POLYTRAUMA AND WHOLE BODY CT SCAN

Metaanalysis of whole body CT

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WHAT IS POLYTRAUMA?

- Person who has been subjected to multiple traumatic injuries.
- Third cause of death after cancer and cardiovascular diseases (Major cause of morbidity and mortality)
- Leading cause in young people (below 35).
- Incidence and prevalence :
    - Motor vehicle accidents
    - Fall from height
    - Bullet injuries
    - Blast injuries - sustained by improvised explosive devices.

HOW DO WE SCORE THE INJURIES ?

BY USING TRAUMA SCORING SYSTEM

PURPOSE OF TRAUMA SCORING SYSTEM

- Field triage
  - assess severity of injury and classification of trauma patients
- Predict patients' outcomes
- Quality assurance
  - Details of proper care, area of preventable morbidity and mortality
  - Treatment centre specific deficiencies or strength
- Evaluate trauma care delivery and trauma research
- Reimbursement assessment for trauma and critical care unit

CLASSIFICATION OF TRAUMA SCORING SYSTEM

Physiologic

- Revised trauma score
- Glasgow coma score
- APACHE scoring (Acute physiology and chronic health evaluation (APACHE I, II, III)

Anatomic

- **Abbreviated injury scale (AIS)**
- **Injury severity score (ISS)**
- New injury severity score (NISS)
- Organ injury scale (OIS)
- Anatomic profile
- International Classification of Diseases (ICD-9) Injury Severity Score (ICISS)

Combined

- Trauma and injury severity scores (TRISS)
- A severity characterization of trauma (ASCOT)

ABBREVIATED INJURY SCALE (AIS)

- Enables ranking of injury severity and correlates with patient outcome
- Developed and published in 1971, with regular revision.
- Each injury - coded based on
  - anatomical site – grouped by body region
    - Head and neck , Face, Chest, Abdomen and pelvis ,Extremities, External structures (skin, burns)
  - nature
  - severity

AIS Severity Score	Injury Severity Description
1	Minor
2	Moderate
3	Serious, not life-threatening
4	Severe, life-threatening
5	Critical, survival uncertain
6	Maximum, actually untreatable

ISS

Total of squares of the highest AIS grade in the 3 most severely injured body regions.

$ISS = A^2 + B^2 + C^2$

where A, B, C are the AIS scores of the three most severely injured ISS body regions

Scores range from 1 to 75

Major trauma - ISS >15

<9 = Mild

9 – 15 =Moderate

16–24 = Severe

>/=25 = Profound

Single score of 6 on any AIS region results in automatic score of 75

PROTOCOL OF NON-WBCT

Depends on history taking and physical examination.

Conventional Radiology

Head, cervical, pelvis radiograph

FAST scan

CT brain (if unconcious)

Organ selective CT after conducting primary survey and ATLS

SELECTIVE CT EXAMINATION

Head and Cervical

- Arm at the side of trunk
- CTA – bolus tracking with ROI at aortic arch, contrast rate 4ml/s, delay of 15s
- CT Venography – total contrast 90-100mls, delay 40s.

Thorax

- Arm raised alongside the head
- Bolus tracking time and saline chase
- IV contrast 3-5ml/s , delay of 25-40s.

Abdomen and Pelvis

- Portovenous phase (70s post IV contrast)
- Suspected active GI bleeding –
  - Arterial 20-25s
  - Portal 70s
  - ± delayed phase (150s)

WHOLE BODY CT

- CT scan of head, cervical spine, chest, abdomen and pelvis.
- Involved patients that exhibited higher ISS values (>15).

Protocol of Whole body CT

-Head and spine unenhanced

-Thorax, abdomen and pelvis - enhanced

-Unenhanced brain

-Contrast enhanced of chest, abdomen, pelvis, vertebral spine and upper leg

- Two step whole body acquisition (vertex to pubic symphysis) without gantry angulation

- Start with non enhanced CT head and neck(arm alongside trunk)

-Second scan -enhanced chest, abdomen and pelvis(repositioning of arms alongside the head)

-Split bolus intravenous contrast imaging technique

-Additional phase – through relevant body regions

RADIATION DOSE?

- Whole body CT effective dose ~24mSv
- For specific examination :

Specific examination	Effective dose
Head	1.5 mSv
Chest	7 mSv
Abdomen and pelvis	11 mSv
Liver	5.5 mSv
CTA brain	2.5 mSv
CTA chest	2.4mSv

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