

CT multitrauma

- focus on abdominal trauma

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Disclosures

- None.....
 - apart from representing only one Danish trauma center....

Contents

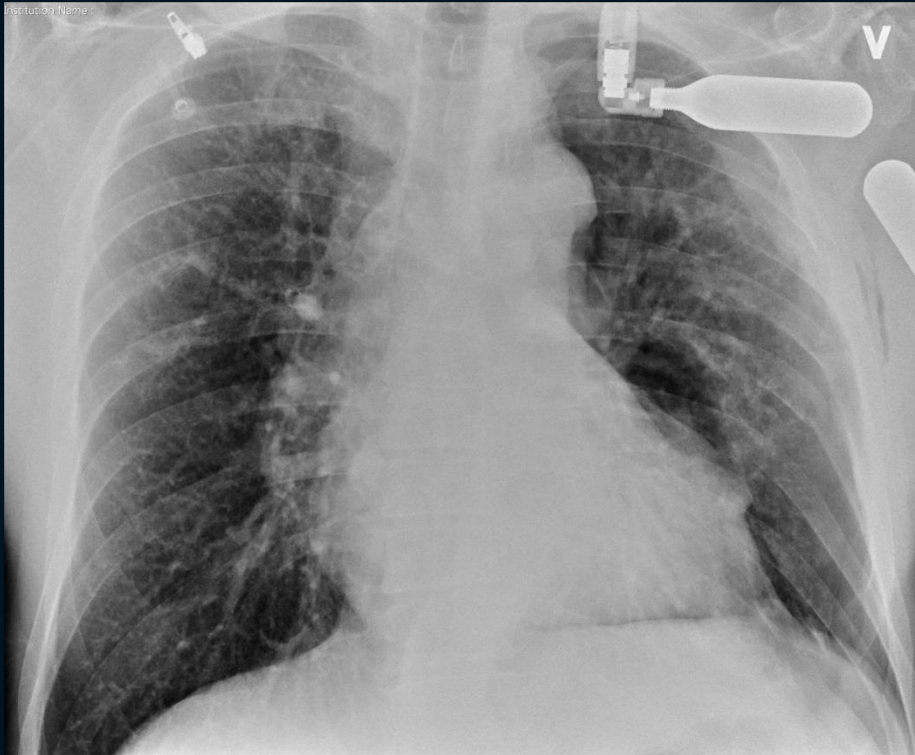
- Imaging in the trauma center
 - Surgeon FAST
 - CT – radiologist on call
- CT protocol
- Examples

Trauma team - radiology



- 2 radiographers – included in primary call
- Radiologist
 - Residents
 - Specialists
- On call – show up in trauma centre within 30 minutes
- Assistance from abdominal- or neuroradiologist
- Interventional radiologist

Primary imaging



CT

- Radiologist ABCD:
 - D
 - ABCD
- NOTE – other rules for children....



CT protocol - adults

- CT brain without iv-contrast agent
- CT cervical angiography and cervical column (+iv)
- CT thorax/abdomen (+iv, samme as above)
- Late phase?
- Contrast dose: 100 ml CA, 5 ml/s
- Delay: 55 s (late arterial phase)

ABCD rapid oral report at the scanner

- D
 - Intracranial bleeding/edema
- A
 - Endotracheal tube
 - Airway obstruction?
- B
 - Pneumothorax
 - Haemothorax
 - Pleural catheter – location?
- C
 - Thorax
 - Abdomen
 - Pelvis
 - Soft tissue
- D
 - Large spinal fractures?

| | | |
|--|-------------------------|-----------|
| Radiologisk klinik Rigshospitalet | Pt. CPR og navn (label) | |
| | Dato: Kl.: | Radiolog: |

| CT undersøgelse | ia | Læsion | Fund | Lokalisation | Kommentar |
|---|--------------------------|--------------------------|--|--|--|
| Cerebrum <input type="checkbox"/> ej udført | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> epidural blødning <input type="checkbox"/> subdural blødning <input type="checkbox"/> subarachnoidal blødning <input type="checkbox"/> kontusionsblødning <input type="checkbox"/> intracerebral blødning <input type="checkbox"/> midtlinjedisplacering mod <input type="checkbox"/> udslattede basale cisterner <input type="checkbox"/> hydrocephalus <input type="checkbox"/> cerebralt ødem <hr/> <input type="checkbox"/> fraktur i cranium <input type="checkbox"/> fraktur i basis cranii <input type="checkbox"/> potentiel kar skade | <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve <hr/> <input type="checkbox"/> impression | |
| Thorax <input type="checkbox"/> ej udført | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> mediastinal ansamling <input type="checkbox"/> obs aortalæsion <input type="checkbox"/> pneumothorax <input type="checkbox"/> pleural ansamling <input type="checkbox"/> mediastinal forskydning mod <input type="checkbox"/> kontusion <input type="checkbox"/> atelektase <input type="checkbox"/> costafrakture(er) <input type="checkbox"/> trachealtube <input type="checkbox"/> CVK | <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> velplaceret <input type="checkbox"/> velplaceret | <input type="checkbox"/> fejlplaceret <input type="checkbox"/> fejlplaceret |
| Abdomen <input type="checkbox"/> ej udført | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> fri væske <input type="checkbox"/> fri luft <input type="checkbox"/> diafragmaruptur <input type="checkbox"/> tarmlæsion <input type="checkbox"/> pågående blødning/ekstravasation | <input type="checkbox"/> hø <input type="checkbox"/> ve | |
| Retroperitoneum | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> fri væske <input type="checkbox"/> fri luft <input type="checkbox"/> karlæsion | | |
| Lever | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> kontusion <input type="checkbox"/> subkapsulært hæmatom <input type="checkbox"/> laceration | | |
| Milt | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> kontusion <input type="checkbox"/> subkapsulært hæmatom <input type="checkbox"/> laceration | | |
| Pancreas | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> fraktur <input type="checkbox"/> kontusion | | |
| Nyrer / urinveje/binyrer | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> perirenal ansamling <input type="checkbox"/> manglende opladning <input type="checkbox"/> pelvis/ureterlæsion <input type="checkbox"/> kontusion <input type="checkbox"/> fraktur | <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve | |

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| CT af ansigtsskelet <input type="checkbox"/> ej udført | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> fraktur i mandibel <input type="checkbox"/> fraktur i maxil <input type="checkbox"/> fraktur i orbita <input type="checkbox"/> fraktur i zygoma | <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve | |
| CT af columna <input type="checkbox"/> ej udført | <input type="checkbox"/> | <input type="checkbox"/> | Columna cervicalis <input type="checkbox"/> fraktur <input type="checkbox"/> luxation <input type="checkbox"/> potentiel karskade ----- Columna thoracalis <input type="checkbox"/> fraktur <input type="checkbox"/> luxation ----- Columna lumbalis <input type="checkbox"/> fraktur <input type="checkbox"/> luxation | niveau: ----- niveau: ----- niveau: | |
| CT af skelet | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> skuldernær fraktur/luxation <input type="checkbox"/> fraktur i bækken <input type="checkbox"/> fraktur i SI-led <input type="checkbox"/> fraktur i acetabulum <input type="checkbox"/> luxation i hofte - fraktur <input type="checkbox"/> fraktur i proximale femur <input type="checkbox"/> pågående blødning/ekstravasation | <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve <input type="checkbox"/> hø <input type="checkbox"/> ve | |

Ved sekundær gennemgang af traumescanning fra eksternt sygehus:

 Er der supplerende fund ved sek. gennemgang på RH: ja nej

hvis ja hvilke:

Kommentarer:

Skemaet afleveres til Traumeleder før man forlader Traumecenteret
Efterfølgende laves fuld beskrivelse i PACS

Radiology


- Find life threatening lesions
- Find lesions that need treatment
- Find other diseases
- Avoid “satisfaction of search”



Systematics



Liver/spleen

- Contusion
- Laceration
- Subcapsular hematoma
- AAST grade
 - If ≥ 2  Follow up CT angiograph day 5 (arterial and venous phase)

Liver

Grade I

- laceration
- subcapsular haematoma

Grade II

- laceration
- intraparenchymal haematoma
- subcapsular haematoma

Grade III

- laceration
- intraparenchymal haematoma
- contained active bleed
- subcapsular haematoma
- vascular injury
e.g. pseudoaneurysm or AV fistula

Grade IV

- parenchymal disruption
- active bleeding

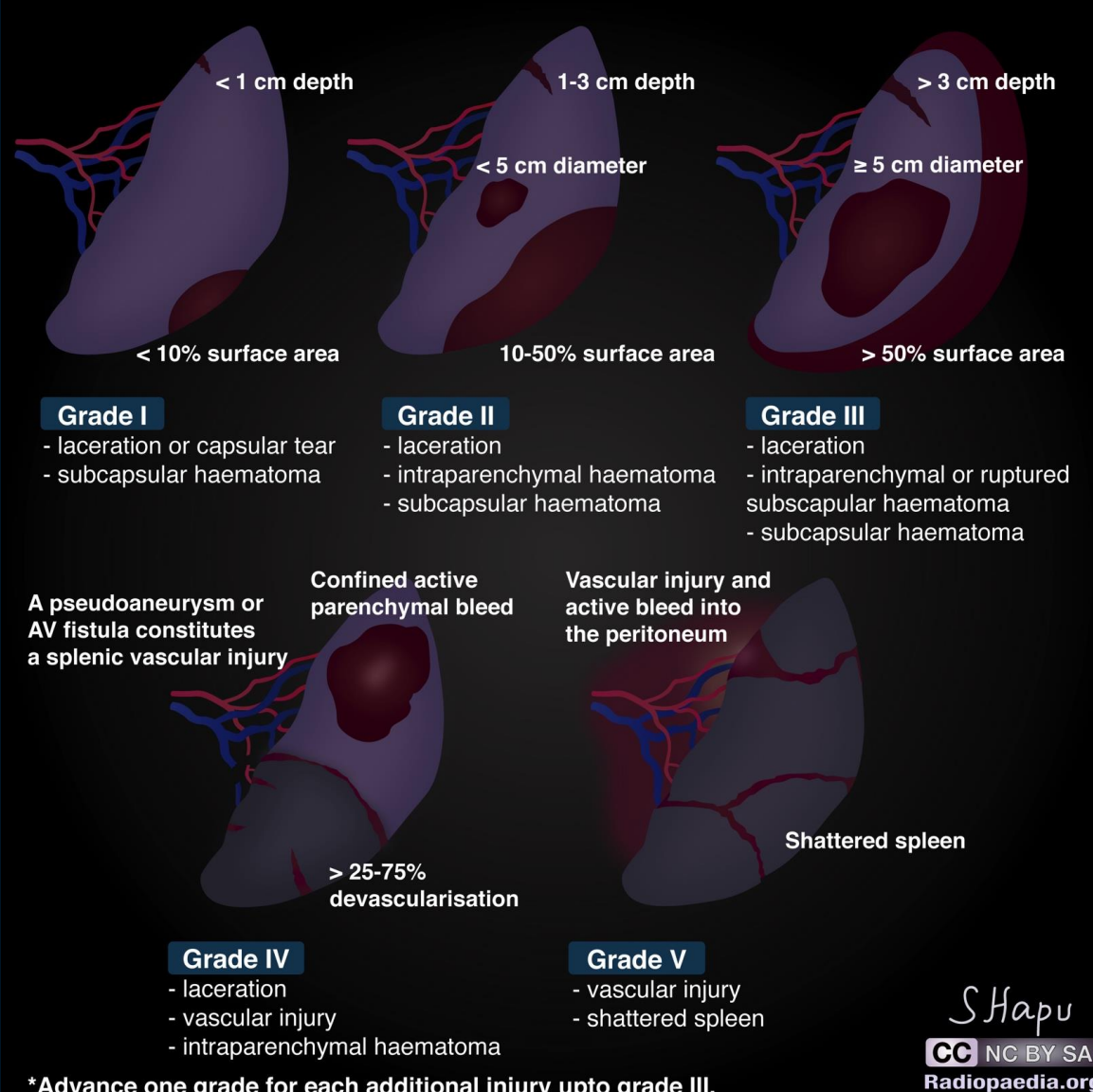
Grade V

- parenchymal disruption
- juxtahepatic venous injury

SHapu
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*Advance one grade for each additional injury upto grade III.

Spleen



The diagram illustrates the grading of splenic injury based on laceration depth and surface area. It shows three cross-sections of the spleen representing increasing injury severity:

- Grade I:** Laceration depth < 1 cm, surface area < 10%.
- Grade II:** Laceration depth 1-3 cm, surface area 10-50%.
- Grade III:** Laceration depth > 3 cm, surface area > 50%.


Additional injury features are categorized as follows:

- Grade IV:** Includes laceration, vascular injury, and intraparenchymal haematoma. A pseudoaneurysm or AV fistula constitutes a splenic vascular injury.
- Grade V:** Includes vascular injury and shattered spleen.

Other specific injury features include:

- Confined active parenchymal bleed
- Vascular injury and active bleed into the peritoneum
- > 25-75% devascularisation
- Shattered spleen

*Advance one grade for each additional injury upto grade III.

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Take Home

- ABCD
- Life threatening lesions first
- Remember clinical history – important for image interpretation
- Avoid “satisfaction of search”

Liver/Spleen

- Scooter versus bus



Liver/Spleen

