

Neonaticide : How does post mortem imaging help ?

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Neonaticide

Definition

- Defined as the killing of a newborn during its first 24 hours of life
(Resnick, 1970)
- Mostly by the mother
- Denied or concealed pregnancy *(Vellut et al, 2018)*
- Death by lack of care and/or traumatic injuries



Neonaticide

Post mortem investigations

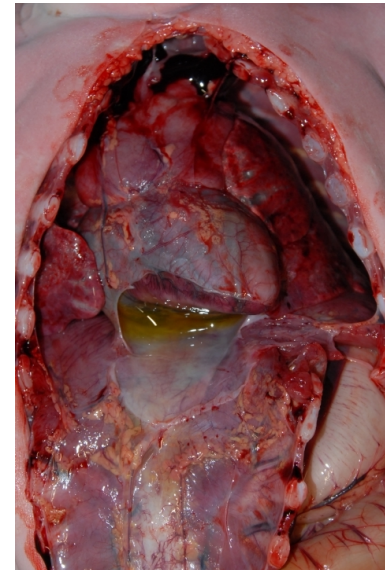
Post mortem imaging
PMCT /PMMRI



Autopsy



Pathological
examination



Neonaticide

Main issues

- Three fundamental questions to be answered

What is the gestationnal age ?
= viability ?

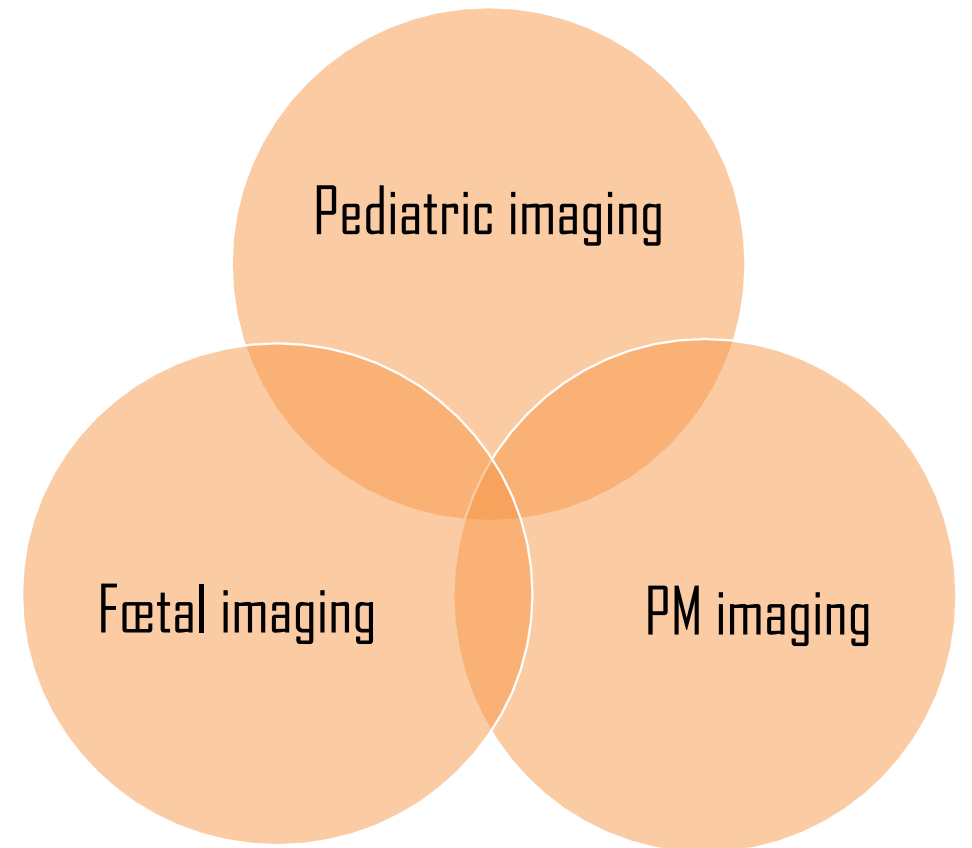
Did the newborn breath ?
= foetus > child

Are there traumatic injuries ?
= Cause of death ?

Neonaticide

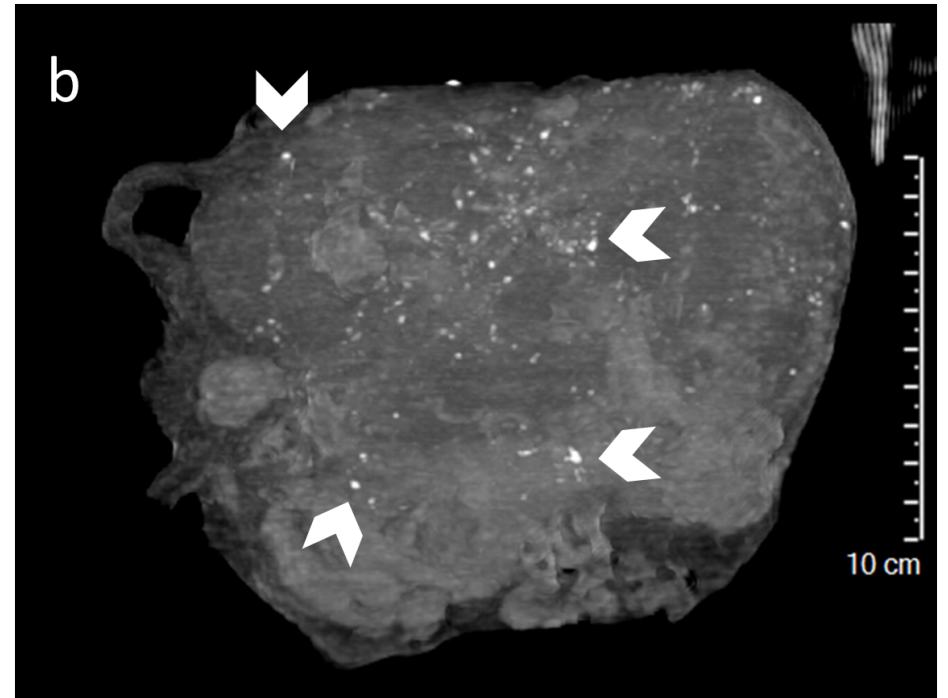
Postmortem imaging

- Whole body imaging: CT and/or MRI
- Reconstructions :
 - Bones
 - Soft tissues (head)
 - Pulmonary parenchyma
- 3D reconstructions



Post mortem imaging of a newborn

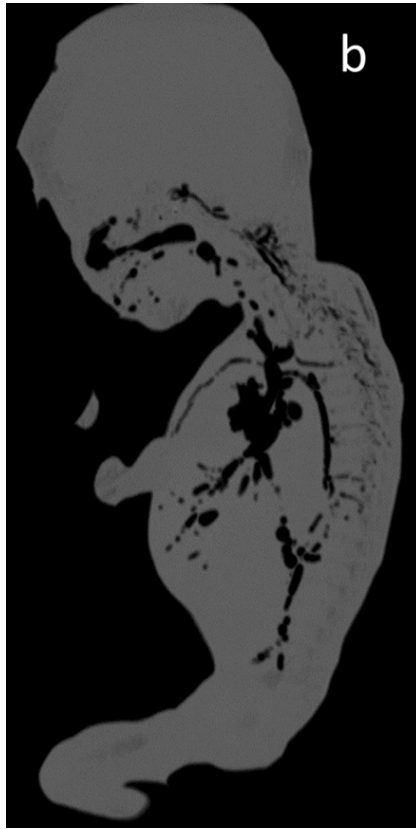
General presentation ; placenta



Post mortem imaging of a newborn

Post mortem changes

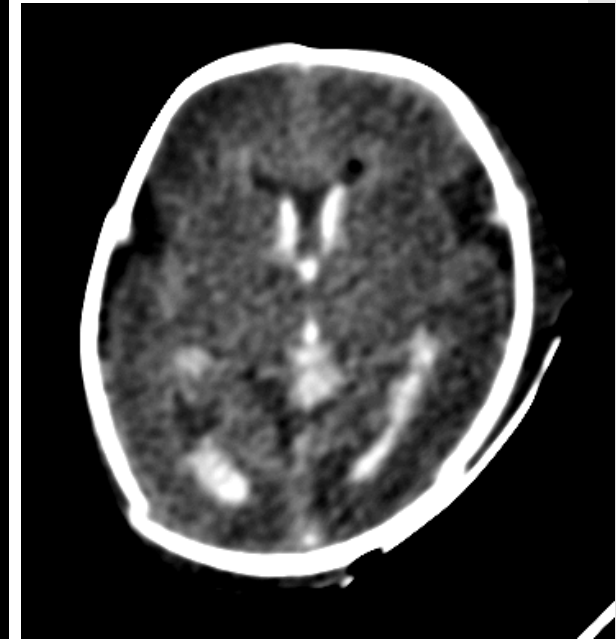
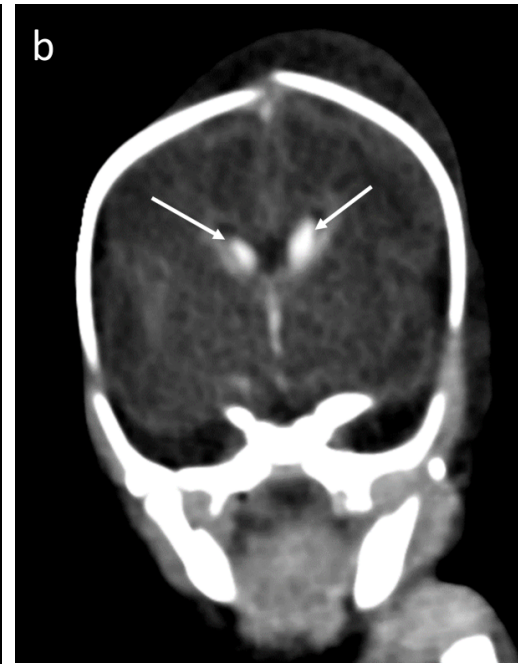
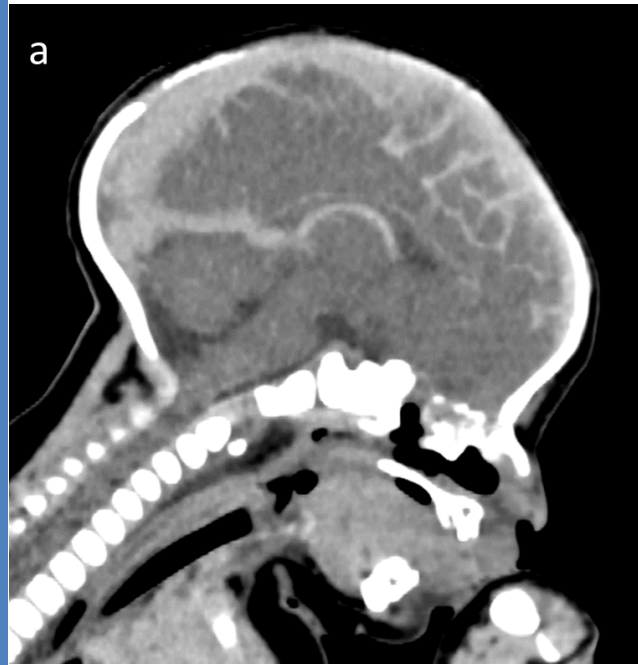
- Gas infiltration
- Deformation / action of fauna



Post mortem imaging of a newborn

Brain

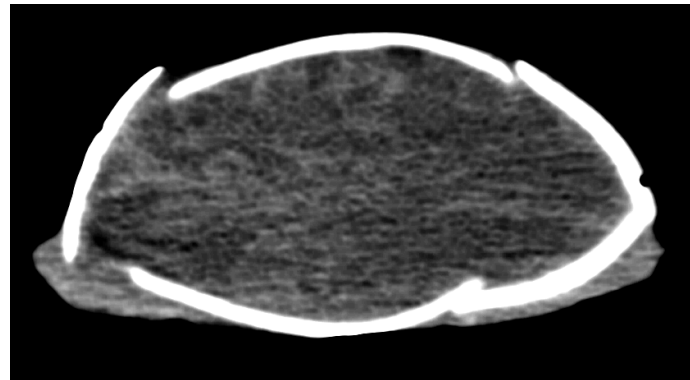
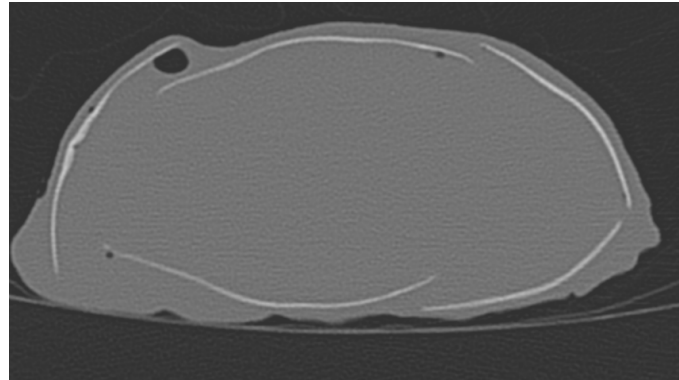
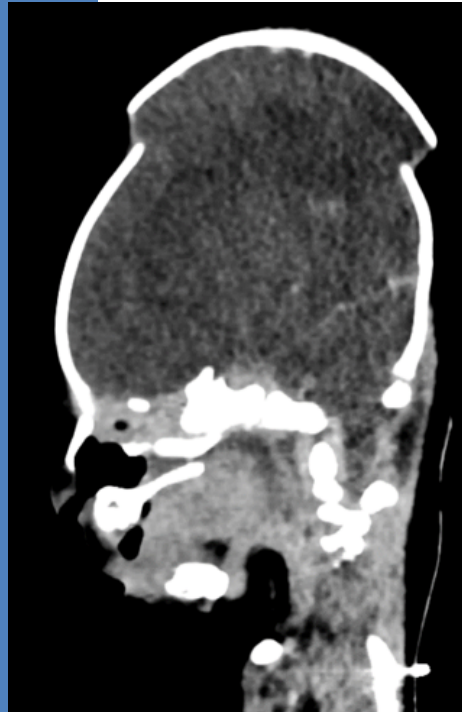
- Hyperdensity of the venous sinuses
- Hyperdensity of the choroid plexuses
- Incomplete gyration



Post mortem imaging of a newborn

Skull deformation

- Passage through the birth canal
- In utero fetal death ?

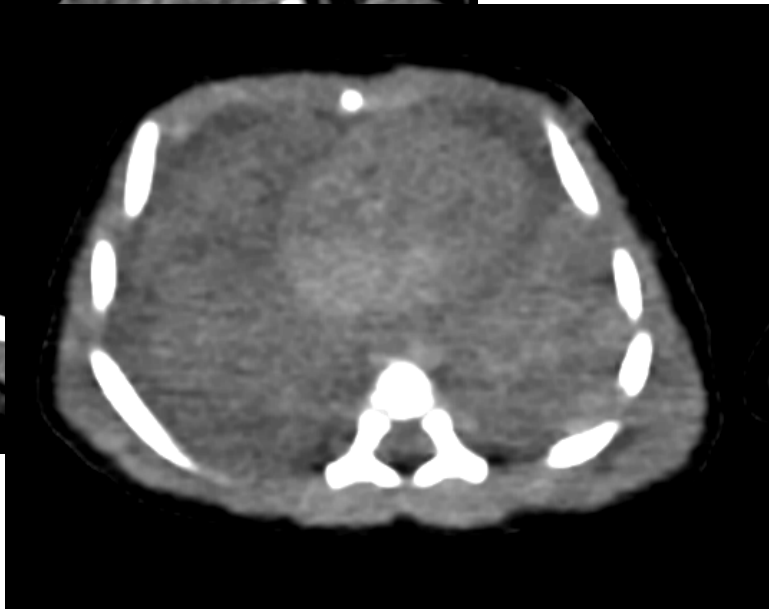
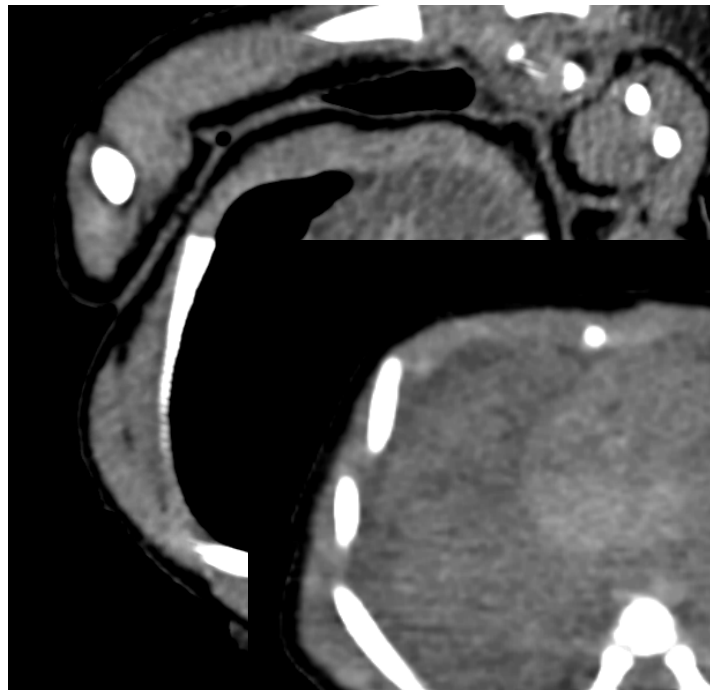


Case courtesy of Dr Kabil kumar loganathan,
Radiopaedia.org, rID: 52233

Post mortem imaging of a newborn

Chest/Abdomen

- Blood level in the heart cavities
- Mediastinum uneasy to analyse when the lungs are unaerated
- Hyperdensity of the meconium



Neonaticide

Main issues

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What is the gestationnal age ?
= viability ?

Did the newborn breath ?
= foetus > child

Are there traumatic injuries ?
= Cause of death ?

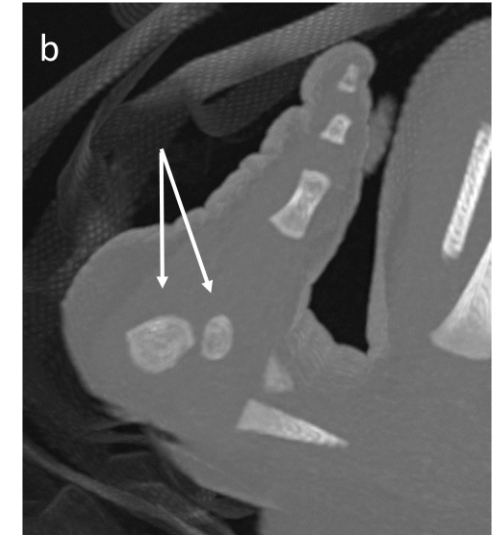
Step 1 : What is the gestationnal age ?

- Gestationnal age = would the child have lived after birth ?
- WHO = 22 WG and/or 500 g
- Post mortem imaging :
 - **Length of the long bones** : femur, tibia, humerus
 - US or anthropological tables
 - **Detection of secondary ossification centres** :
 - Calcaneum : 24 WG
 - proximal tibial epiphysis : 32 WG
 - distal femoral epiphysis : 36 WG
- Biparietal or abdominal diameters (with cautious)

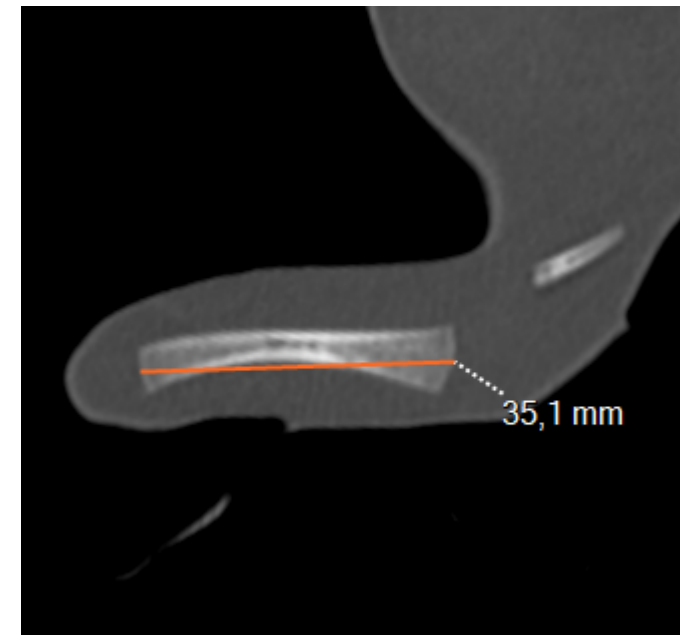
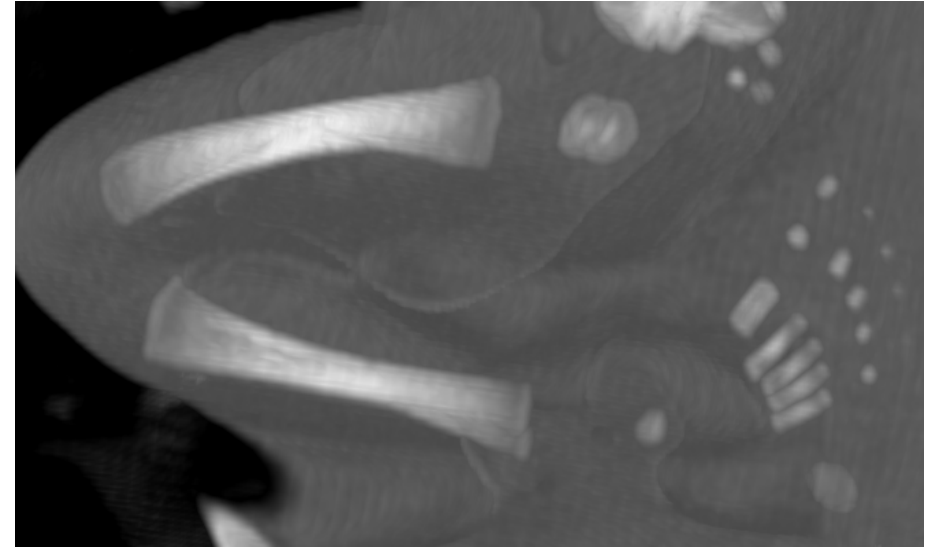
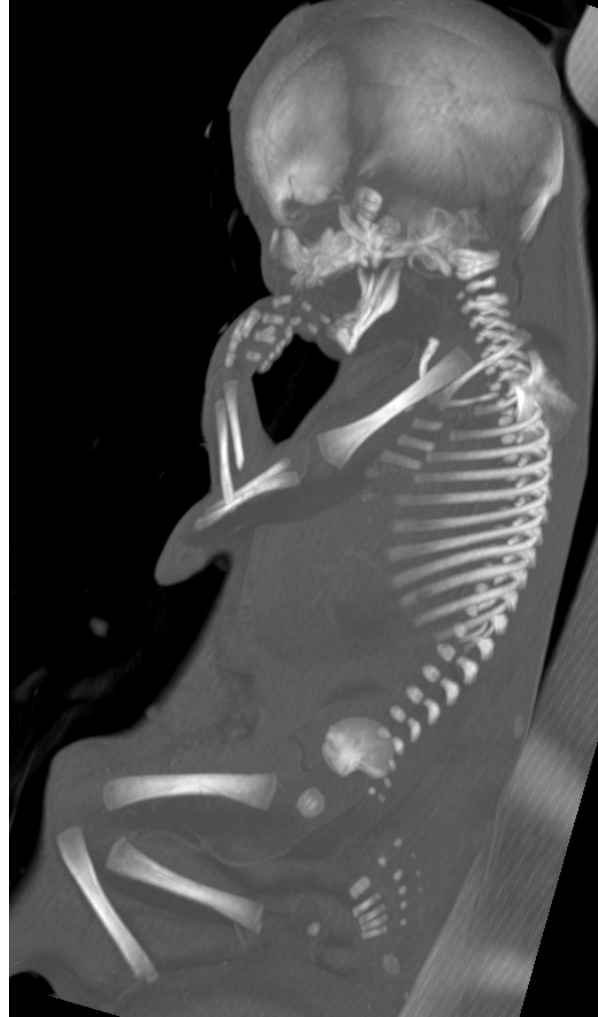
$$GA = \frac{\text{femur length} + 18.72}{2.52}$$

Carniero et al, 2016

Step 1 :
Examples –
Full term infant



Step 1:
Examples -
Fetus of 20 WG

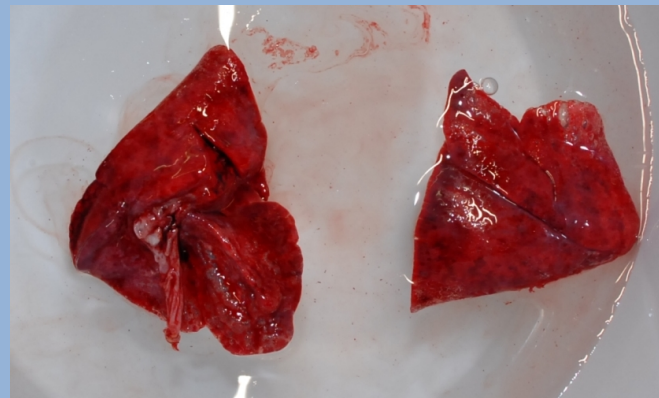




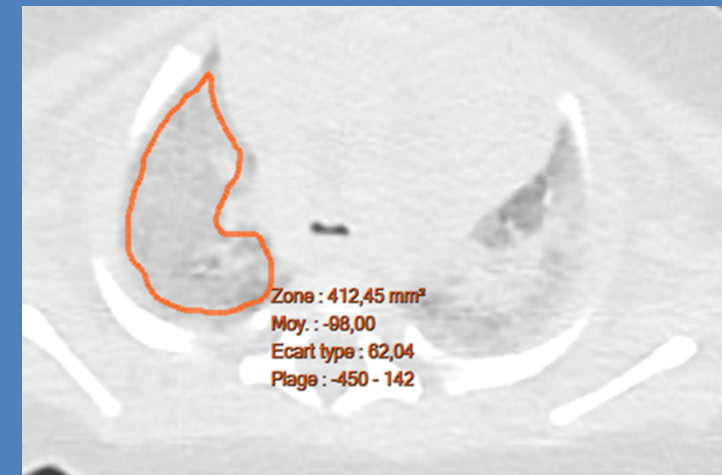
Step 2 : Did the newborn breath after delivery ?

- THE key issue of the investigation of a suspected neonaticide
- Change the legal considerations around the newborn's death
= are the lungs inflated with air ?

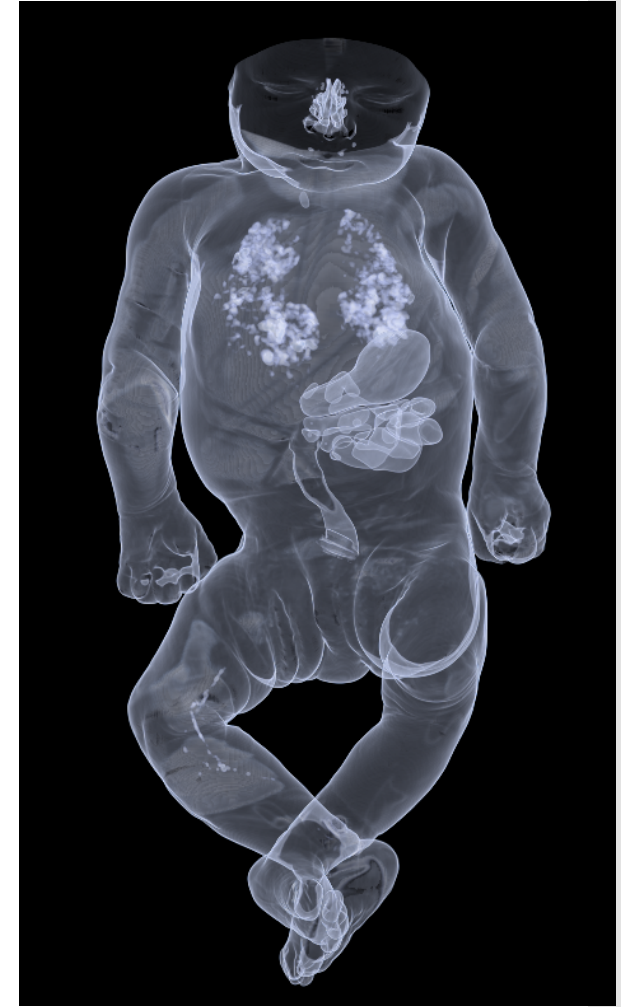
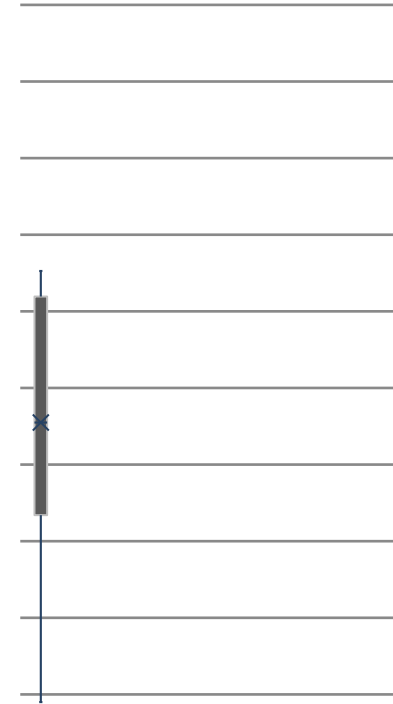
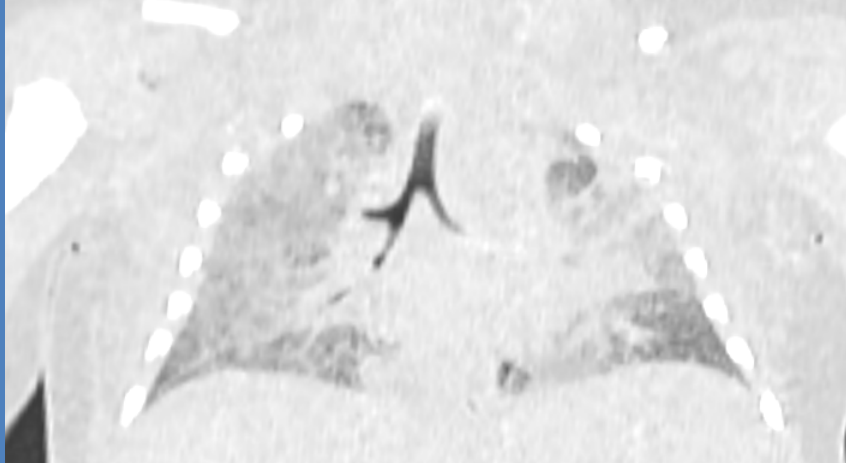
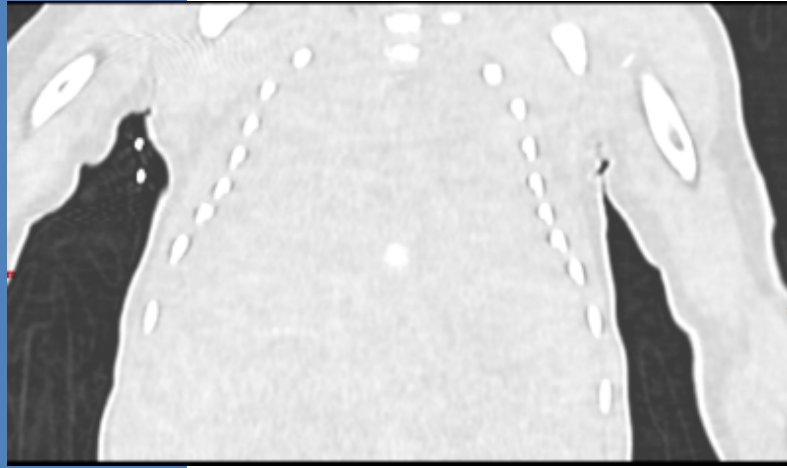
Flotting lung test



Density on PMCT

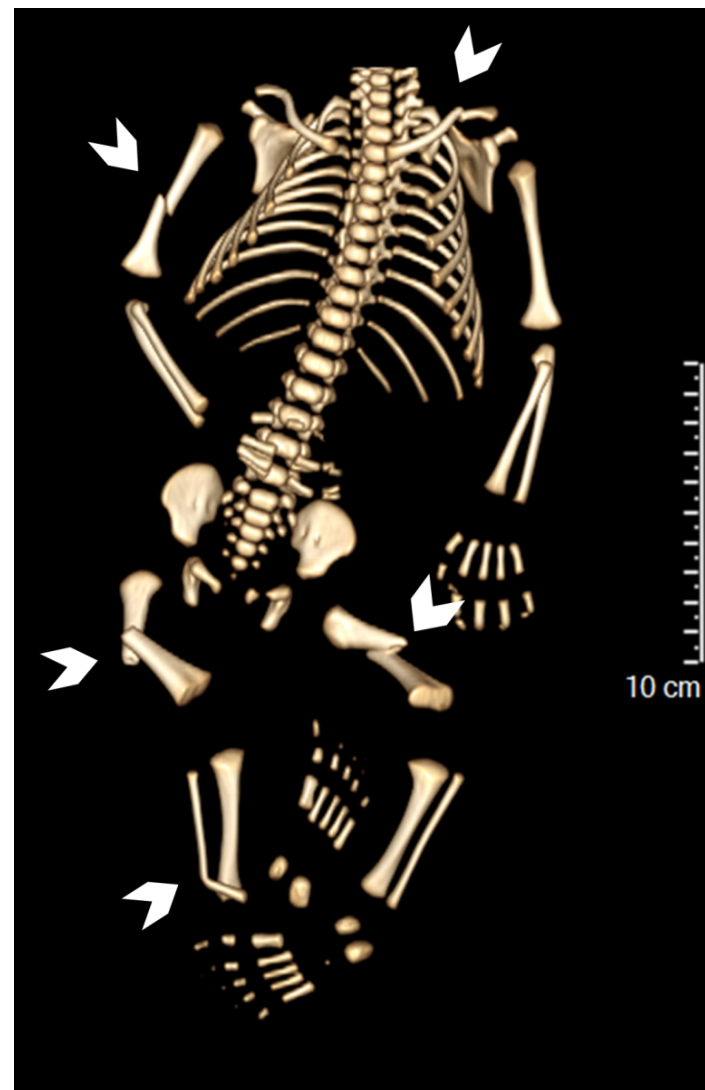
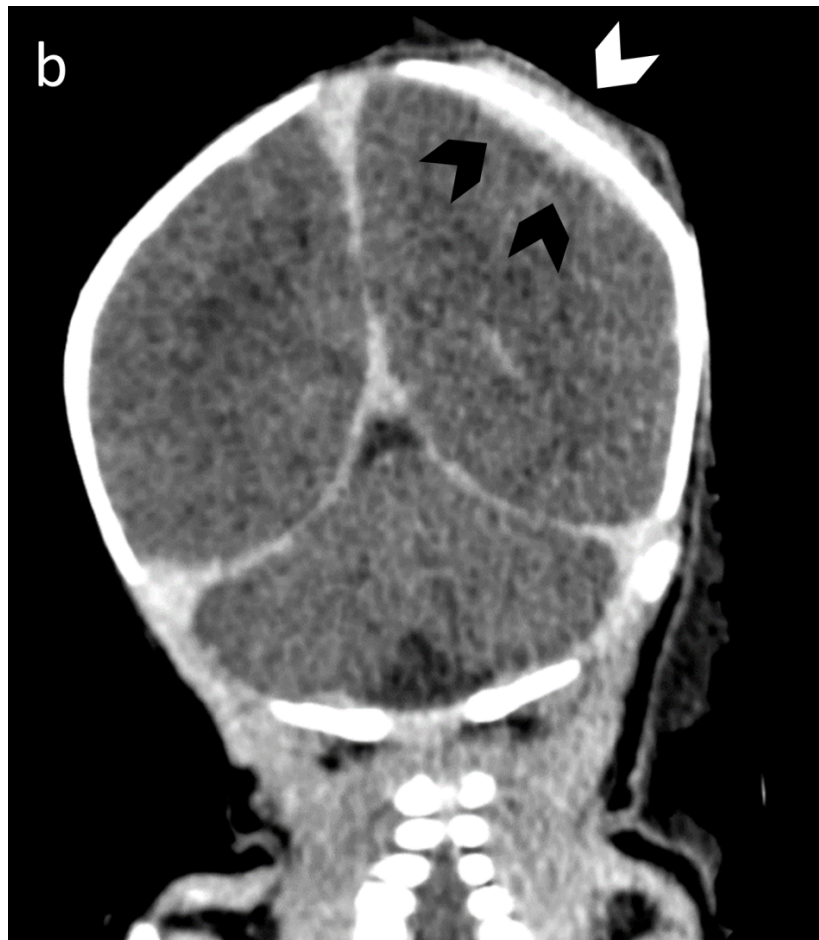
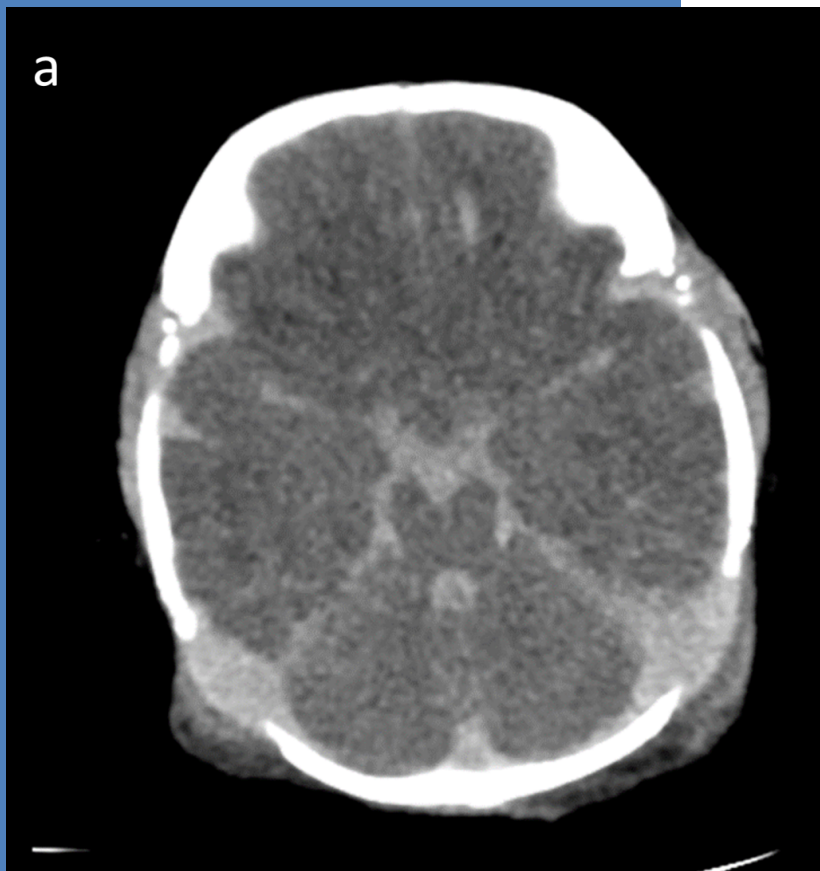


Step 2: Examples



Step 3 : Are there traumatic injuries ?

- Help to determine cause and circumstances of death
- Injuries visible on CT :
 - **Intra cranial bleeding**
 - Skull fractures
 - Limbs fractures
- Birth injuries vs inflicted trauma ?



Conclusion

- Neonaticide = PM imaging + forensic autopsy + pathological examination
- Post mortem changes ?
- Communication between radiologist and pathologist

Gestationnal age

Breathing after birth

Traumatic injuries /cause of death





Pictorial review of the postmortem computed tomography in neonaticide cases

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ORIGINAL ARTICLE



Lung density measurement in postmortem computed tomography: a new tool to assess immediate neonatal breath in suspected neonaticides

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for your
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