

Hyper resonant percussion

Therapy – thoracic tube – 4.-5. ICS anterior axillar line


L
AMM
EXPIRATION

Tension pneumothorax

Air retention -> collapse of the lung -> mediastinum shifting to healthy side -> respiratory failure

Therapy – first aid – thick needle in 2nd ICS in medio-clavicular line

Thoracic tube

Rupture of trachea or large bronchi

Clinical examination: stridor, emphysema, tachycardia, hypotension, pneumothorax

Bronchoscopy before intubation in stable patient

Therapy: surgery

Hemothorax

Small <300ml – observation

Medium 300 – 1 000ml – thoracic tube

Massive >1 000ml or >300ml/hour – urgent thoracotomy

Burns

ARDS

Lung edema

Clinical examination: dyspnea, cough, cyanosis, hemoptysis, hypotension, tachycardia

Stenosis of airways after healing

Contusion

Lung – CAVE: subcutaneous emphysema with absence of visible chest-wall injury

Heart – right side, pulmonary outflow tract, root of aorta

Therapy: analgesia, rest, O2, antiarrhythmics, sedation

Heart tamponade

Paradox pulsation

Triad of Beck:

- neck veins distension
- Hypotension + bradycardia
- Distant, muffled heart sounds

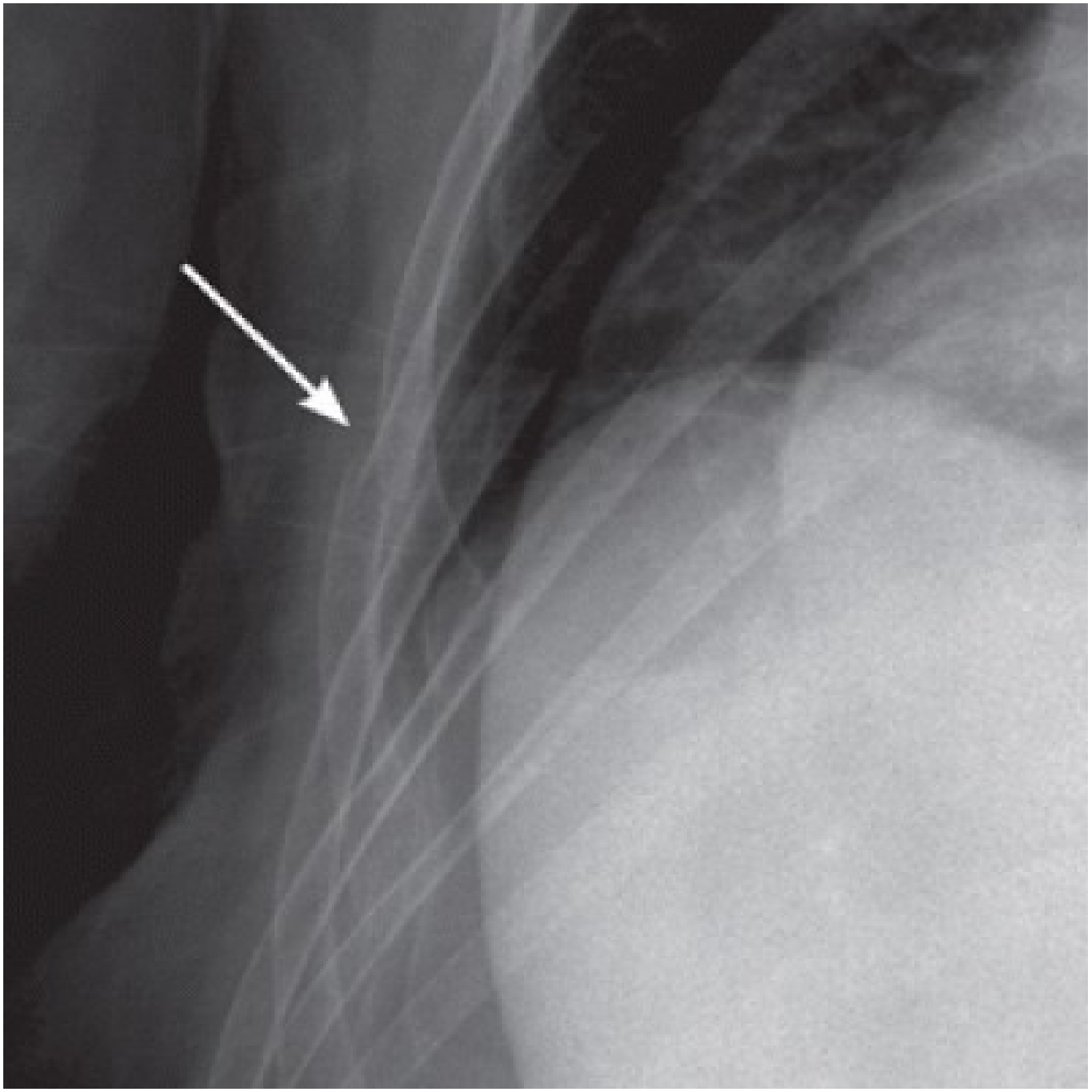
ECHO

Injury of great vessels

Rupture of aorta

Aortal dissection – DeBakey classification

CAVE: fracture of scapula, clavicula, 1st and 2nd rib



Injury of rib

„egg shell“ type

Rib fracture – CAVE: doesn´t have to be seen on X-ray

Costo-vertebral dislocation

Series fracture

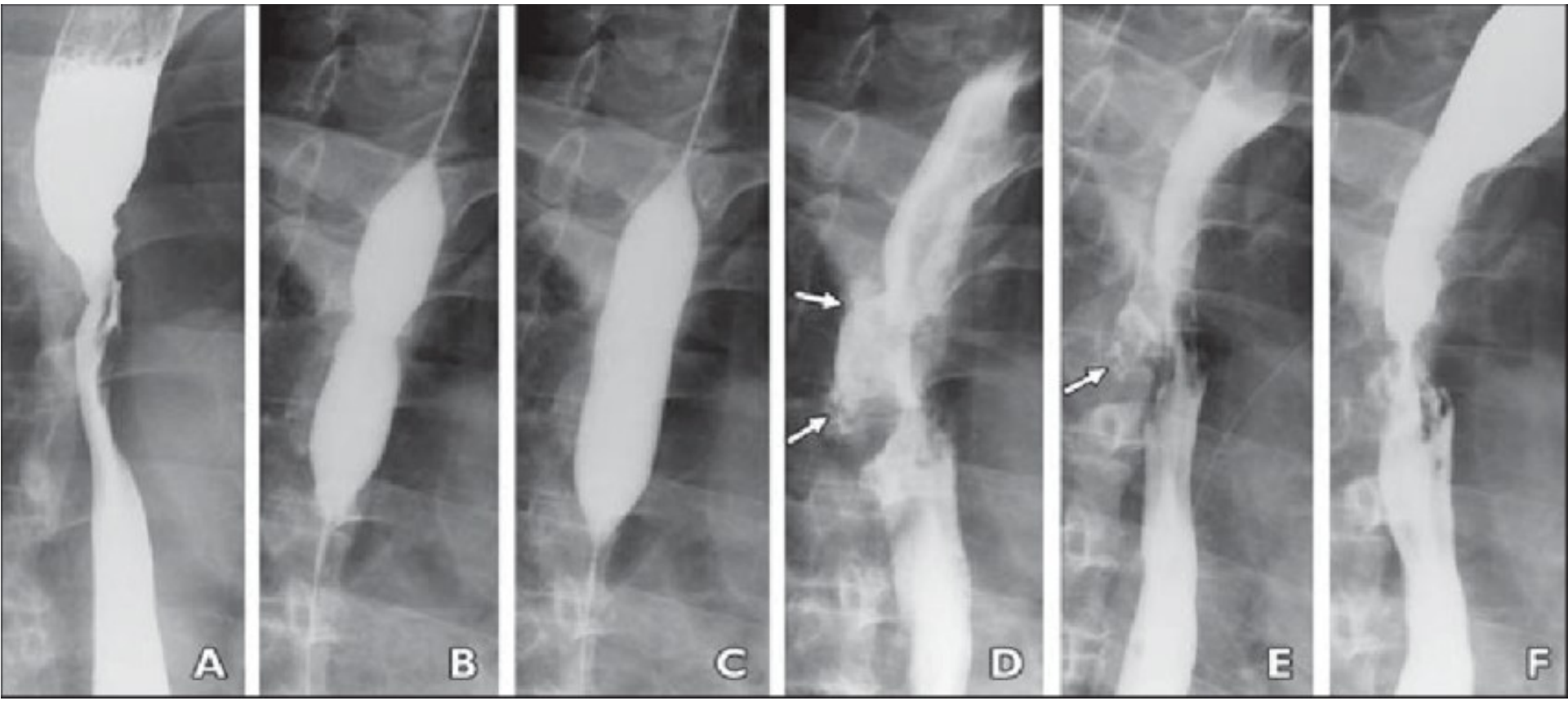
Parallel („window“) fracture – flail chest – T: elastic bandage

CAVE: injury of abdominal organs

Flail Chest

Flail chest could be a life threatening condition.

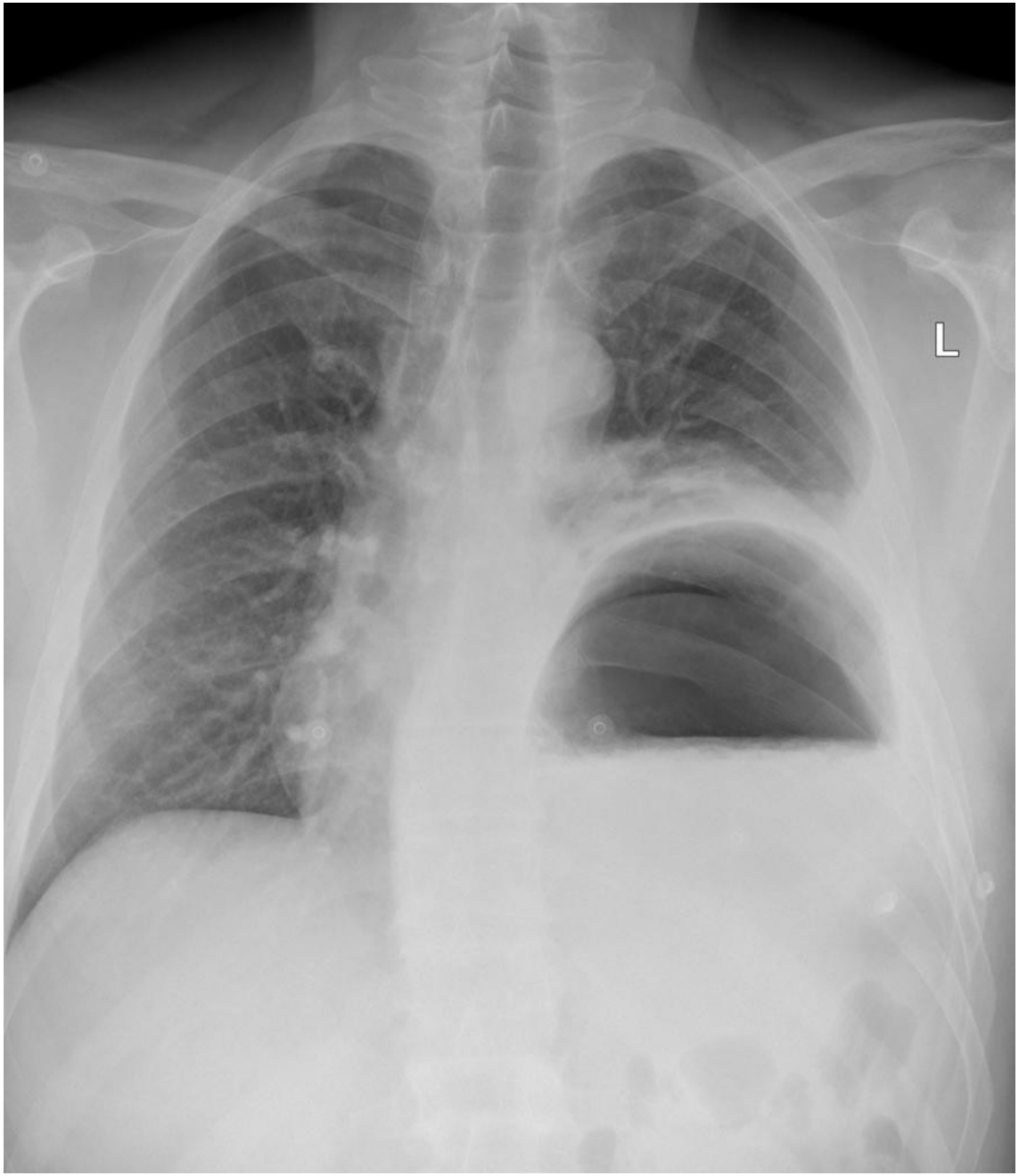
A segment of the rib cage breaks and becomes separated or detached from the chest wall.


A
B
C
D
E
F

Injury of esophagus

Clinical examination: neck emphysema, pneumothorax without rib fracture

CT with p.o. contrast


L

Injury of diaphragm

Common on left side, unusaul on right – liver

Be carefull about the spleen during surgery

Symptoms

Pain

Dyspnea

Hypotension + tachycardia

Bradycardia – tamponade

Hypoxia

Hypercapnia

Therapy

Simple rib fracture, mild contusion – analgesia, rest, O2

Pneumothorax, hemothorax, chylothorax – drainage

Bigger injury, COPD, smokers - ATB

Non-traumatic disorders

Aspiration

Spontaneous pneumothorax

Pleural effusion

Pneumonia

Postoperative complication

Non-traumatic disorders

Acute esophageal obstruction

Esophageal hemorrhage

Esophageal rupture

Hiatal hernia

Mediastinitis

Pulmonary embolism

Pleural effusion

Transudate

Exsudate

Pyothorax

Hemothorax

Chylothorax

Cause

- Transudate
  - heart failure, PE, liver cirhosis
- Exsudate
  - Infection, TBC
  - Malignancy
  - Chylothorax
  - Perforation of esophagus

How to distinquish

Puncture – appearance

Light criteria

Criteria	Transudate	Exudate
Pleural fluid protein:serum protein ratio	≤0.5	> 0.5
Pleural fluid LDH:serum LDH	≤0.6	> 0.6
Pleural fluid LDH	≤200	>200

Microbiology + cytology

Chest pain

Dyspnea

Coughing

Hemoptysis

Patients history

Pain

- When it started
- How long does it hurt
- Location
- Propagation
- How it looks like
- What causes the pain
- Is there any relief position
- What are the other symptoms (dyspnea, nausea, vomiting, sweating)

Clinical examination

Sight

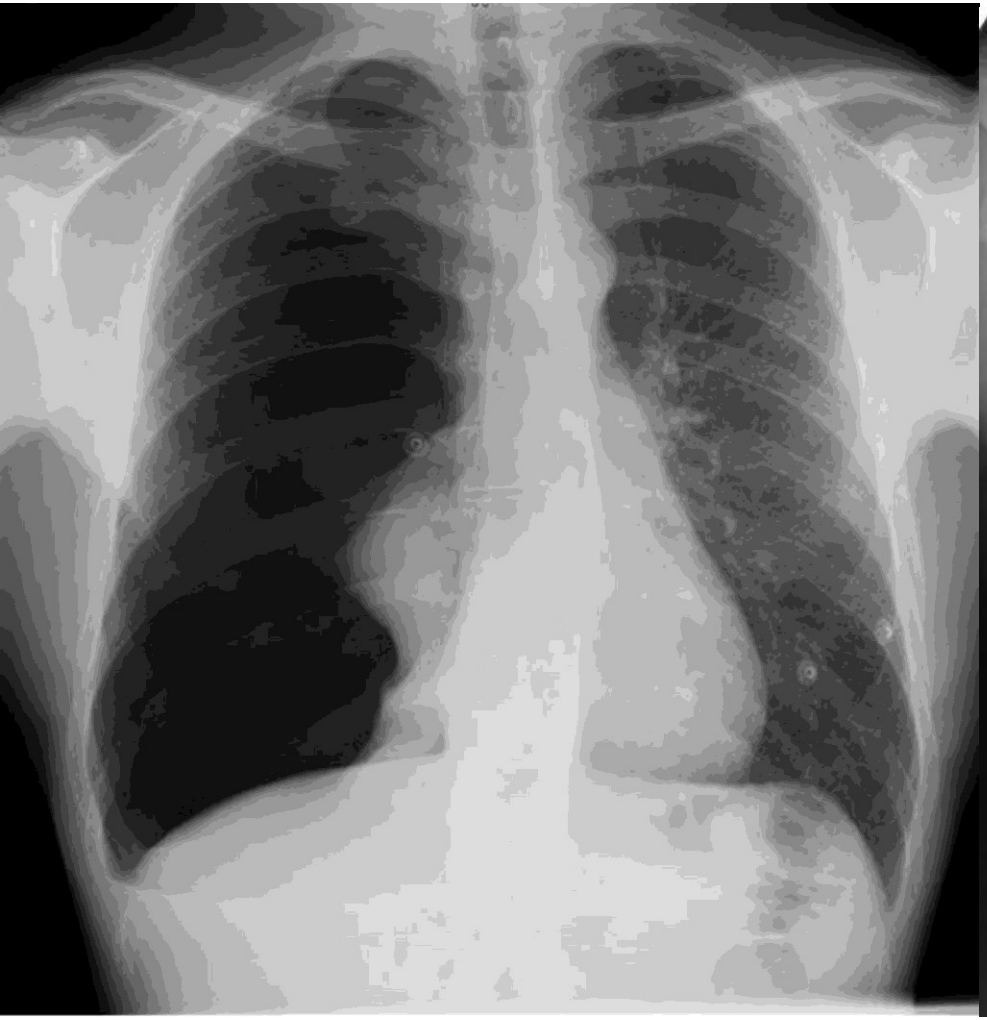
- usage of help respiratory muscles
- Colour of the skin
- way of speaking – shortness of breath
- Breathing frequency
  - normal – 12 – 20
  - > 25 – tachypnoe
  - < 12 bradypnoe

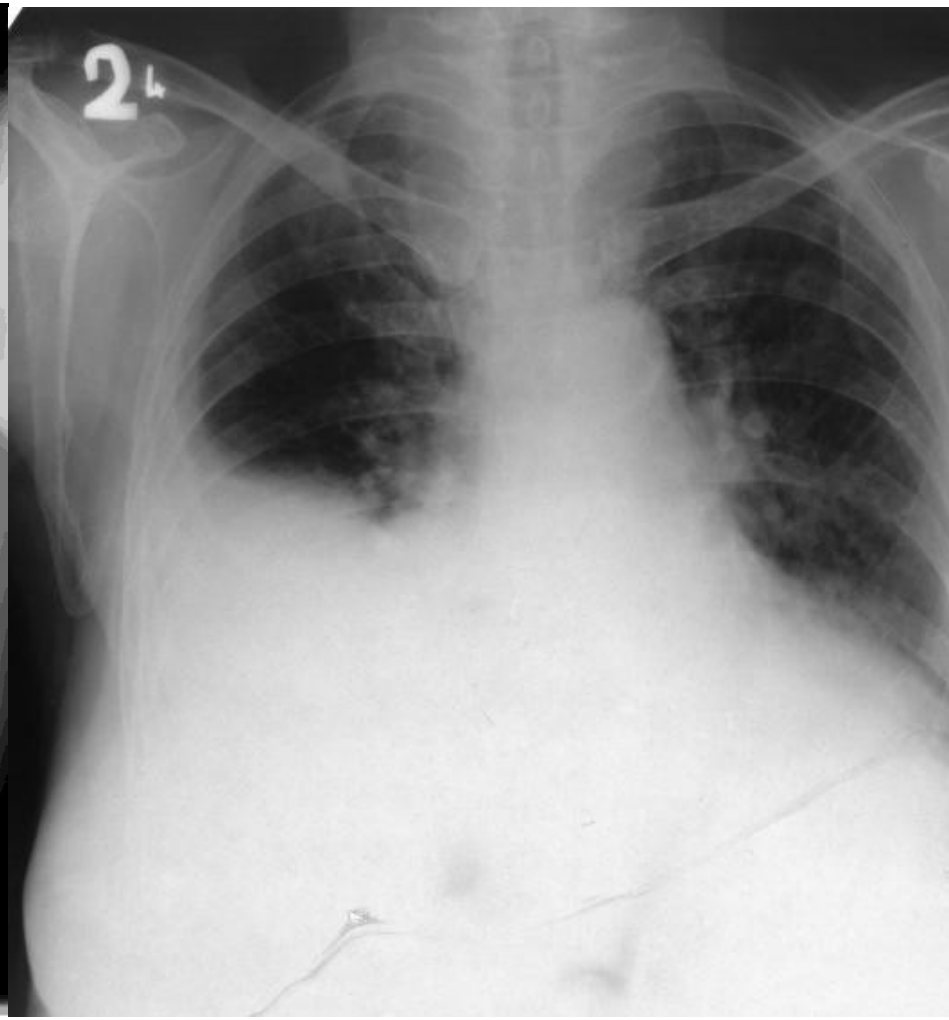
Percussion

resonant - normal

hyper – resonant

dull




2

Auscultation

Alveolar – normal

Week

Added sound – stridor, wheezes, crackles

https://en.wikipedia.org/wiki/Respiratory_sounds#

Other examination

Blood tests – troponin, Hb

SpO2 – 95 – 100%

ASTRUP

pH	**7,36-7,43**
$paCO_2$	**4,8-5,8 kPa**
paO_2	**10-13 kPa**
HCO_3^-	**22-26 mmol/l**
BE	**od -3 do 3 mmol/l**

ECG

X-ray, HRCT

Chest pain

Sharp

Dull

Persistent

Conected to breathing

What can be the cause

Patient history

Clinical examination – cyanosis, heart rate, blood pressure

normal doesn´t mean not severe

Cause

ECG

SpO2

Blood test: TnT, D-dimers, NTproBNP, blood count, Urea, Kreat., AMS, koag., CRP

Imaging

Chest pain

Ethiology:

Cardiovascular

- Ischemic
- Non-ischemic

Non-cardiovascular

- Pulmonary/Pleural
- Gastrointestinal
- Pain of the chest wall
- Verterbogenous
- Other - psychiatric

Chest pain

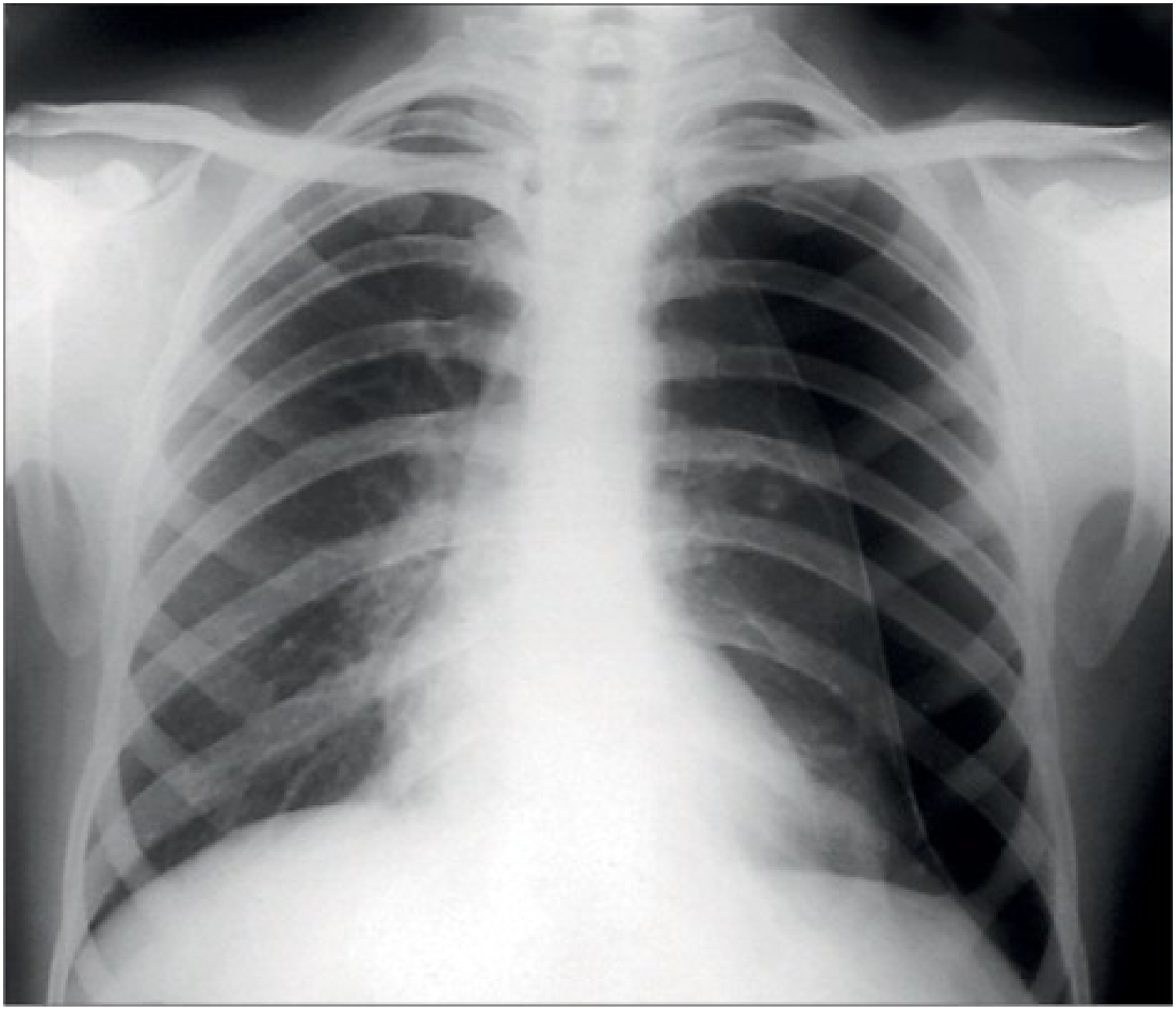
Patient A:

- Young man – 25 years old
- 195cm, 90kg
- Sudden chest pain
- After work-out
- Conected to breathing

Patient A – clinical examination:

- Breathing frequency 16/min
- No cyanosis
- Mild dyspnea

- SpO_2 – 95%



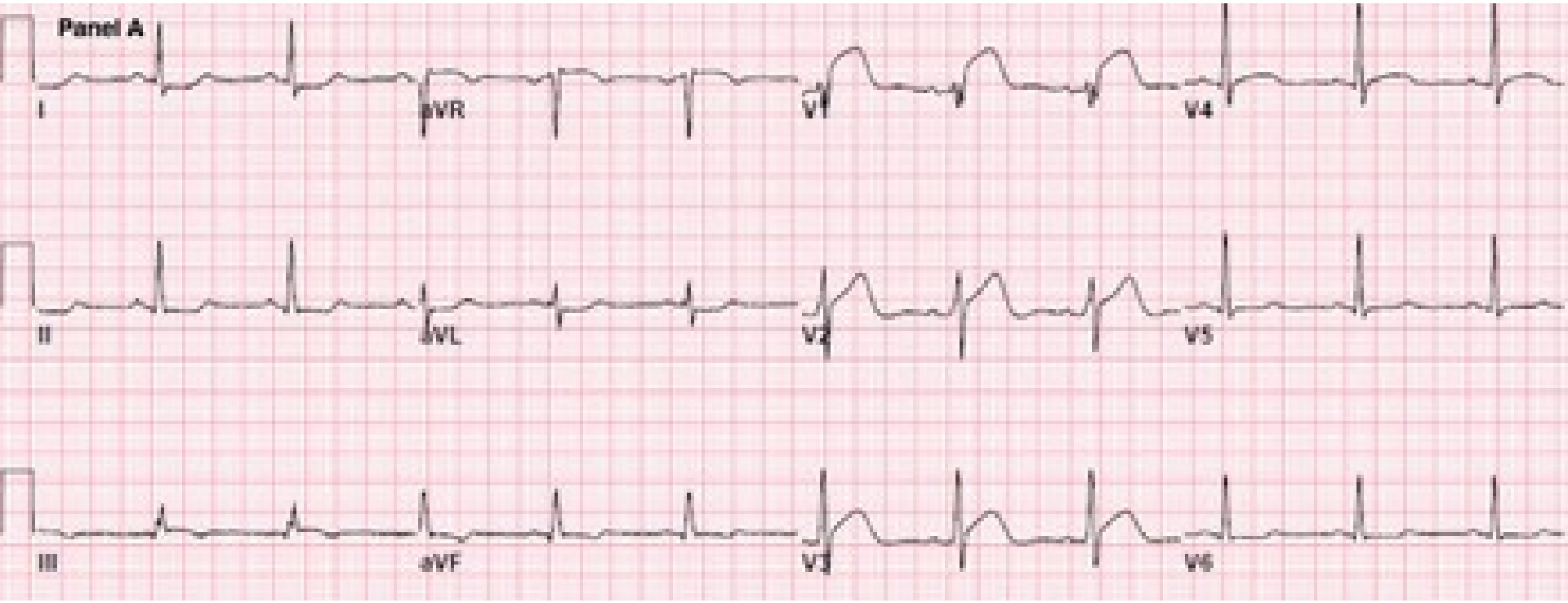
Diagnosis?

- A: Pneumonia
- B: Spontaneous pneumothorax
- C: Tuberculosis
- D: He is healthy

Chest pain

Patient B:

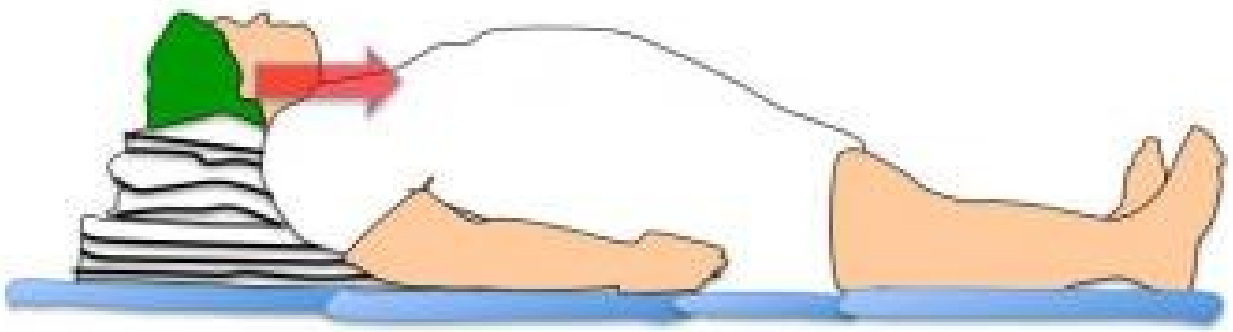
- Man 62 years
- Patients history: hypertension, smoker 20cig/day 40 years
- Sudden start
- Dull, constringent pain


Panel A
I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6

Dyspnea

How it looks like:

- Orthopnea
- Tachypnea > 25/min
- Hyperventilation
- Hypoventilation



Cause?

Cardial

Pulmonary

Head – neck

Neuromuscular

Mechanical

Metabolic

Anaemia

Psychogenic

What is the cause

Patient history

- Dynamics: acute, recidivans , chronic
- Is it worse with exercise? NYHA
- Is it worse in lying position?
- Does it appear at night? When?
- Other symptoms? Fever, pain

What is the cause

Clinical examination:

- Vital functions
- Inspection
- Auscultation

What is the cause

ECG, ASTRUP, X-ray

Lab: blood count, electrolytes, gly, urea, kreat, liver enzymes, TnT, D-dimers

Firts aid

O2, nitrates, antishock

B2-mimetics

ICU

What next?

ECHO

CTAG + CT of lungs

Laryngoscopy

Spirometry

Cough

Acute

Asthma

Infection

Pleuritis

Aspiration

Acute heart failure

Cough

Chronic

COPD

Bronchiectasies

Interstitial diseases

Carcinoma

Left-heart failure

Drugs

GERD

Psycho

What is the cause

Patient history

- Productive or dry?
- What provoces cough?
- Chronic medication?
- Smoking?
- Work?

What is the cause

Auscultation

X-ray

Spirometry

ECG

Take home message

- Patient who coughs longer than 3 weeks should have X-ray, longer than 6 weeks BSC.
- If it is negative think about asthma, COPD.
- If lying possition provoces coughing think about GERD
- Smoker – cough other than usuall – think about carcinoma
- Do not forget about TBC

Hemoptysis

Is it really hemoptysis

Pseudohemoptysis

Hematemesis

Cause

Massive – 600ml /24h

Ex-sanquinating > 150ml /h

Cause

Inflammation
Cardiovascular
Malignancy
Vasculitis
Pulmonary Embolism
Bleeding diathesis
Aneurysm formation
Broncholithiasis
Trauma

- https://www.youtube.com/watch?v=_6sFa79u6FQ

Nodal syndrome

One location

Generalised

Infection

Malignancy

Other

Nodal syndrome

Patients history

- How fast does it grow?
- Is it painfull?
- Other symptoms: sweating, weight-loss, itching, fever, cough, dyspepsia

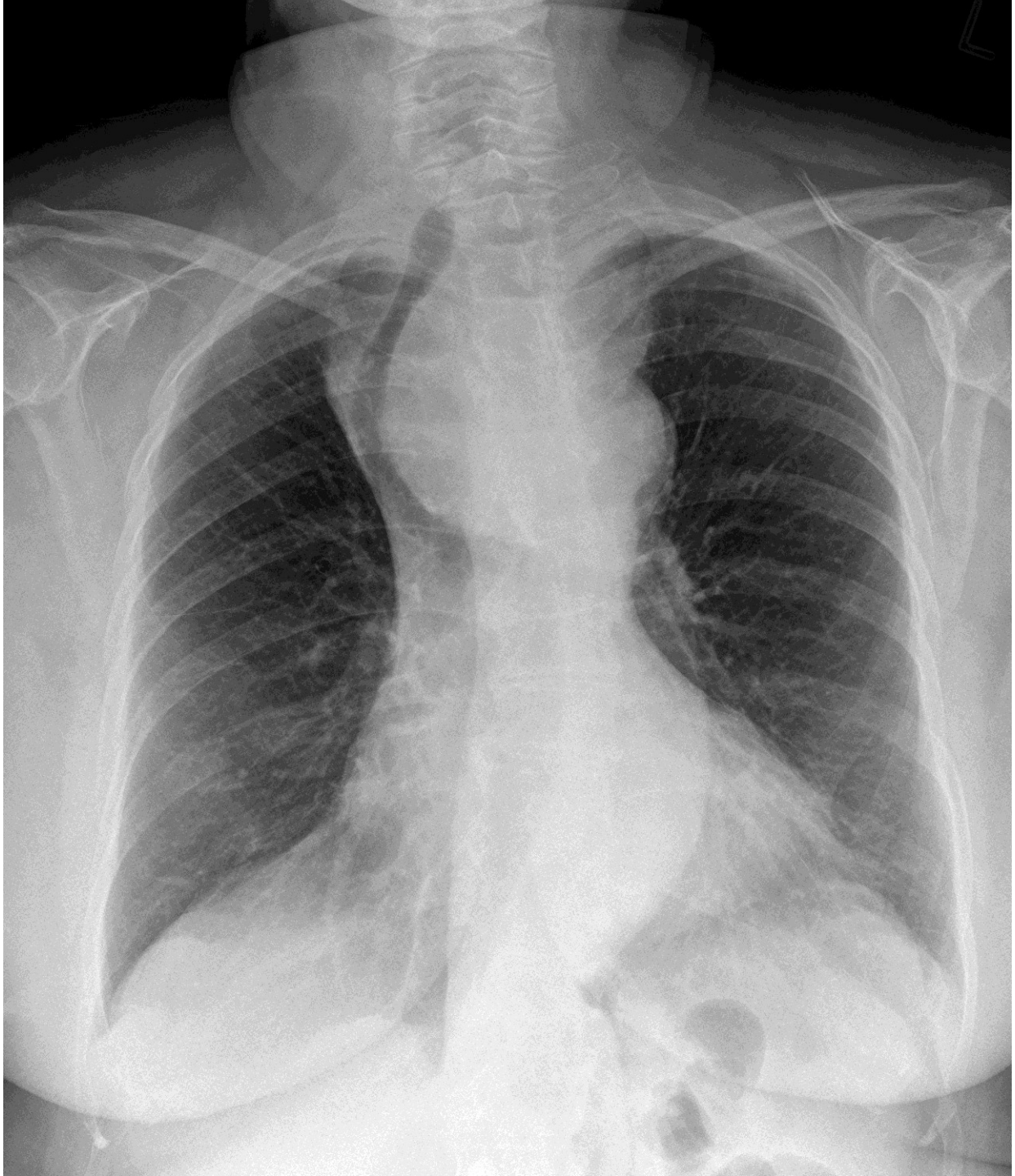
Nodal syndrome

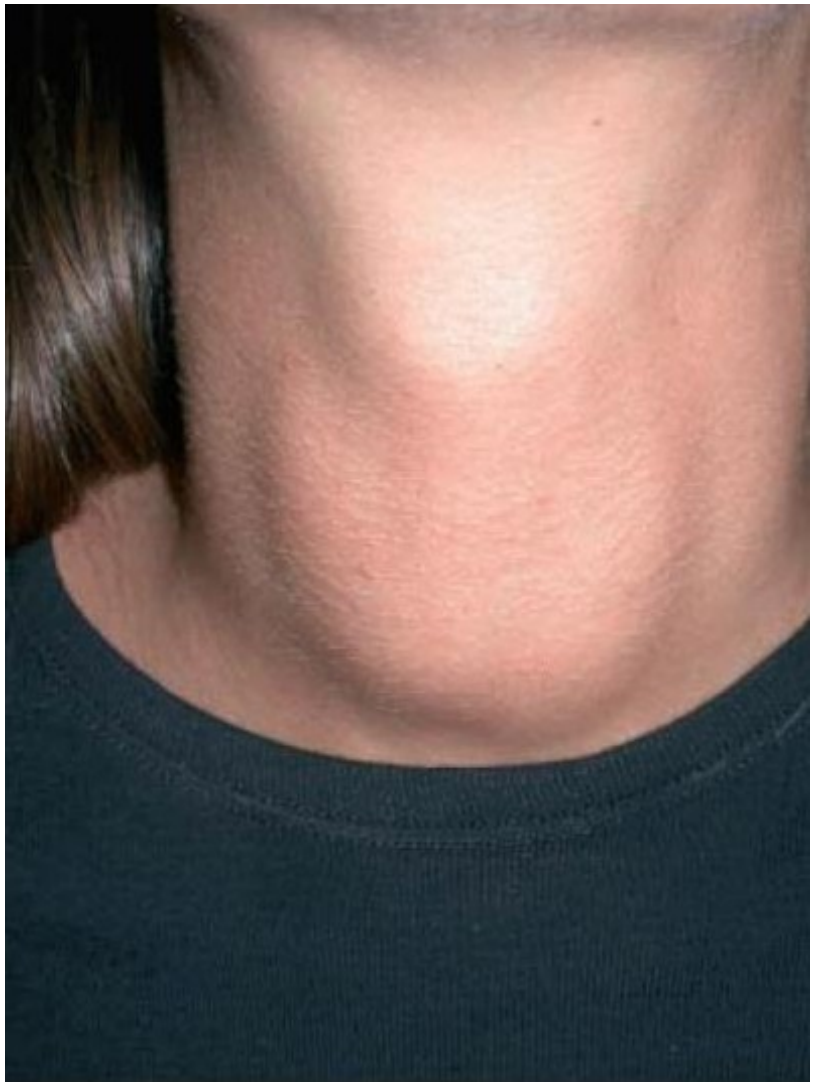
Clinical examination

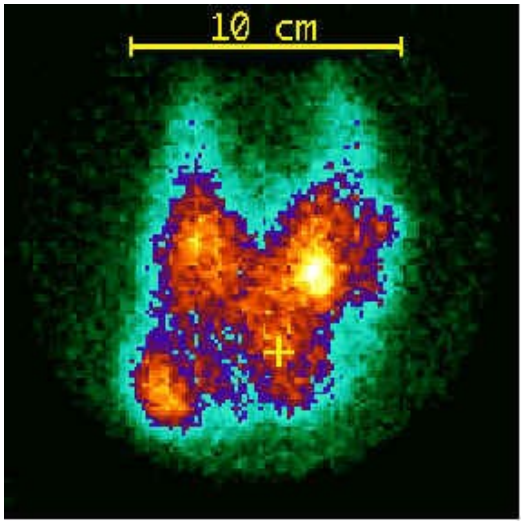
- Palpation < 1,5cm

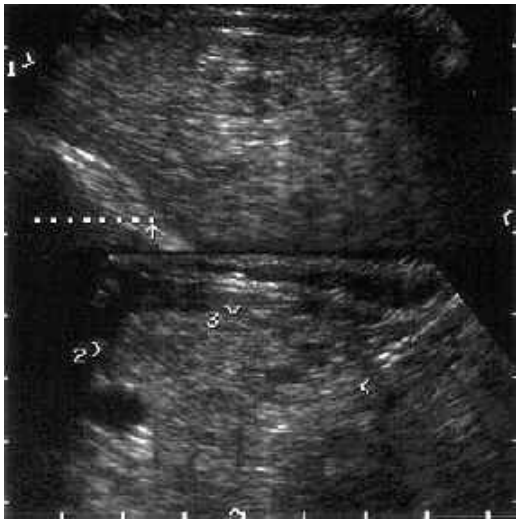
USG, CT

Histology – needle, open, surgical endoscopy

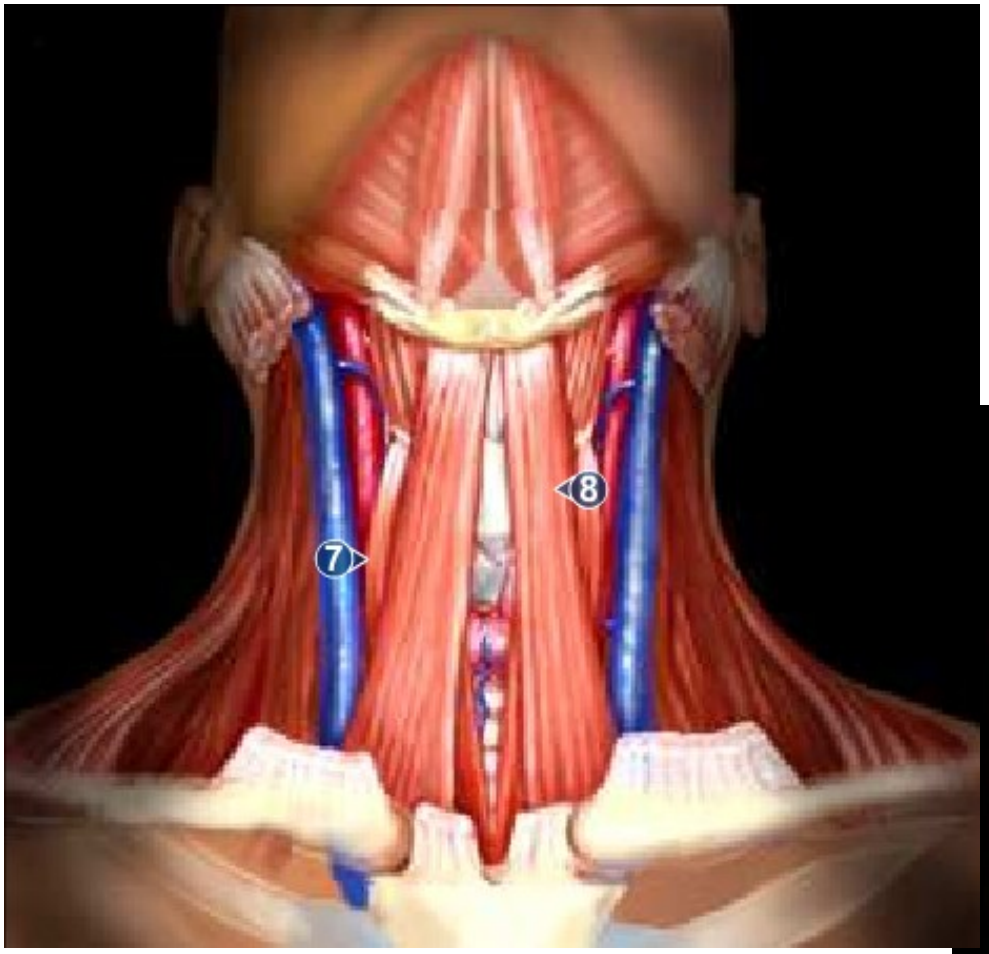


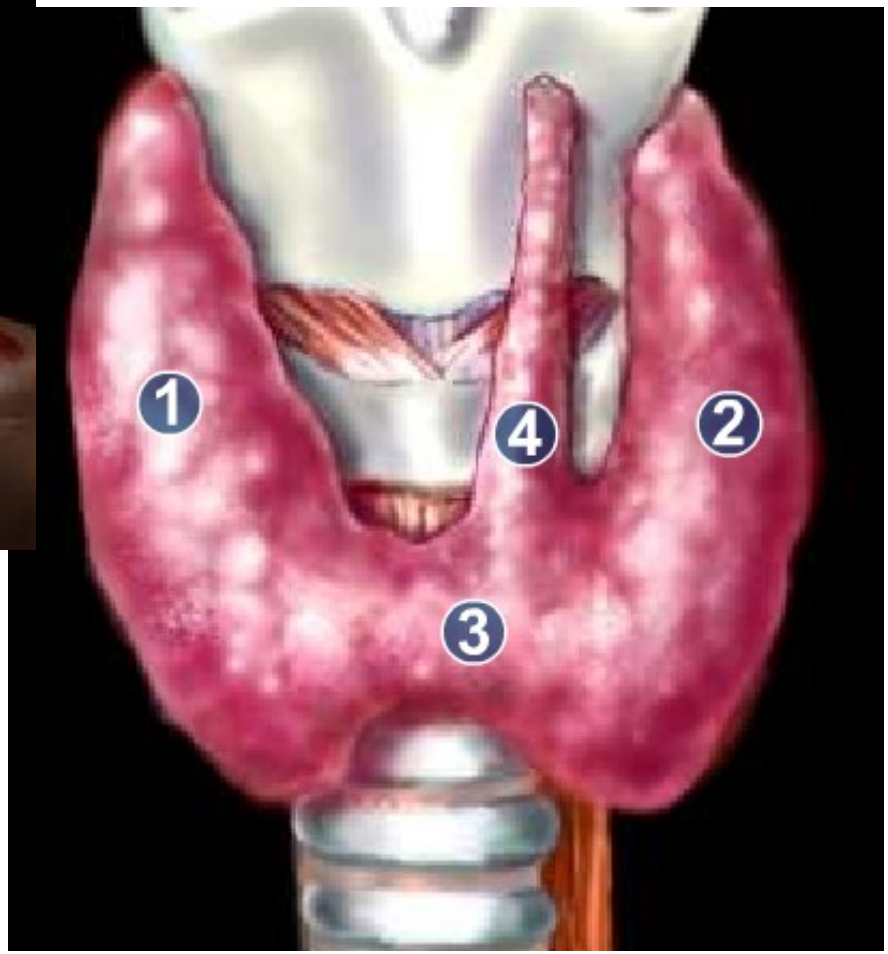



10 cm



Thyroid disease





Goiter

Function (hyper, hypo, eufunction)

Parenchyma – nodular, diffuse

Benign x malignant x inflamatory

Endemic

Strumigens

During pregnancy

Malignant goiter

Anaplastic

Folicular

Papilar

Medular

Examination

Endocrinologist

- Blood tests: fT3, fT4, TSH, TPOAb, TRAb, TgAb
- USG
- Scintigraphy
- CT if retrosternal

Indication to surgery

Malignancy

Normal function nodal goiter in kids and young

Mechanical obstruction

Toxic goiter with no answer to medication

Thank you for attention