

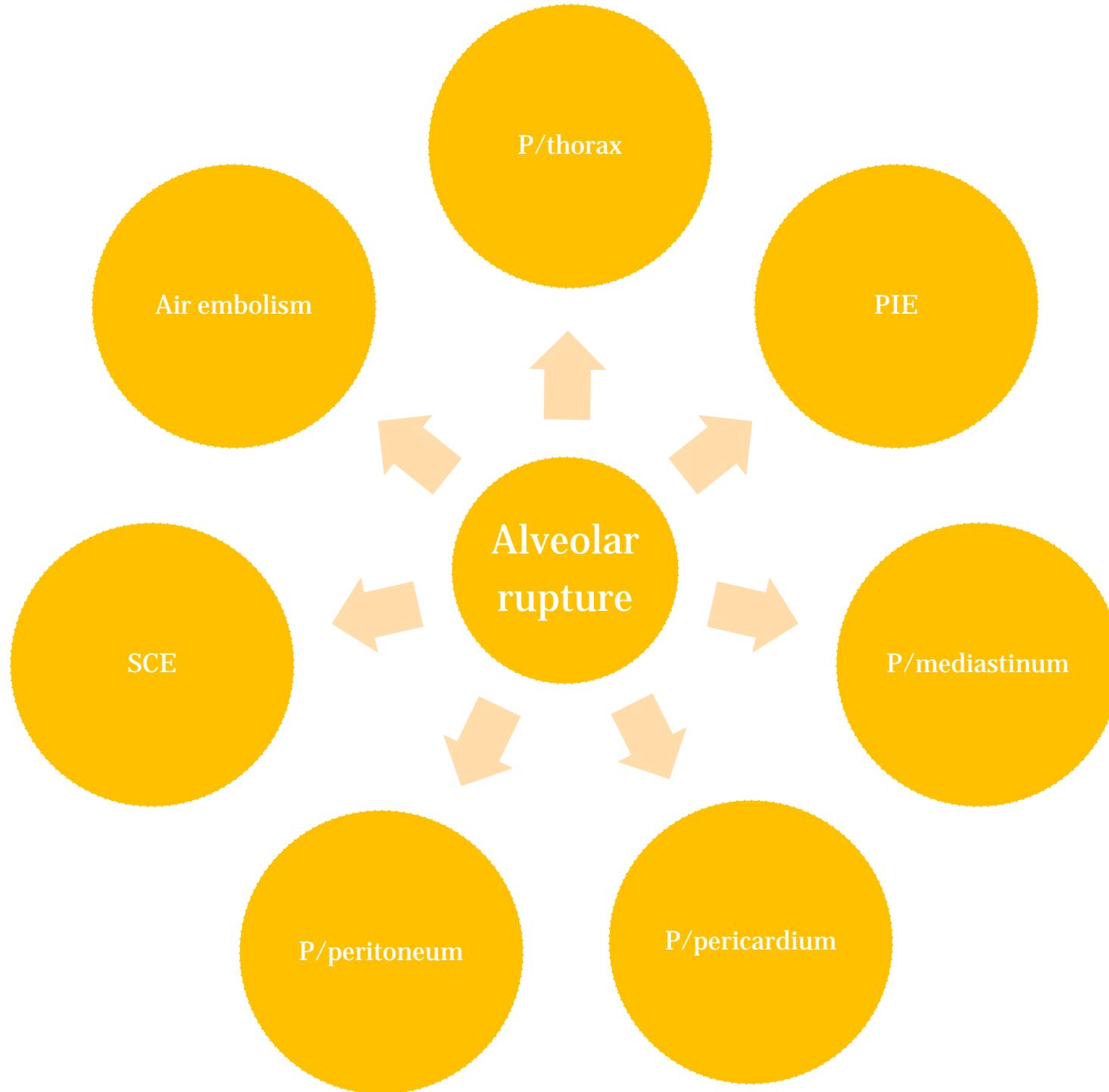
Neonatal Air Leak Syndromes



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Air Leaks

- Pneumothorax
- Pneumomediastinum
- Pneumopericardium
- Pneumoperitoneum
- Subcutaneous emphysema
- Pulmonary Interstitial Emphysema (PIE)
- Air embolism



Aetiology

- Over-vigorous resuscitation
- Intubation/ IPPV/ NCPAP
- ‘Fighting’ ventilator
- High PIP; Long I.T
- MAS; RDS; Pneumonia; Pulmonary hypoplasia

Neonatal Pneumothorax



Incidence

- 1-1.5% of all newborns
- Affects 5-14% of babies admitted to NICUs
- Males > Females
- Terms = Pre-terms
- Spontaneous pneumothorax : 10/15,000
- Bilateral in 10-21%
- Mortality 20%

Clinical Presentation - 1

- Signs of respiratory distress: grunting, ↑RR, recession, cyanosis
- Apnoea, bradycardia, ↓BP
- Displaced apex beat
- Change in breath sounds
- ↑Ventilatory requirements

Clinical Presentation - 2

- Sudden collapse with severe hypotension, bradycardia, apnoea, hypoxia, respiratory acidosis

Investigations



- CXR – AP, Lateral decubitus

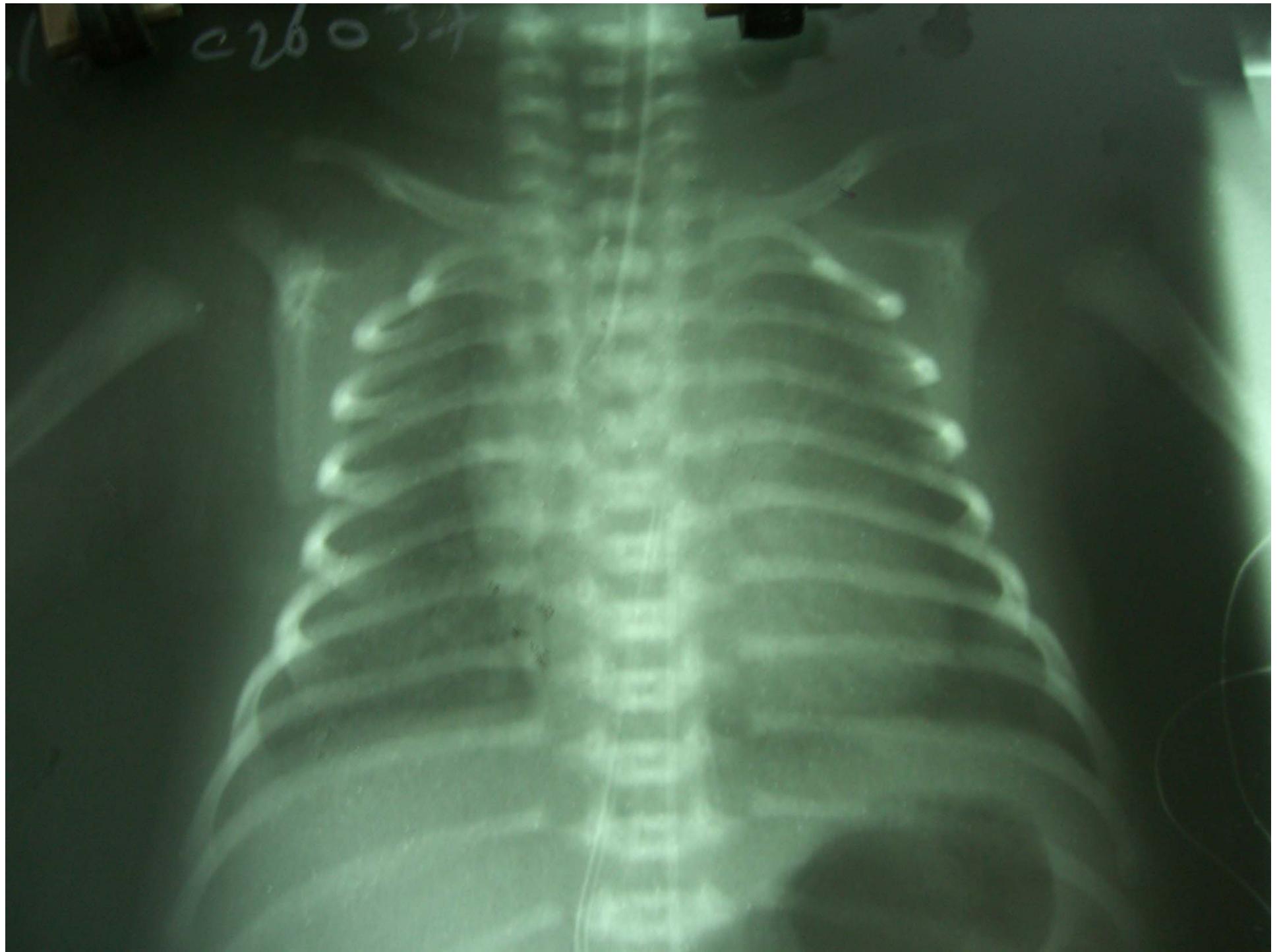




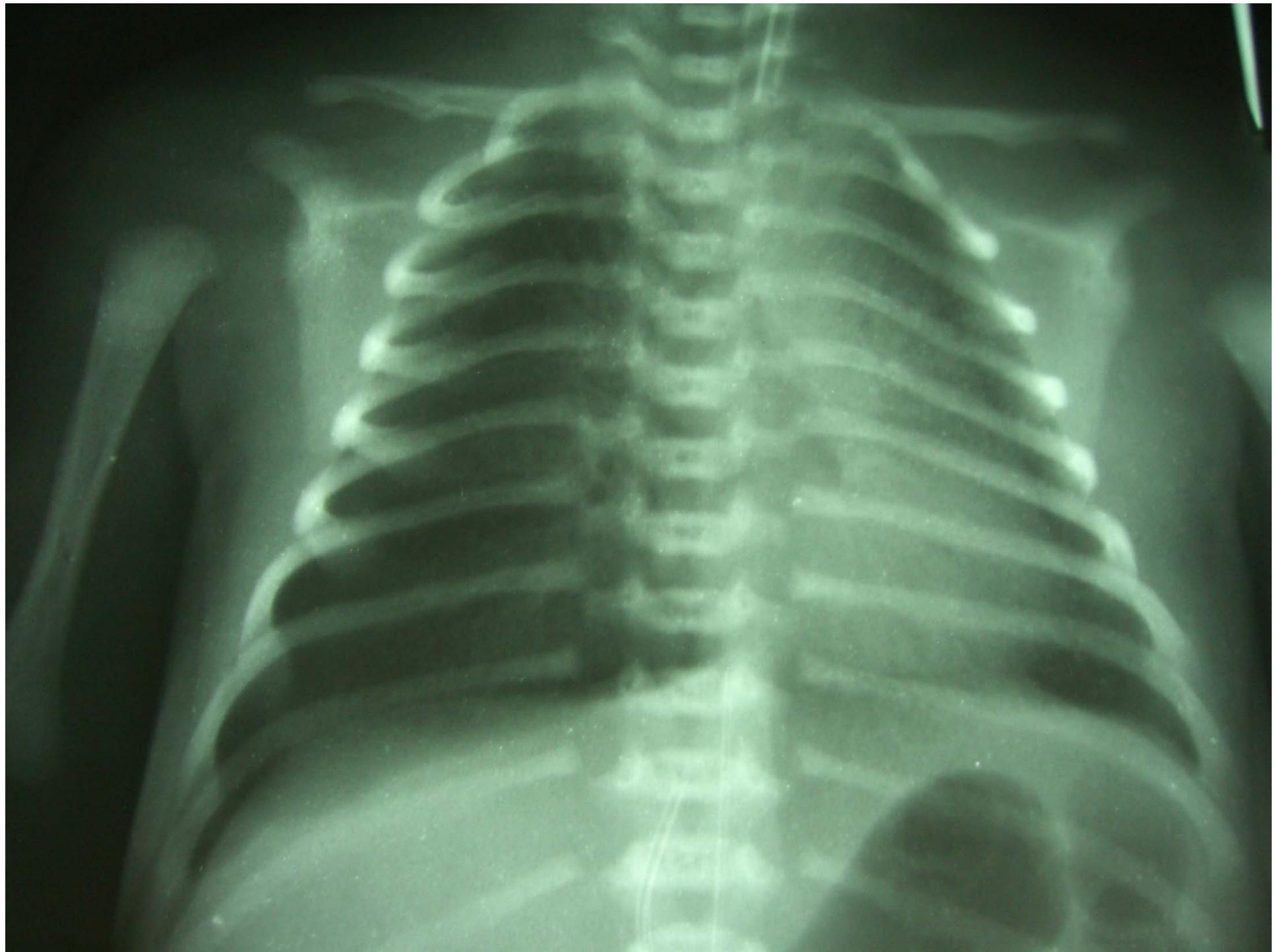
A dark, blurry image showing a ribcage or chest bones. The image is very dark and lacks sharpness, making specific details difficult to discern. A small, light-colored rectangular label is visible in the upper right corner, containing the handwritten text "C1276".

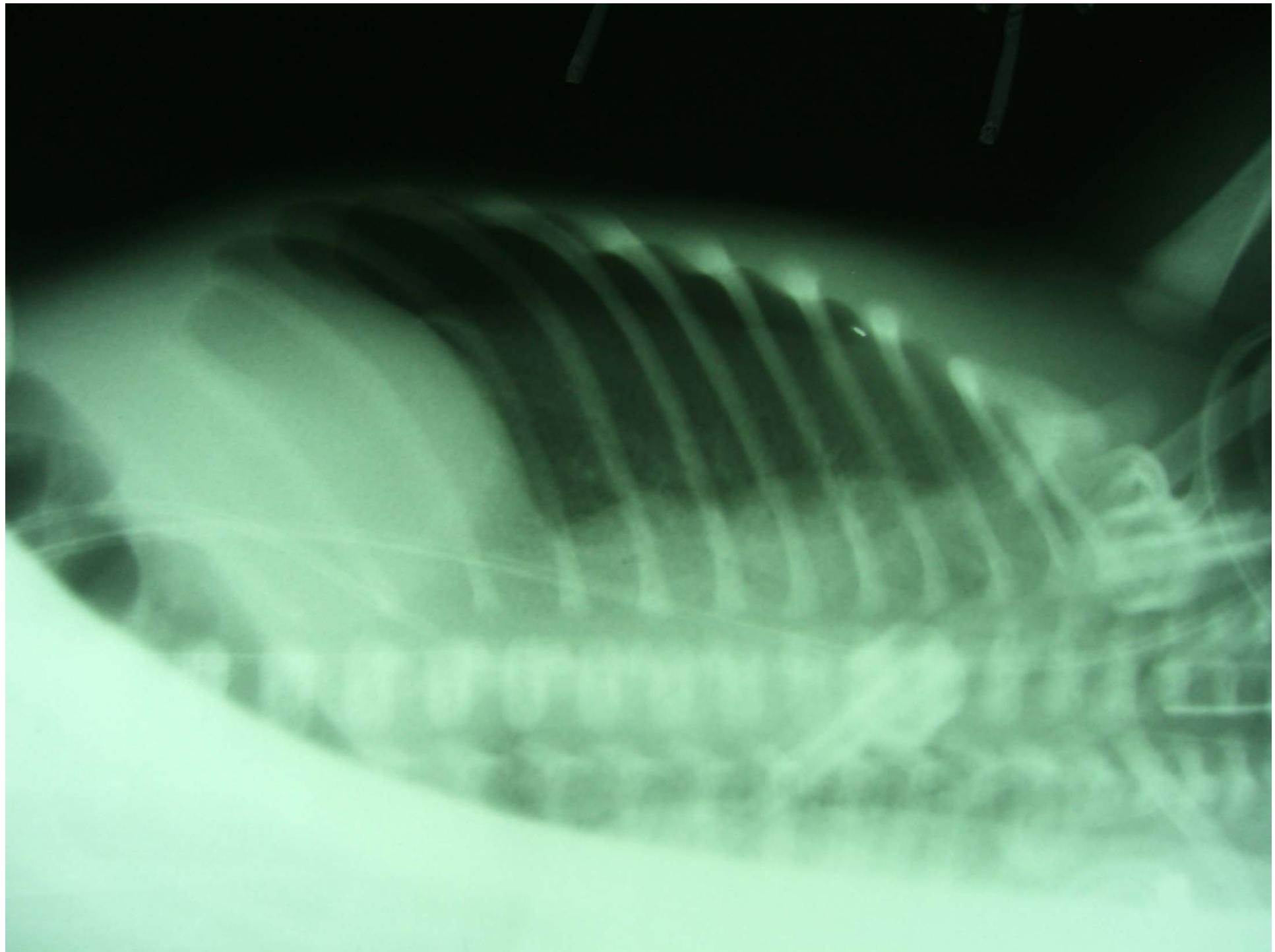
C1276

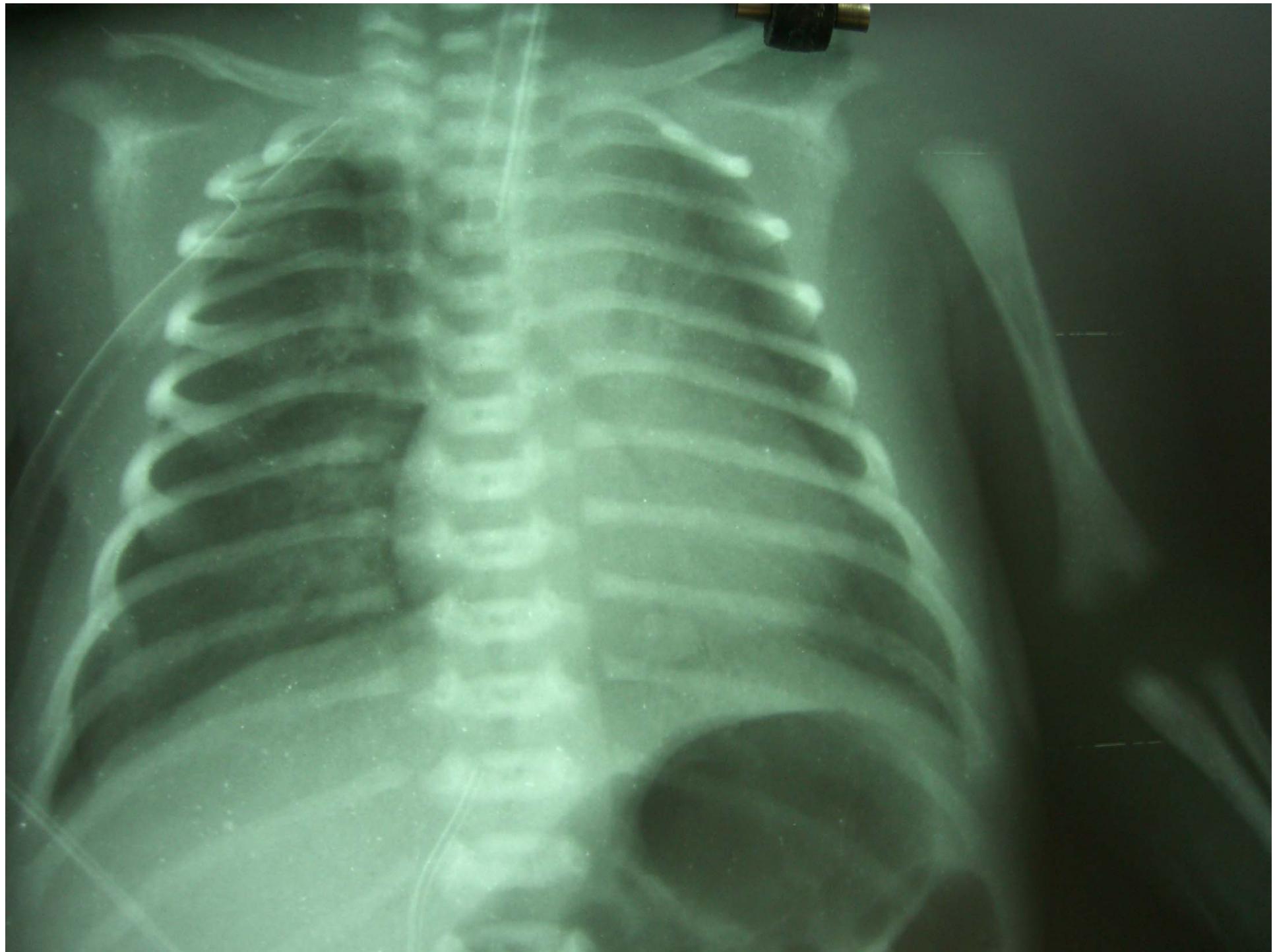








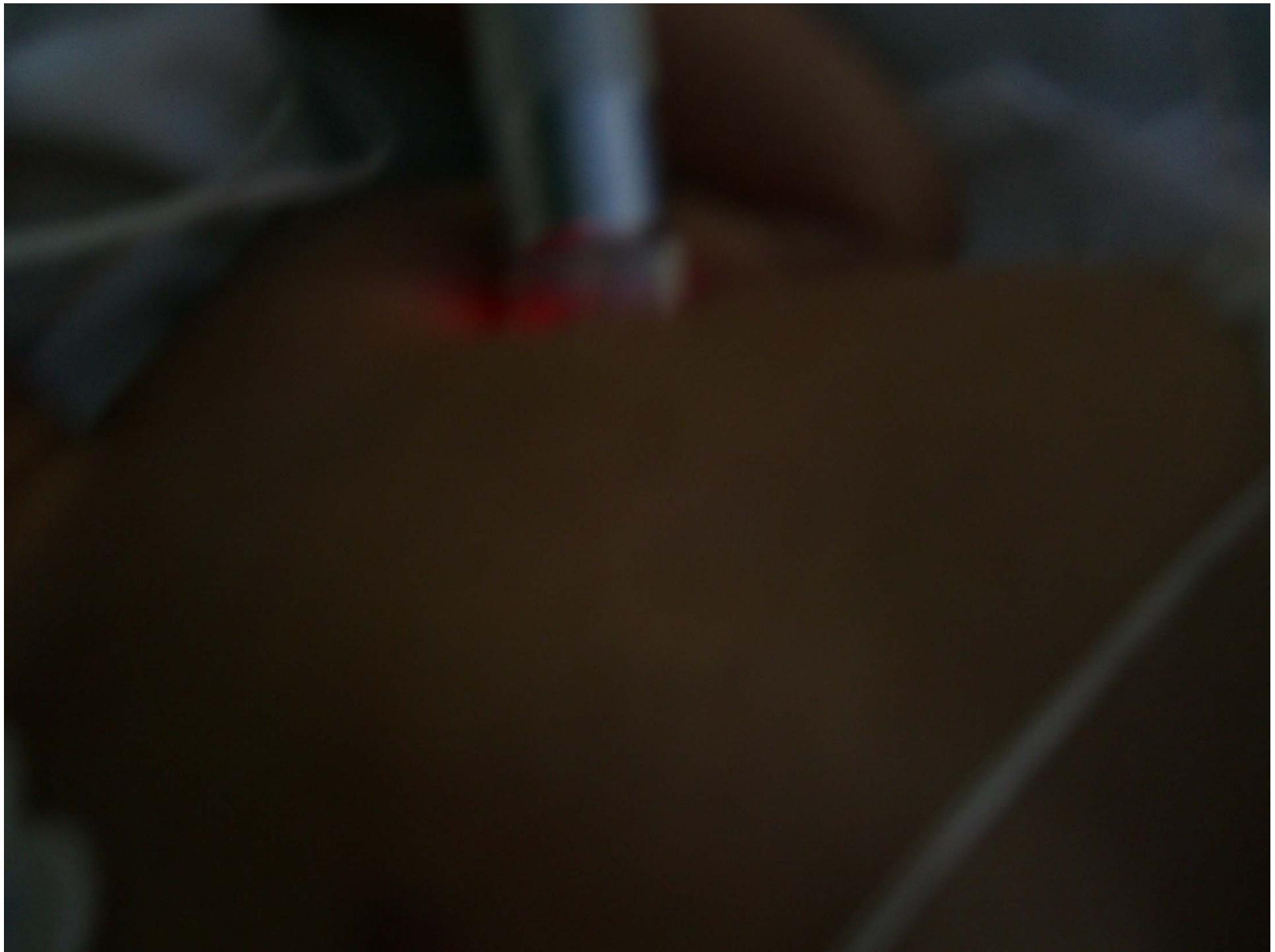


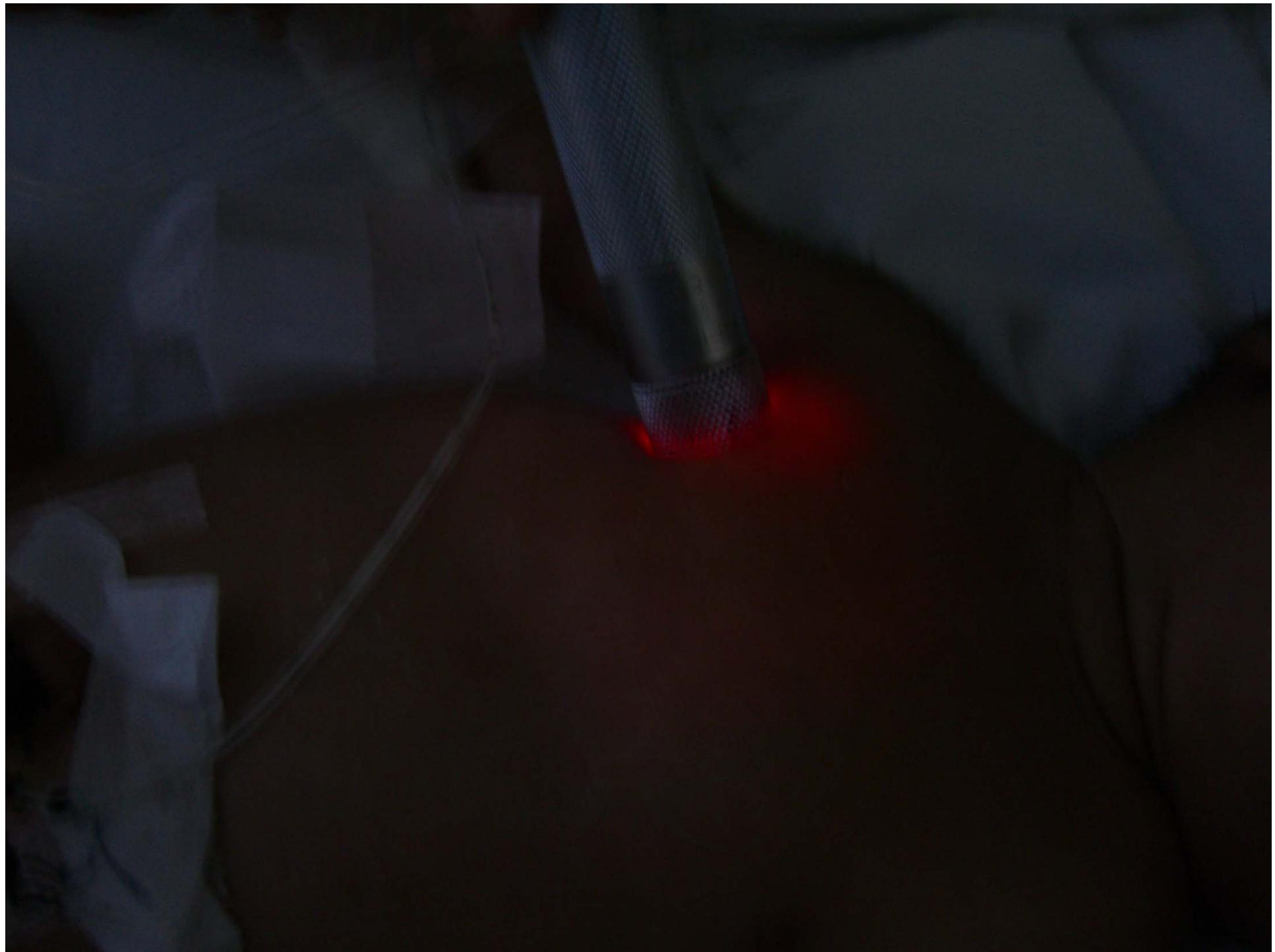


Investigations

- CXR – AP, Lateral decubitus
- Transillumination







Investigations

- CXR – AP, Lateral decubitus
- Transillumination
- Direct needle aspiration – diagnostic & therapeutic

Treatment - 1



Conservative therapy +/- 100% oxygen

- If no underlying lung disease
- No complicating therapy
- No distress
- No continuous air-leaks

Resolve in 24-48 hrs

Treatment – 2

Needle aspiration



Equipment

- 21-23G butterfly needle
- Cleaning solution
- Gallipot/ sterile water or
- Syringe & 3-way tap

Treatment – 2

Needle Aspiration



Procedure

- Clean skin
- Insert needle 2nd/3rd ICS MCL
- End of tubing under water & watch for bubbles or
- Apply continuous suction to syringe until rapid flow of air



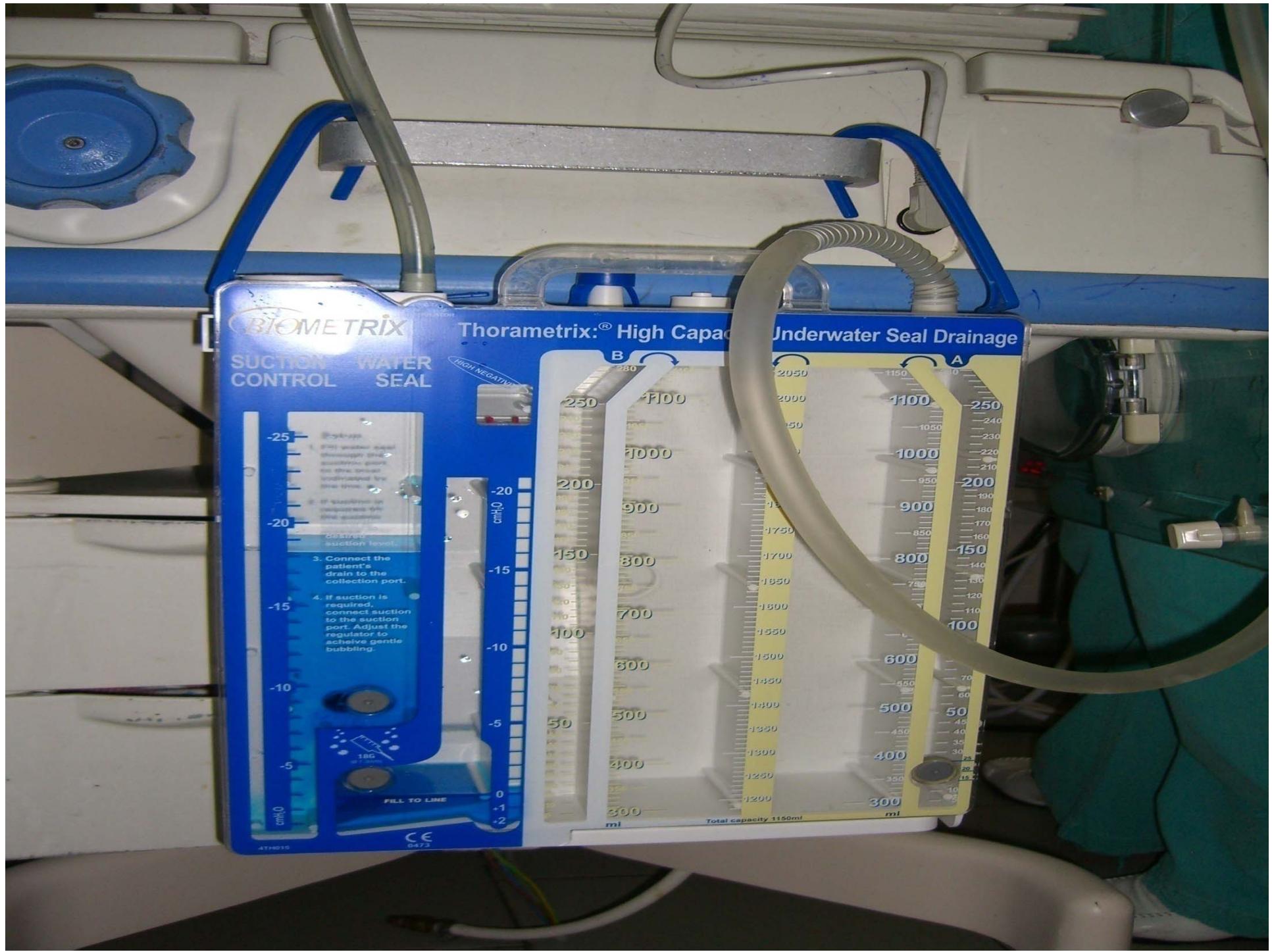


Treatment – 3

Thoracocentesis - Equipment

- Chest drain 10 or 12FG mounted on trochar
- Sterile gown/gloves & cleaning solution
- LA, syringes & needles
- Sterile dressing pack – fine mosquito forceps, scalpel/blade, large clamp
- Underwater seal drain
- 3-0/4-0 silk suture & transparent adhesive dressing







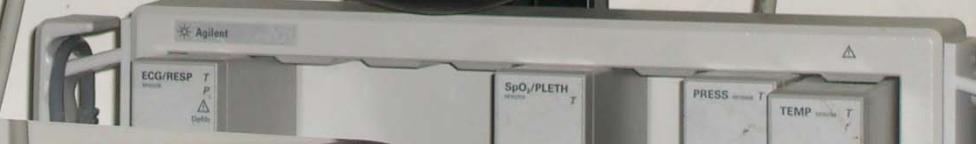




















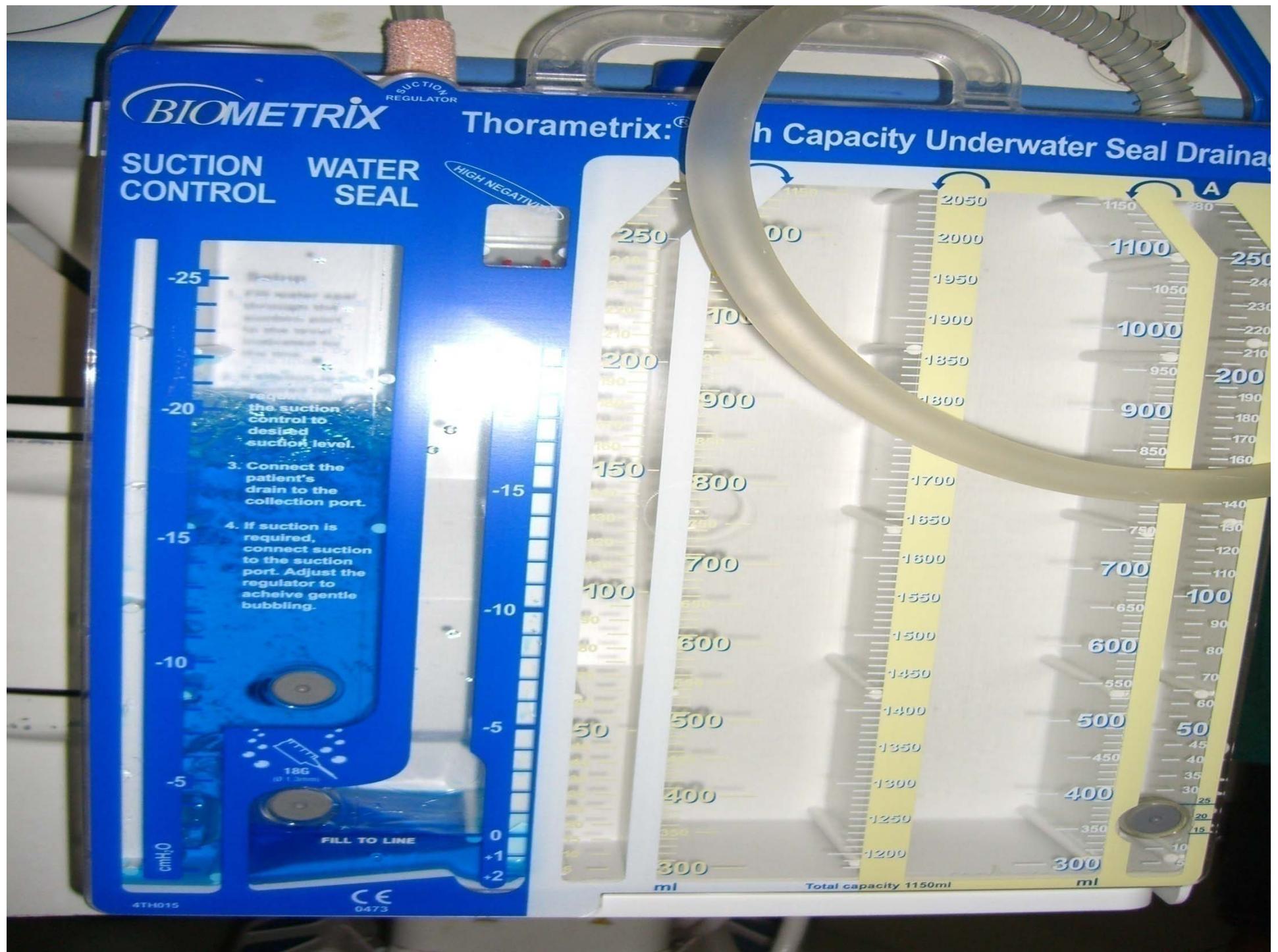












regulator to
achieve gentle
bubbling.

-10

-5

cmH₂O

4TH015



18G
(Ø 1.3 mm)

FILL TO LINE

CE
0473

-10

-5

0

+1

+2

100

650

600

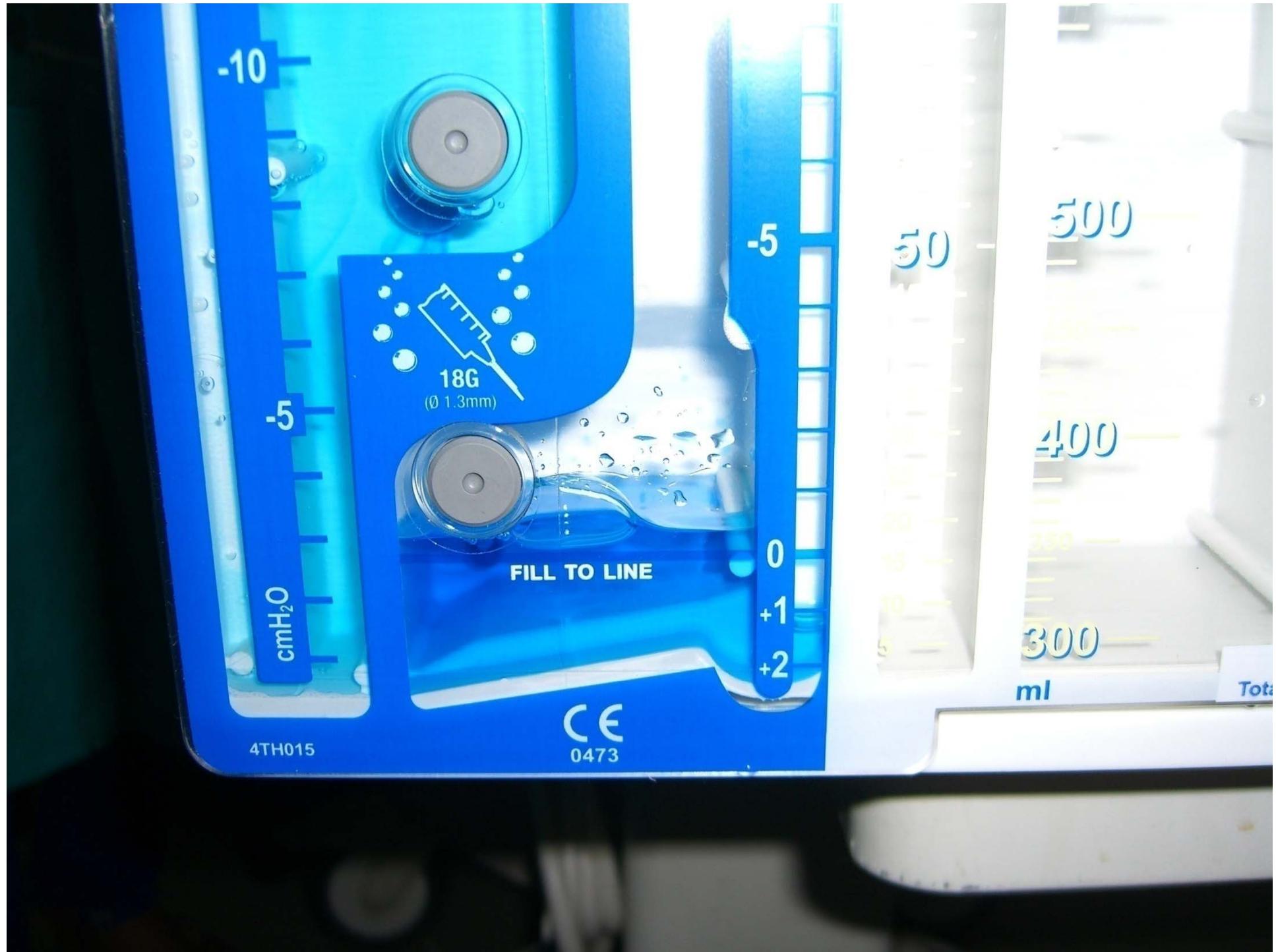
500

400

300

ml

Total capa



Treatment – 3

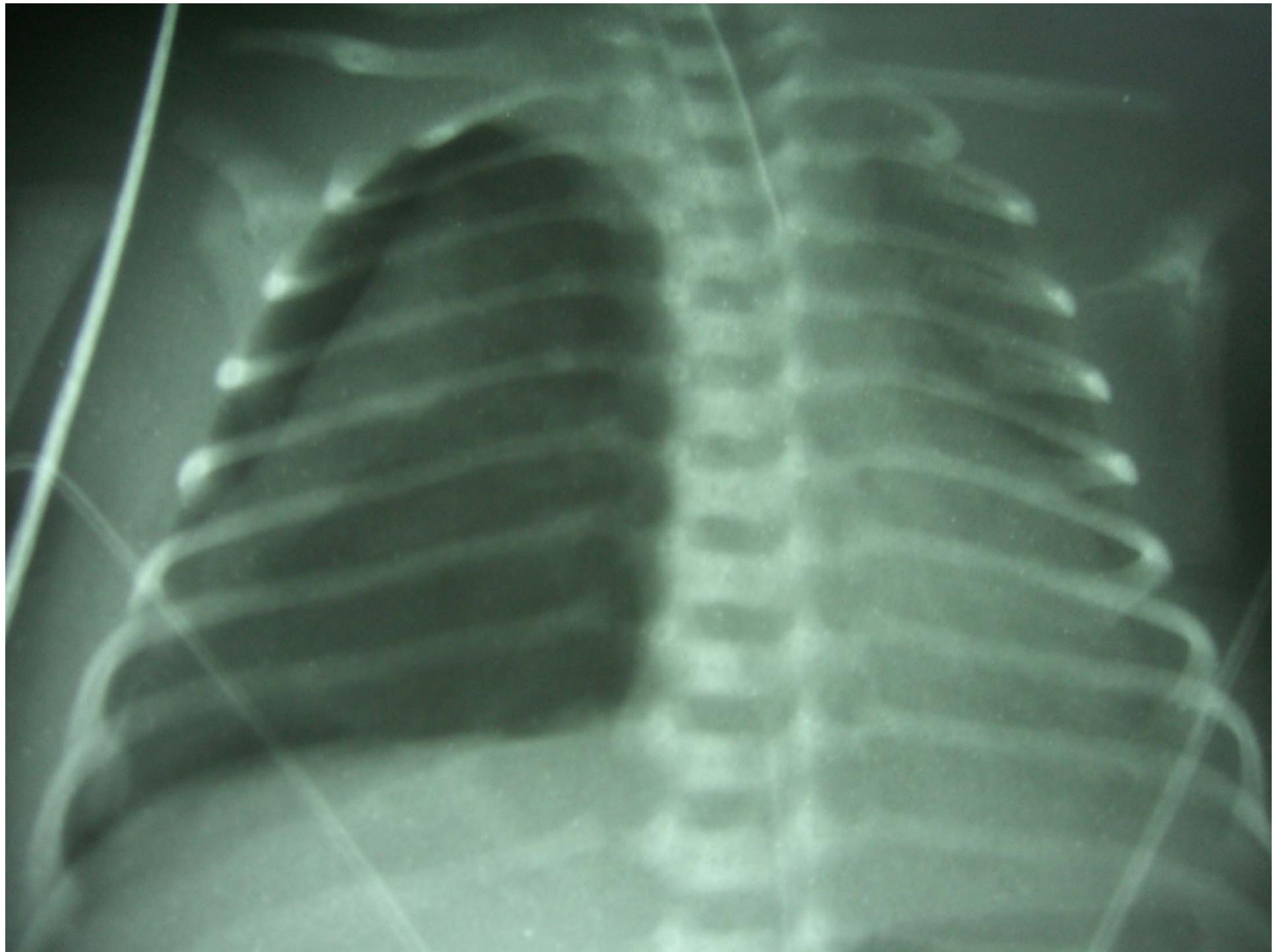
Thoracocentesis - procedure

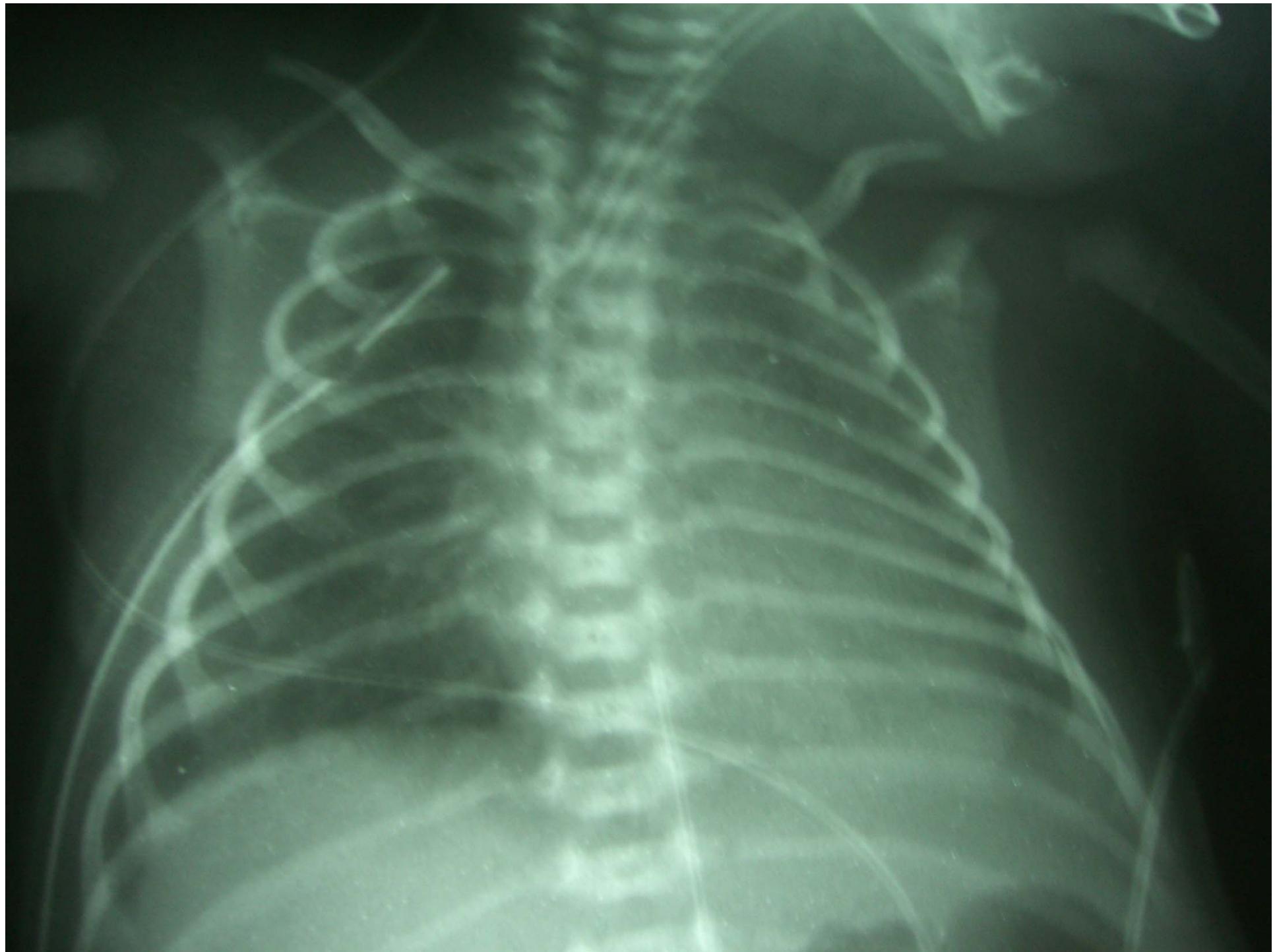
- Clean area & inject LA
- Make nick in skin along 4th/5th ICS MAL parallel to rib
- Use fine mosquito forceps to make track for chest drain – just above rib below
- Insert chest drain through track about 2-3cm, having previously withdrawn trochar from tip of chest drain

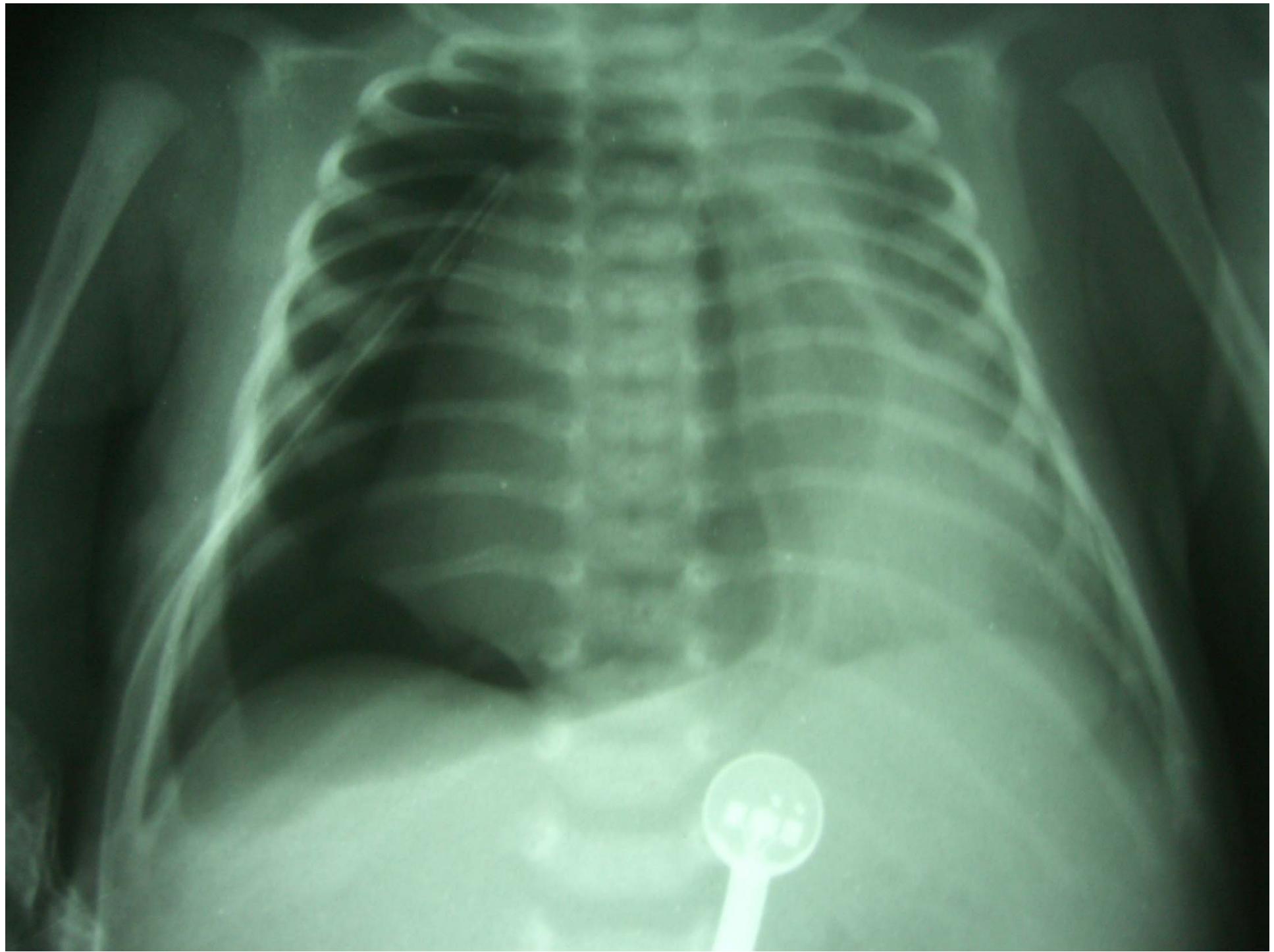
Treatment – 4

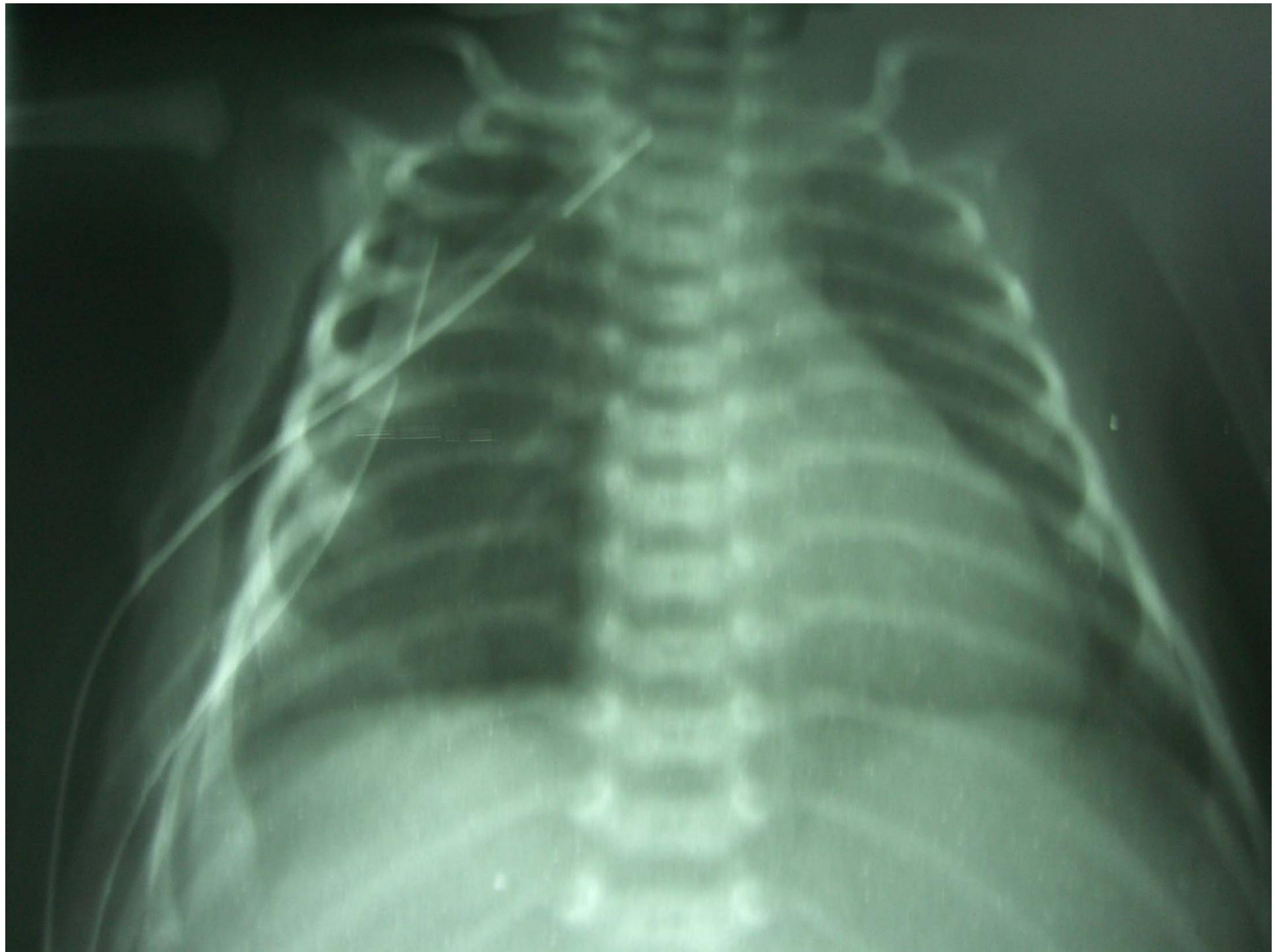
Thoracocentesis - procedure

- Place clamp on chest drain proximal to tip of trochar & remove trochar completely
- Connect chest drain to underwater seal drain with 10-20 cm H₂O suction pressure
- Remove clamp and watch for air bubbling out
- Suture chest drain in place
- Cover with transparent adhesive dressing
- CXR





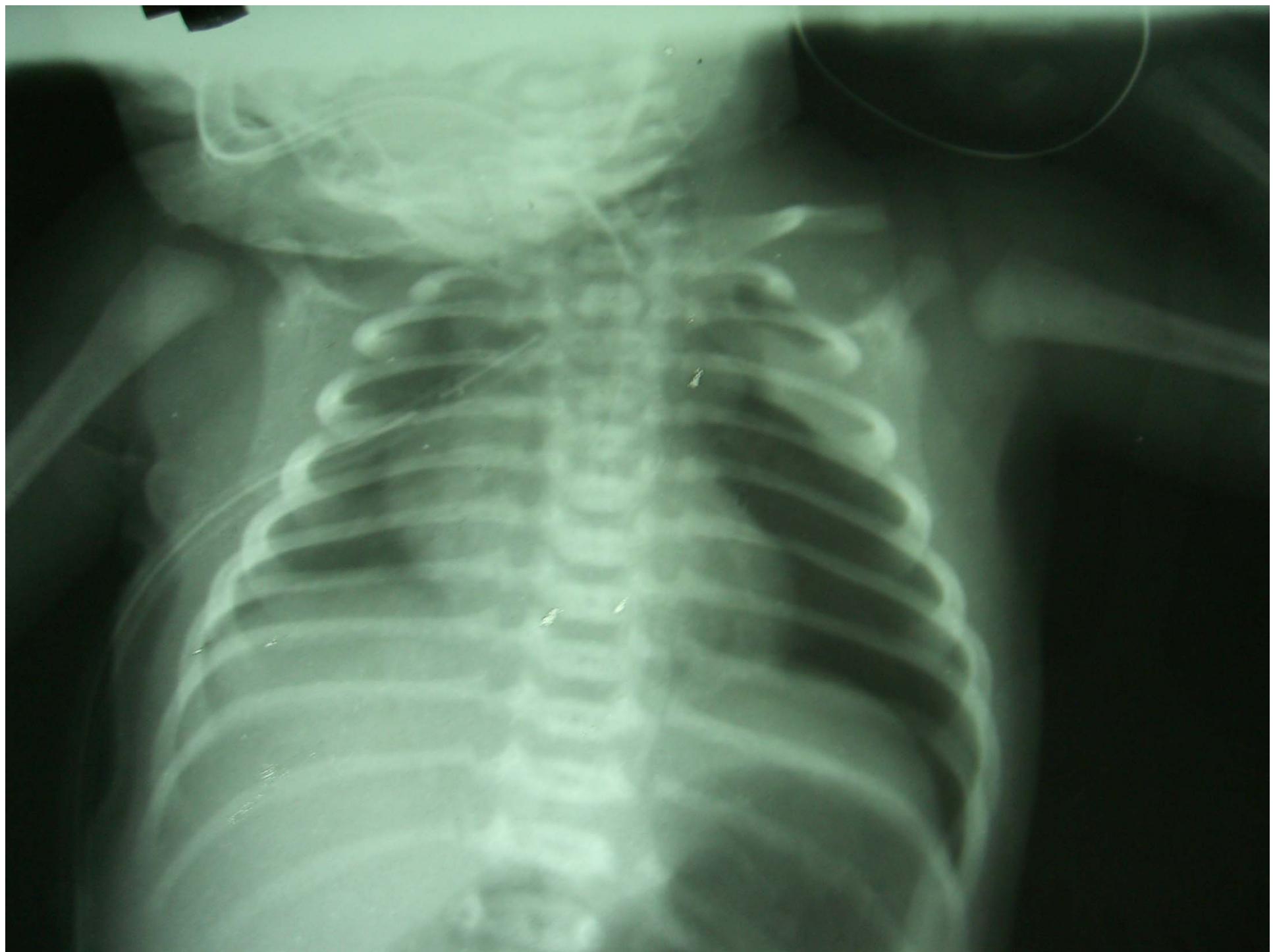




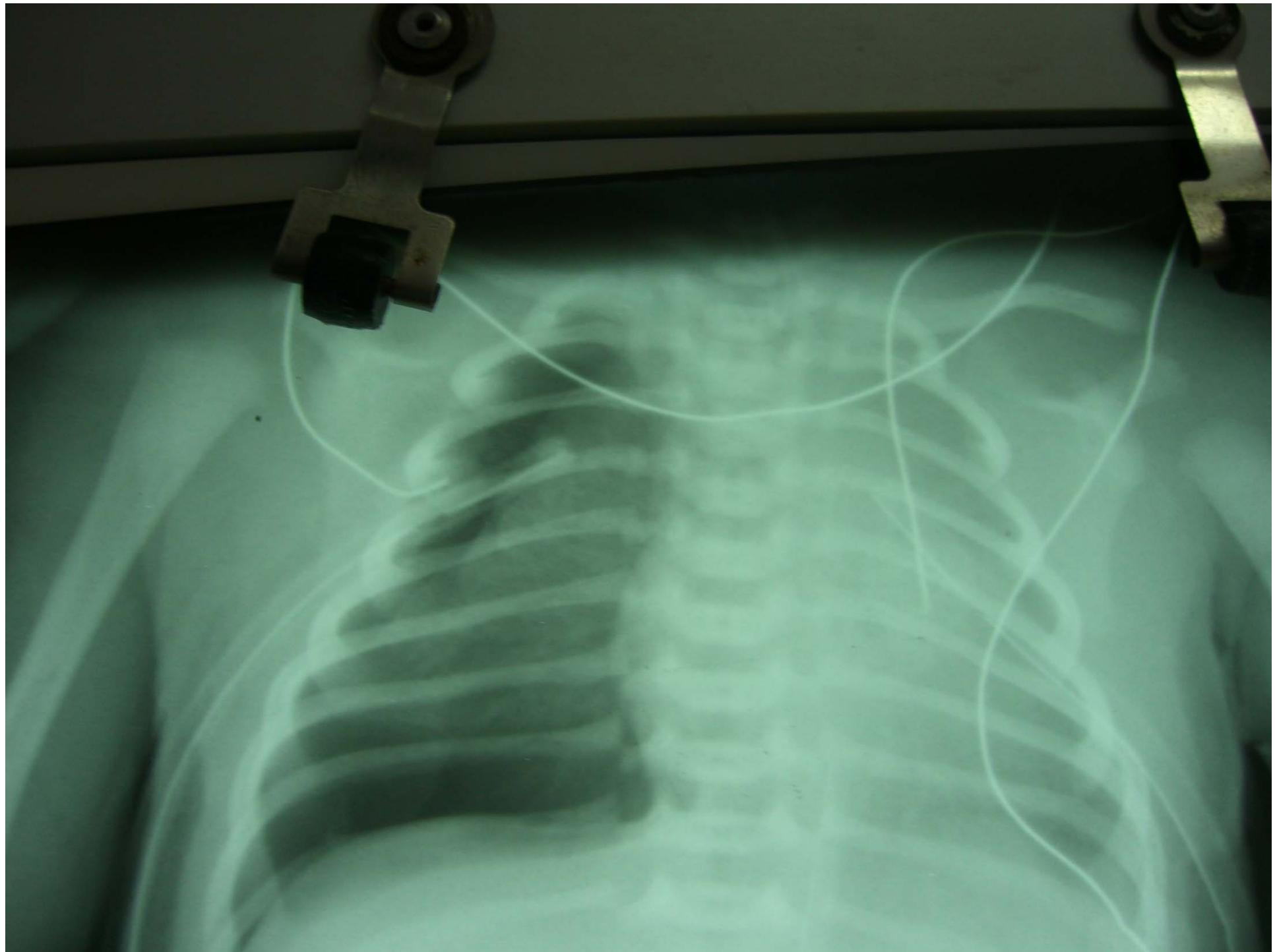
Removal of chest drain

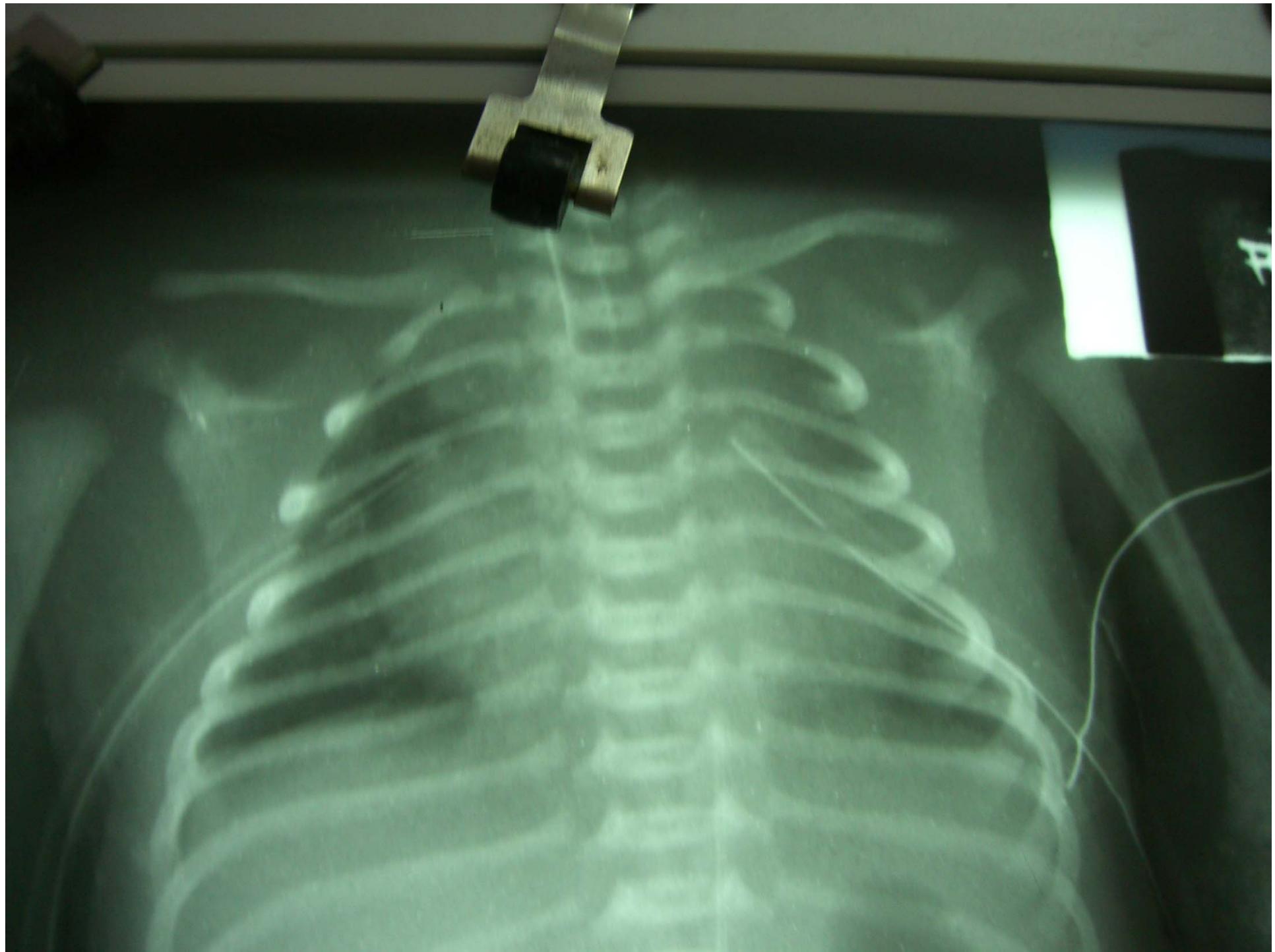
- Lung disease has improved
- Drained no air for 24-48hrs
- Pneumothorax resolved for 24-48 hrs
- No longer requiring PIP >25
- Stop suction, clamp drain & remove on successive days – CXRs
- Remove during expiration if spontaneous breathing; inspiration if vent'd

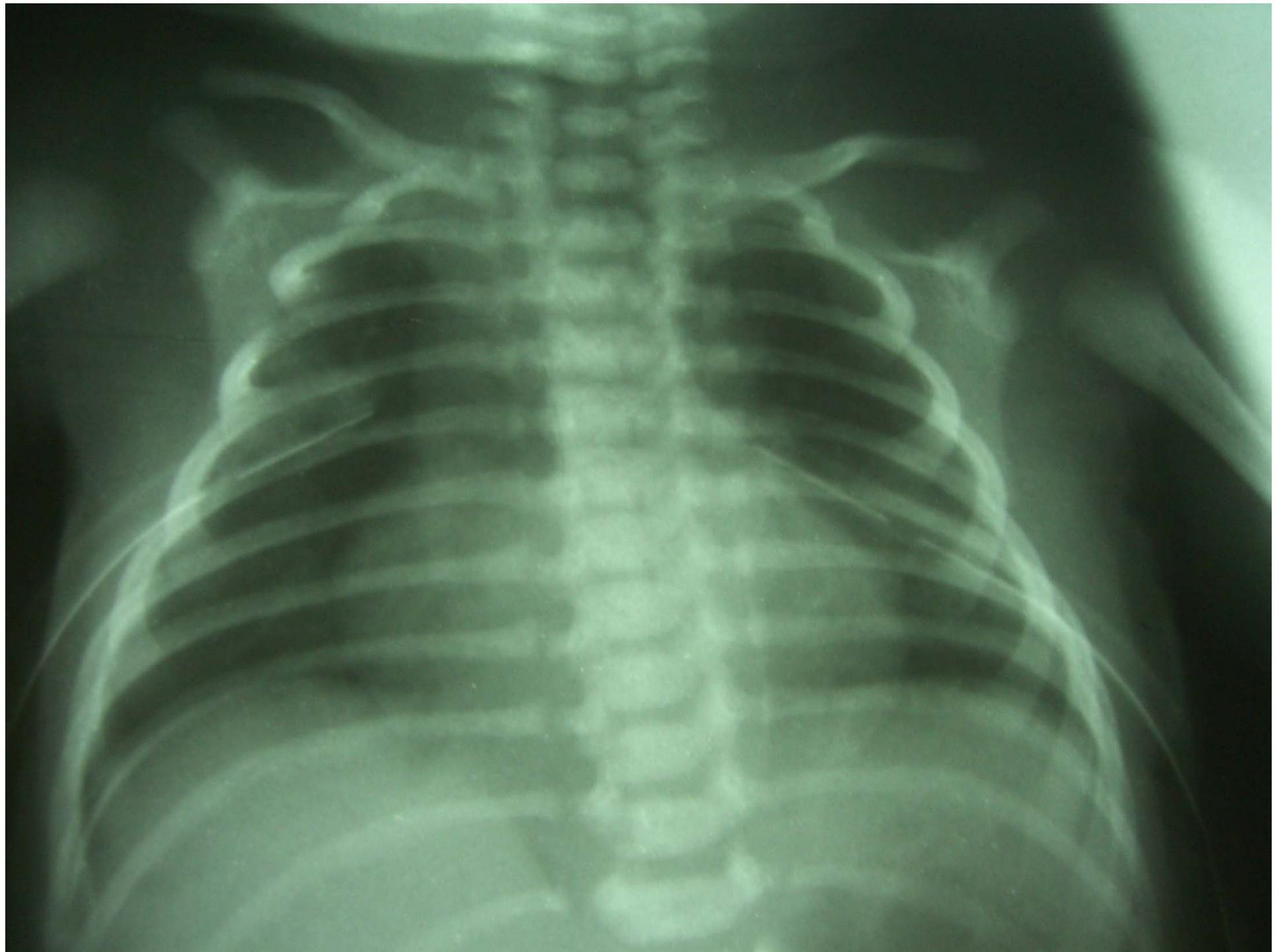






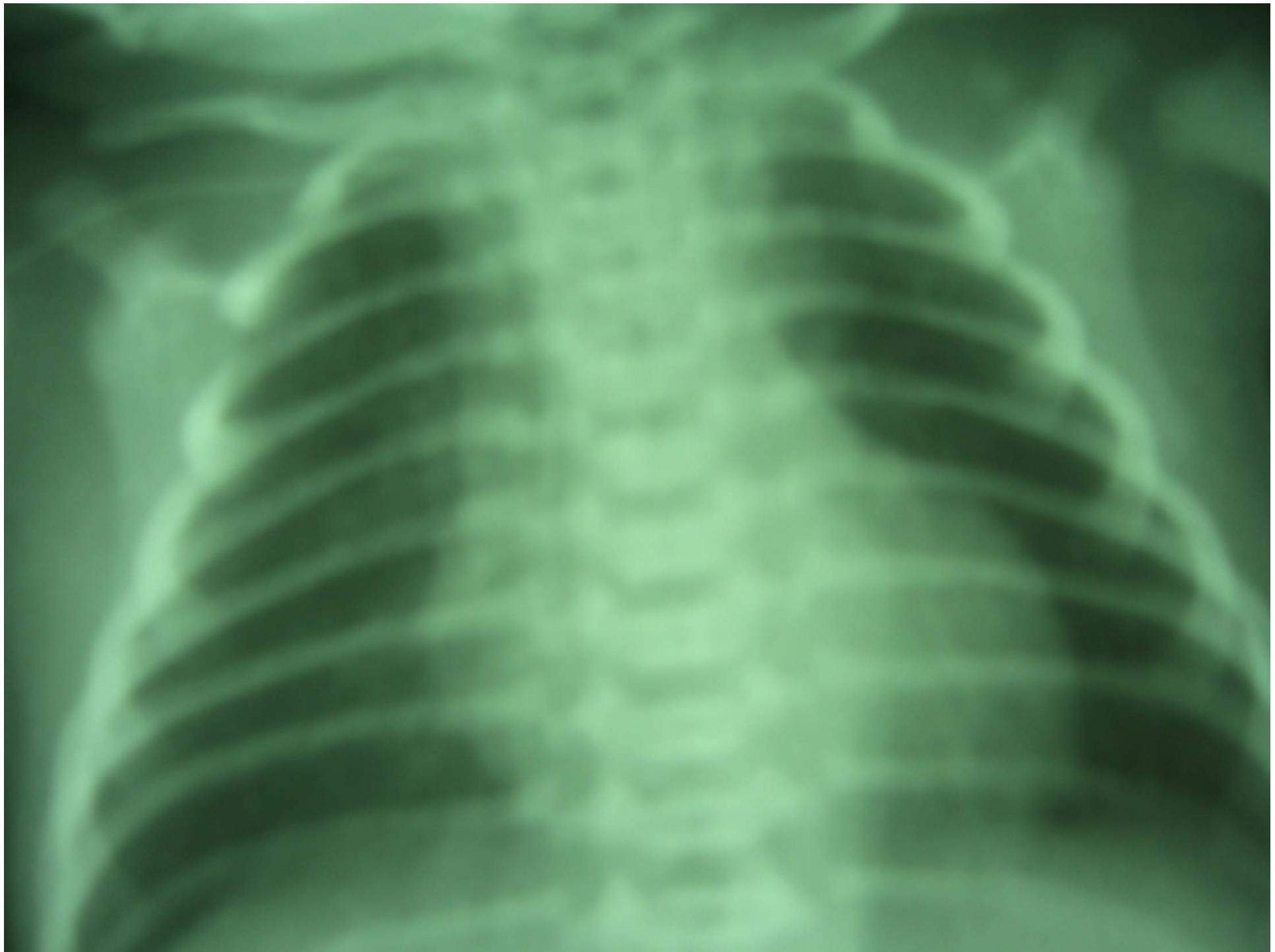








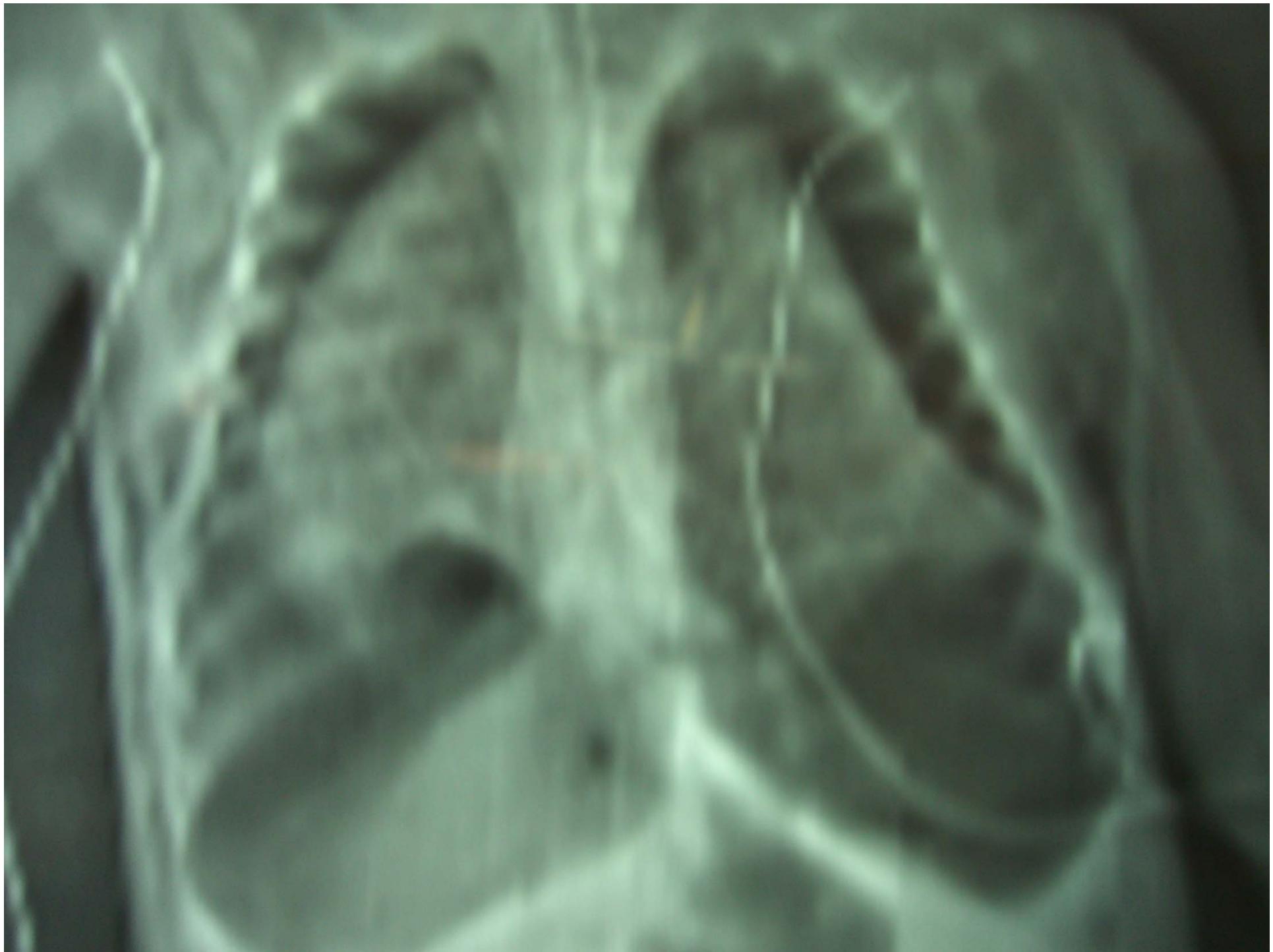




Complications



- Profound ventilatory & circulatory compromise & death
- IVH
- SIADH











Pneumomediastinum



DIAGNOSIS:

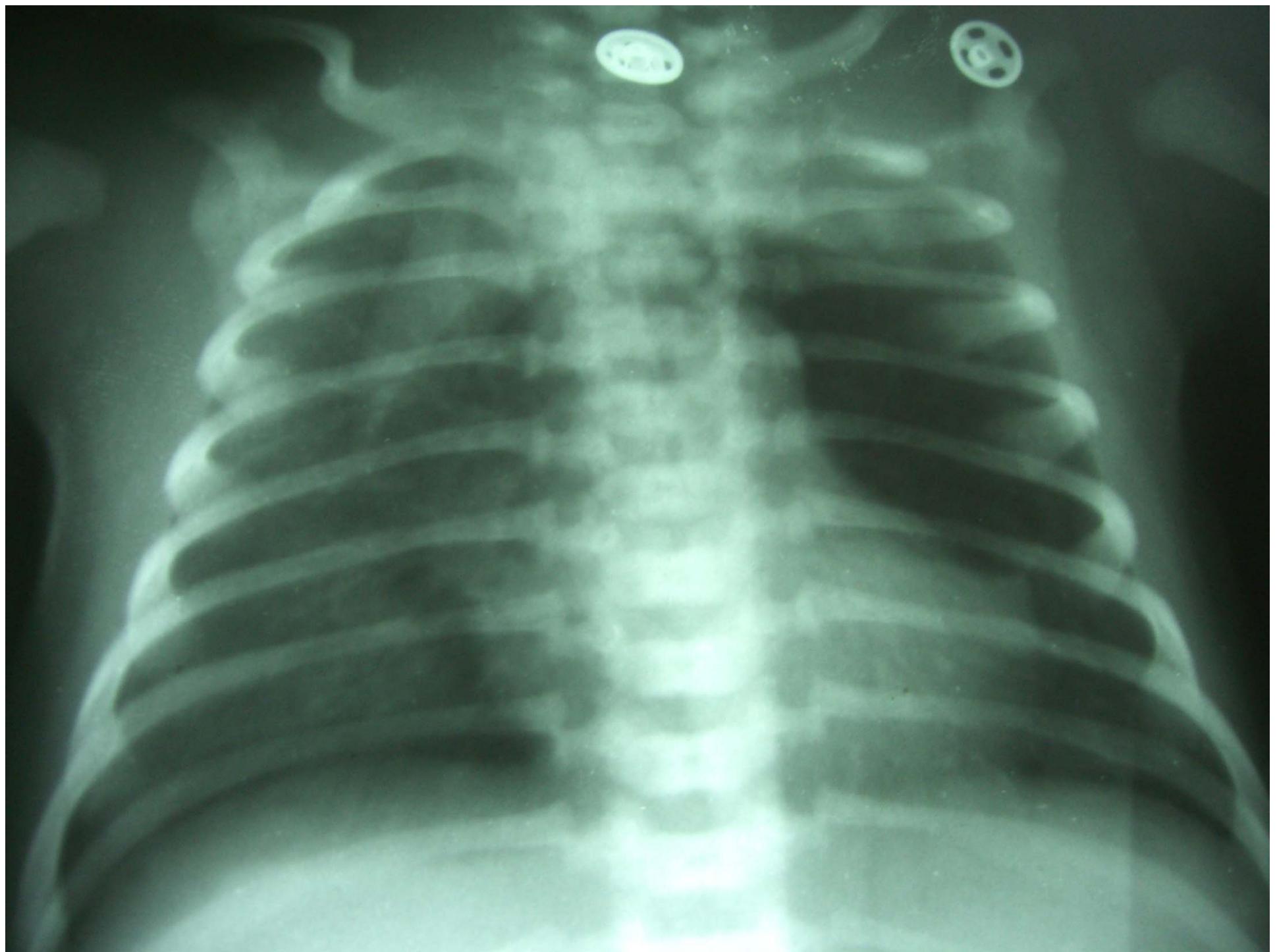
DISTANT HEART SOUNDS

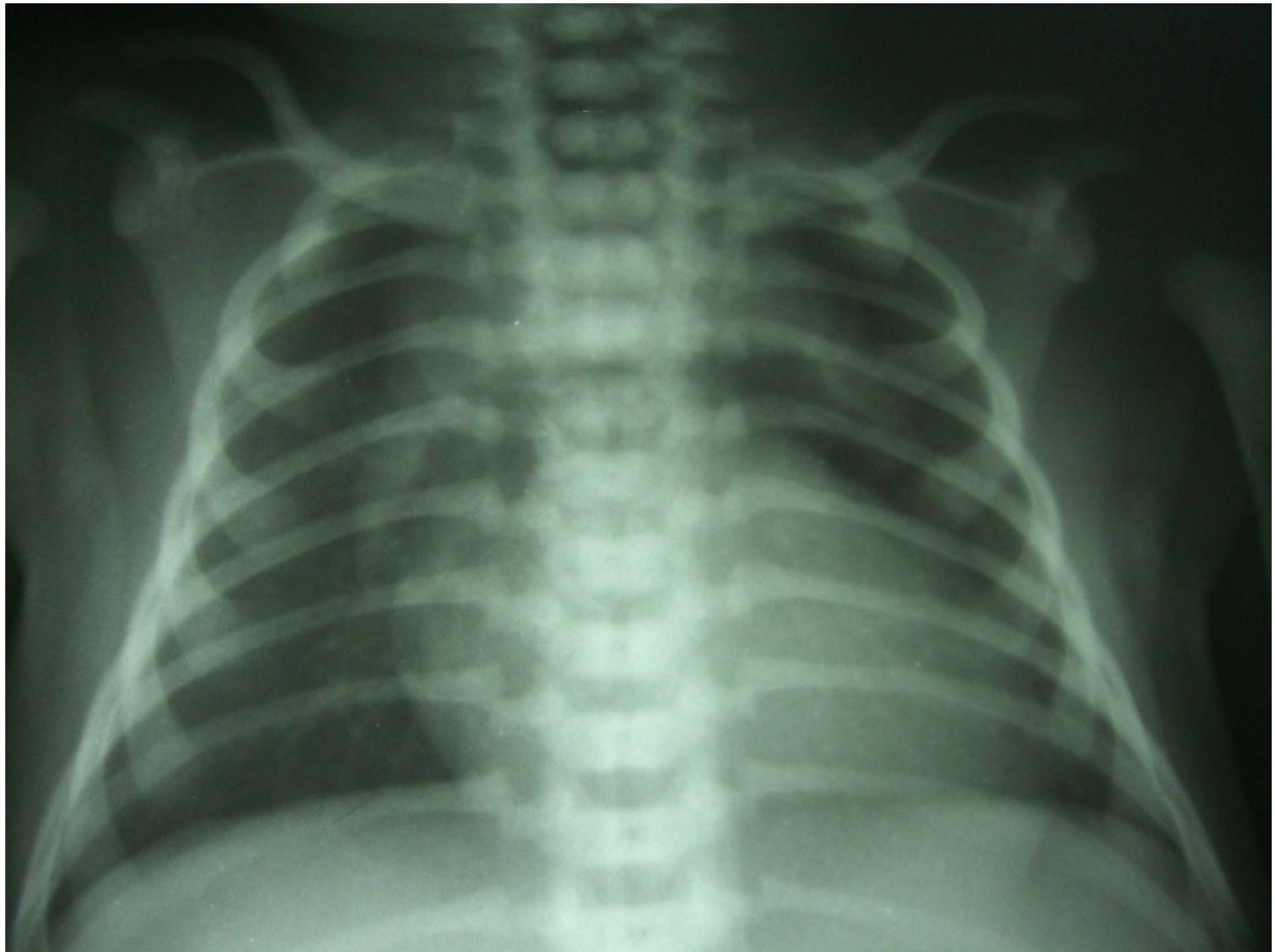
+VE TRANSILLUMINATION

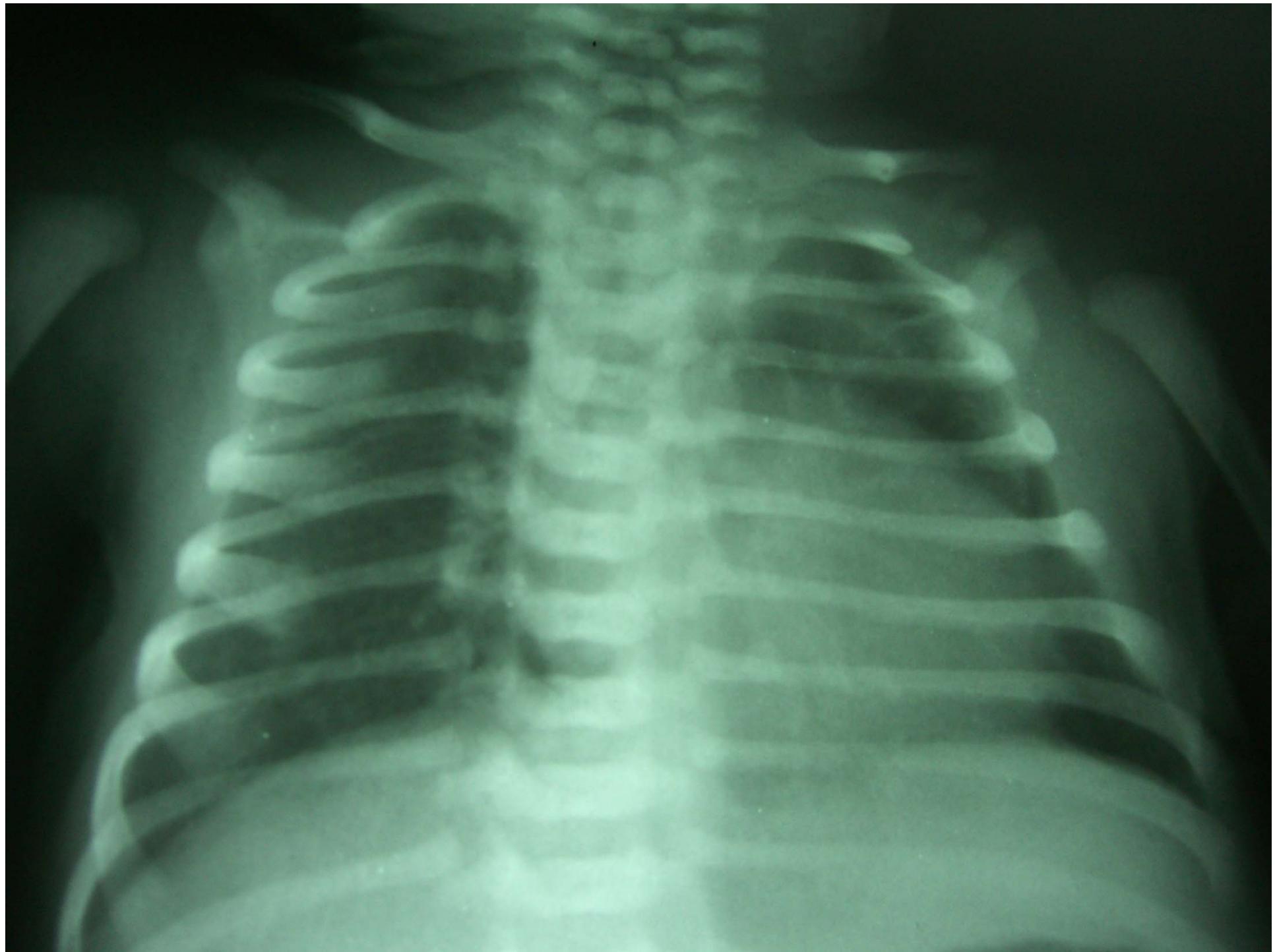
CXR AP – SAIL SIGN

LATERAL

TREATMENT - CONSERVATIVE



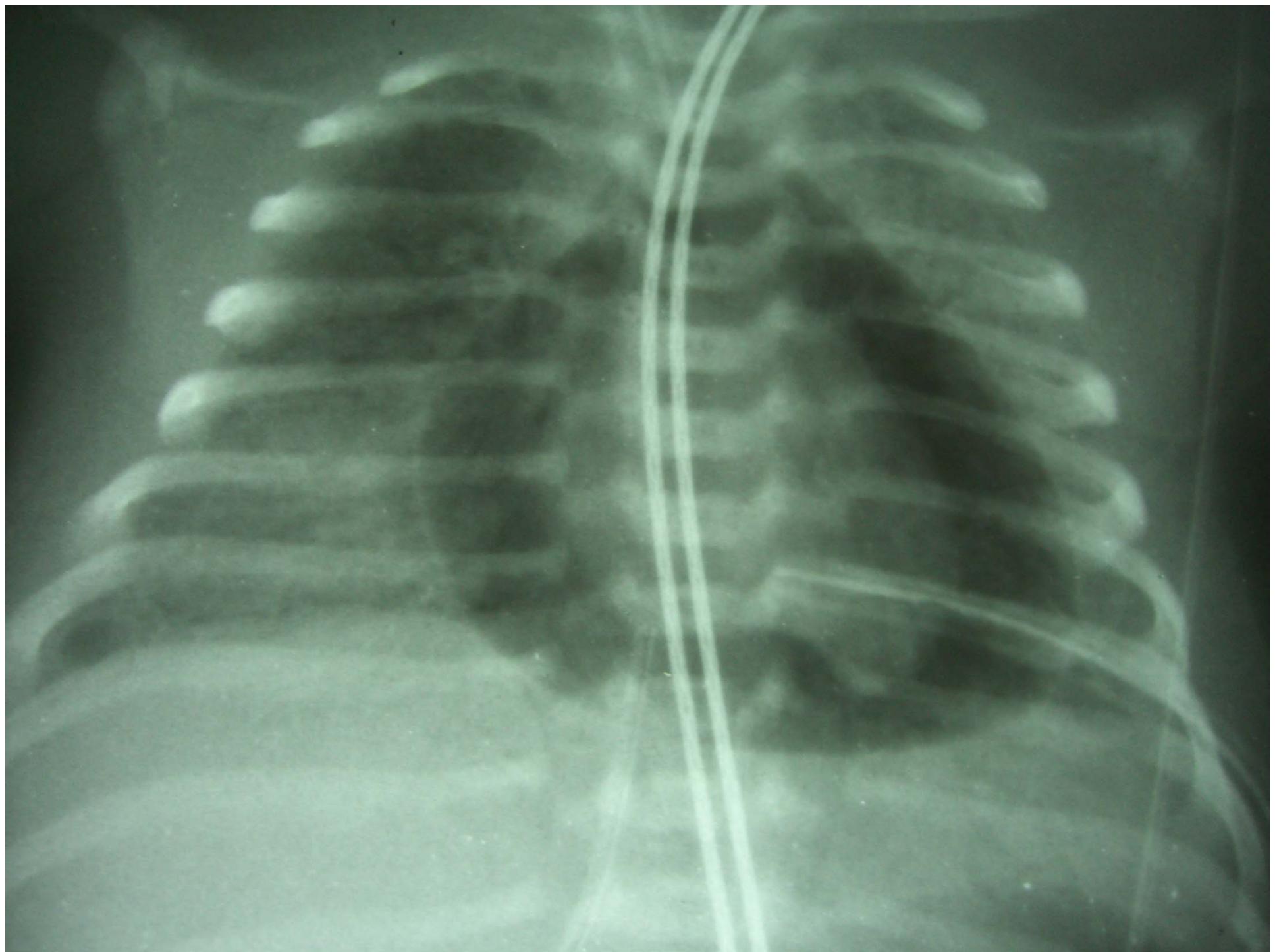




Pneumopericardium



**CARDIAC TAMPOONADE
CXR ; TRANSILLUMINATION
RX: PERICARDIAL TAPPING
HIGH MORTALITY**



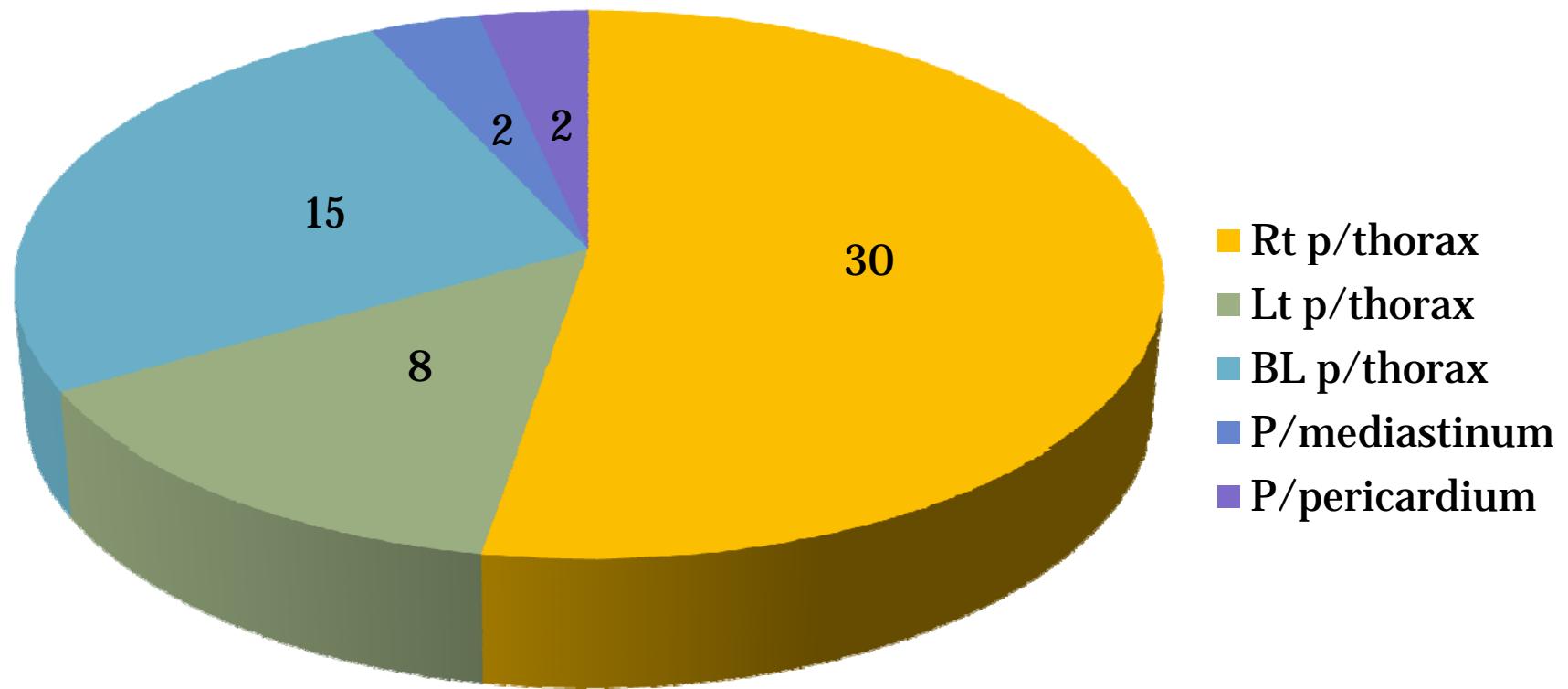
Audit on Neonatal Air Leaks



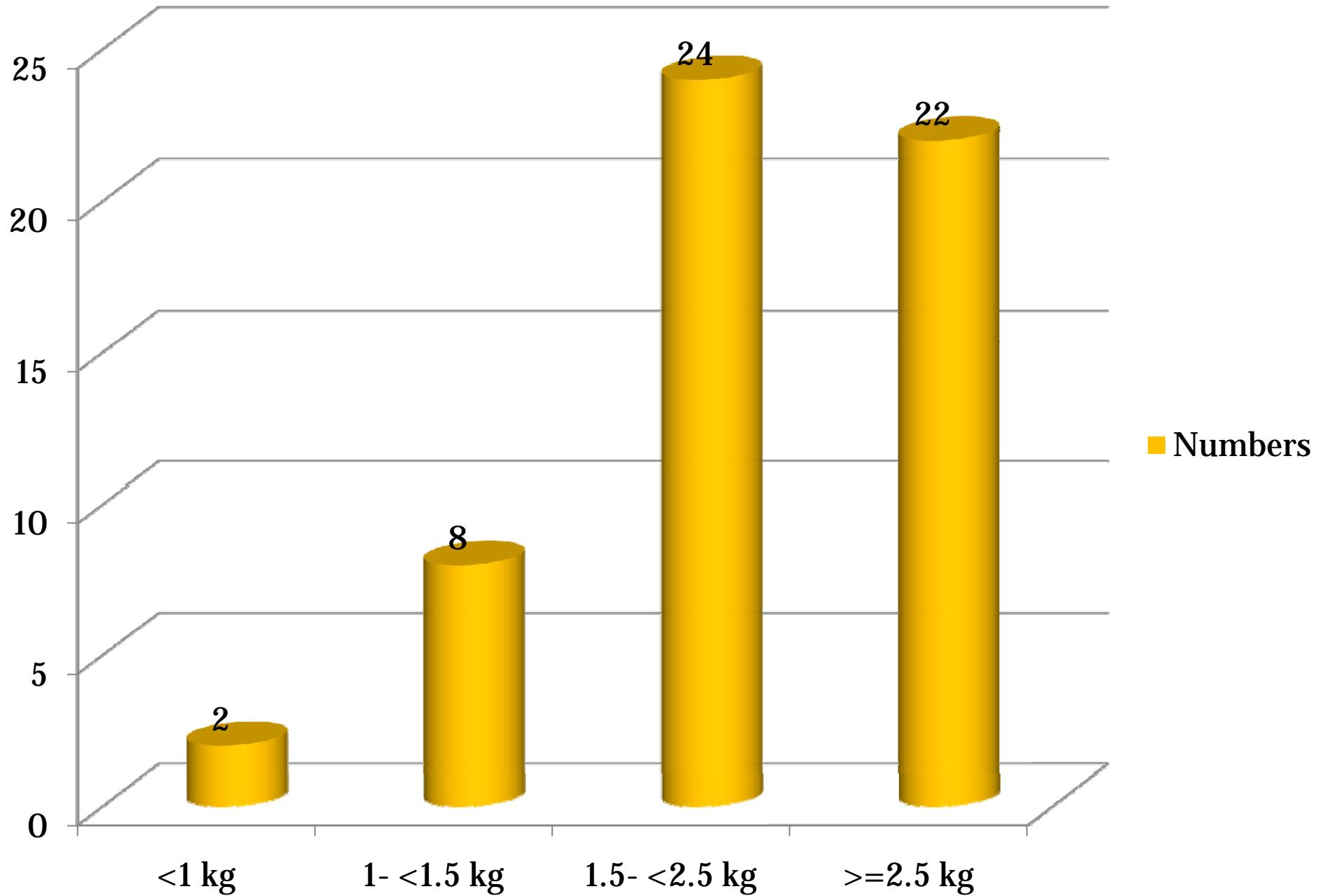
**SSRNH NICU
31.07.2001-31.07.2007**

Incidence	56/1280 (4.3%)
Gender	39 boys, 17 girls
Place of birth	SSRNH 22; JH 20; FH 7; Other 7
Mode of delivery	Em CS 15; El CS 16; NVD 24; Forceps 1
Outcome	39 alive; 17 dead (Mortality 30%) Only 3 deaths directly attributable to airleak.

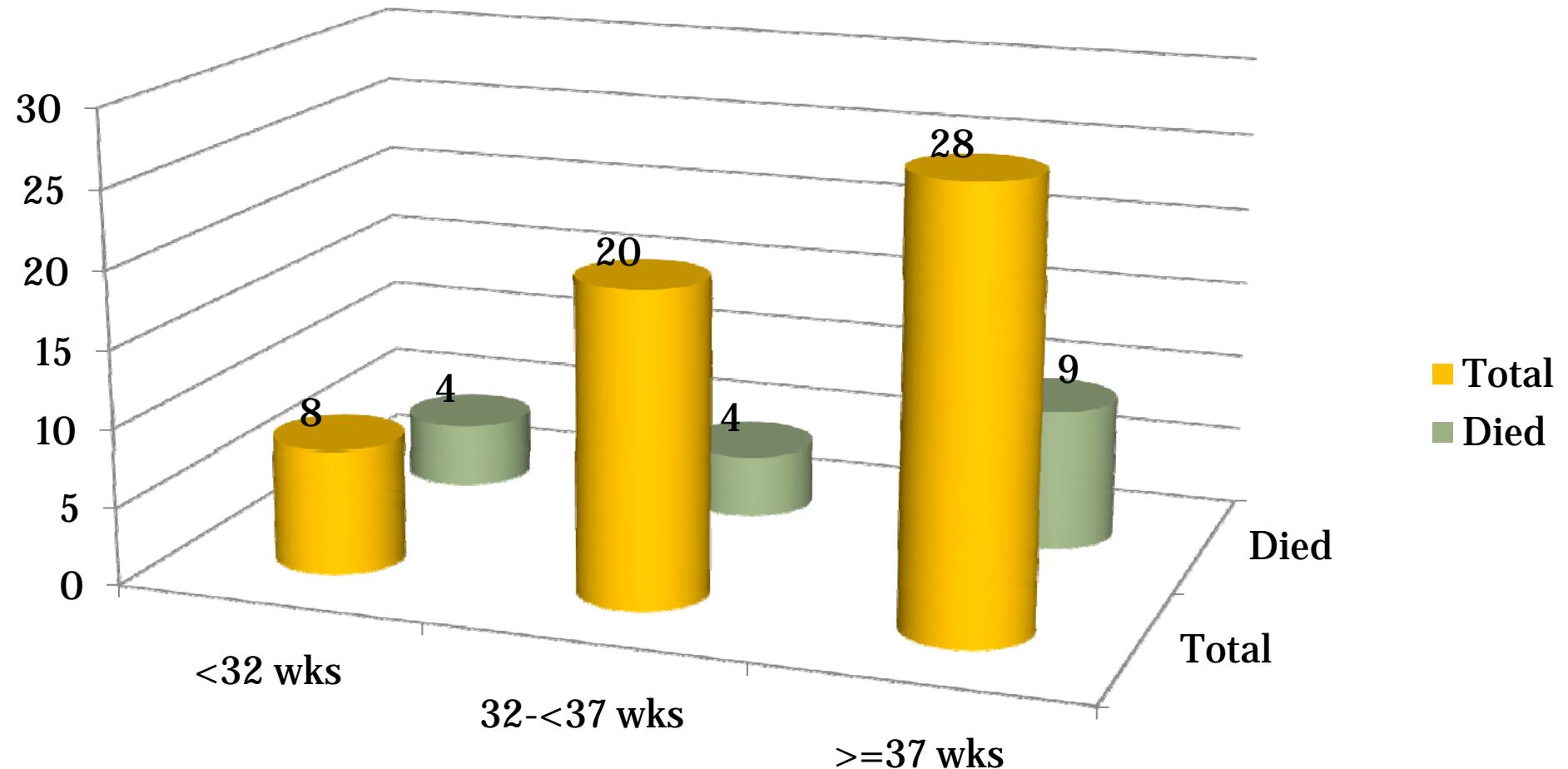
Type & site of air-leak



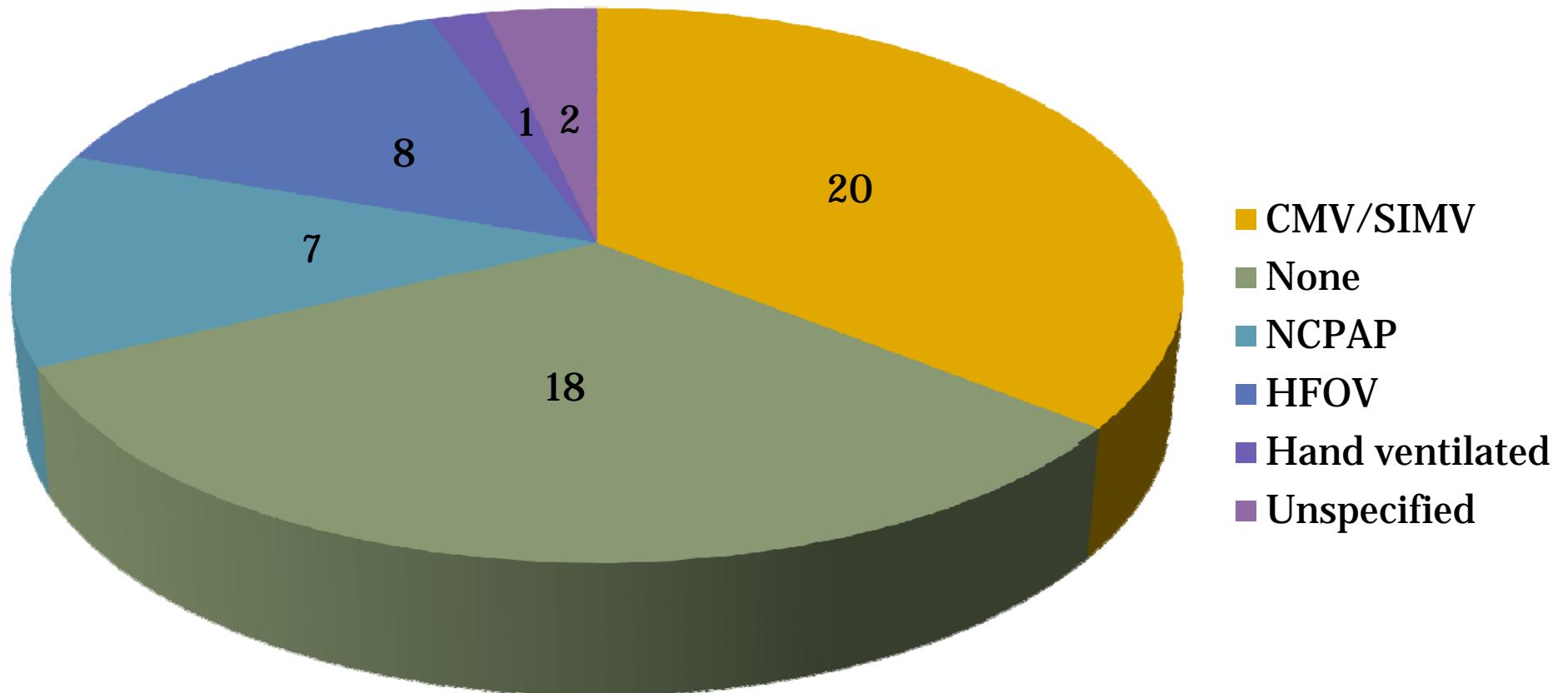
Birth Weight



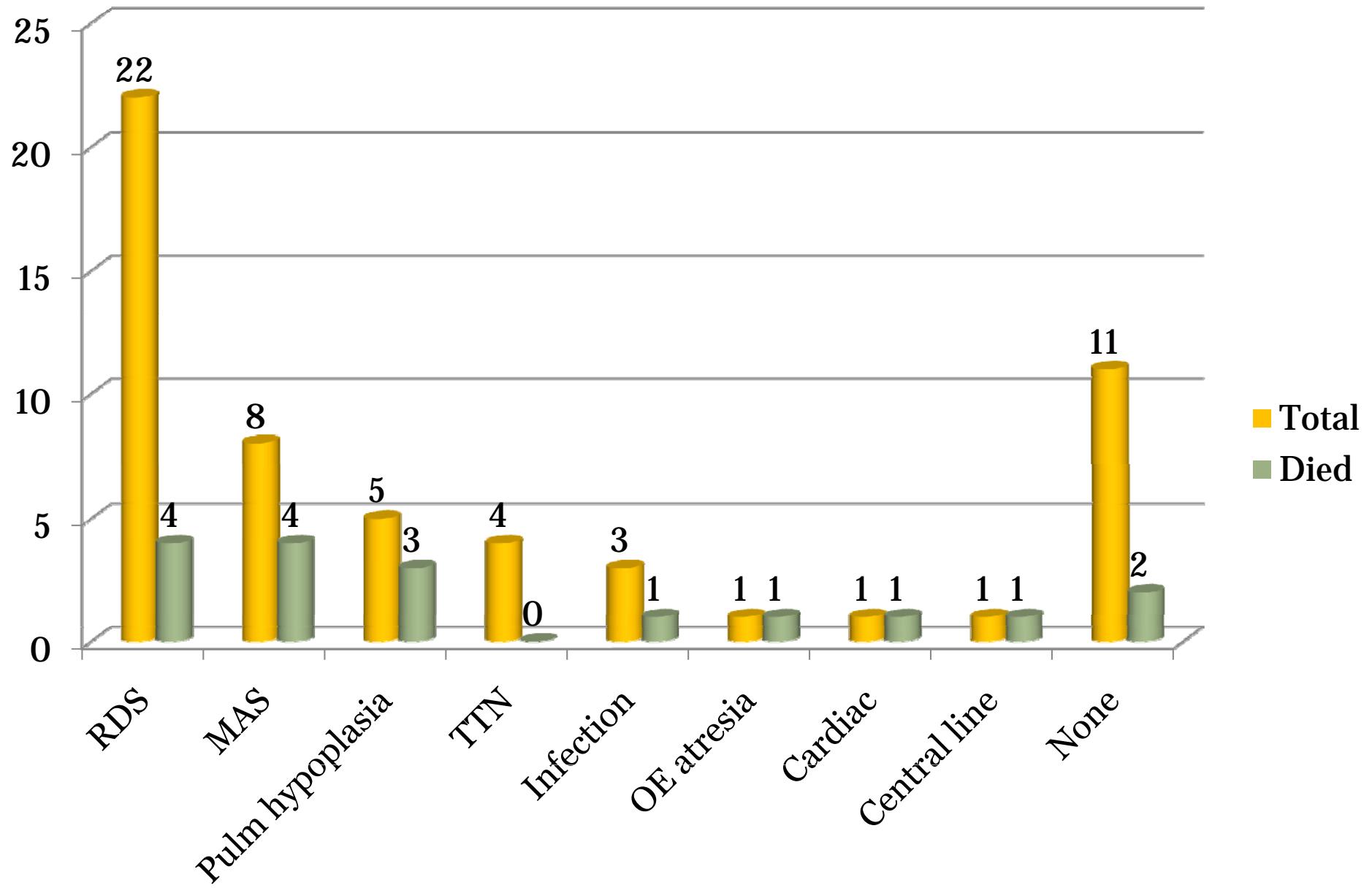
Gestation & Mortality



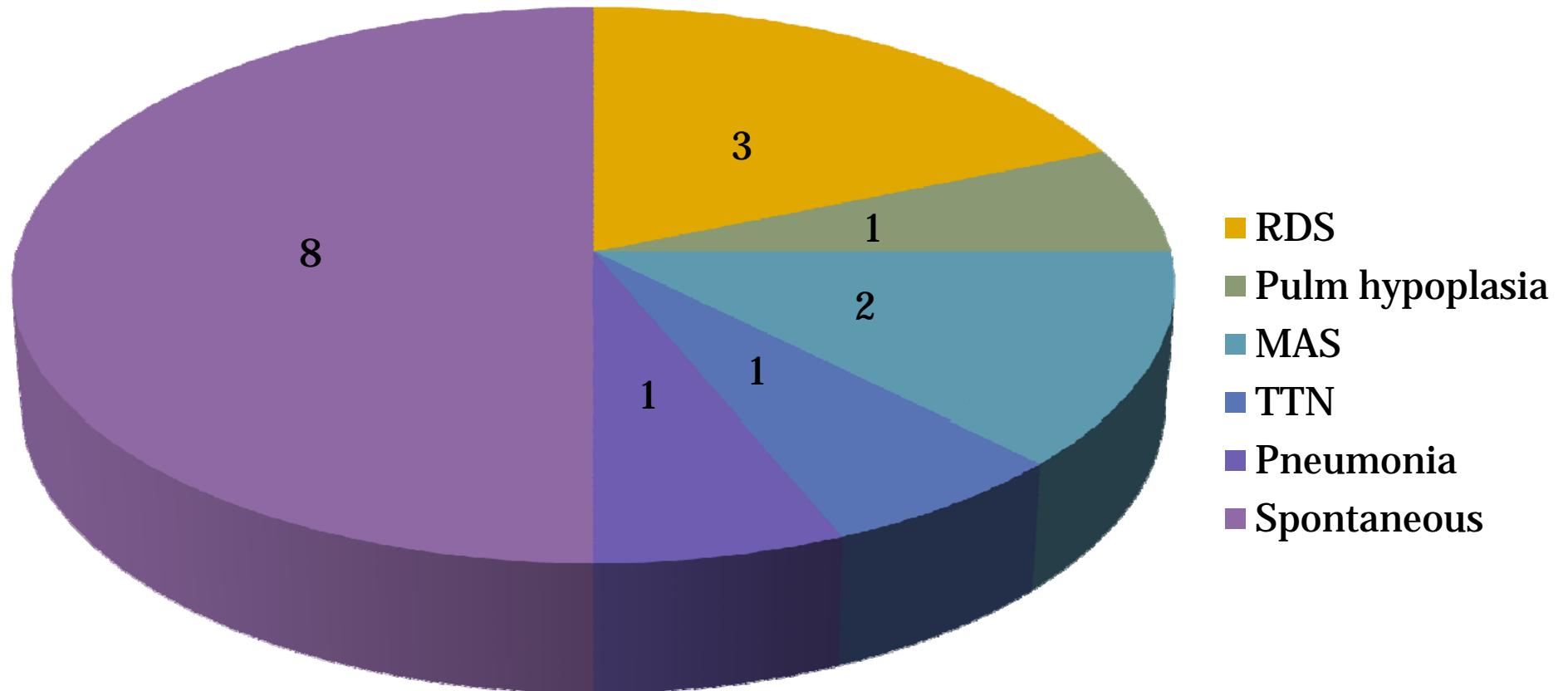
Respiratory support prior to event



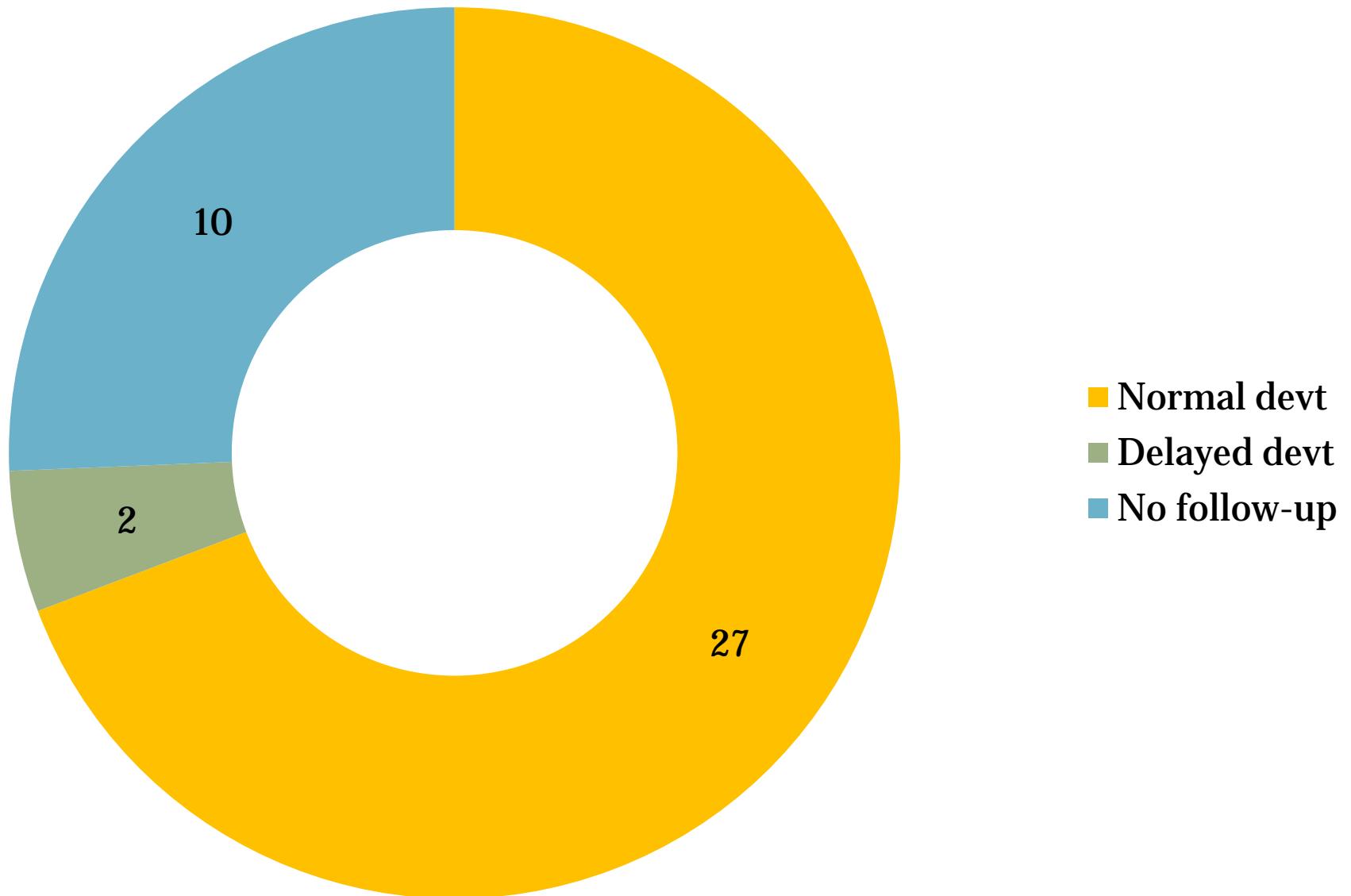
Underlying diagnosis & Mortality



Air leaks on admission = 16



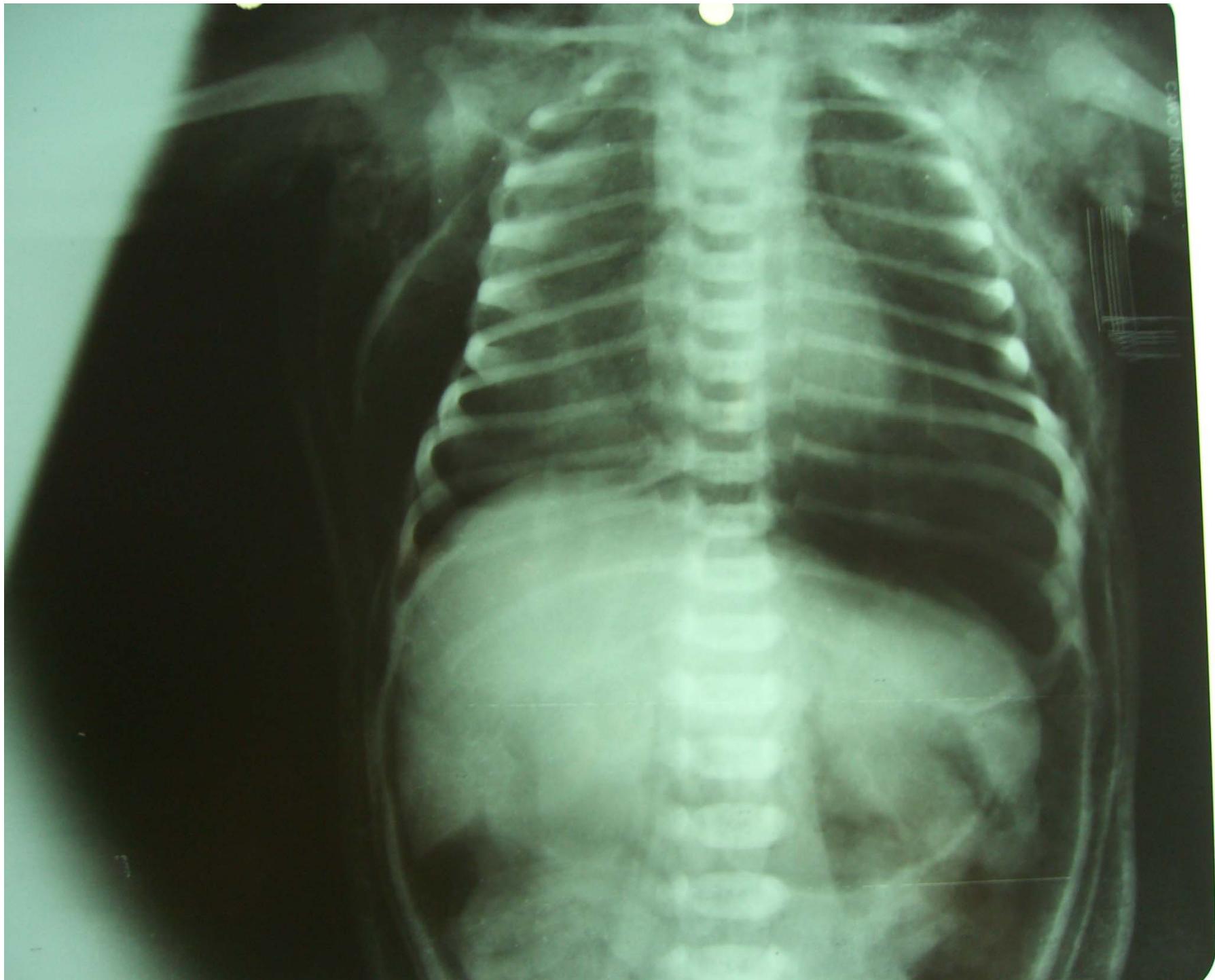
Outcome of survivors



Summary & Recommendations



- Multiple aetiology & not specific to NICU
- Not always caused by ventilation
- Beware post-surfactant effect
- ? Mortality
- Very low rate of CP
- The undiagnosed & untreated pneumothoraces – future approach





Thank you