La lettura della radiografia del torace: edema, addensamento, versamento, pneumotorace.

Impariamo *a riconoscere le informazioni utili nella gestione dei nostri pazienti.*

Luca Belli

Direttore U.O. Radiologia

ICCS - Milano

Milano, Atahotel Executive

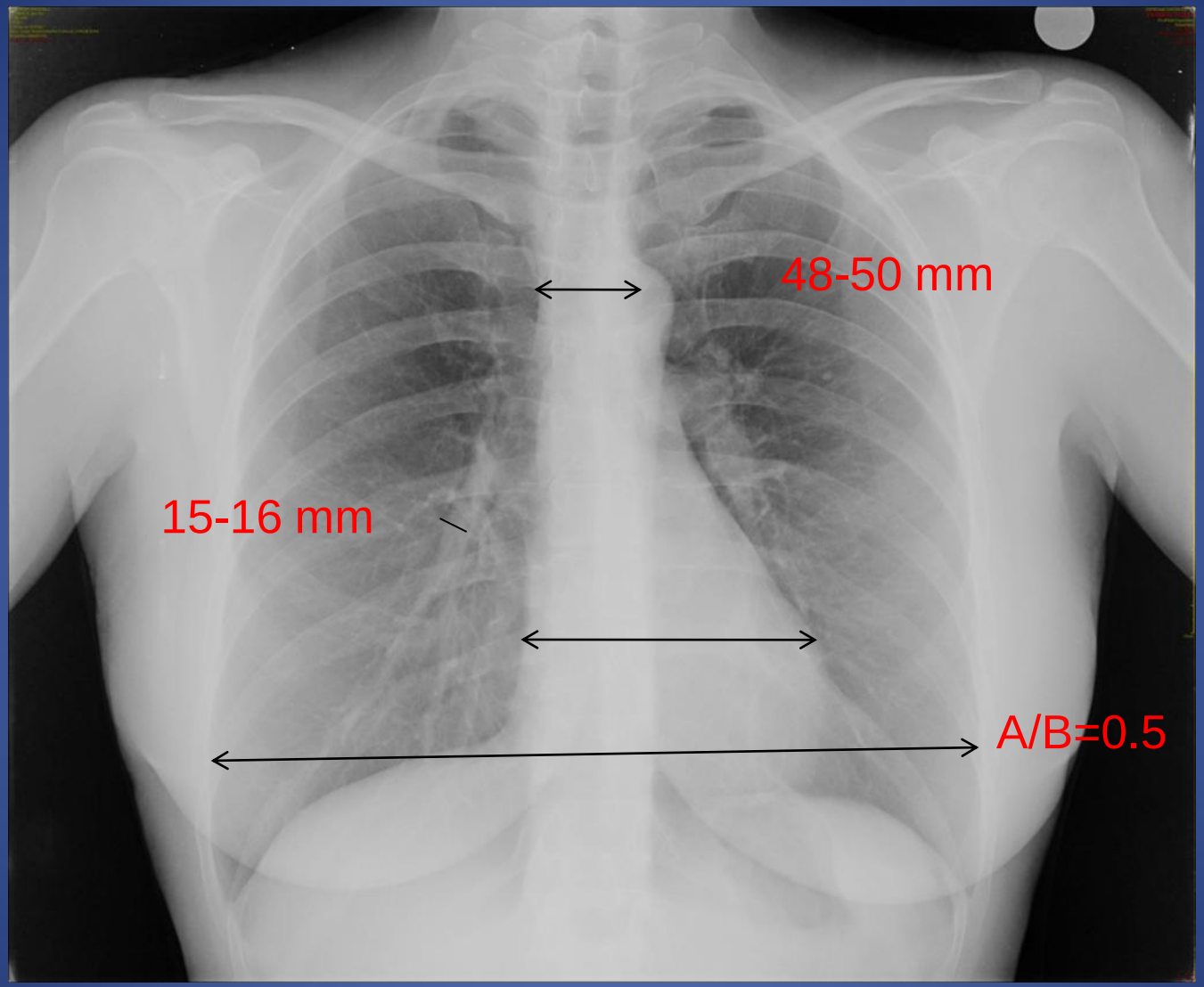
20 Maggio 2013

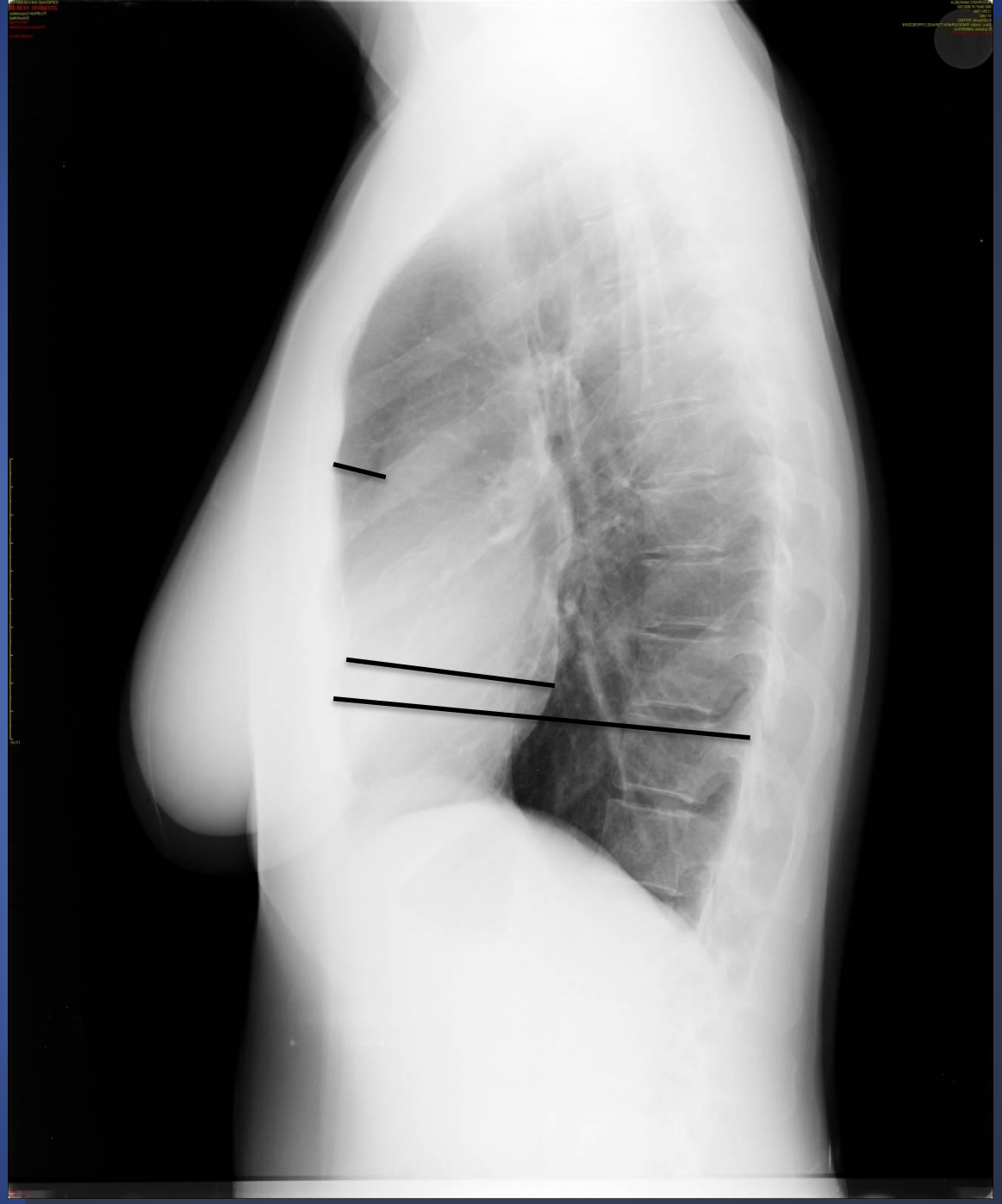
ICCS
Istituto Clinico Città Studi

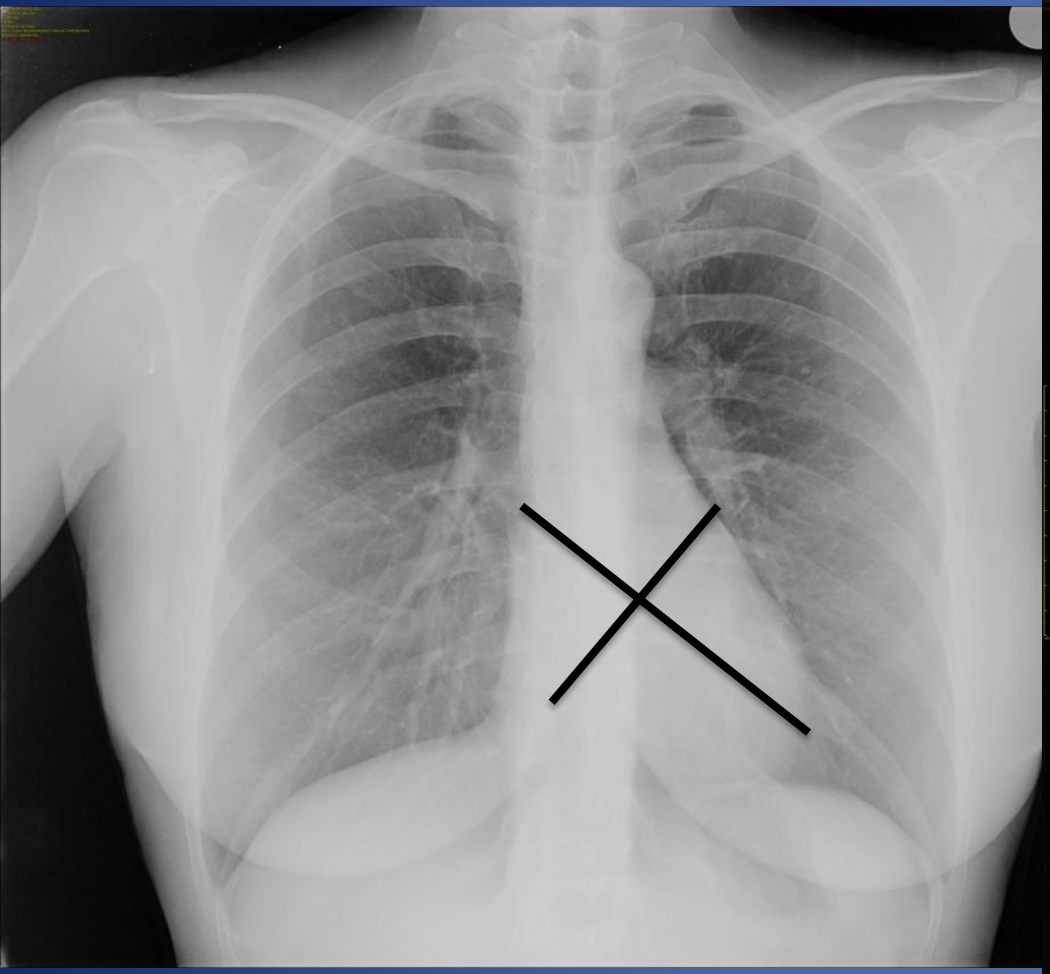
Il radiogramma normale

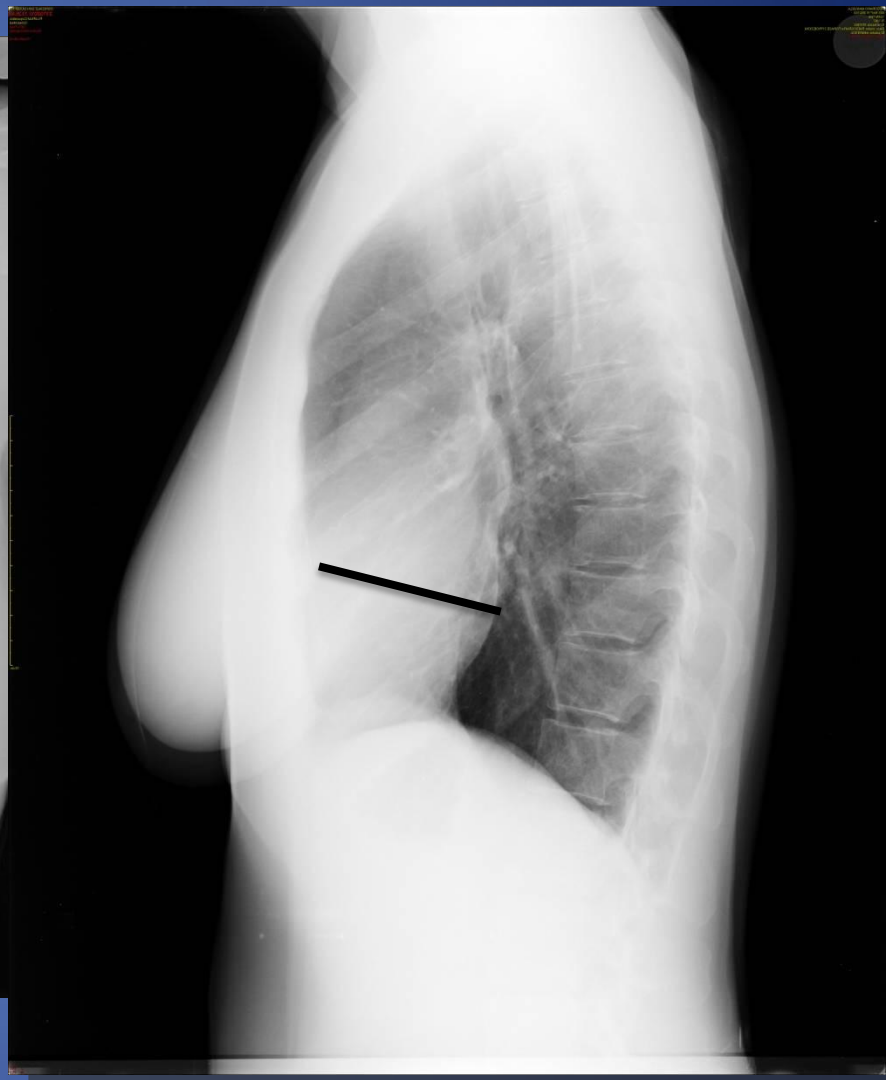
Parametri di valutazione generale del circolo polmonare e sistemico e dell'immagine cardiaca

Importante riconoscere i limiti della normalità


48-50 mm
15-16 mm
A/B=0.5





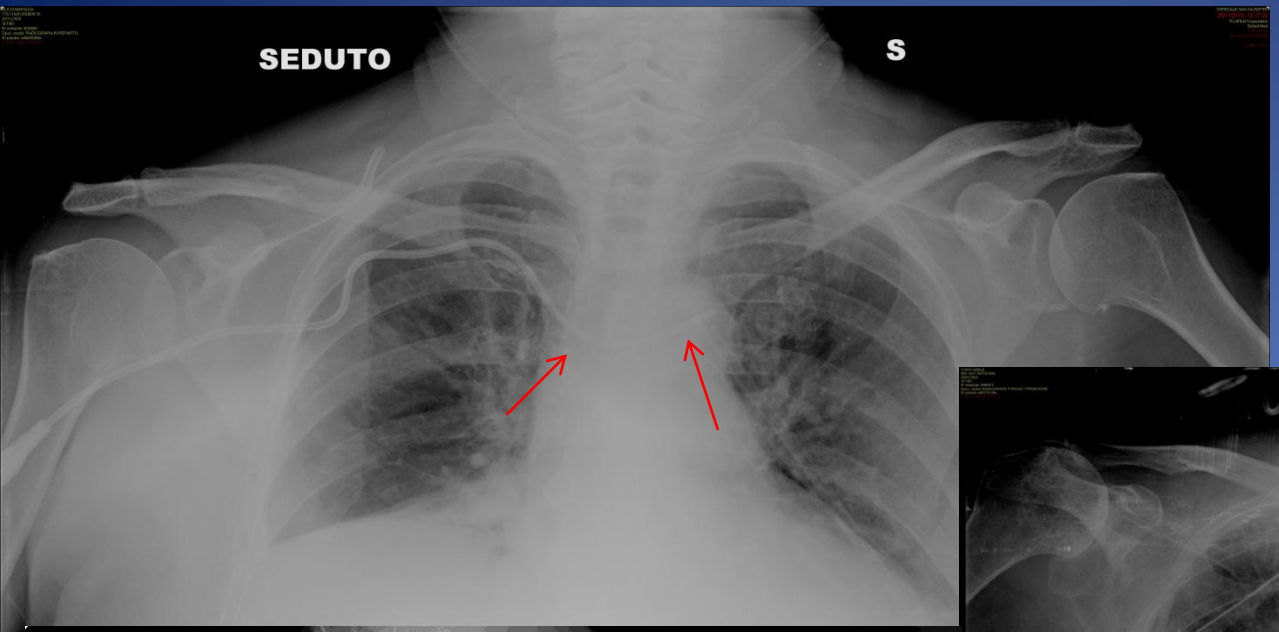


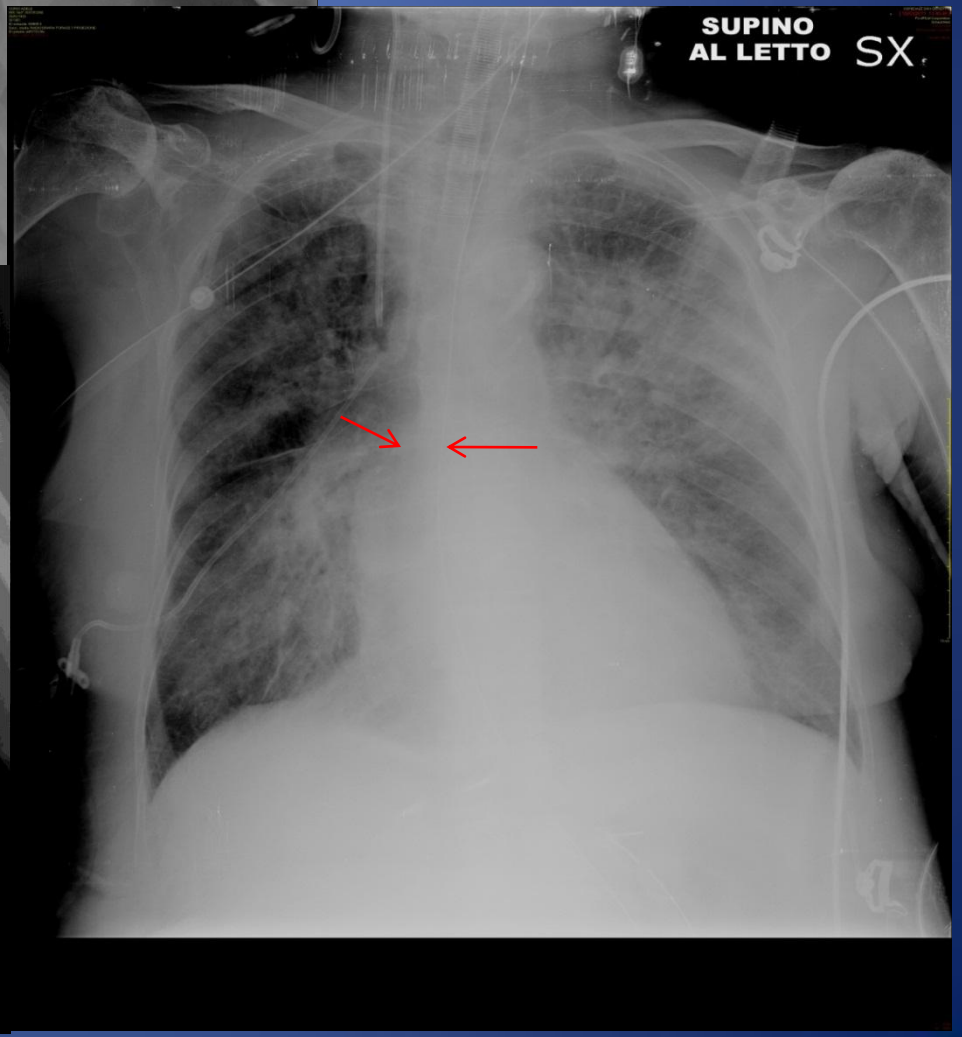
VCR = a x b x c /sup. corporea (norm. 350-500 ml/mq)

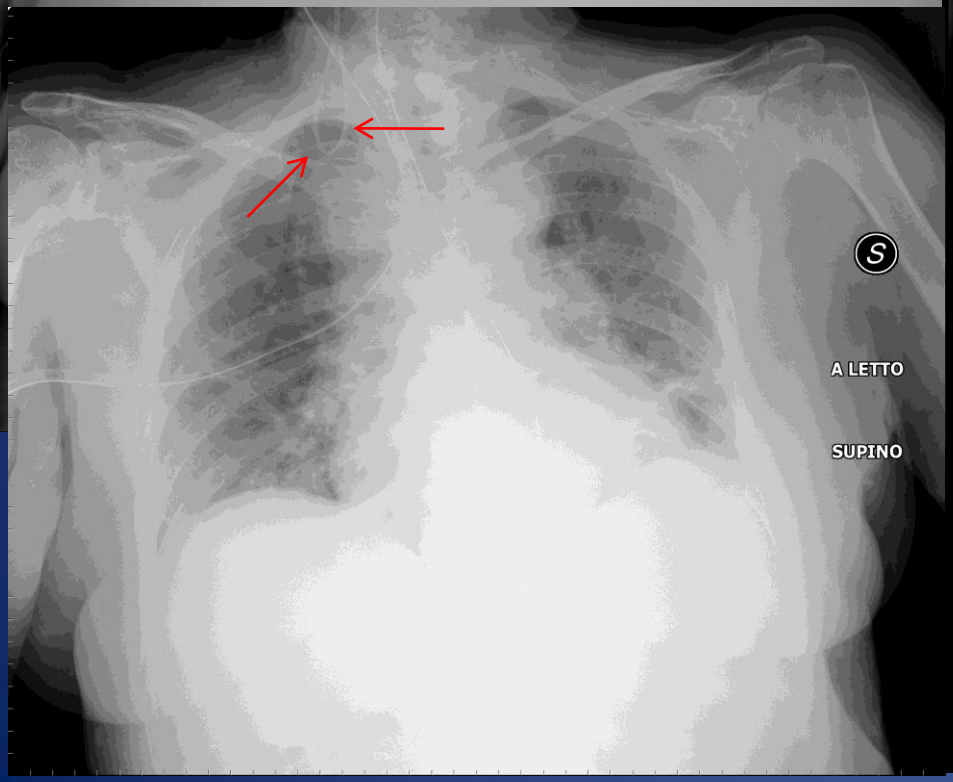
Immagine digitale

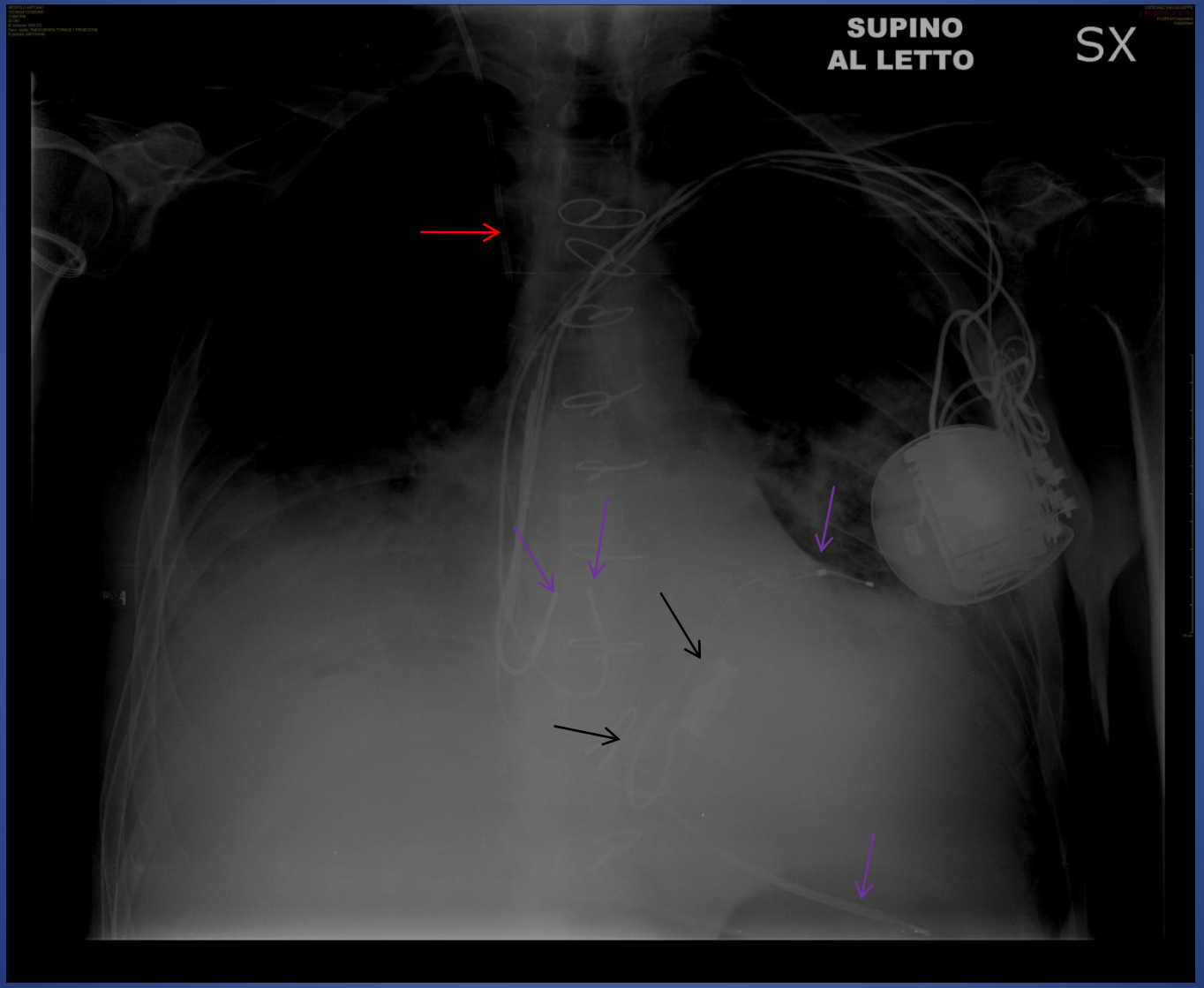
Immagine rilevata da detettori dedicati che ottengono immagine a matrice numerica.
La quantità di luce emessa dal detettore è prorzionale alla dose di radiazione assorbita in quel punto (relazione lineare).
Limite principale: risoluzione spaziale (2.5-5 pl/mm)
Vantaggio principale: immagine dinamica

Tubi e devices








SUPINO
AL LETTO
SX

RX in TI o UCIC

Esami eseguiti in precarie condizioni tecniche
Tuttavia l'esame ha dimostrato:
35% progressione e nuova malattia
30% cambiamento nella gestione clinica
20% individuazione di malposizionamenti

Bekermayer WB, Cropo RD: Efficacy of chest X-Ray in intensive care units. Chest 88:691-695;1985

RX in TI o UCIC

Aspetti radiologici delle principali condizioni di interesse clinico:

1. Stasi del circolo polmonare
2. Versamento pleurico
3. Pneumotorace
4. Addensamento parenchimale

Stasi circolo polmonare

Bilancio idrico del polmone si gioca tra due forze contrapposte.

a. P capillare polmonare (circa 8 mmHg)

b. P osmotica (circa 25 mmHg)

Stasi circolo polmonare

Aumento pressione venosa polmonare

- p > 20 mmHg → dilatazione vasi ilo con redistribuzione agli apici
- p < 20-30 mmHg > → edema interstiziale
- p > 30 mmHg → edema alveolare

Signs of Heart Failure in Chest Radiographs

Increasing hydrostatic pressure

Cortese concessione **Helmut Prosch Dept. of Radiology Vienna General Hospital**

Stasi circolo polmonare

Punteggio emodinamico-radiologico:

0 normale

I Art/bronco minimo incremento

II edema interstiziale

III edema alveolare localizzato (basi, ilo)

IV edema alveolare diffuso

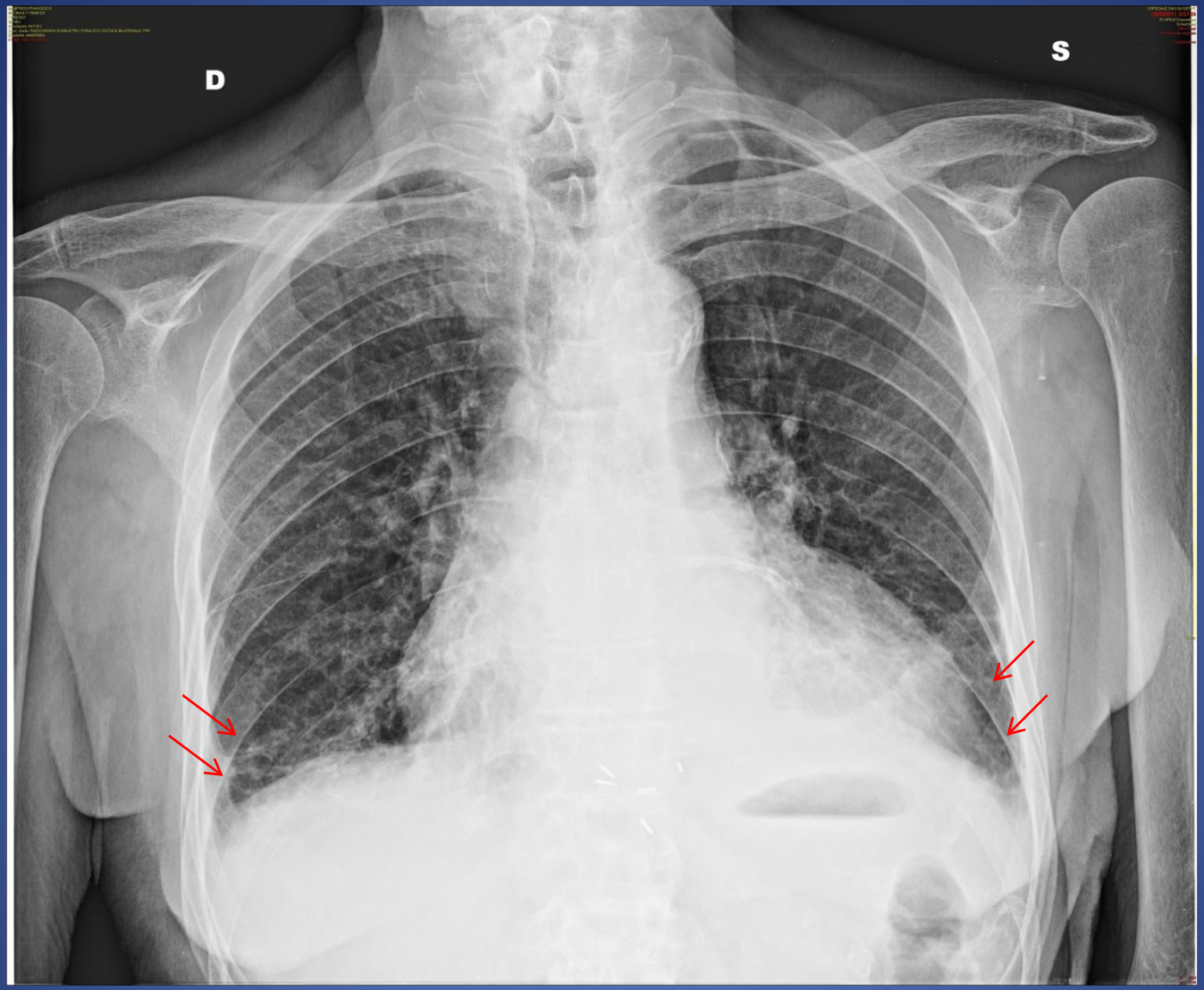
Aberle DR, Wiener Kronish JP, Webb WR: Hydrostatic vs. increased permeability pulmonary edema: diagnosis based radiographic criteria. Radiology 168: 73-79;1988

Stasi circolo polmonare

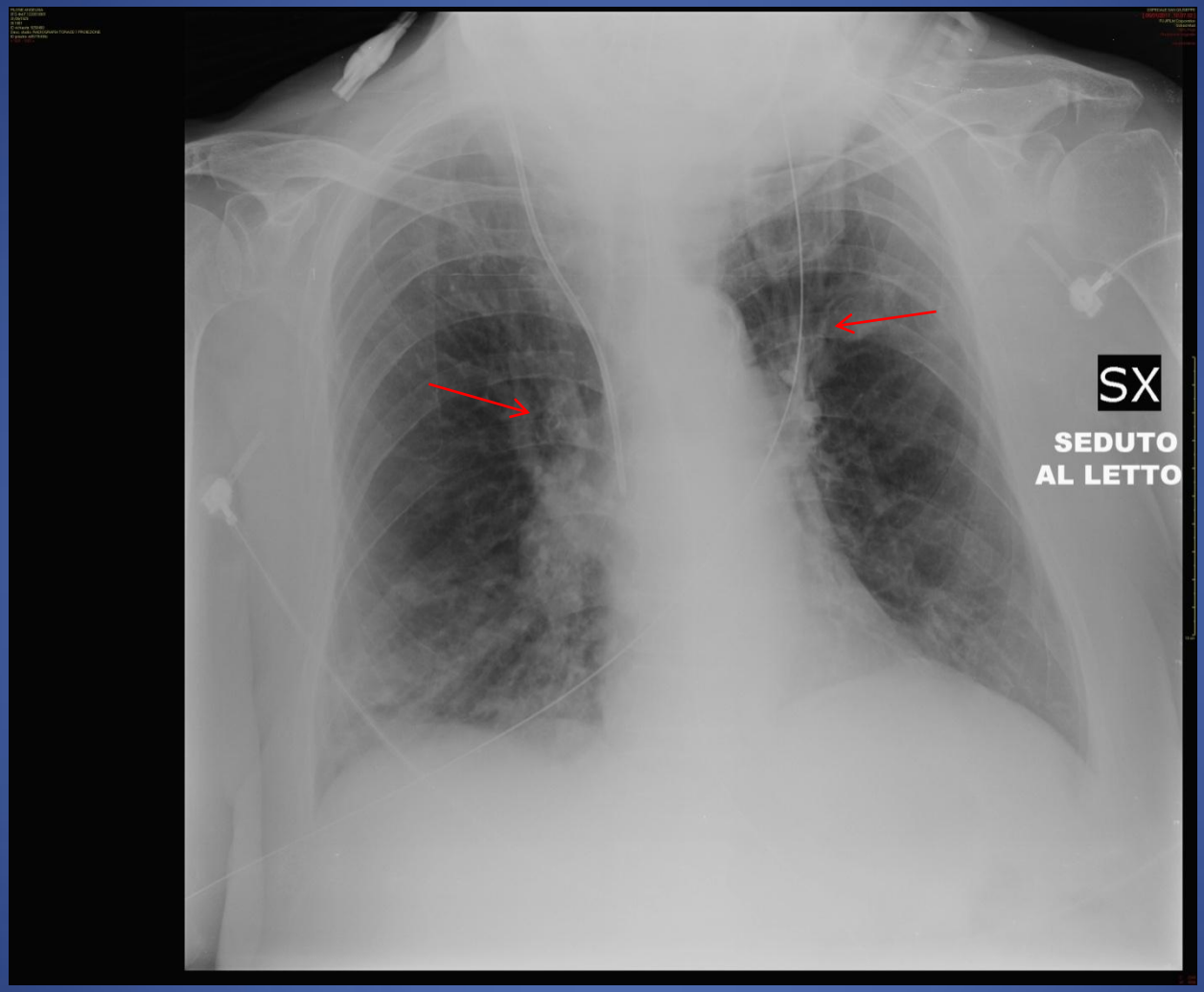
Segni radiologici di edema polmonare:

- Strie di Kerley (liquido nei setti interlobari)
- Riditribuzione del flusso all'ilo
- Incremento del peduncolo vascolare
- Cardiomegalia (in edema cardiogeno)
- Consolidamento parenchimale edemigeno

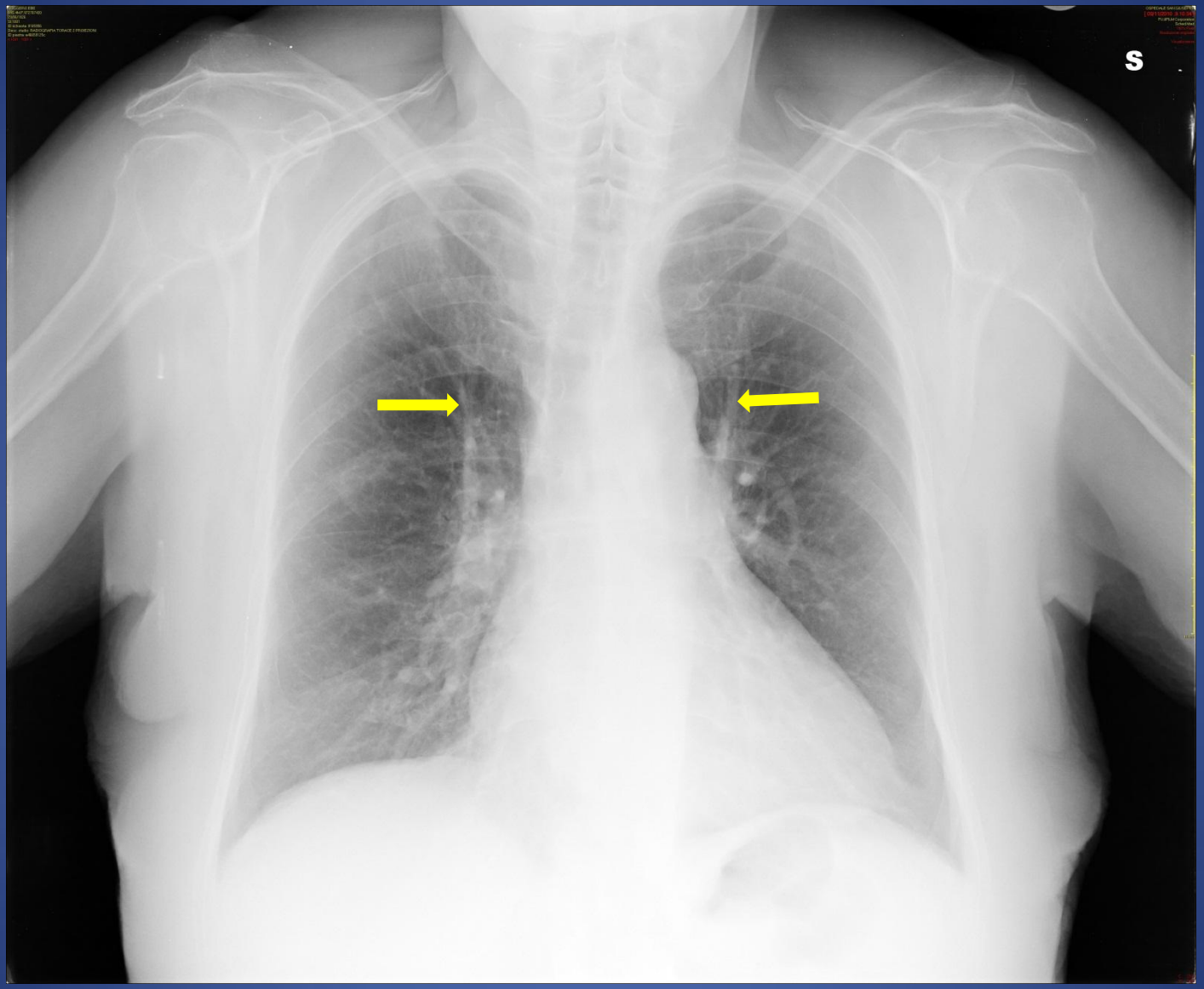
C. Ravin Imaging radiology in Intensive Care Unit – Chrchil-Livingstose Ed. 1993



Stasi basale con strie di Kerley



Eversione flusso polmonare agli apici



Eversione flusso polmonare agli apici

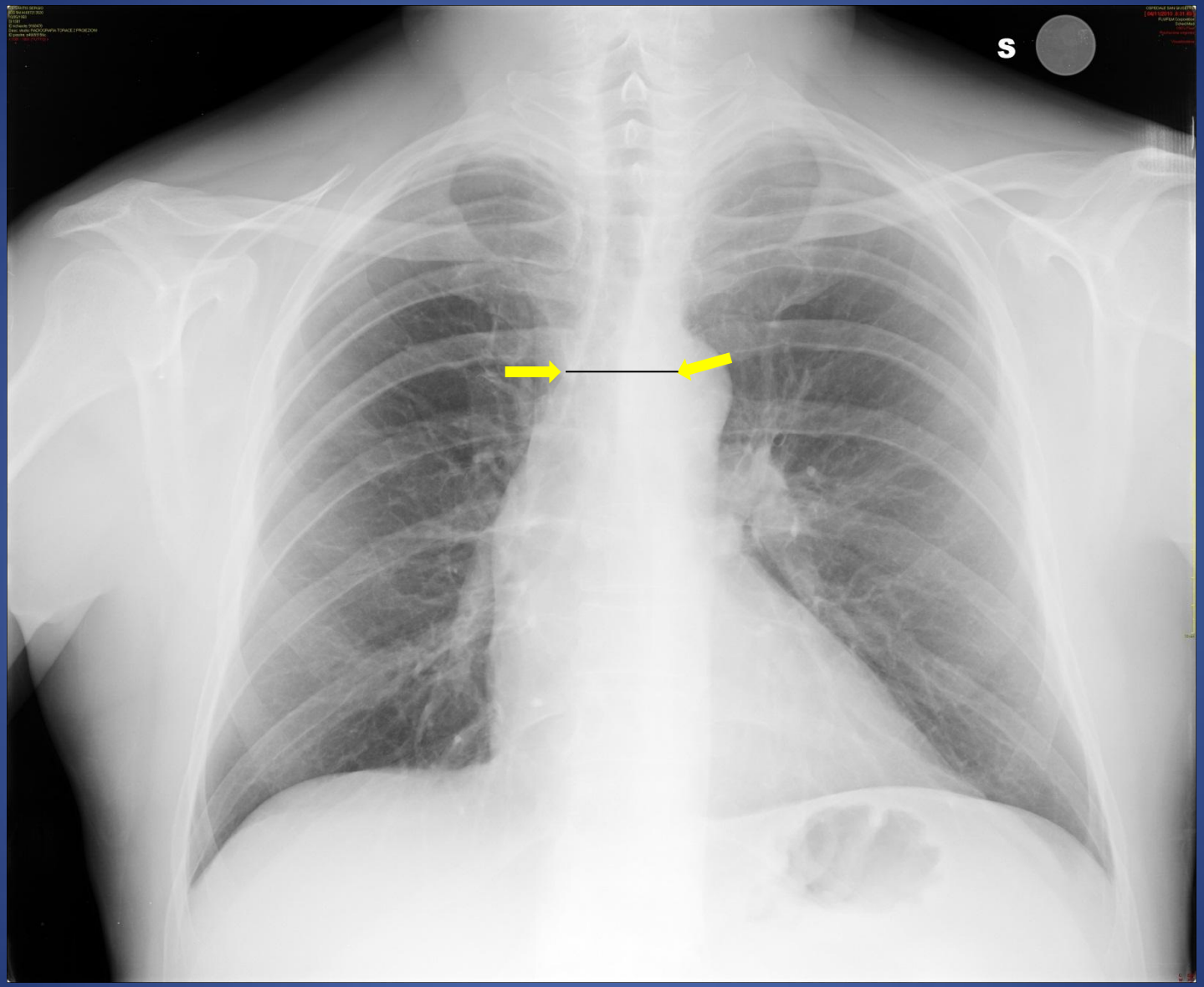
Stasi circolo polmonare

PEDUNCOLO VASCOLARE:
Linea A : incrocio VCS/Bronco dx
Linea B: Incrocio A. Succl.sin/arco ao

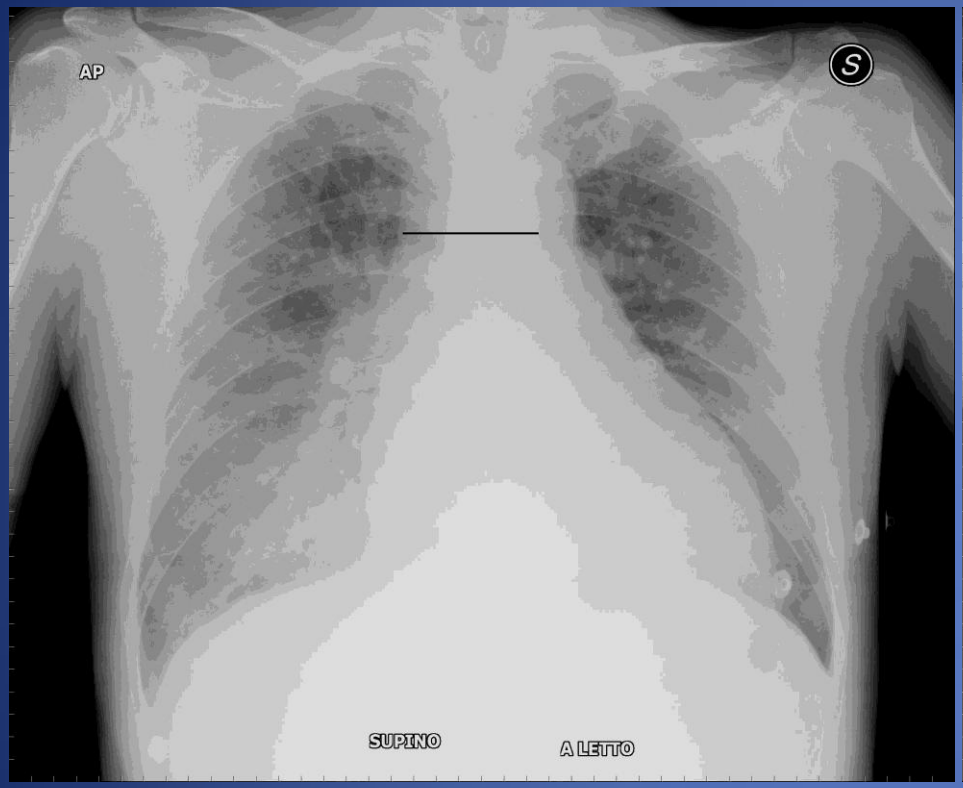
Margine DX: Venoso
Margine SIN: Arterioso

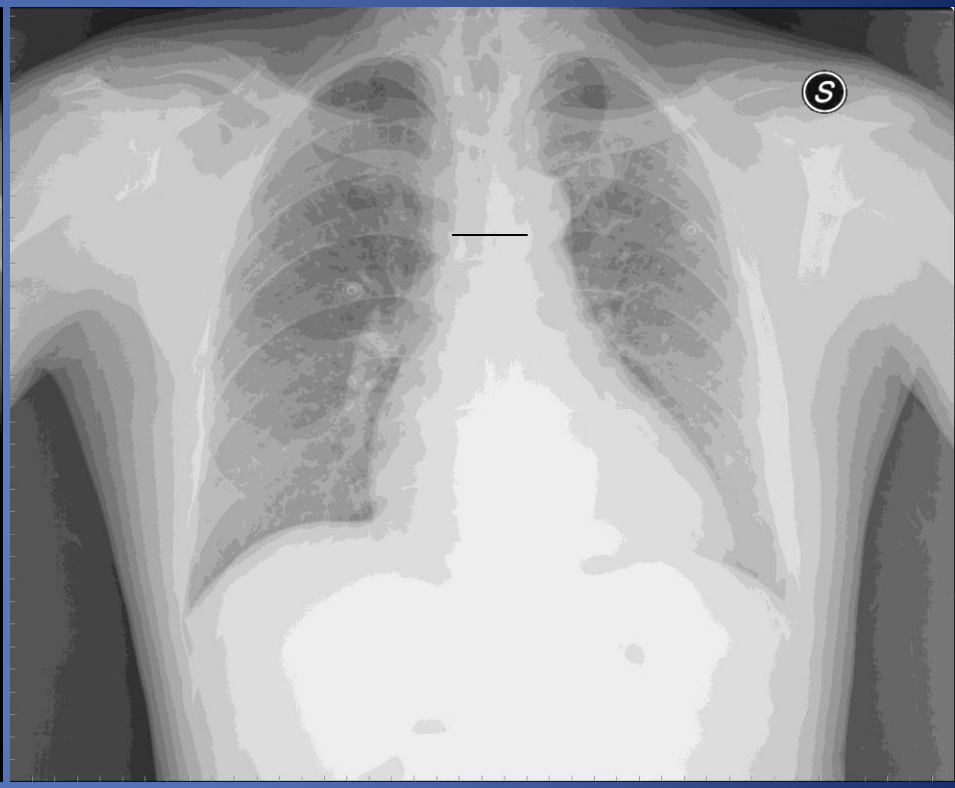
Normale 48-50 mm

C. Ravin Imaging radiology in Intensive Care Unit – Chrchil-Livingstose Ed. 1993

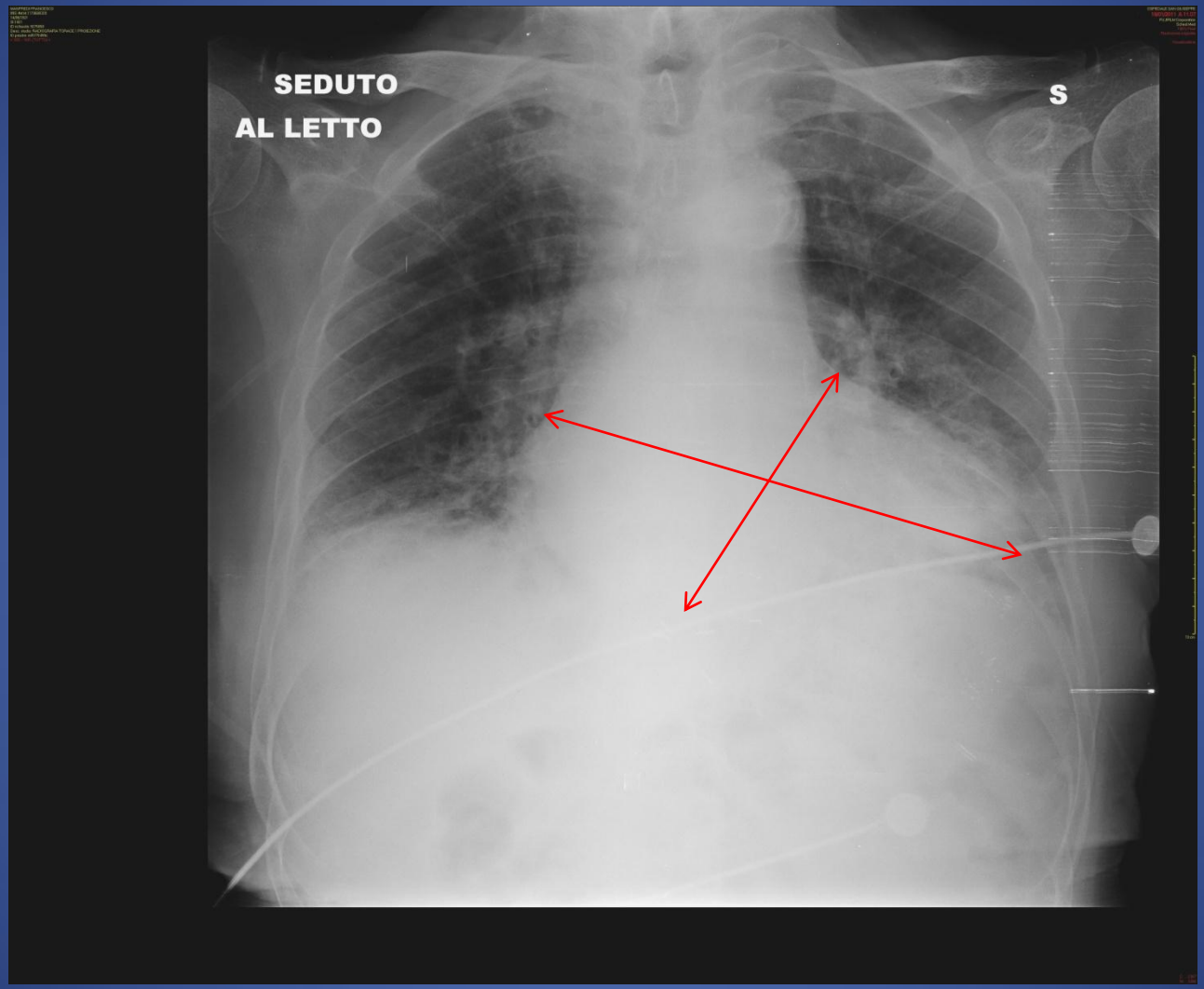


Peduncolo vascolare

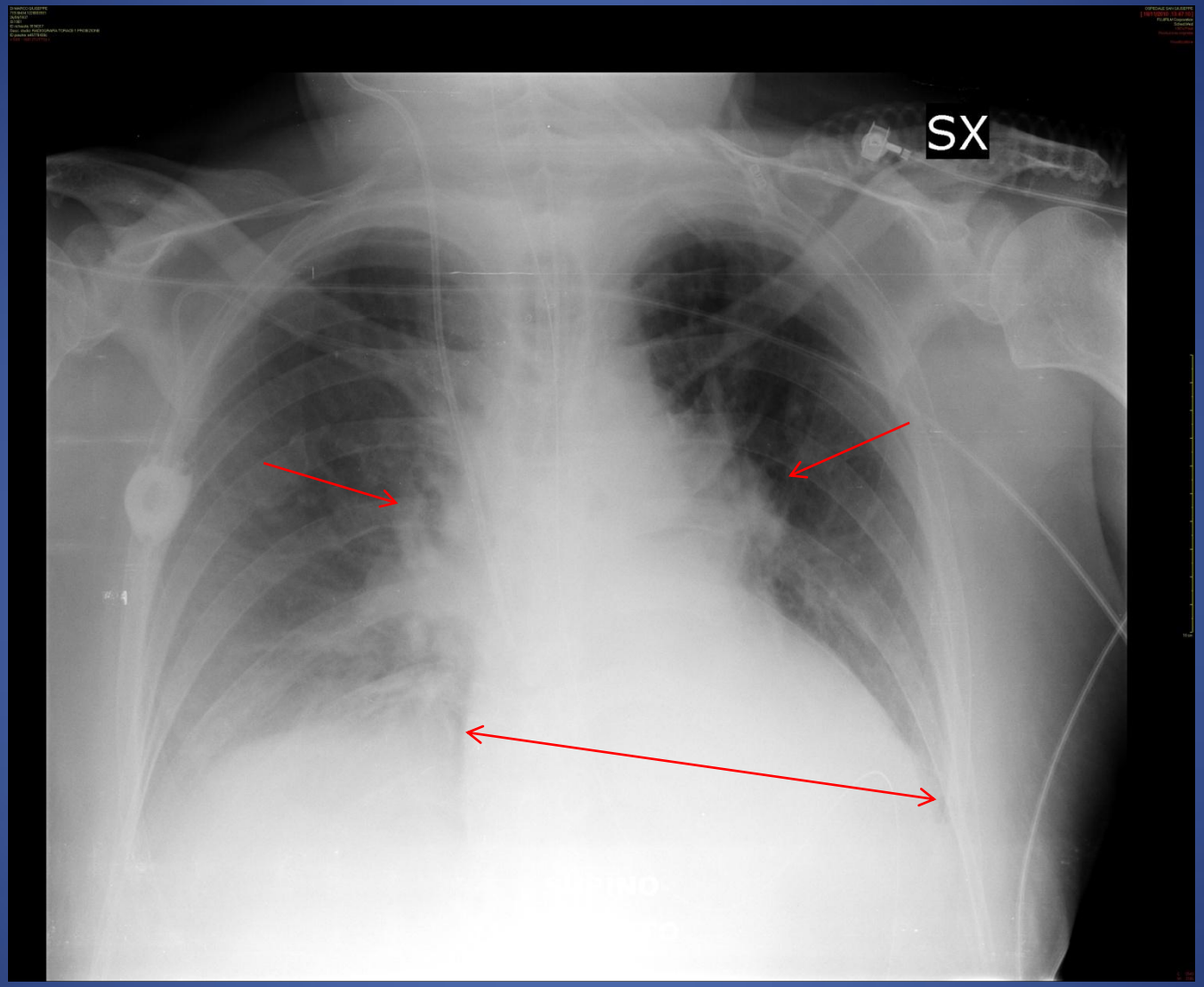




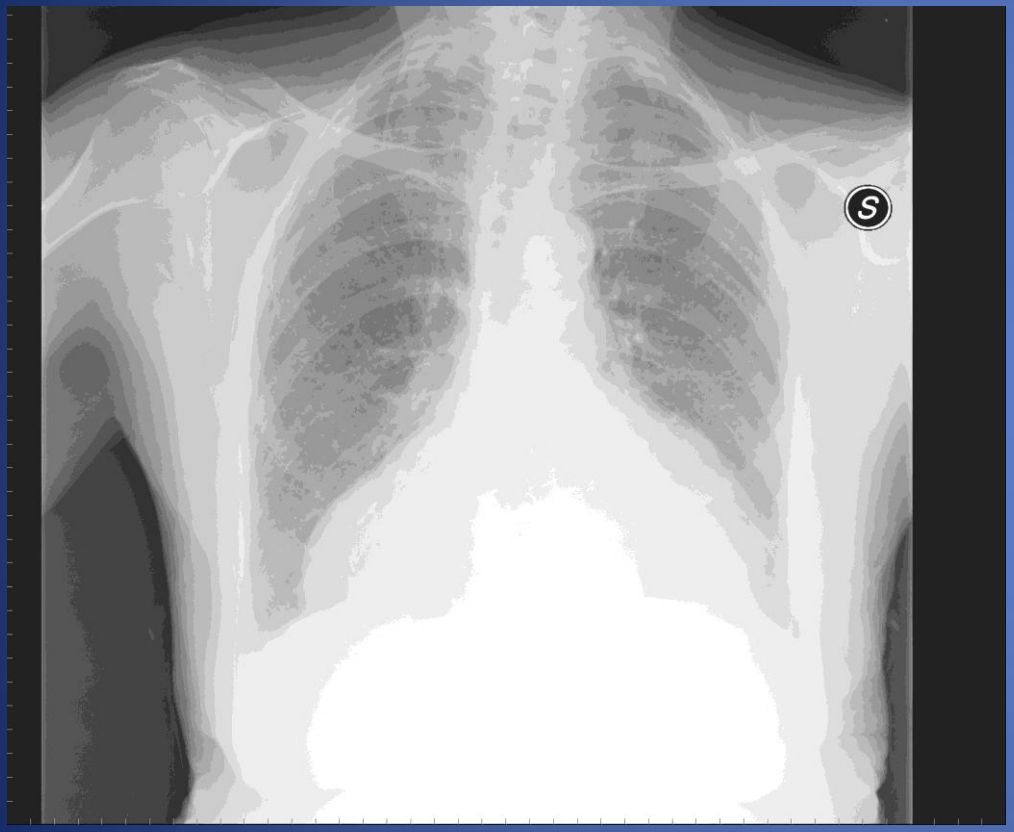
Peduncolo vascolare



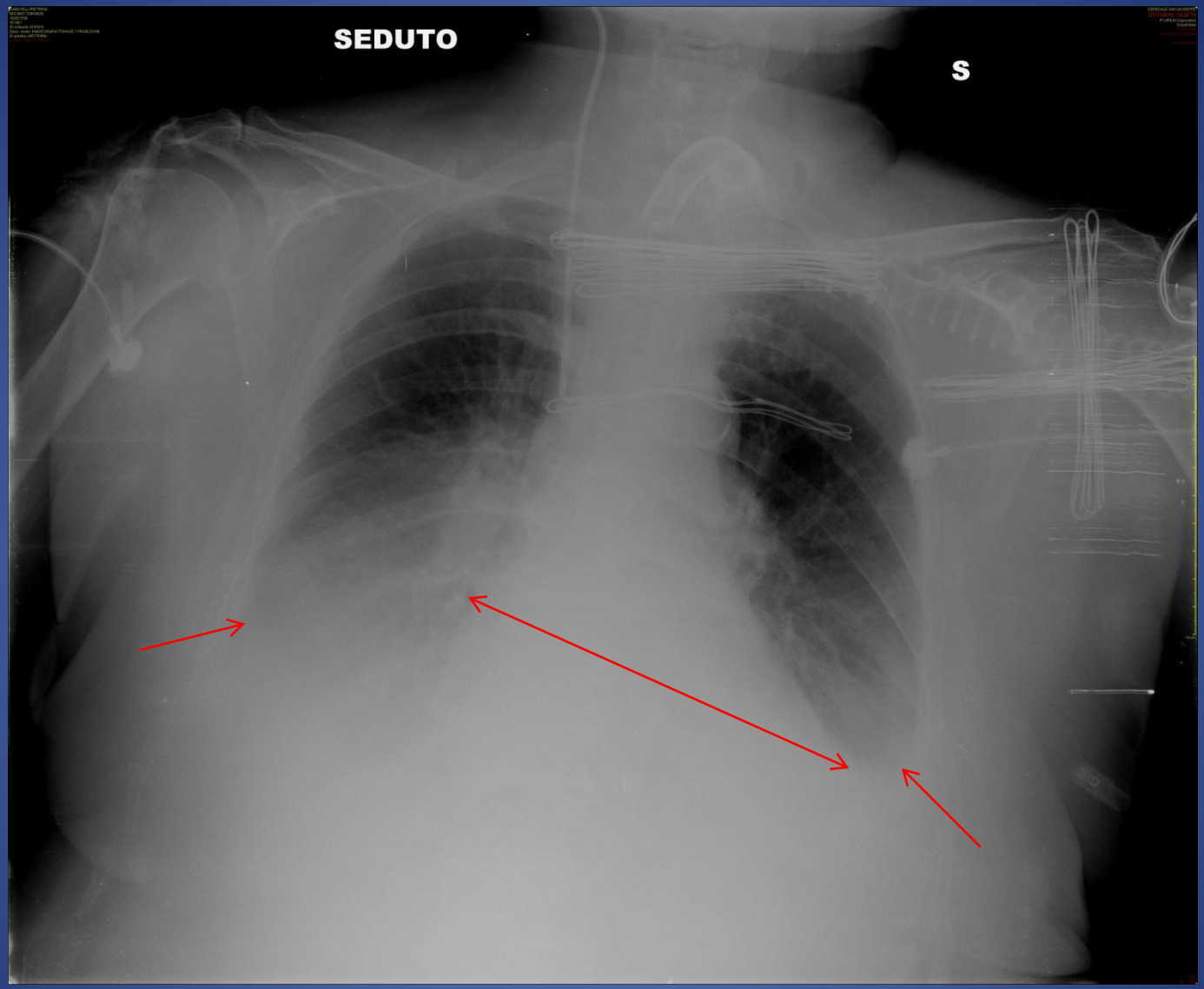
Cardiomegalia



Cardiomegalia e stasi circolo polmonare



Cardiomegalia mitralica



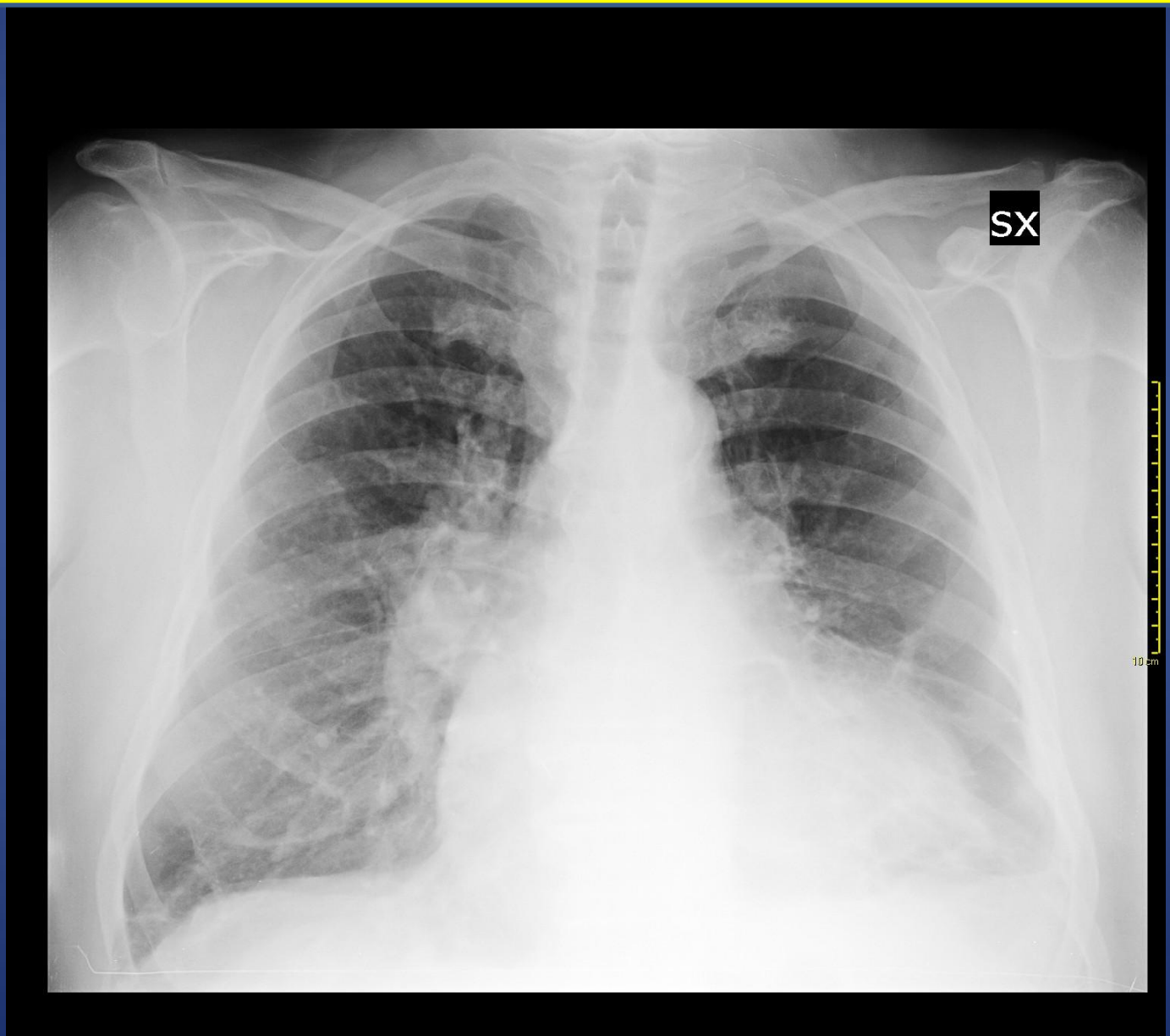
Cardiomegalia, stasi polmonare, versamento pleurico

Stasi circolo polmonare

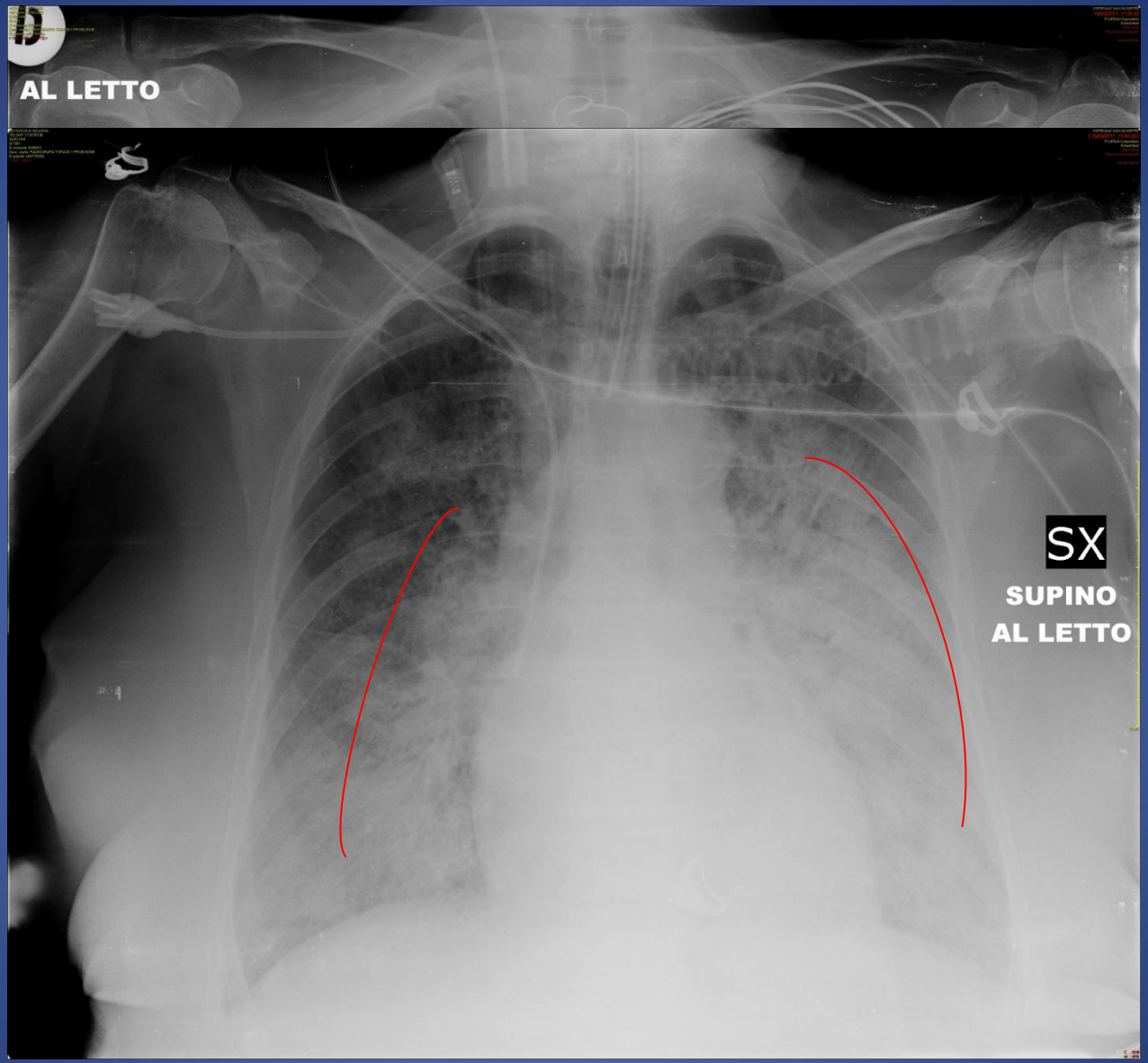
	Cardiaco	Altro
Cardiomegalia	si	no
Flusso polmonare	invertito	bilanciato
Linee di Kerley	si	si
Edema	basale, diffuso	perilare
Versam. pleurico	frequente	a volte

Milne EN, Pistolesi M: The radiologic distinction of cardiogenic and non-cardiogenic edema. AJR 144: 879-894; 1985

SCOMPENSO CARDIOGENO

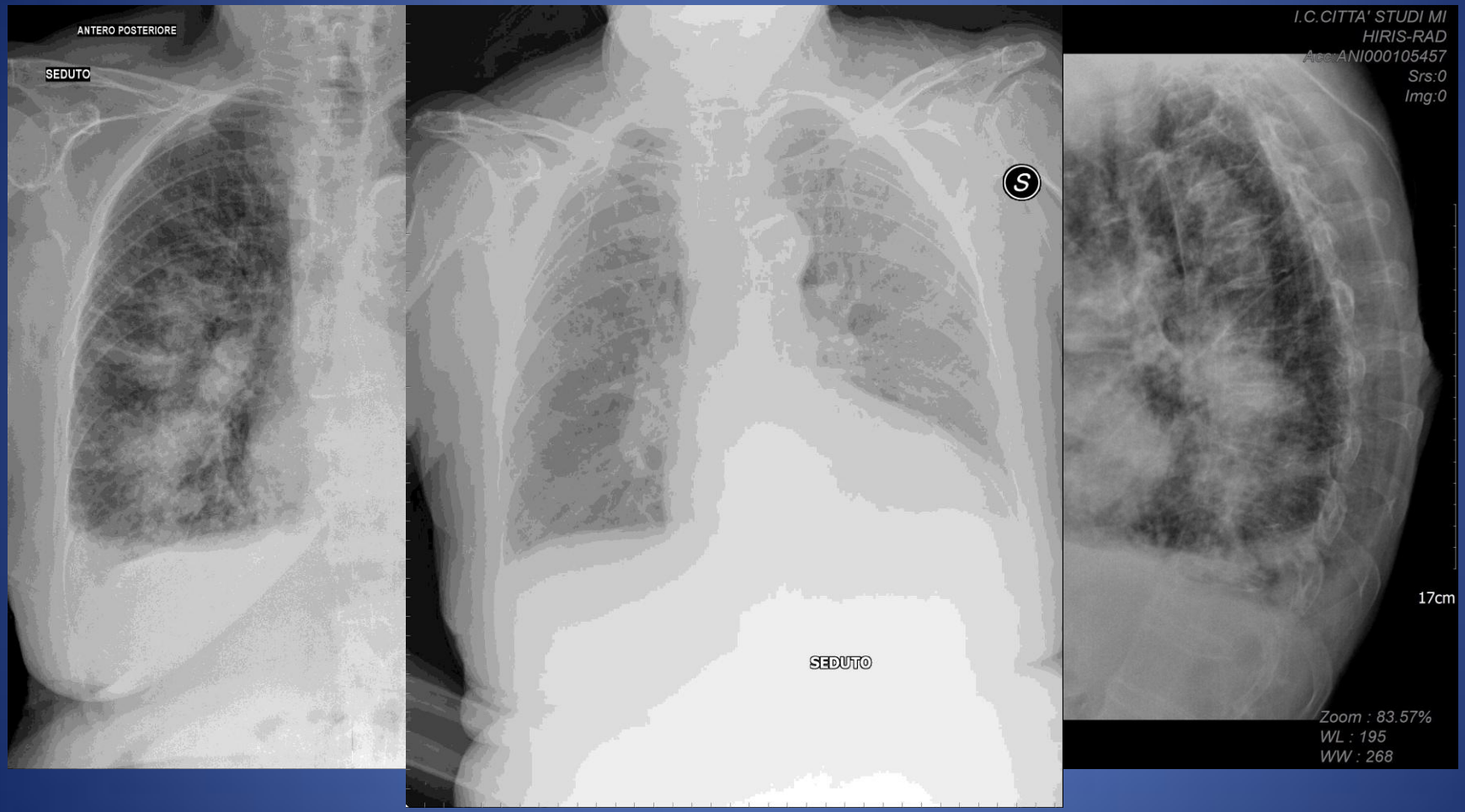


SCOMPENSO CARDIOGENO



Edema polmonare perilare

Edema polmonare diffuso

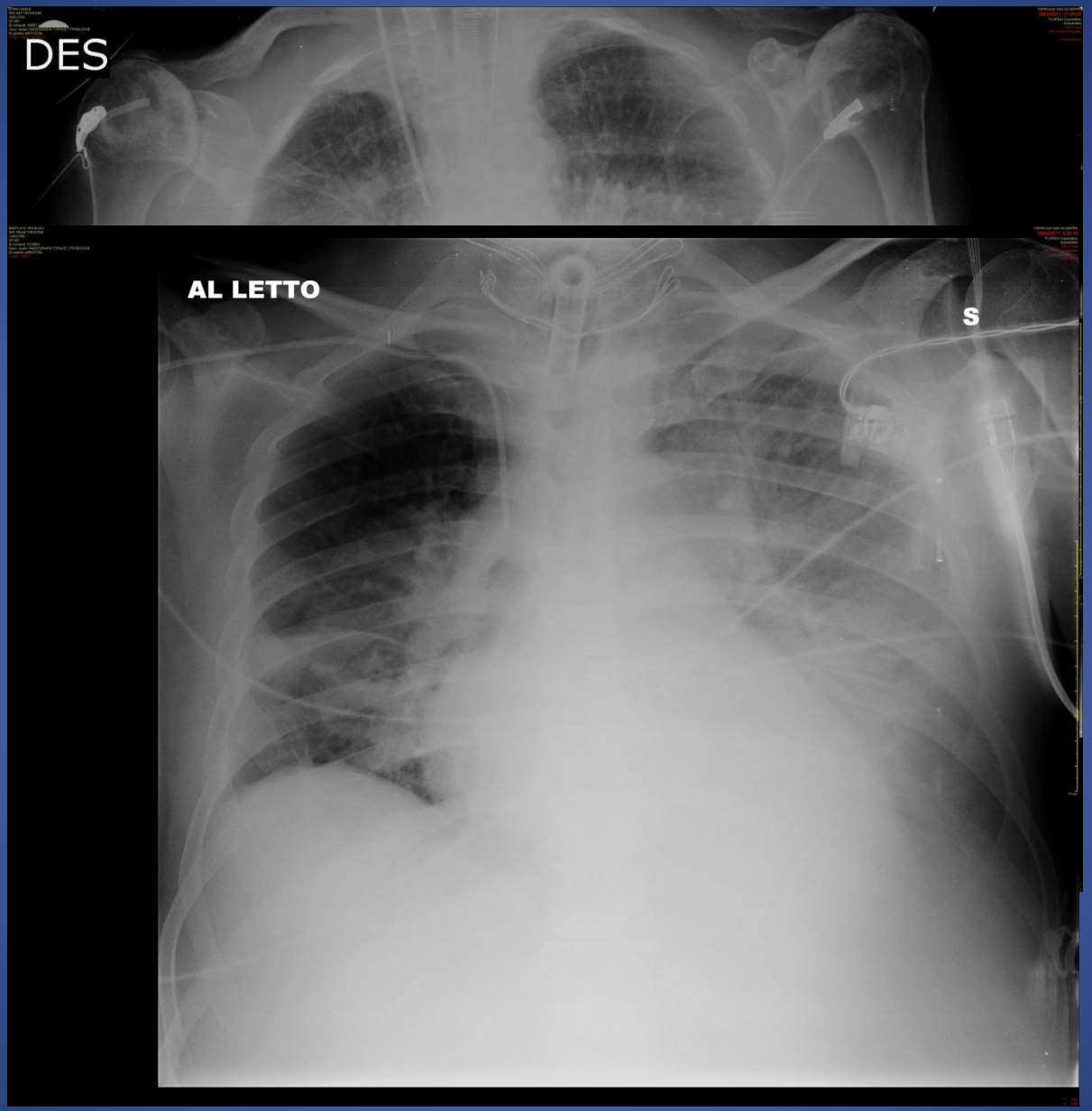


Polmone umido

Edema polmonare omolaterale

Evento raro, difficile da distinguere rispetto a processo flogistico
Specie in caso di decubito prolungato o occlusione venosa unilaterale.

C. Ravin Imaging radiology in Intensive Care Unit – Chrchil-Livingstose Ed. 1993



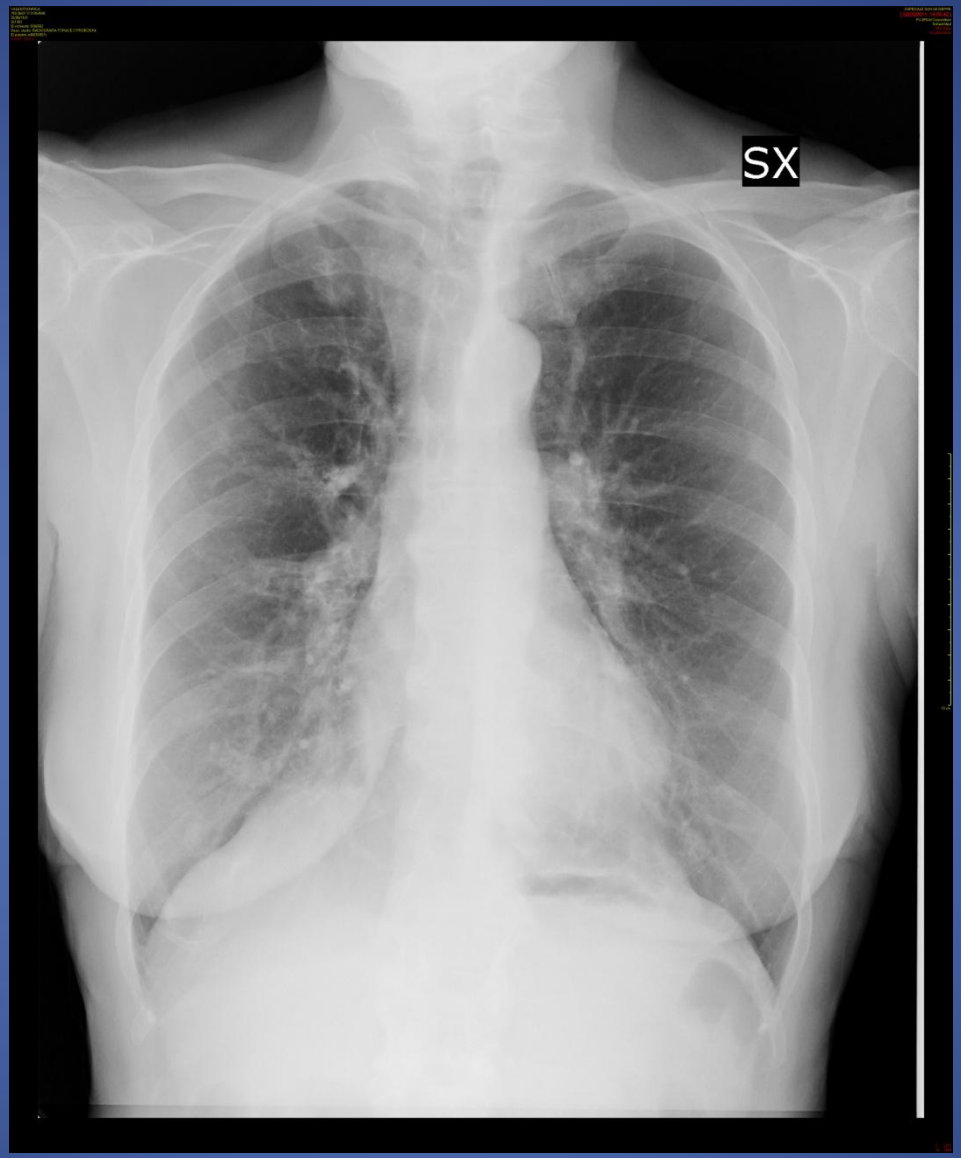
Edema polmonare monolaterale

Ipertensione polmonare

Aumento pressione arteriosa polmonare

- dilatazione arterie prossimali (elastiche) con restringimento delle periferiche (muscolari)

Worsley DF, Alavi A: Chest X-Ray findings in pts with acute pulmonary embolism from PIOPED study Radiology 189:133-136; 1993



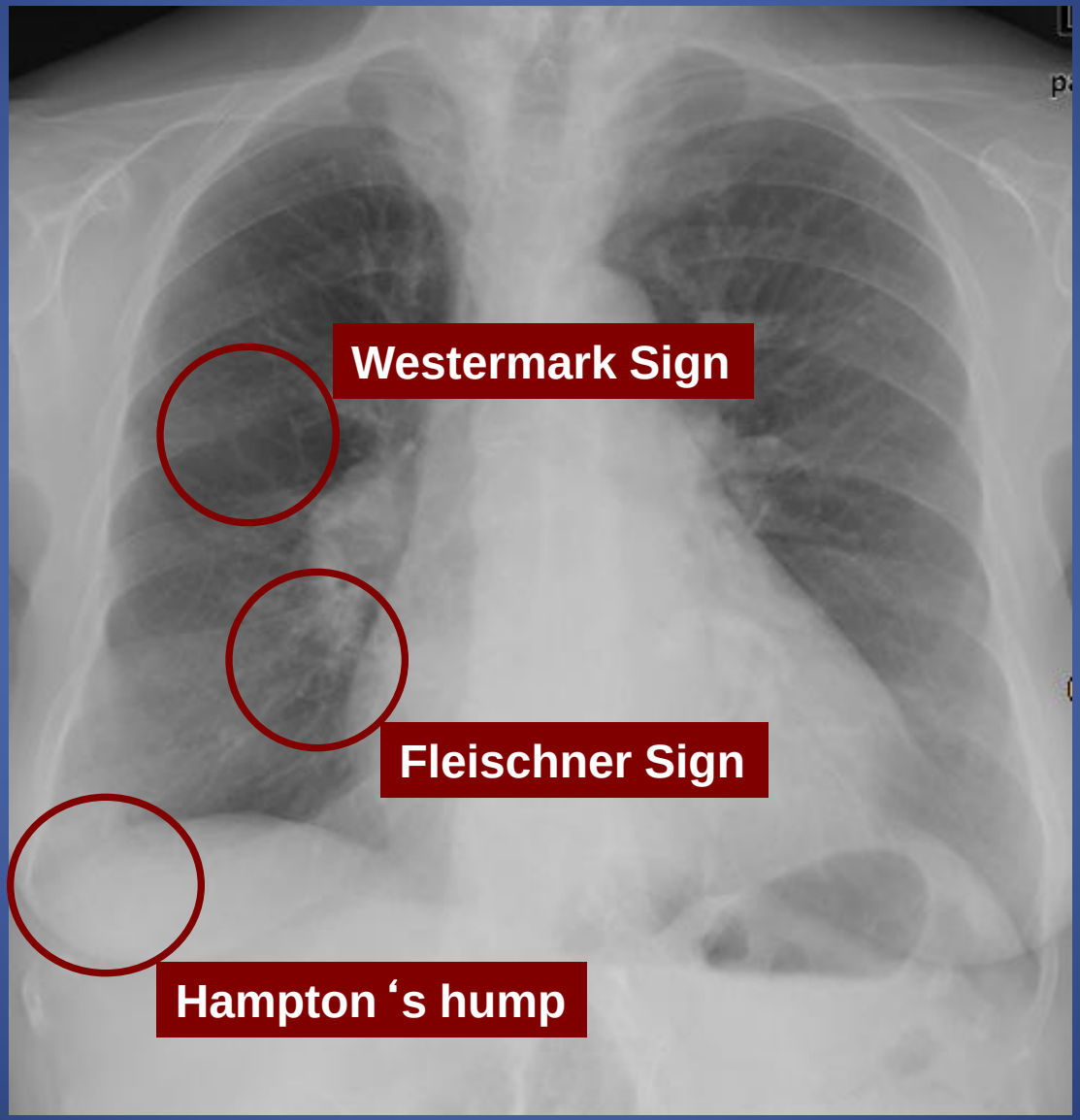
Ipertensione arteriosa polmonare

Embolia polmonare

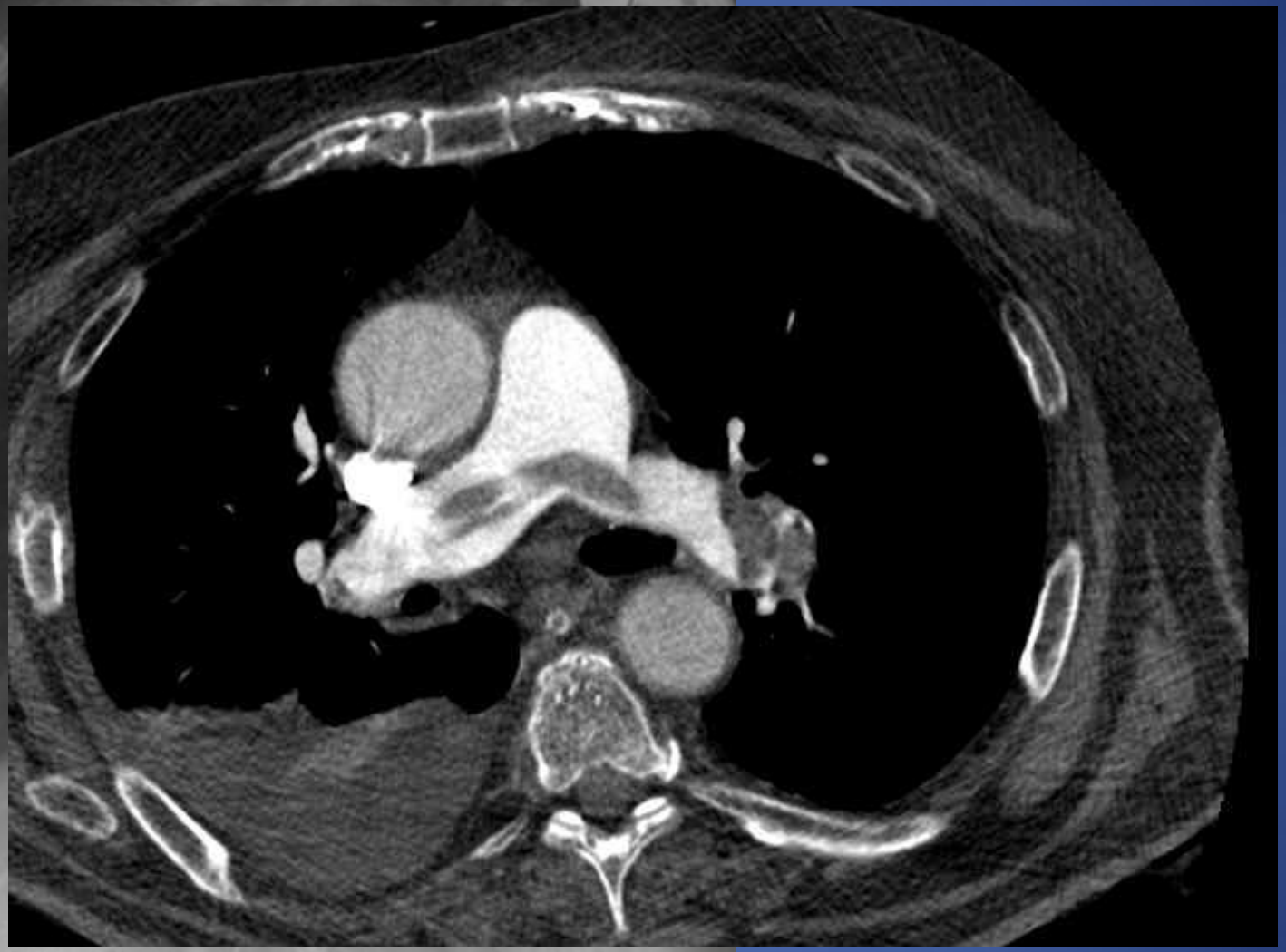
Embolia polmonare:
- atelettasie (65%)
- modificazioni circolo polmonare (25%)
- cardiomegalia (25%)
- versamento pleurico (48%)
- segno di Westermark – Fleischner (60%)
- infarto parenchimale – Hamton (10-35%)

Worsley DF, Alavi A: Chest X-Ray findings in pts with acute pulmonary embolism from PIOPED study Radiology 189:133-136; 1993

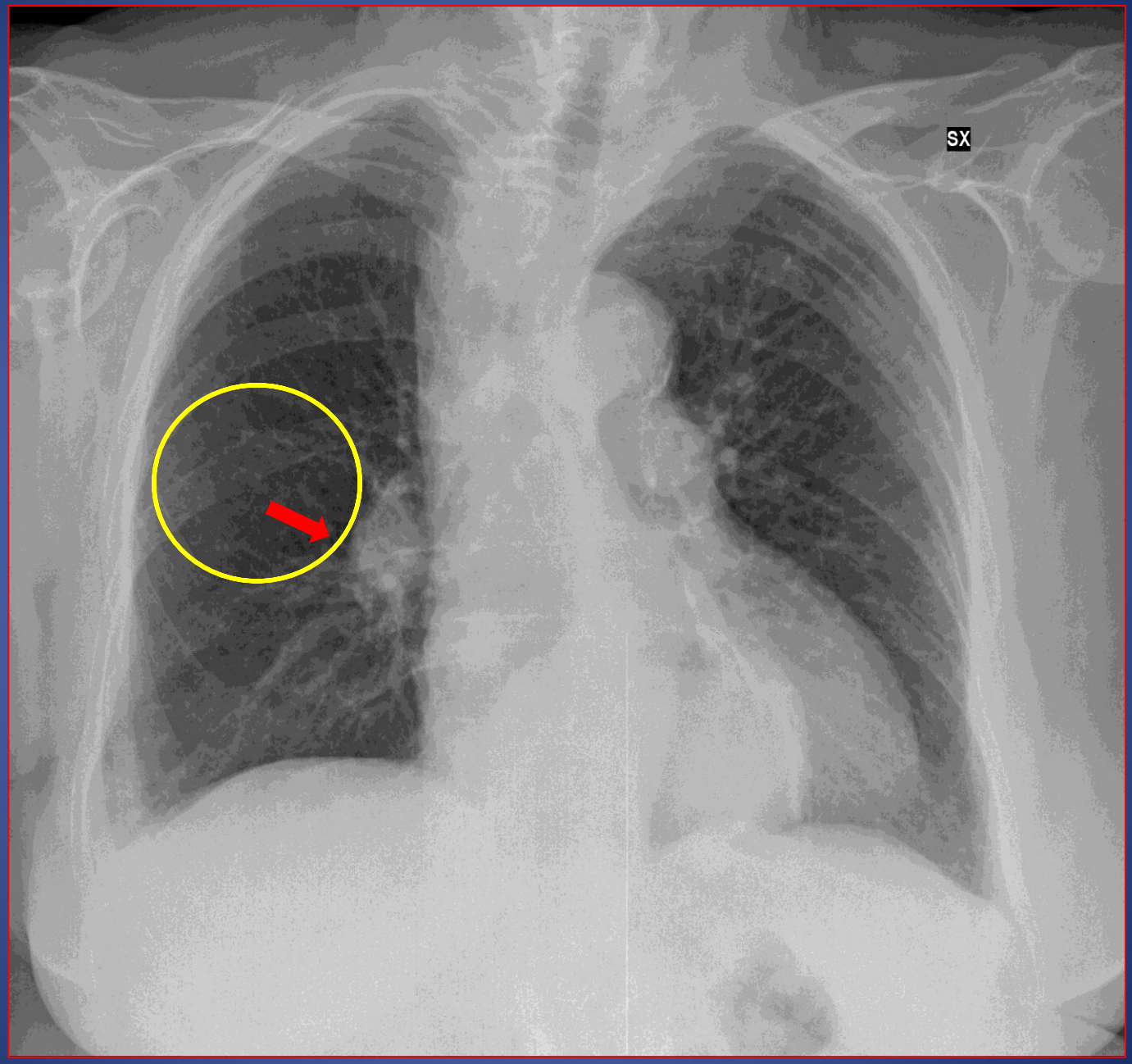
Signs of Pulmonary Embolism on Chest RX



Cortese concessione **Helmut Prosch Dept. of Radiology Vienna General Hospital**



TEP



Segno di Westermark – Fleischner

Versamento pleurico

Squilibrio tra produzione ed assorbimento di liquido

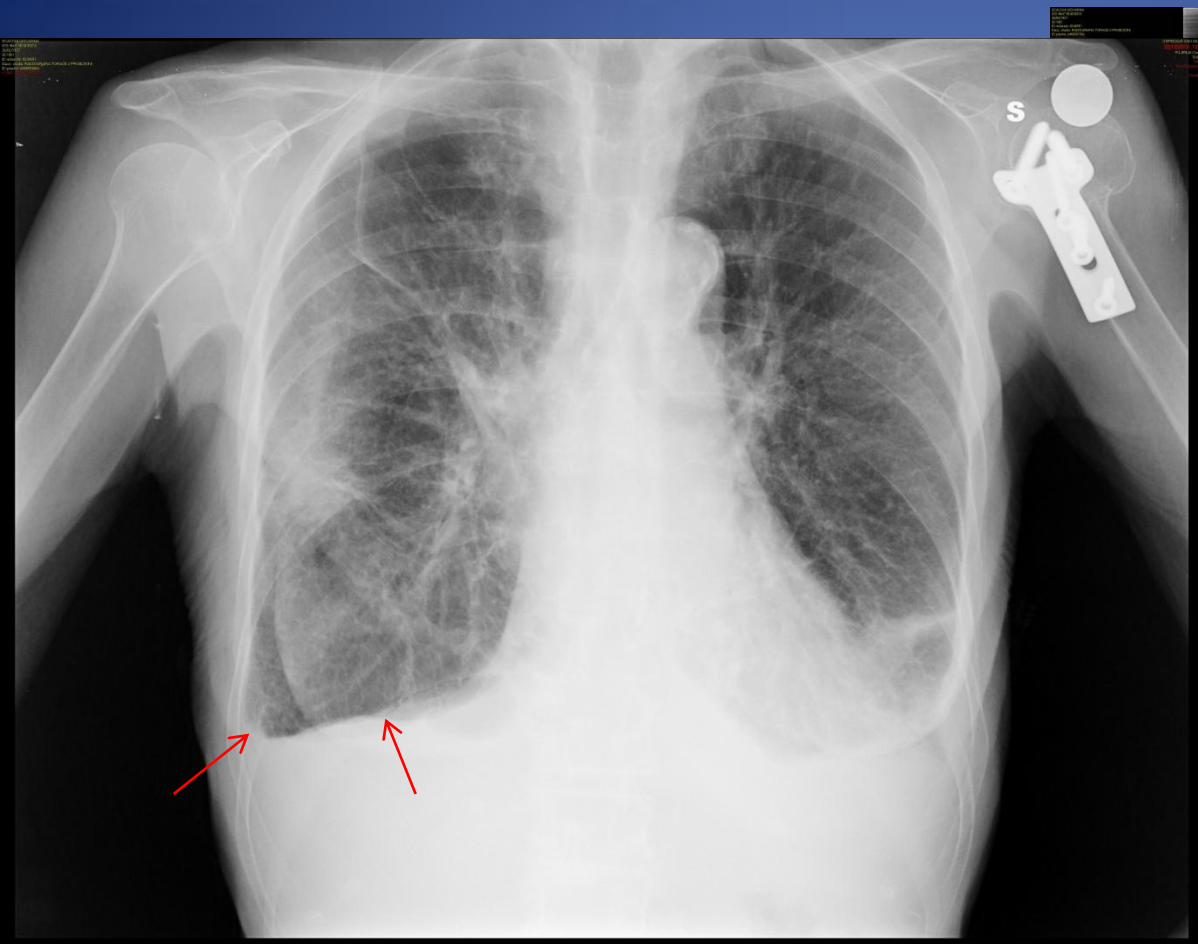
- ↑ p idrostatica → scompenso e stasi
- ↑ permeabilità e stasi linfatica → processi infiammatori

Visibilità ad RX torace:

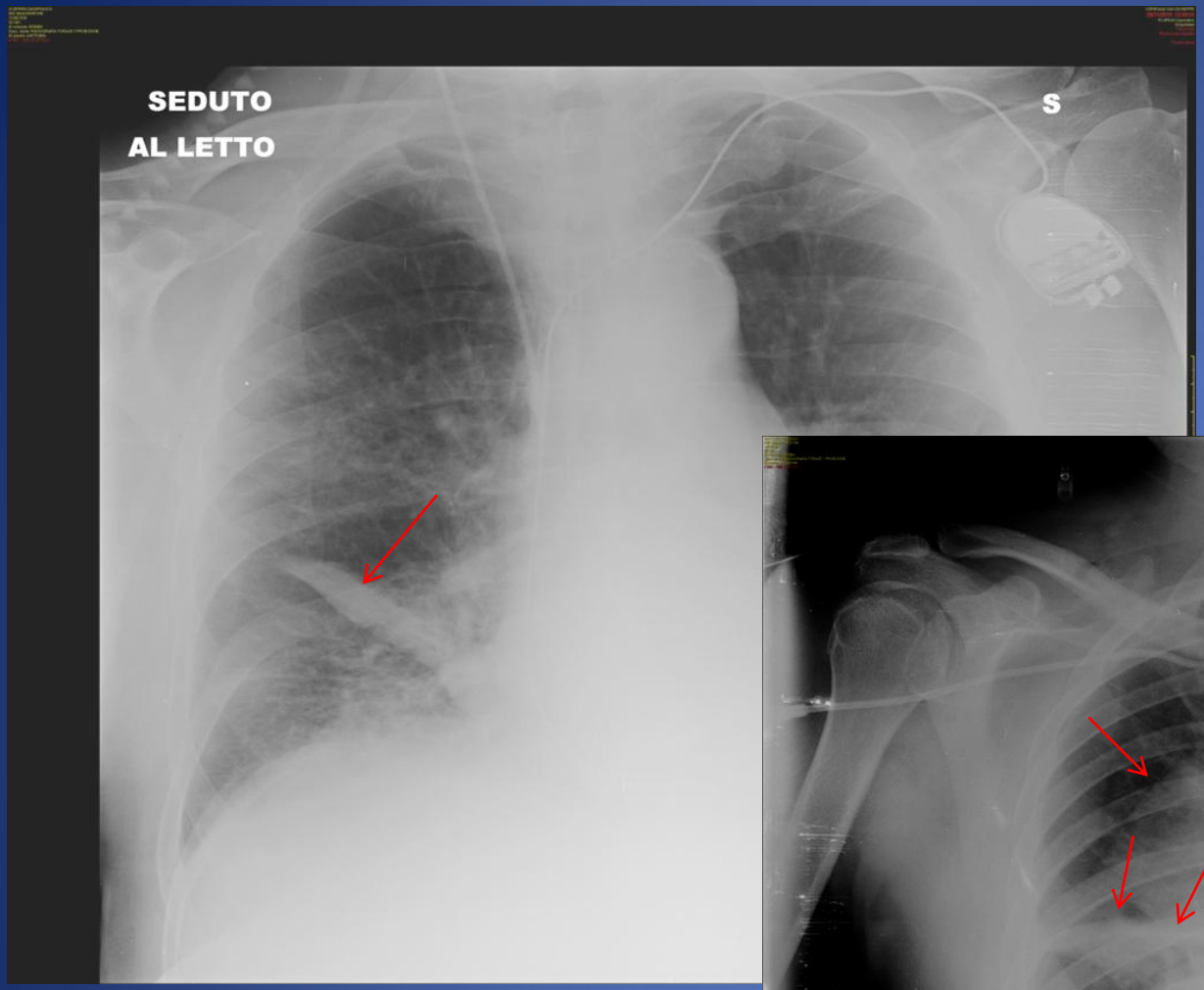
- > 25 ml → obliterazione sfondato post. RX LL
- > 125 ml → obliterazione sfondato lat. RX AP

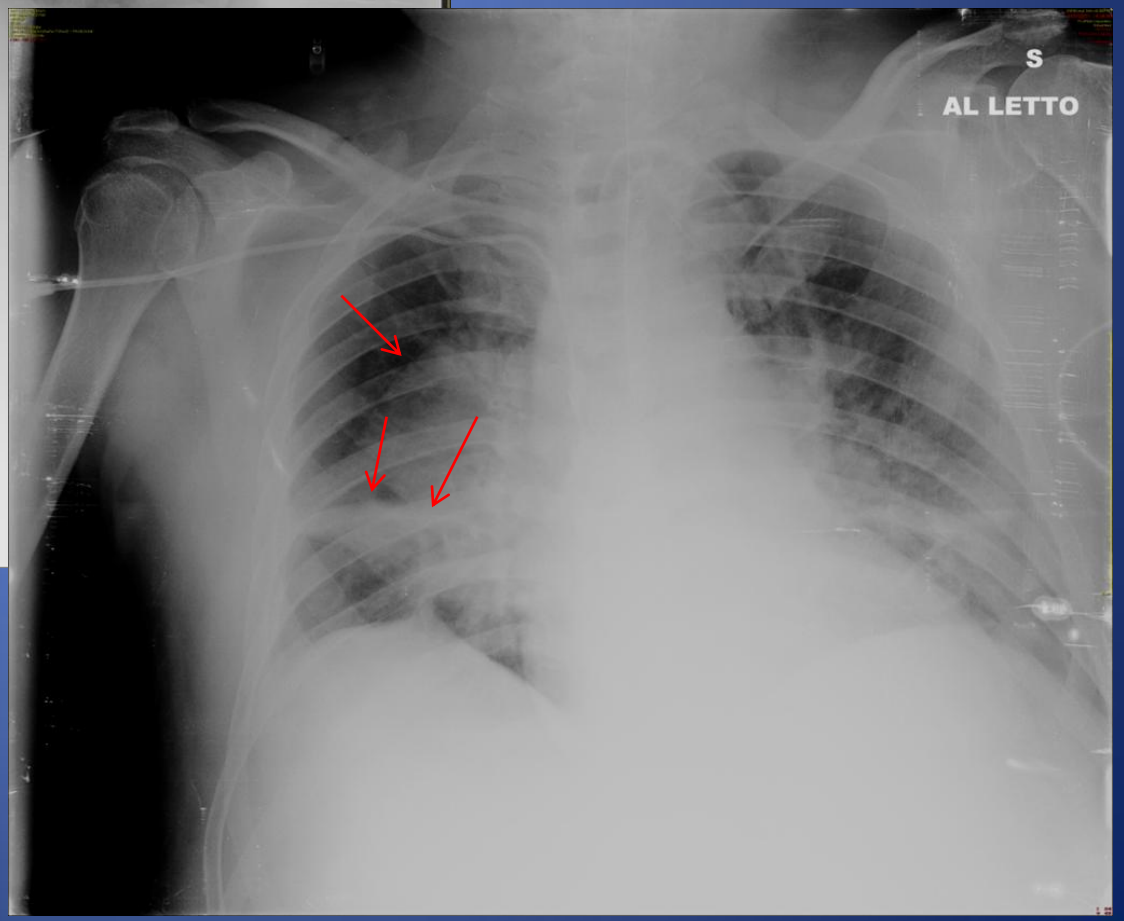
Spesso difficile da apprezzare in decubito supino

A volte solo interscissurale.

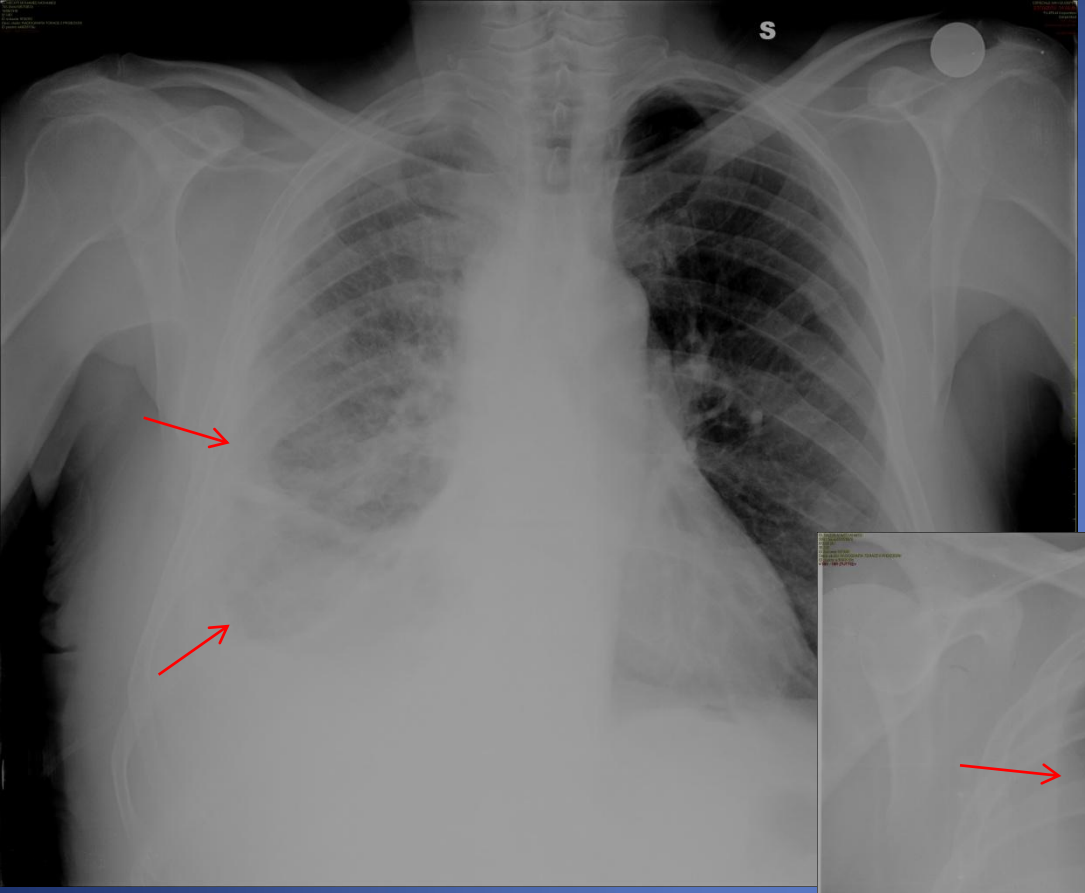


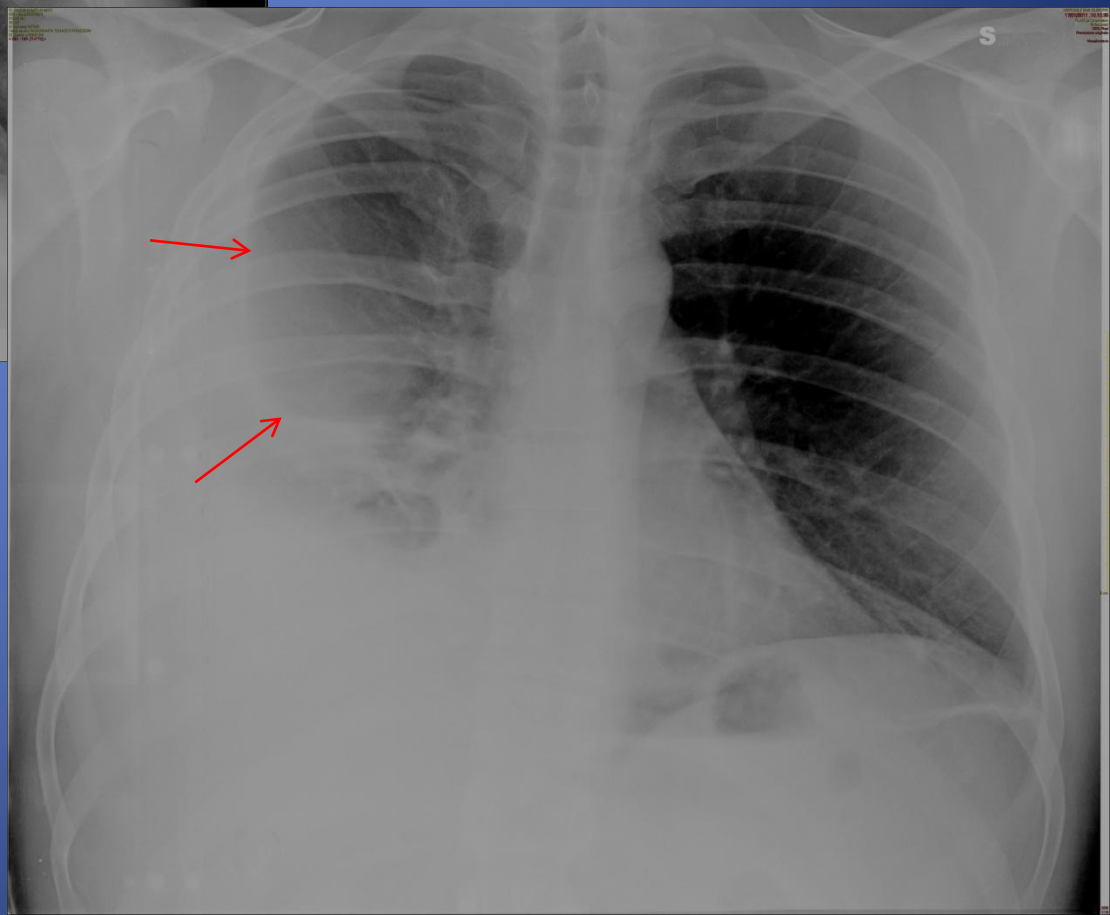
Versamento pleurico



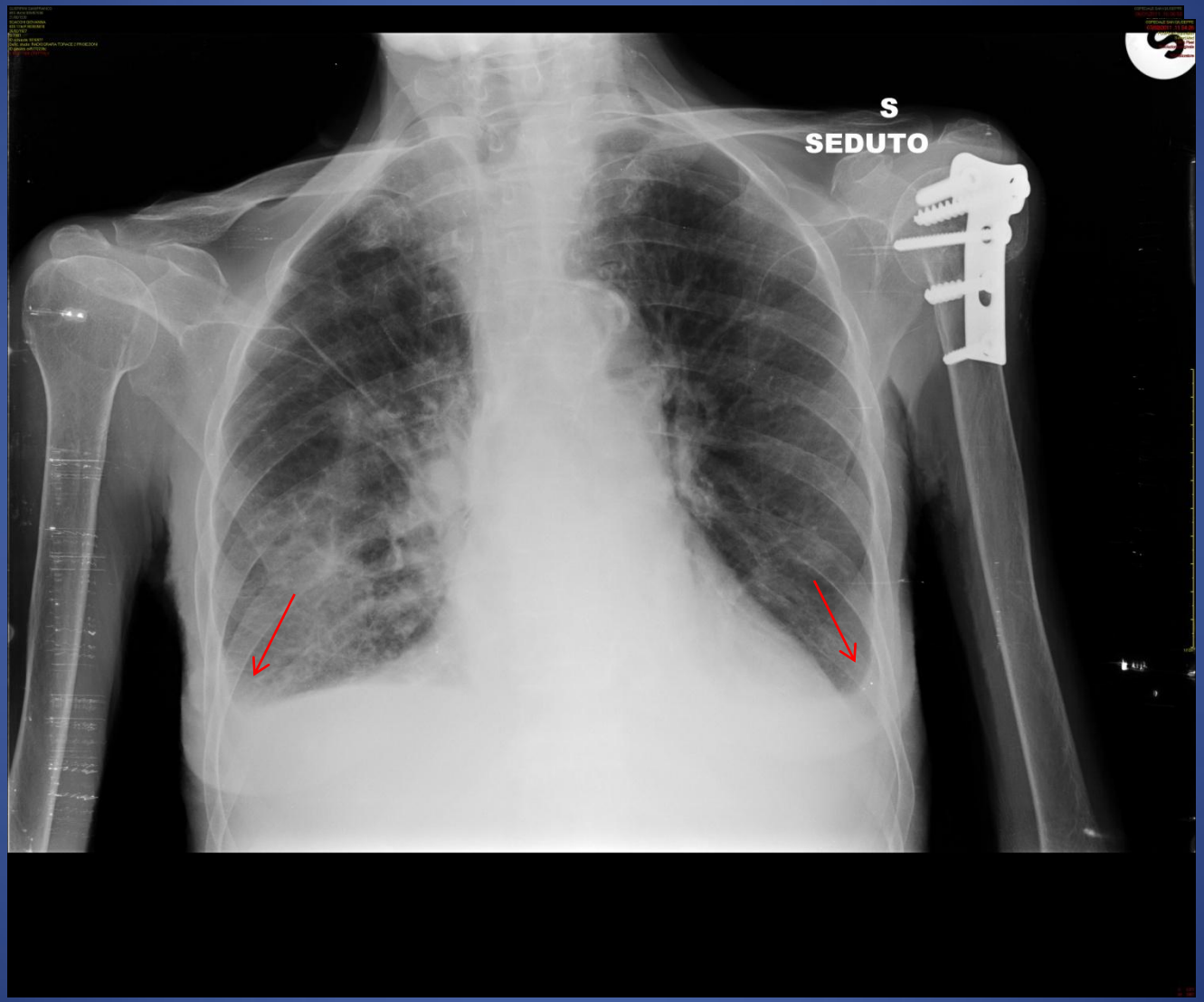


Versamento scissurale

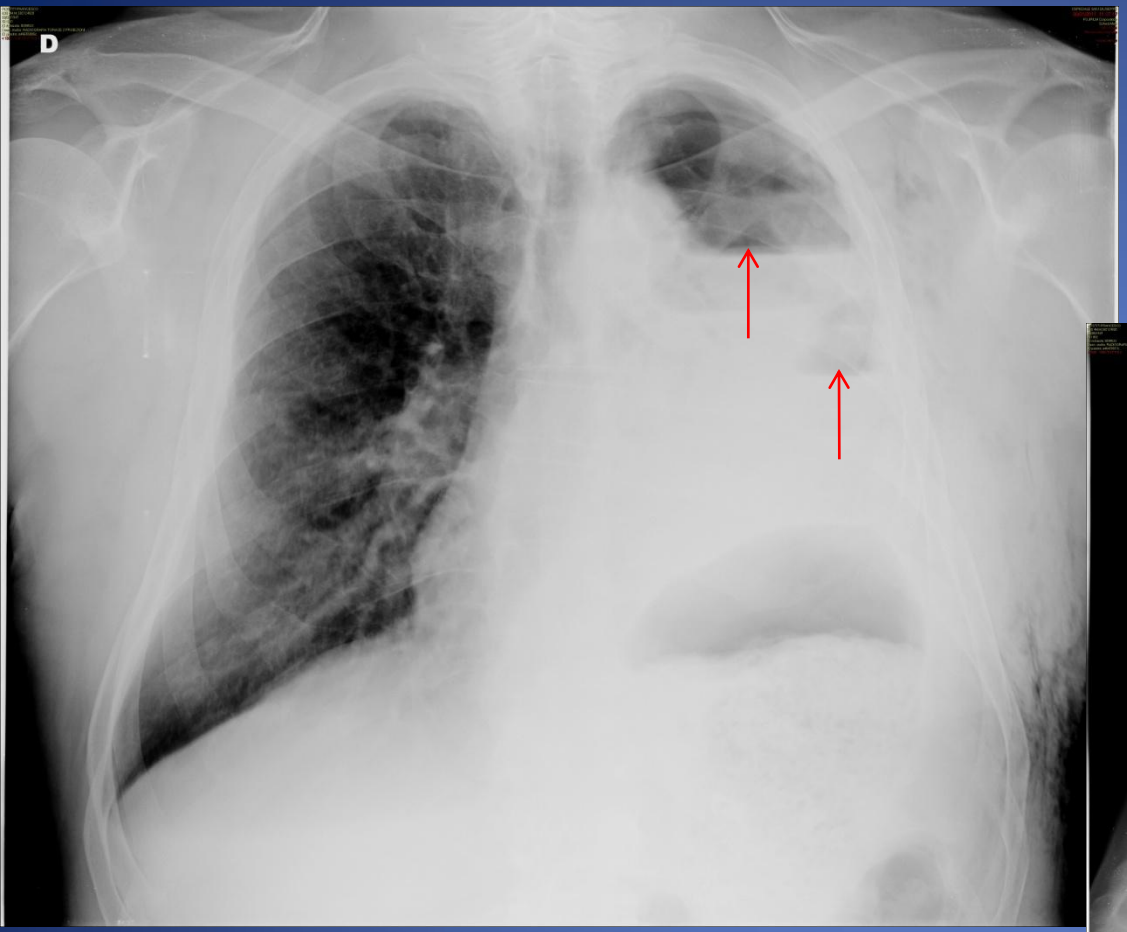




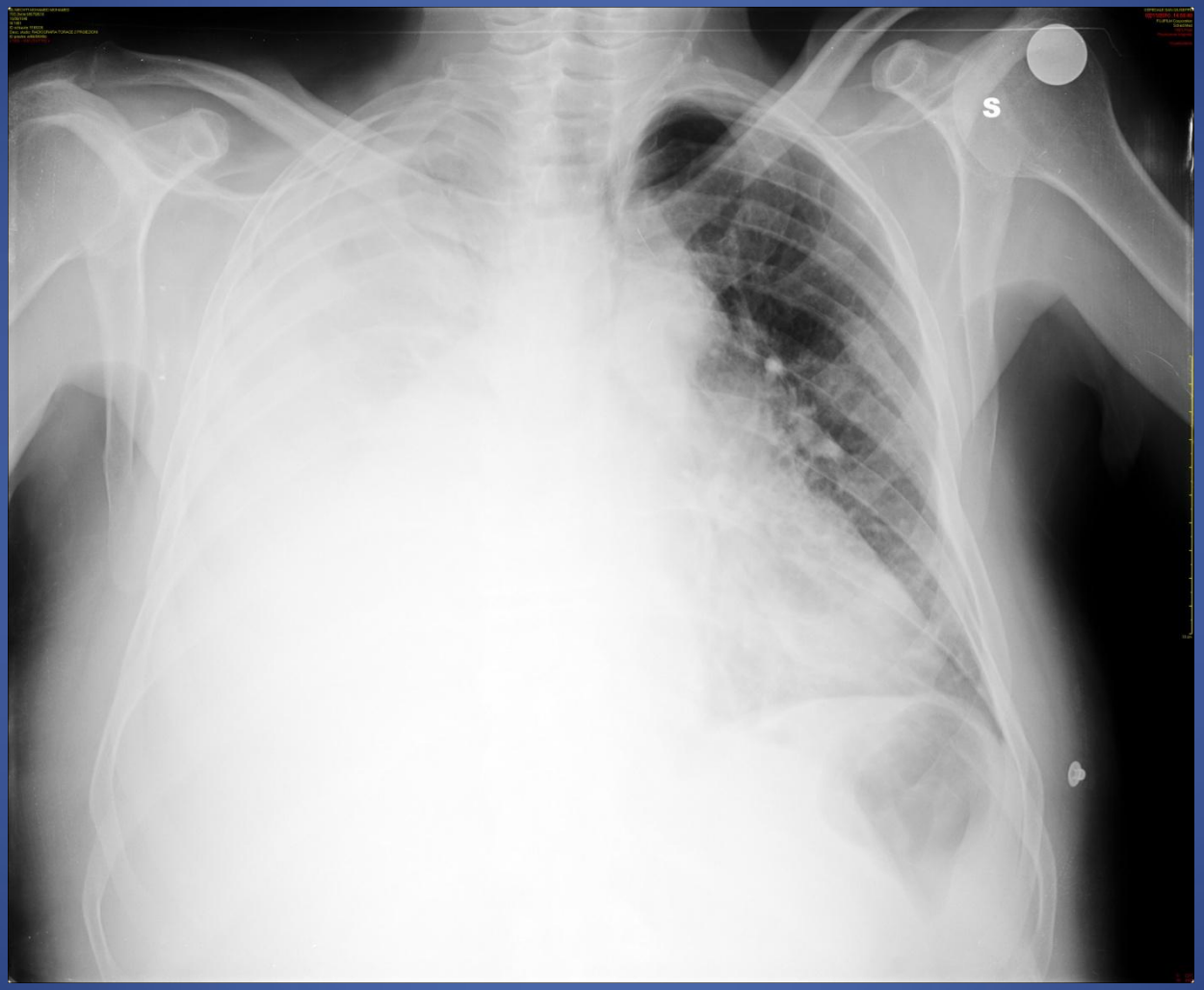
Versamento pleurico



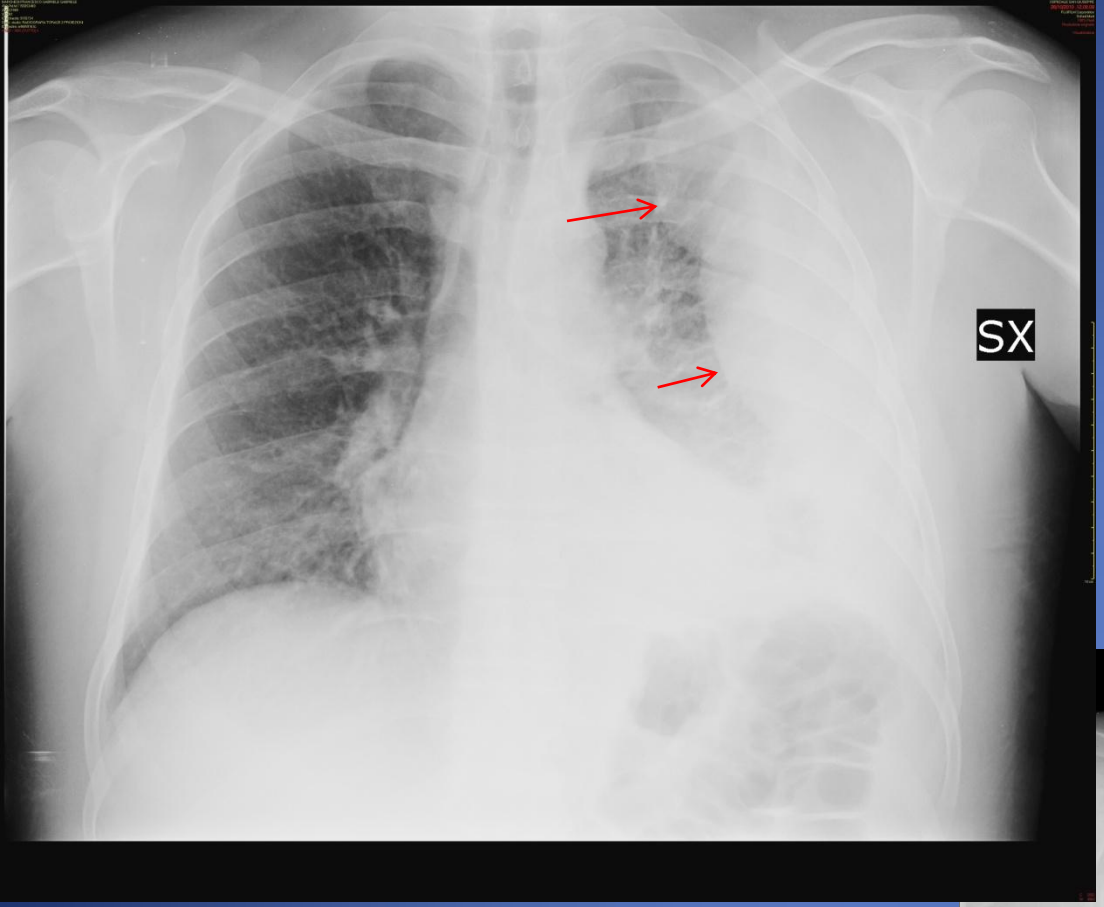
Versamento pleurico bilaterale

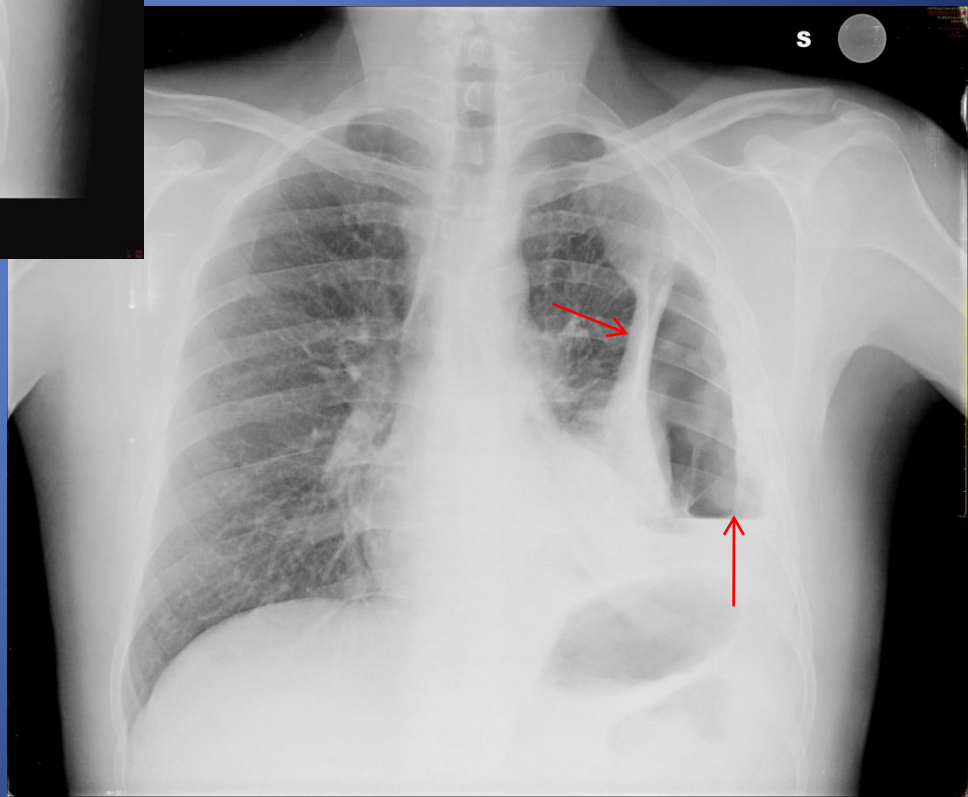


Idropneumotorace plurisaccato



Versamento pleurico massivo



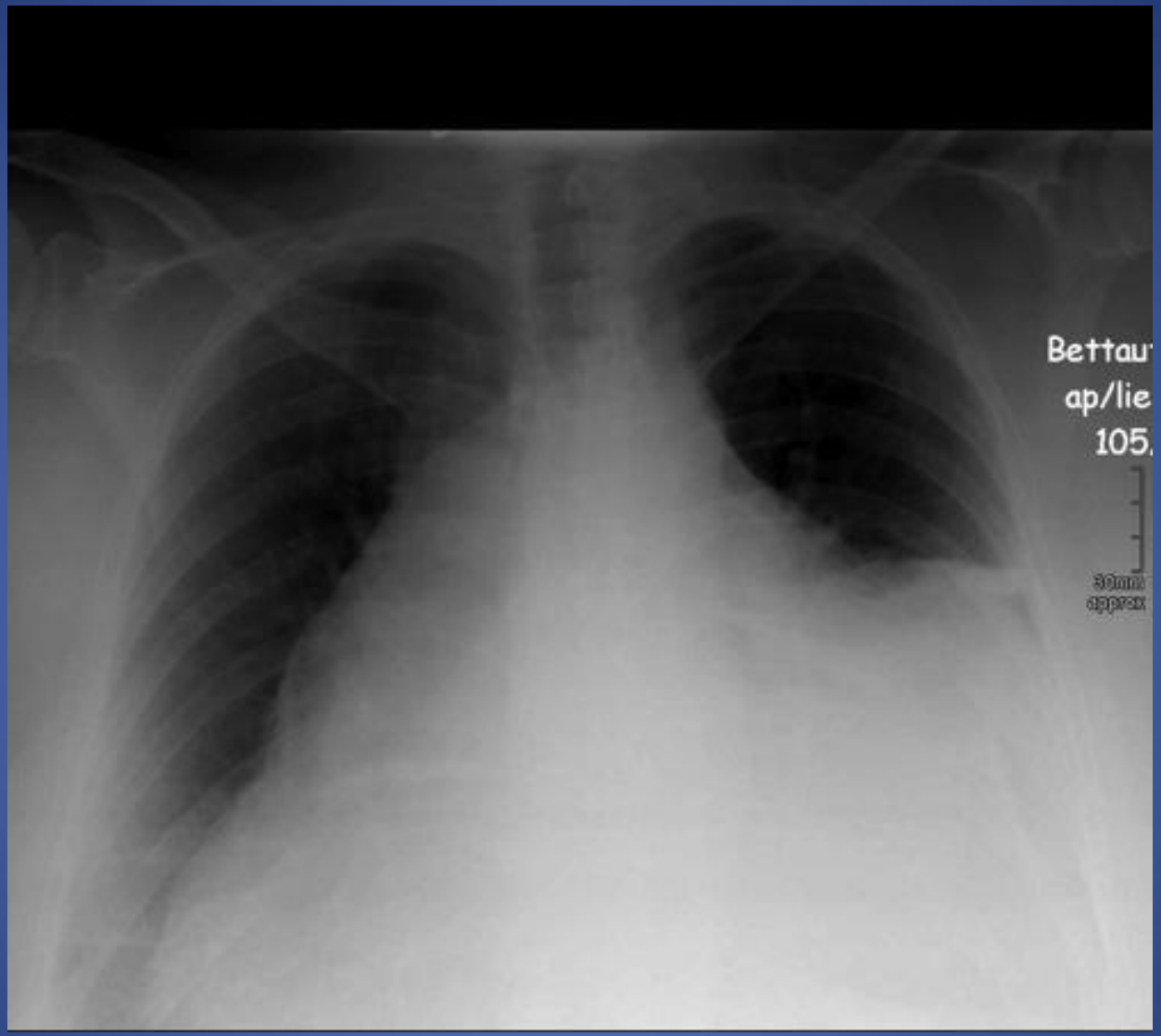


Versamento saccato

Versamento pericardico

Rilevabile solo se la quantità di liquido è superiore a 250 cc.

-  ombra cardiaca
- congestione vena cava
- vasi polmonari normali o poco incrementati

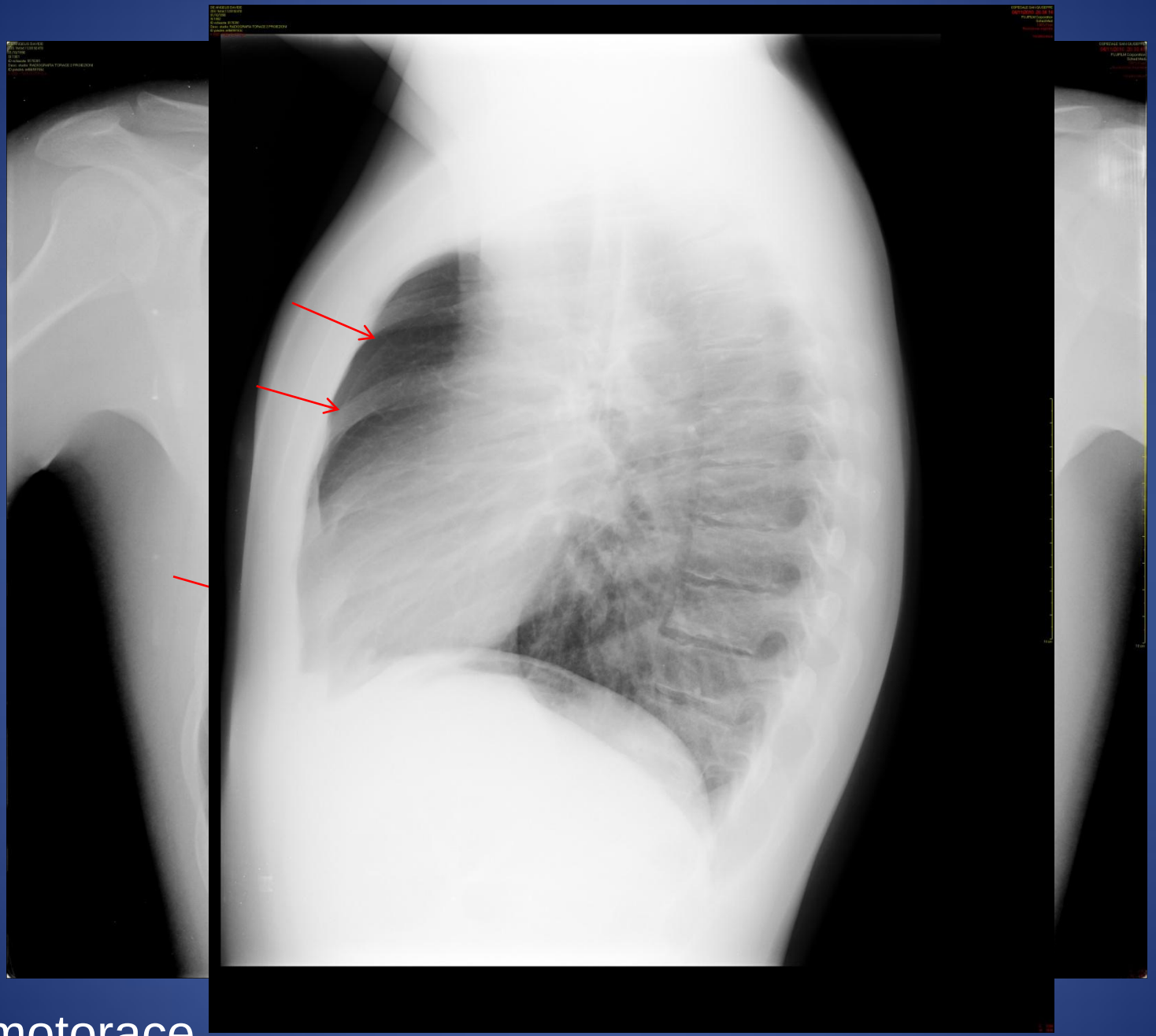

Bettau
ap/lie
105

Pneumotorace

Presenza di componente aerea nel cavo pleurico che pertanto determina scollamento dei foglietti pleurici.

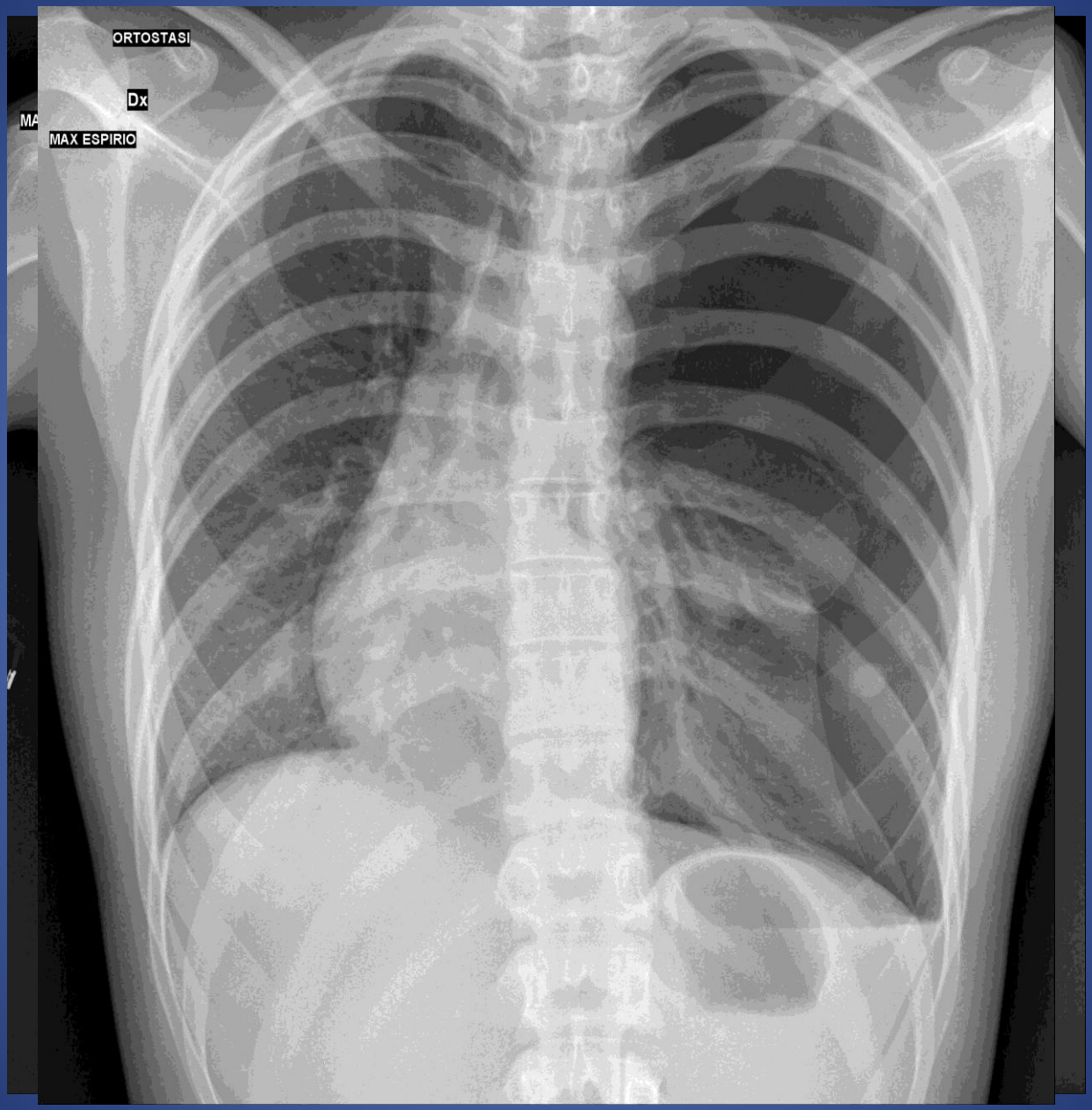
Segni radiologici in stazione eretta:

- linea pleurica viscerale netta
- assenza disegno polmonare all'esterno
- riduzione volume polmonare - atelettasia



Pneumotorace

Plica cutanea

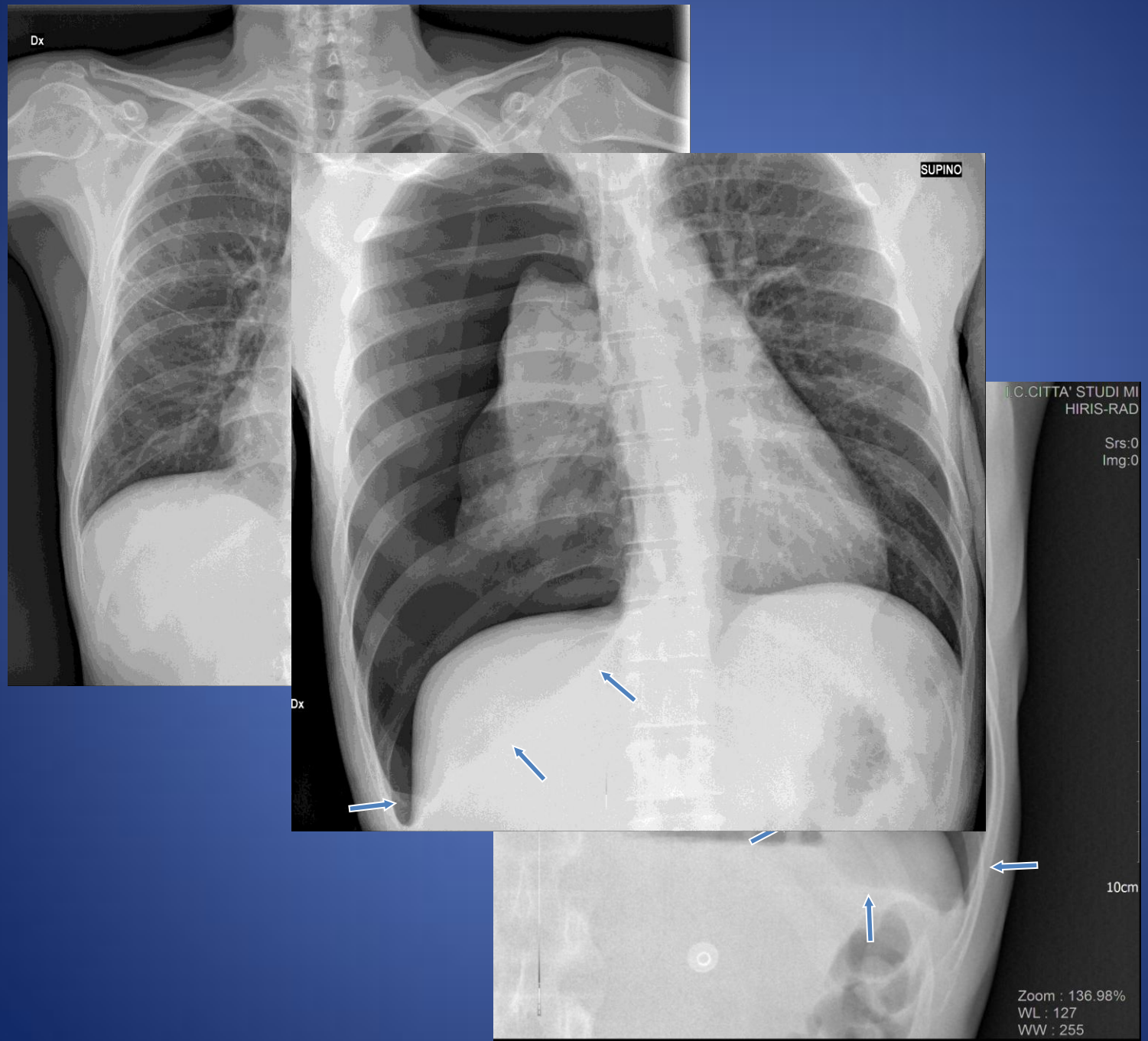

ORTOSTASI
Dx
MAX ESPIRIO

Pneumotorace

Segni radiologici in decubito supino:
- segno solco profondo
- ipertrasparenza addome superiore

La diagnosi è comunque difficile specie in caso di falda di limitata entità

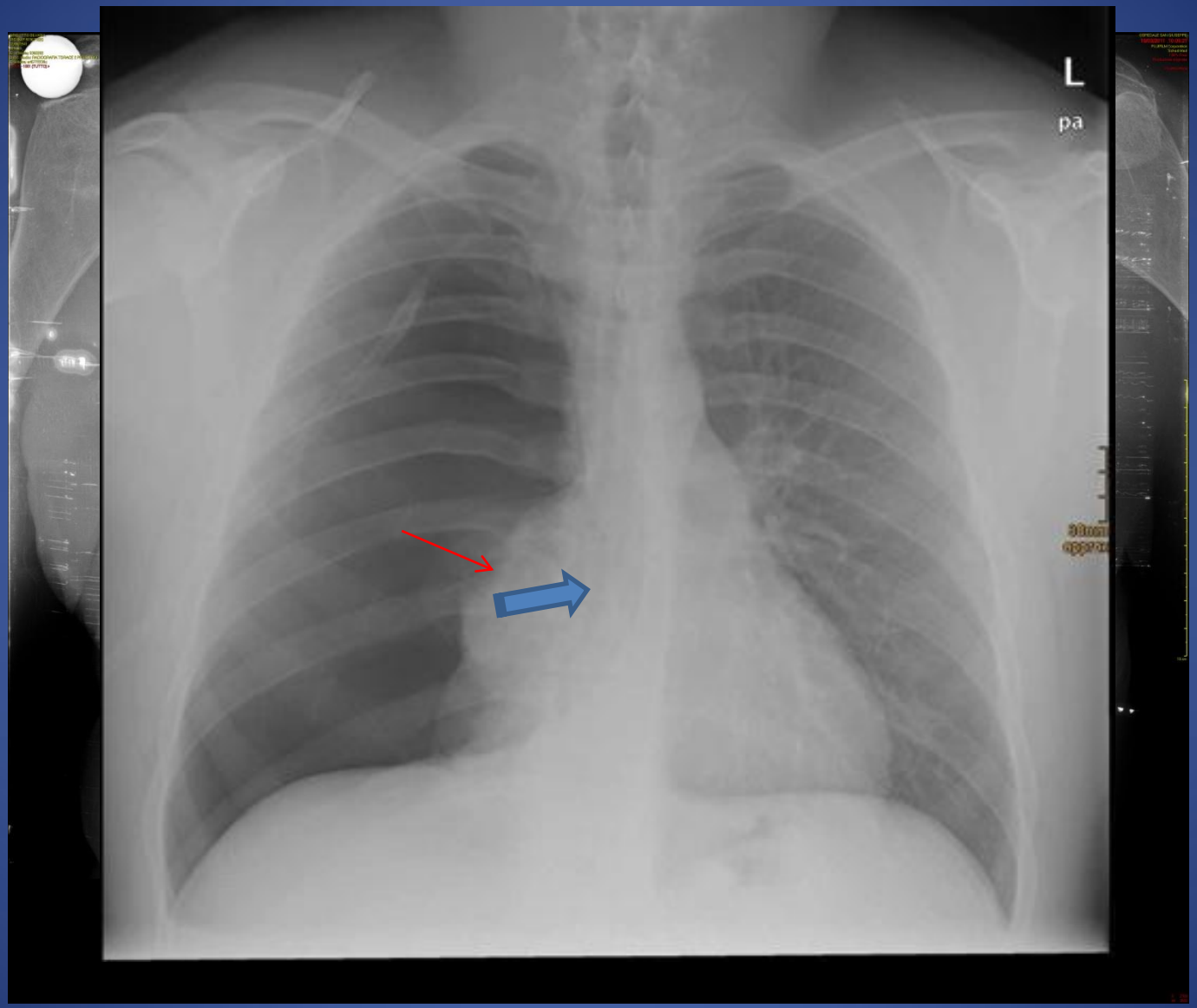
N. Raby, L. Berman, G. de Lacey: Accident and emergency Radiology
Elsevier-Sauders Ed. 2005


Dx
SUPINO
Dx
I.C.CITTA' STUDI MI
HIRIS-RAD
Srs:0
Img:0
10cm
Zoom : 136.98%
WL : 127
WW : 255

Pneumotorace

Pneumotorace iperteso: meccanismo a valvola con
Progressivo accumulo di aria nel cavo pleurico.

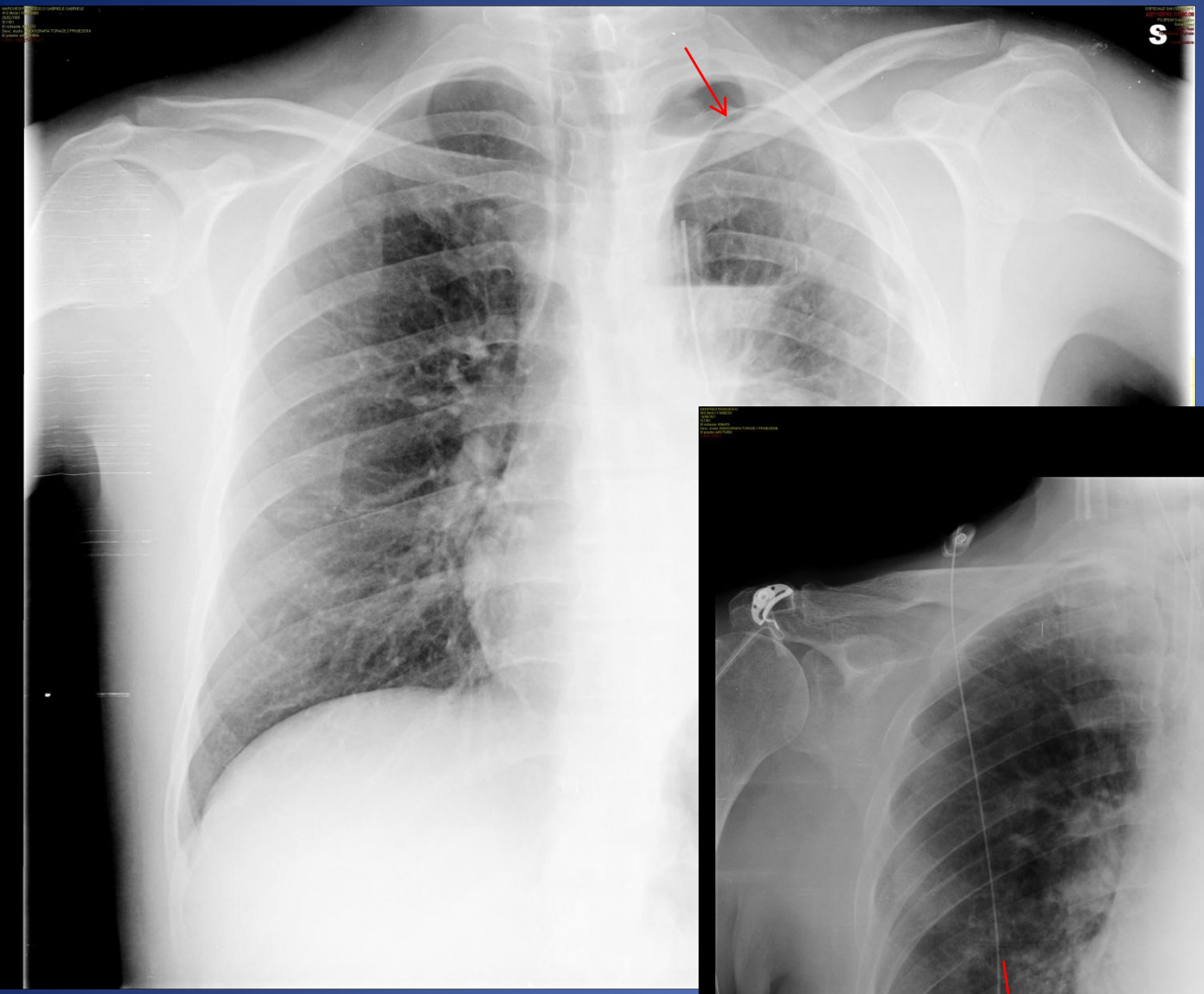
- ↑ p pleurica
- dislocazione mediastino
- appiattimento emidiaframmi

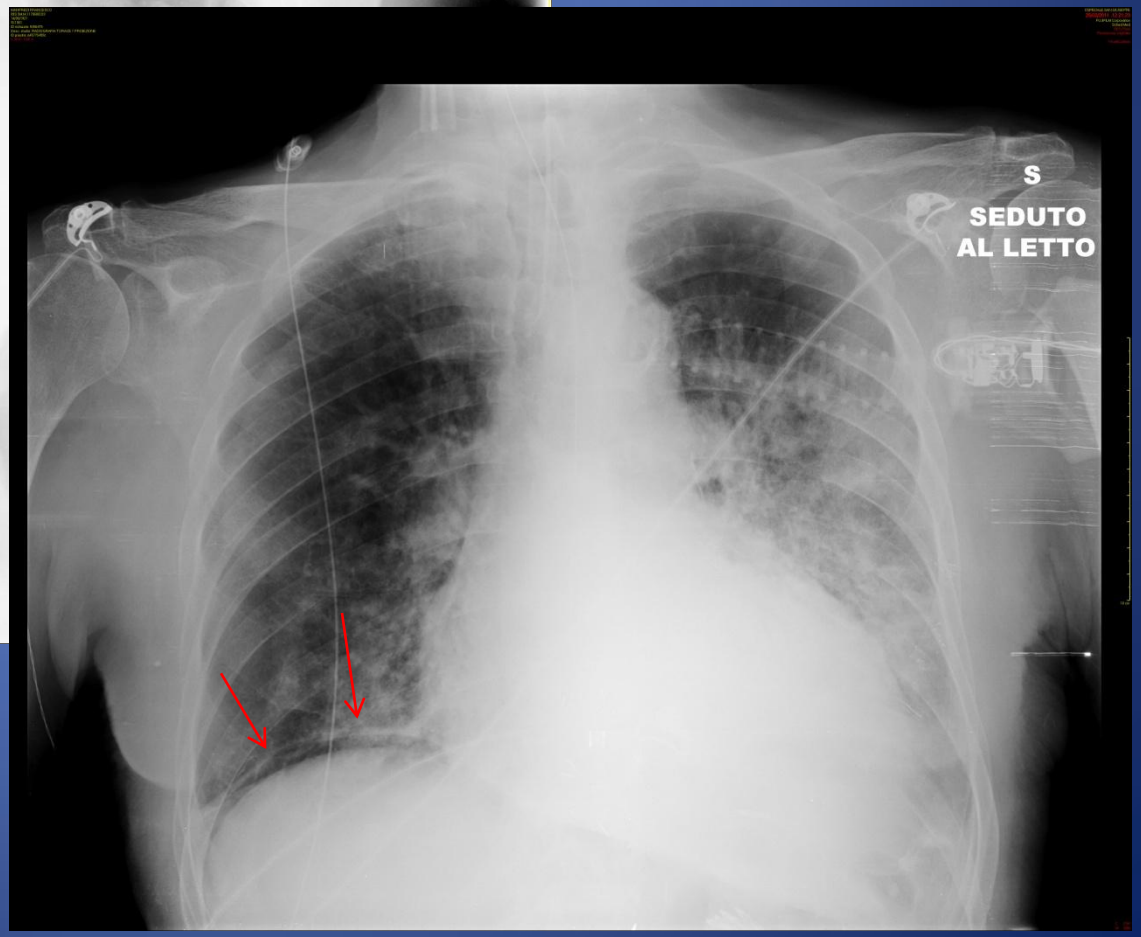


Pneumotorace iperteso

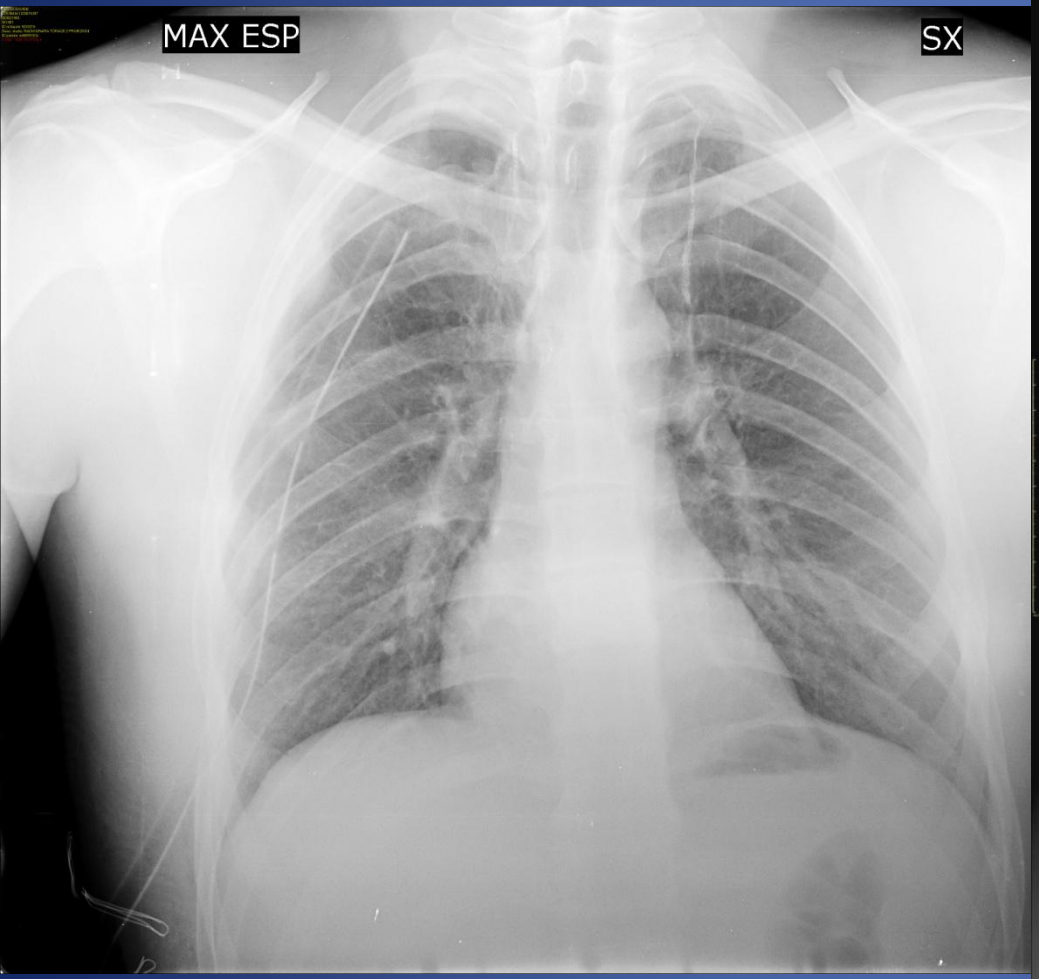
Pneumotorace

Importante corretta esecuzione dell'esame.
In paziente critico a volte difficile da dimostrare specie a paziente supino.
A volte sedi anomale (es. basi).





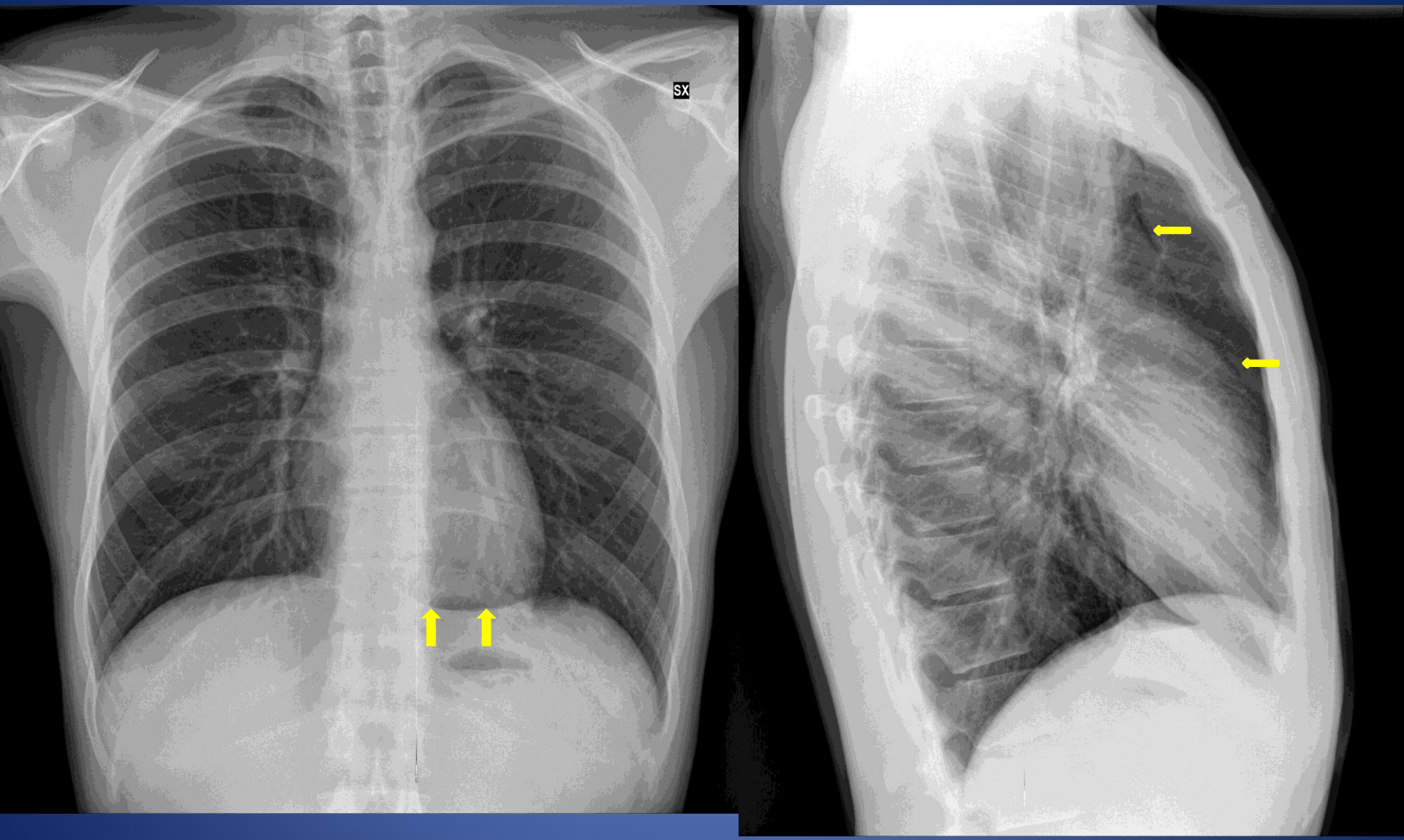
Pneumotorace



Esecuzione in espirio

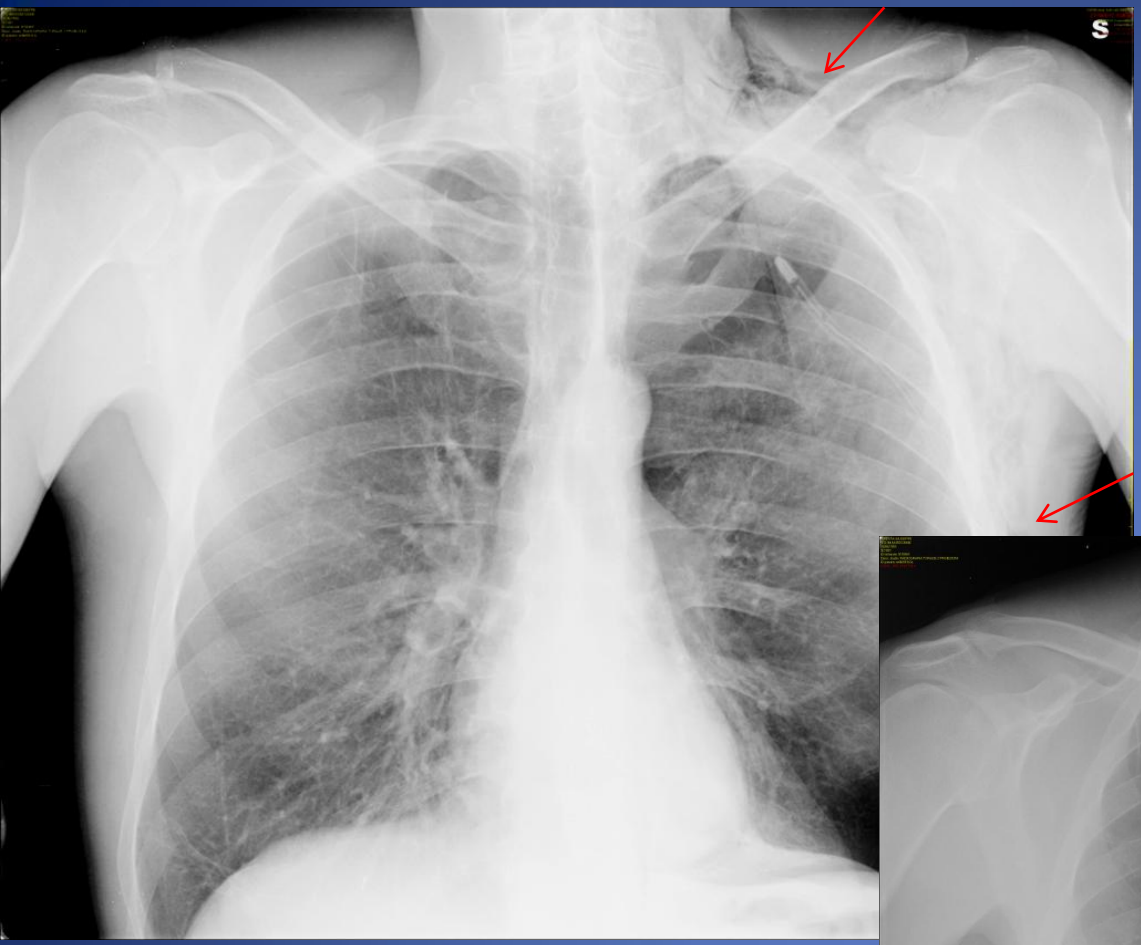
Pneumotorace

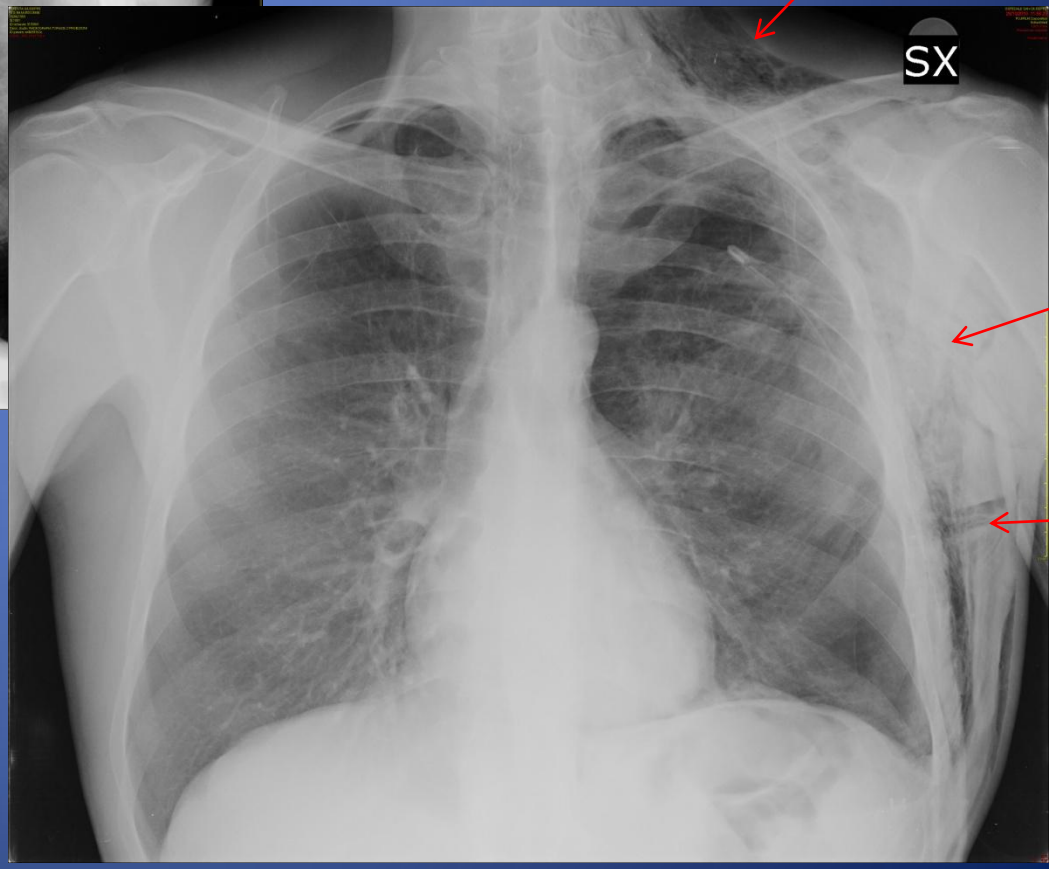
Ventilazione meccanica (PEEP) può determinare:
- enfisema
- pneumomediastino
- pneumotorace
- enfisema sottocutaneo



Pneumomediastino


ORTOSTASI
SX





Enfisema sottocutaneo

Addensamento

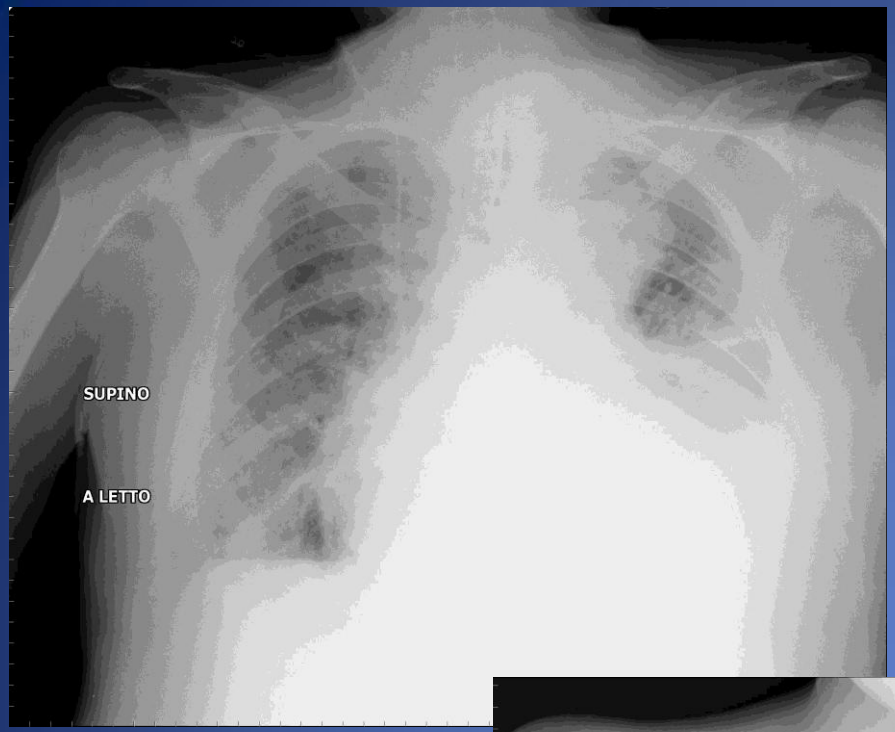
Opacità parenchimale

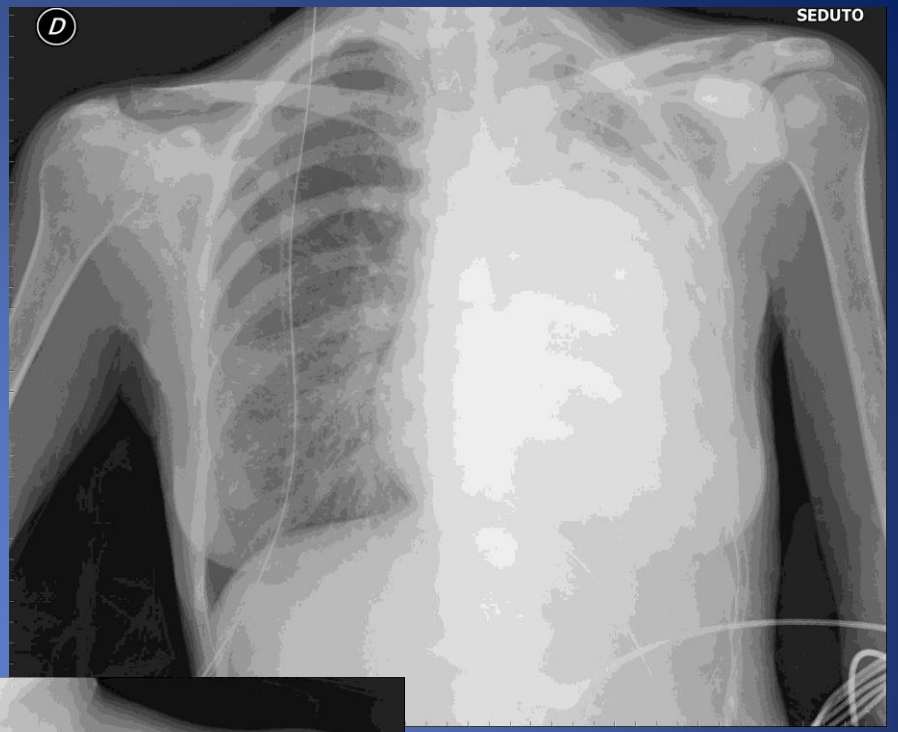
- ➡ nodulare
- ➡ atelettasia

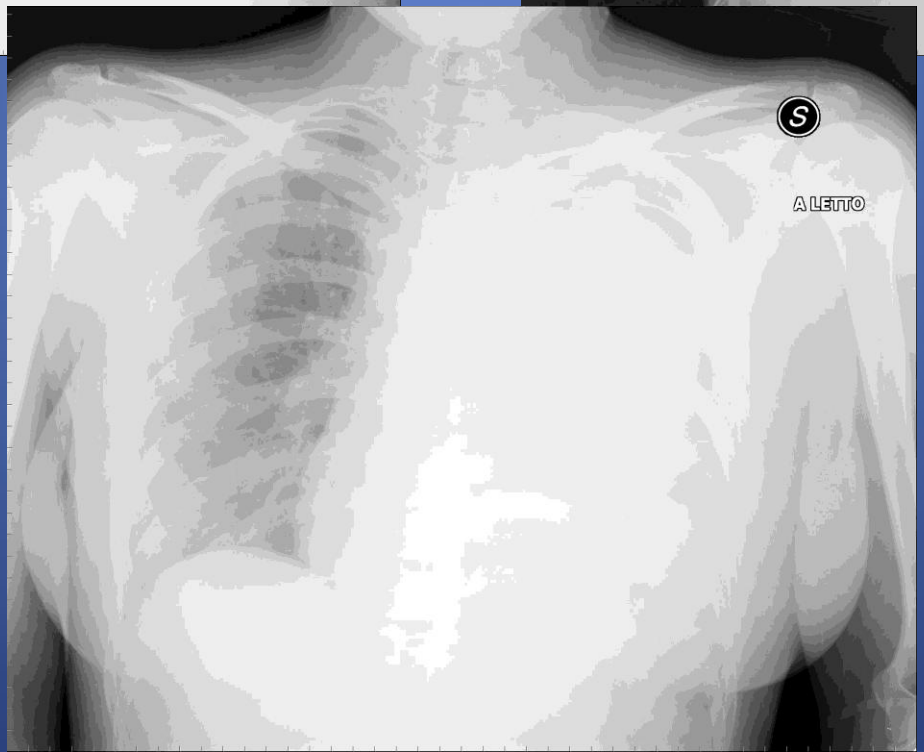
Addensamento

Atelettasia parenchimale

- ➡ da ostruzione bronchiale
- ➡ da compressione (es. versamento)
- ➡ consolidamento parenchimale


SUPINO
A LETTO

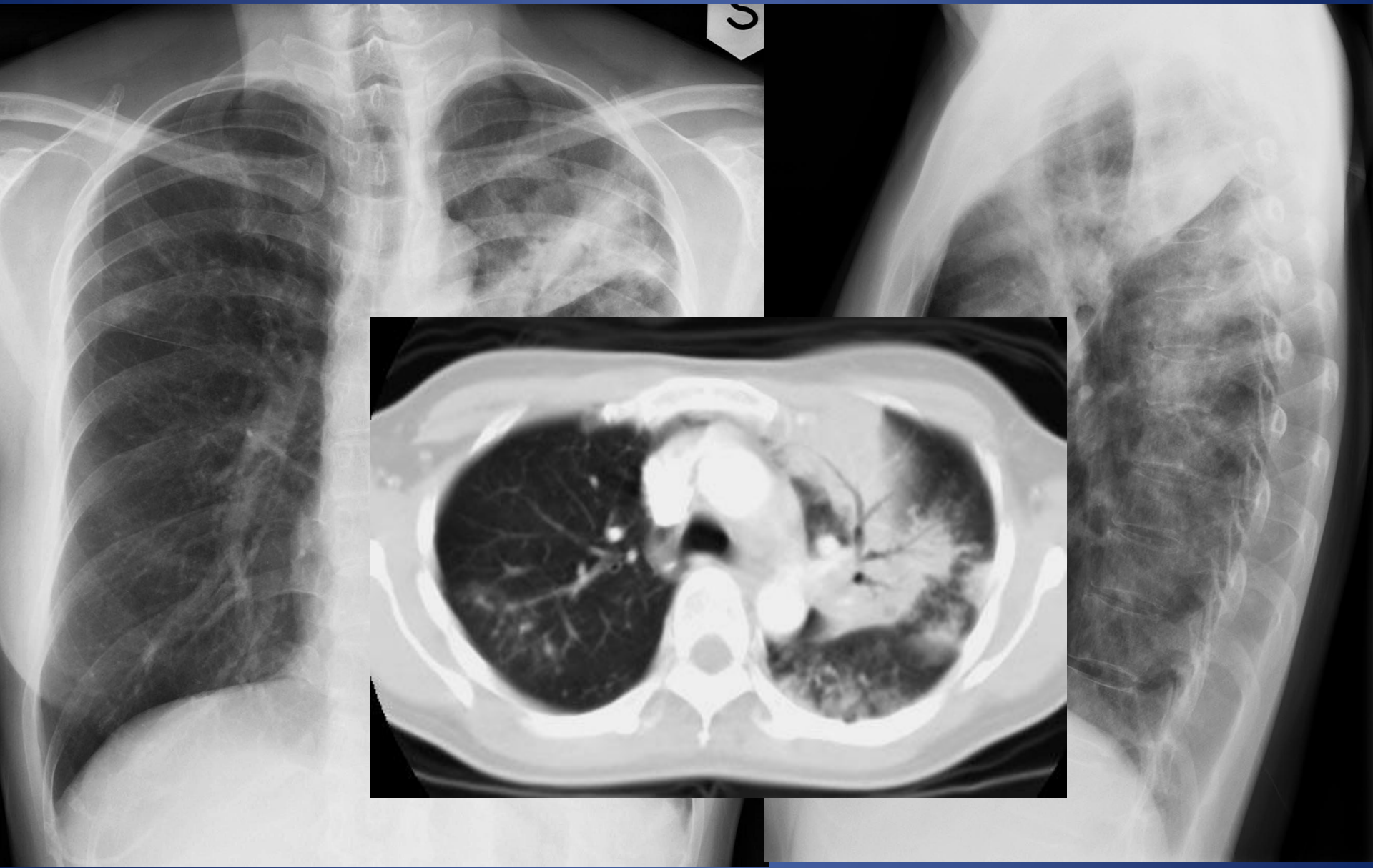

D
SEDUTO


S
A LETTO

Addensamento

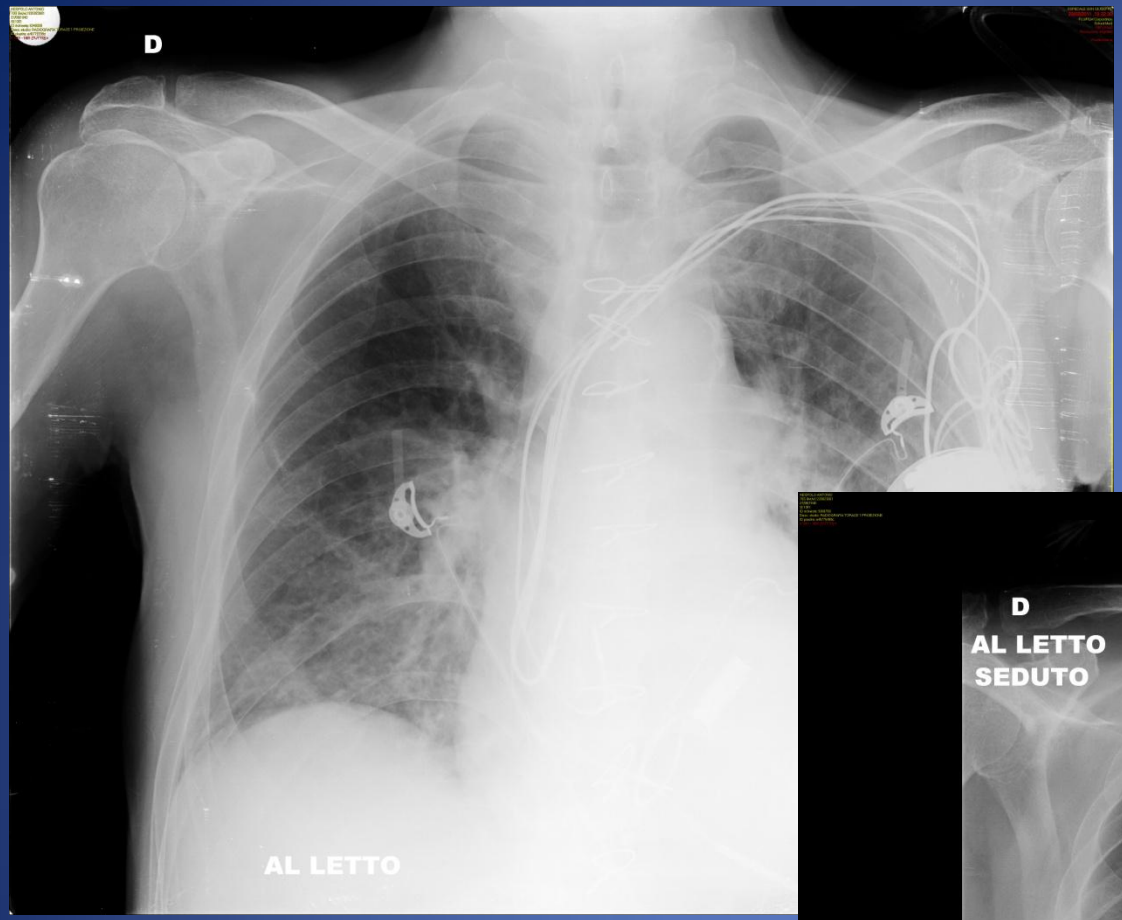
Opacità parenchimale

- ➡ flogistica: margini sfumati, spesso broncogramma e versamento pleurico.
- ➡ produttiva



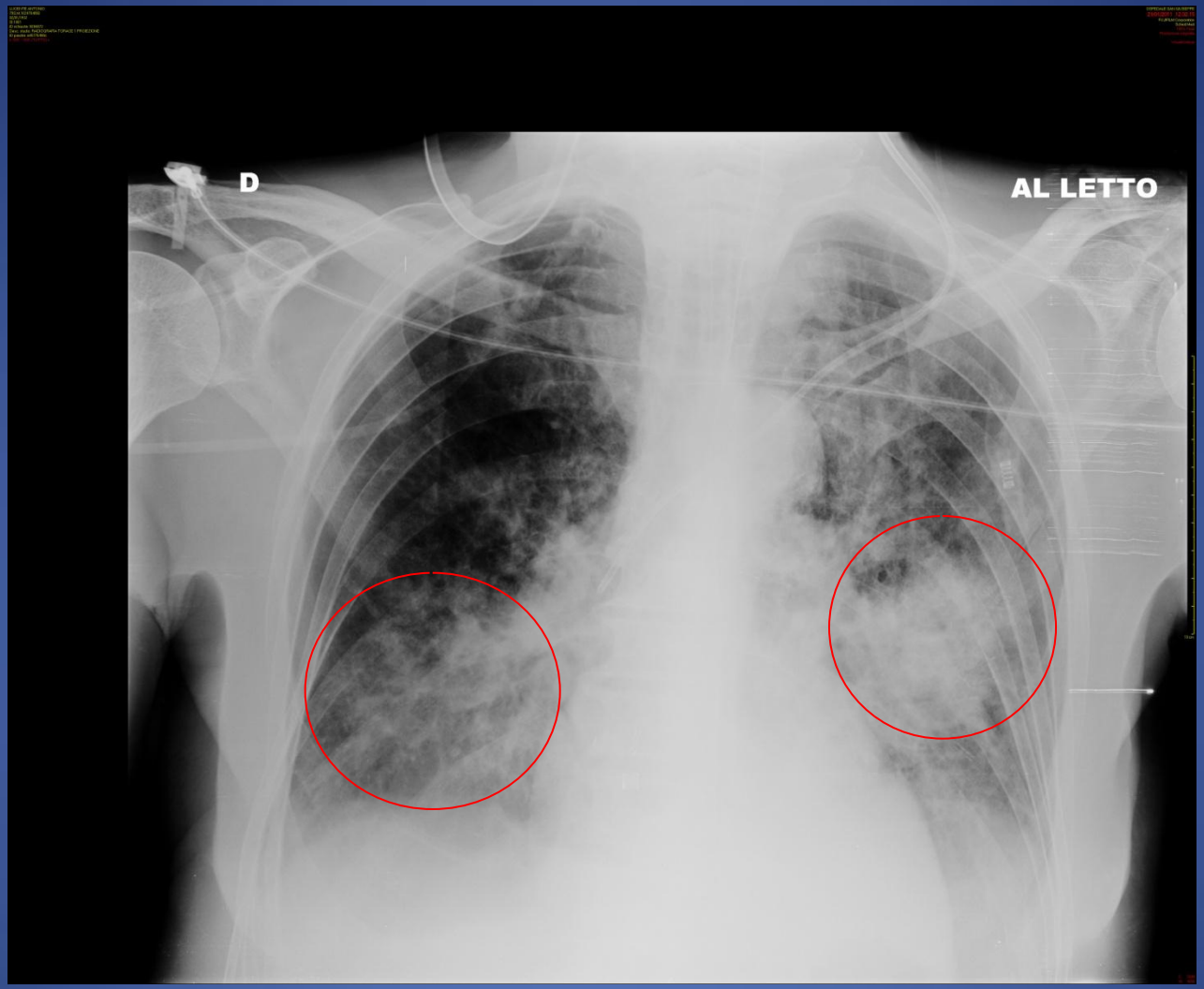
Focolaio flogistico

BPM

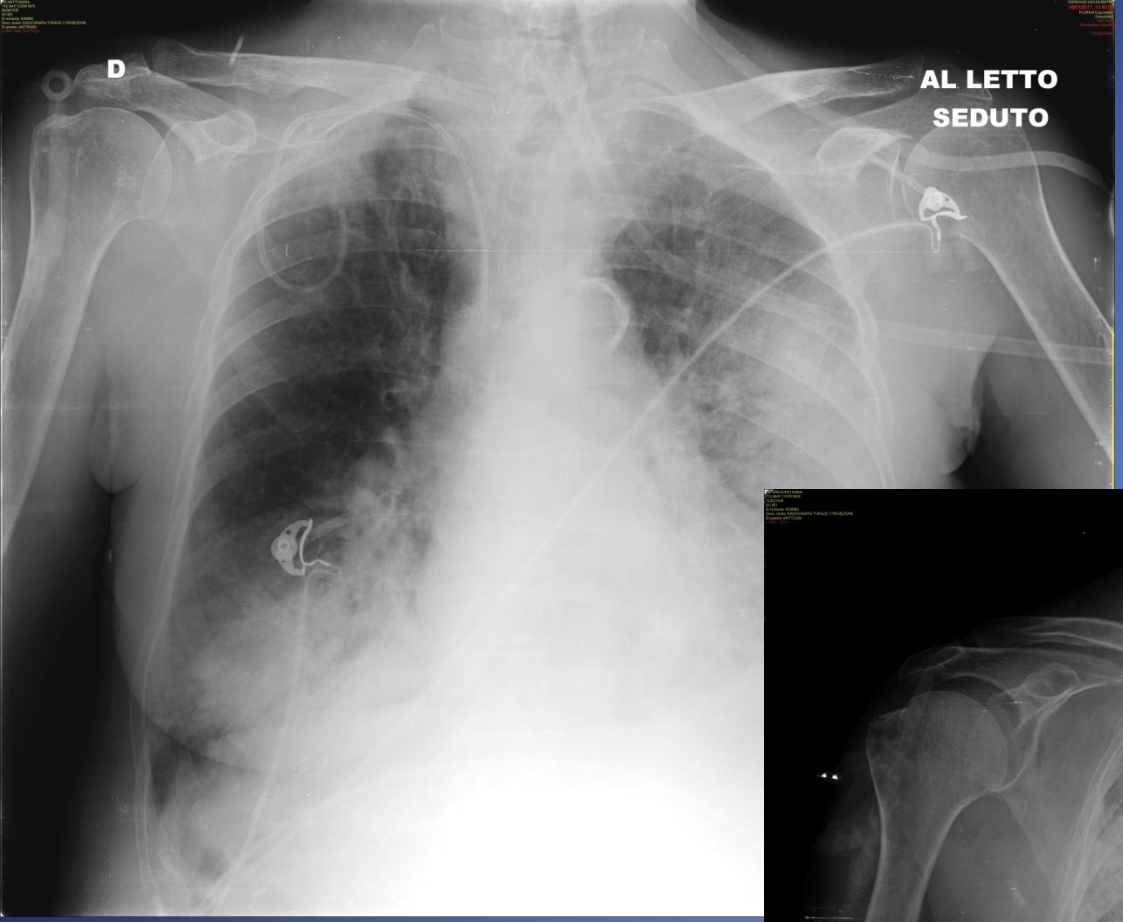


48 ore

Focolaio flogistico
(test temporale)



Focolai multipli



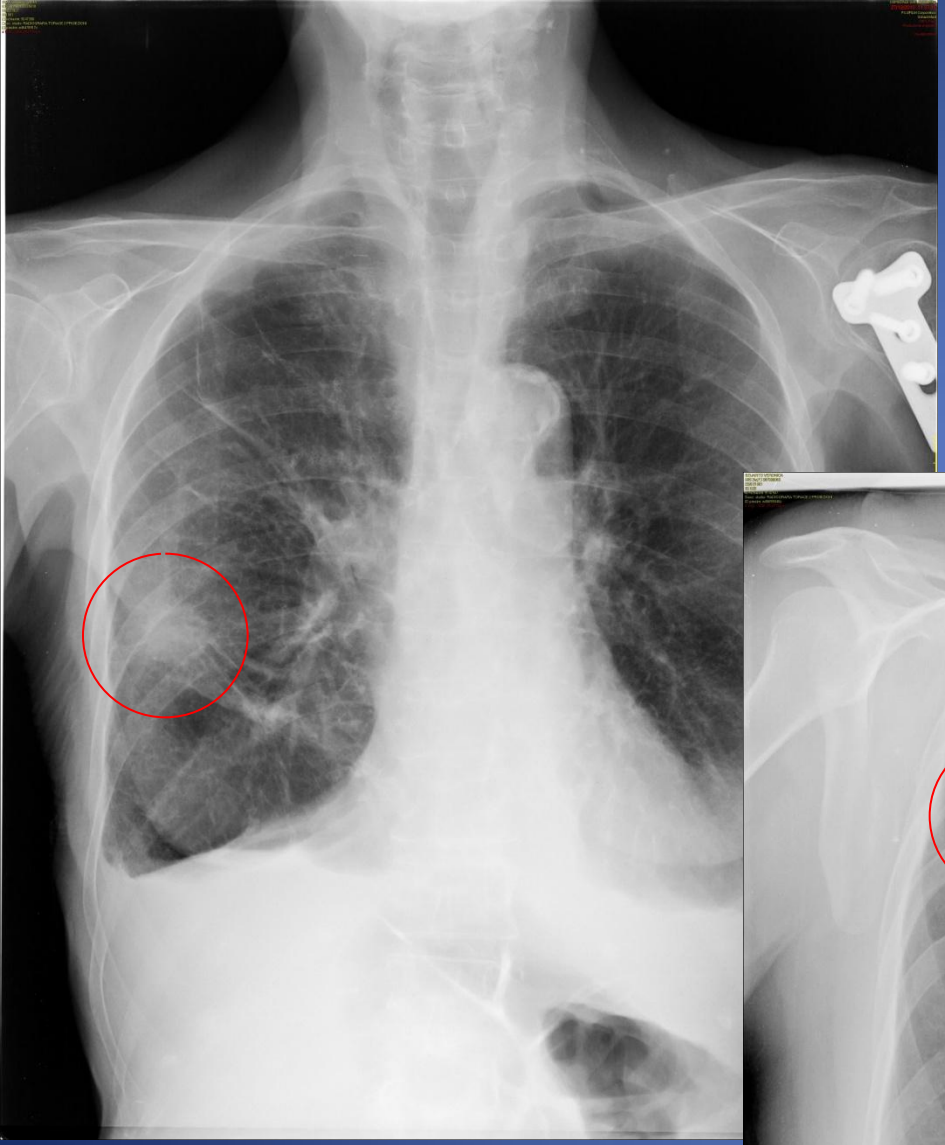
Focolai multipli

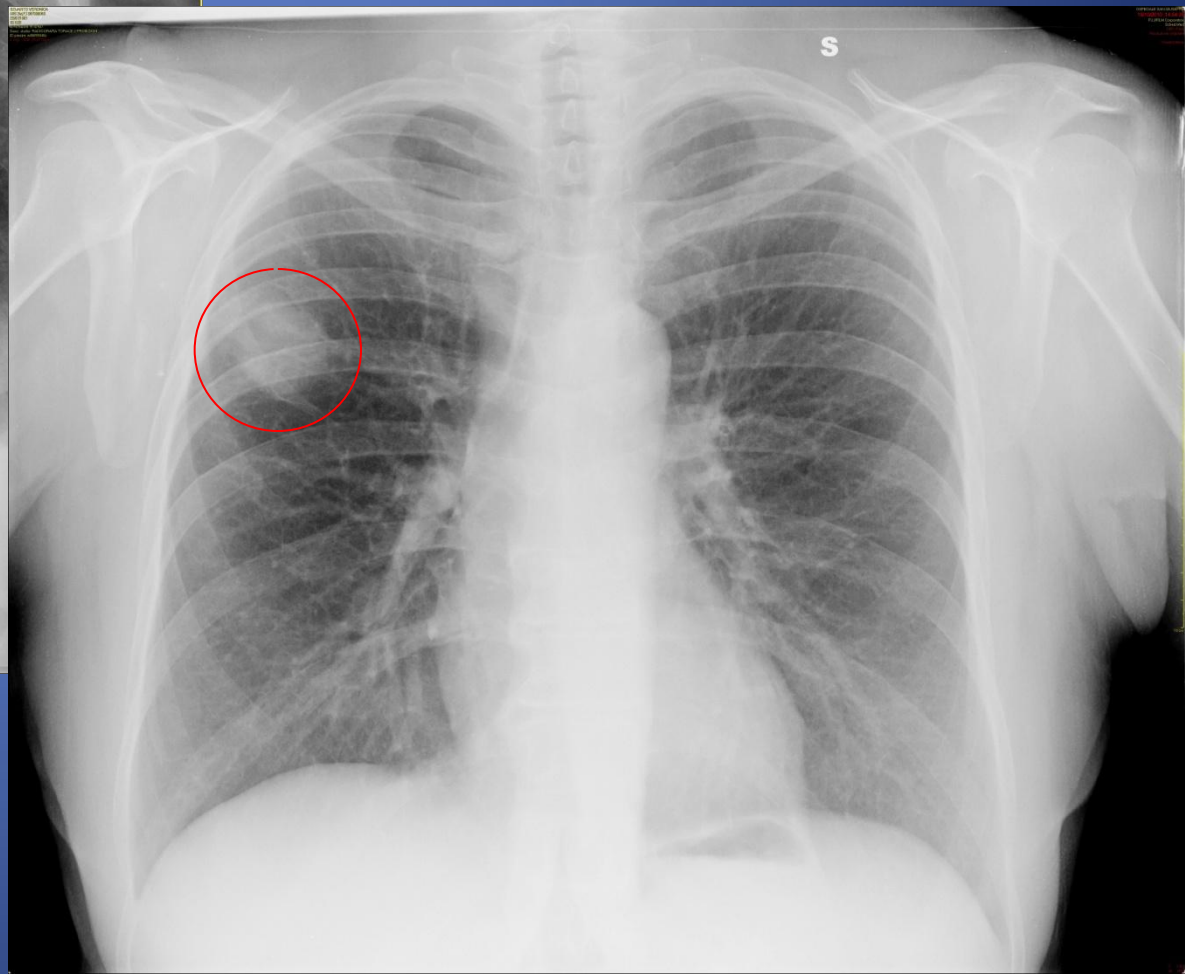
Addensamento

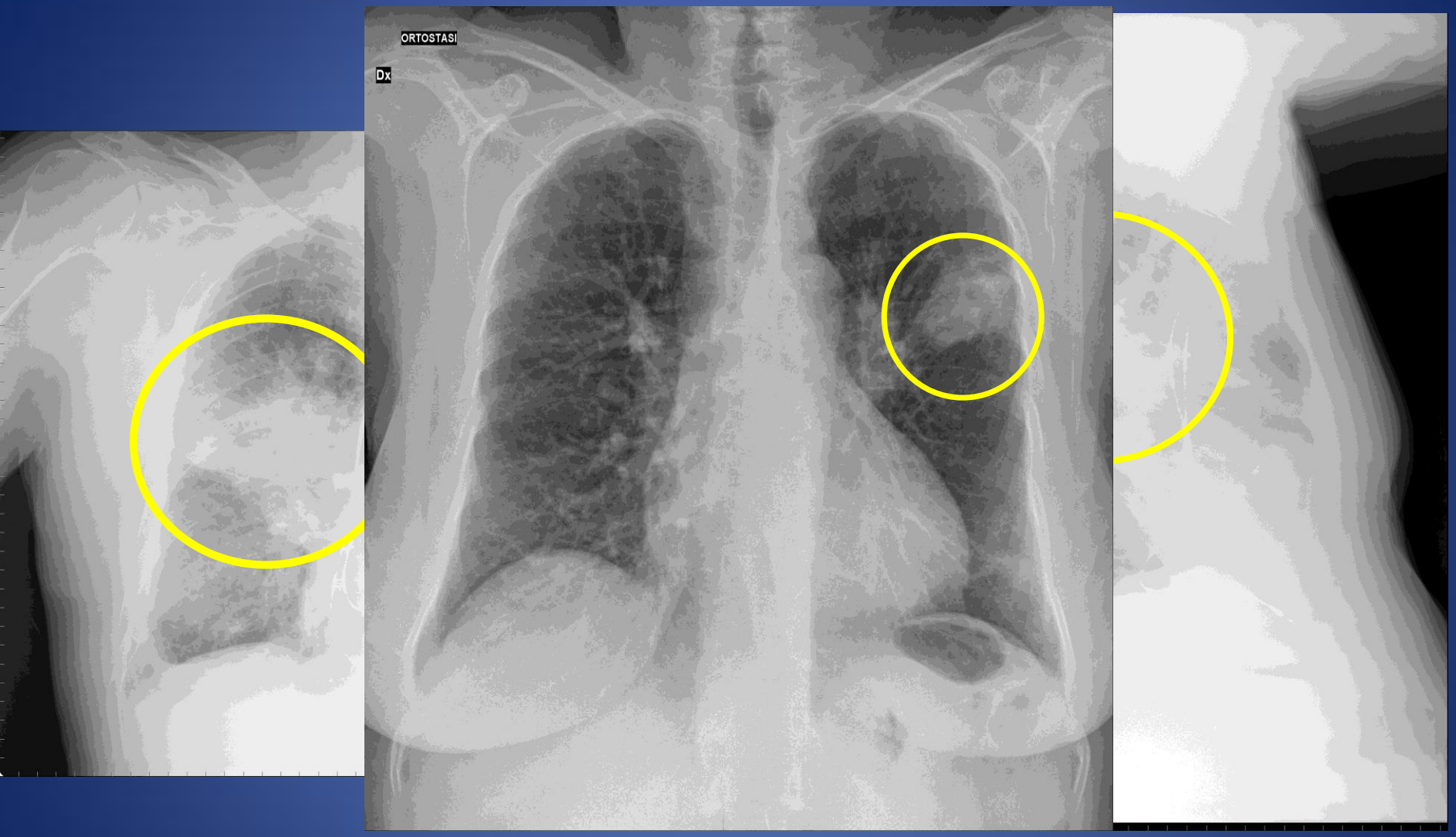
Opacità parenchimale

- ➡ flogistica
- ➡ produttiva: margini sfrangiati, raro broncogramma, spesso LN med.

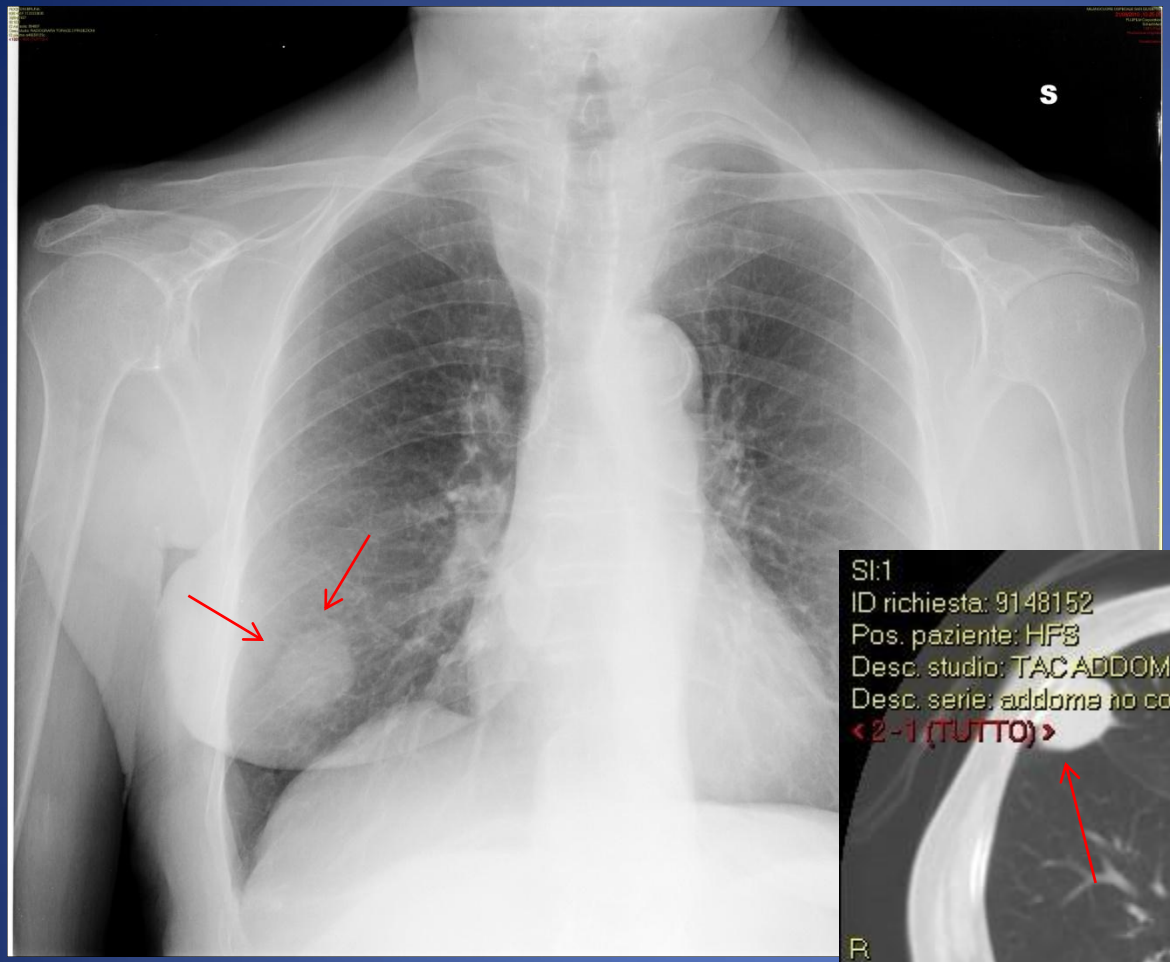
Neopalsia primitiva







Consolidamento neoplastico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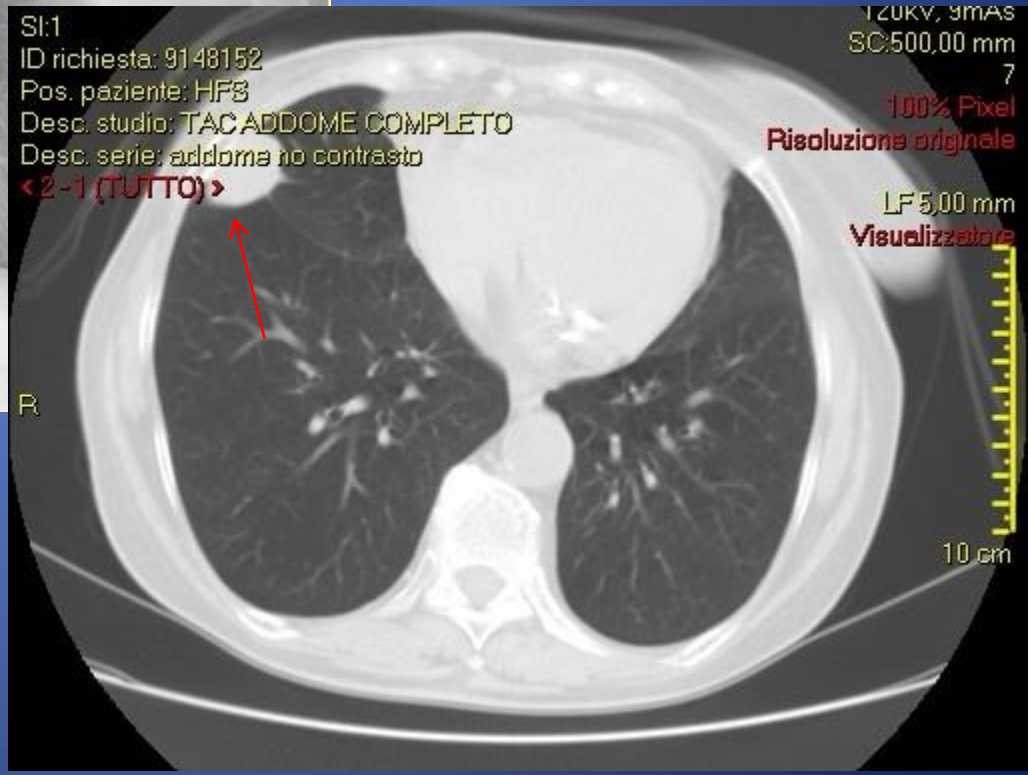
SI:1
ID richiesta: 9148152
Pos. paziente: HFS
Desc. studio: TAC ADDOME COMPLETO
Desc. serie: addome no contrasto
‹ 2 - 1 (TUTTO) ›
120kV, 9mAs
SC:500,00 mm
7
100% Pixel
Risoluzione originale
LF 5,00 mm
Visualizzatore
R
10 cm

Metastasi

M.J. Prieto: Visita all’ospedale