

ANALYSIS OF ANATOMICAL INFORMATION USING 1 RANGE: CASE STUDY OF EMERGENCY CT SCAN OF THE HEAD WITH CLINICAL MILD HEAD INJURY

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ABSTRACT

A head CT scan can be carried out using a two-range sequence. The procedure for CT scans of the head with clinical mild head injuries at Muhammadiyah Islamic Hospital Kendal uses 1 range, from vertex to cervical 7. The aim of this research is to determine the reasons for using 1 range and to determine the anatomical information resulting from CT scans of the head with clinical mild head injuries at Muhammadiyah Islamic Hospital Kendal. The research used qualitative research with a case study. The subjects of this research were 3 radiographers and 1 radiology specialist. Research Objects one patients. Data collection techniques are triangulation by means of in-depth interviews, observation, and documentary studies. The results of the research were that the examination procedure was carried out without special preparation, the patient removed the metal object, the patient was positioned supine and a scan of the area from cervical 7 to the vertex was used with a slice thickness of 5 mm. The reason for using a scan of the area from the vertex to the cervical 7 is to see the entire anatomy of head trauma patients. The anatomical information obtained is the anatomy of the right and left lateral ventricles, III, IV, pons, cerebellum, hemorrhage, and fractures. It is best for a CT scan of the head with clinical CKR to scan the area by looking at the patient's trauma condition, because this is to minimize the dose received by the patient.

Keywords: CT Scan, Range, pediatrics, head

BACKGROUND

The head consists of 8 cranial bones (skull) and 14 facial bones. The cranium is a large cavity that protects the brain. Facial bones form the structure, shape of the face, and function as protection for the upper ends of the respiratory and digestive tracts (Lampignano & Kendrick, 2018).

One of the pathologies of the head is head injury. Head injury is a process where there is direct injury or deceleration to the head which can result in damage to the skull and brain (Nasution, 2014; Wintermark et al., 2024). Based on the severity of head injuries, they are classified into three, namely Severe Head Injuries, Moderate Head Injuries, Mild Head Injuries (Manarisip et al., 2014; Putri & Fitria, 2018; Rohmah & Dewi, 2024).

Mild head injuries are included in the emergency category. An emergency is a clinical situation that requires immediate medical action to save life and prevent disability. Emergency services are medical actions required by emergency patients immediately to save lives and prevent injury. Including if there is a patient with a mild head injury, they need immediate service to save lives and prevent disability (Firmada et al., 2021; Putri & Fitria, 2018)

Mild head injury is loss of consciousness shortly after the trauma, the patient wakes up well oriented, there are no neurological deficits. Of patients with mild and moderate head injuries, only 3% - 5% require surgery and the rest are treated conservatively (Nasution, 2014; Sari et al., 2024).

CT Scan is one of the supporting examinations for confirming a trauma diagnosis (Sidipratomo et al., 2014; Yunus et al., 2020). CT scans can be used in clinical cases of mild head injuries, so they can see an anatomical picture of the head in an axial section and can see the possibility of bleeding and fractures in the head image. CT scans can be used to see the location of the lesion, the presence of fractures and possible short-term complications such as epidural hematoma and subdural hematoma (Oktavian et al., 2021).

CT scan procedure for head trauma uses a scan of the area from basis cranii to the vertex (Saputri et al., 2023). A head trauma CT scan scans the area with the upper border 2 cm above the vertex and the lower border of the symphysis mentii (Aditya & Apriantoro, 2020). The addition of 3D images is very good for detecting fractures and can be seen more quickly, easily and more accurately through examination with three-dimensional reconstruction in conditions of trauma or such as mild head injuries (Mandang et al., 2022). In addition, it is recommended for health facilities to use 3D CT as an imaging modality for patients with head and maxillofacial trauma.

Based on the researcher's observations, the emergency CT scan procedure of the head with mild head injury clinically at the Radiology Installation of Muhammadiyah Islamic Hospital Kendal was carried out using 1 range with a

scan area from cervical 7 to vertex. Based on this background, there are differences expressed according to theory and those carried out in the field, based on (Aditya & Apriantoro, 2020), A head trauma CT scan scans the area with the upper border 2 cm above the vertex and the lower border of the symphysis mentii but at the Radiology Installation of Muhammadiyah Islamic Hospital Kendal was carried out using 1 range with a scan area from cervical 7 to vertex . Based on so the researchers are interested in studying further regarding the application of the use of 1 range of emergency CT scan head examination procedures with clinical light head injuries at the Radiology Installation of Kendal Islamic Muhammadiyah Hospital, and knowing the information anatomy of the use of 1 range in emergency CT scans of the head with clinical mild head injury.

METHOD

This research uses qualitative research with a case study design. The research location is RSI Muhammadiyah Kendal Hospital. The research subjects were 3 radiographers, 1 radiology specialist. The research objects were 2 patients. Data collection tools use observation guidelines, interview guidelines, stationery and cellphones. Data collection techniques are triangulation by means of in-depth interviews, observation, and documentary studies. Observation of the tools and materials used, CT Scan examination procedures for head trauma. Documentation studies include X-ray request letters, tools and materials for Head CT Scan examinations, and Head CT Scan examination results. Data analysis was carried out with the results of interviews, interview transcripts, data reduction, categorization tables, open coding, and conclusions were drawn.

RESULT AND DISCUSSION

CT scans of the head with clinical mild head injuries do not require special preparation, only the patient is instructed to remove metal objects around the head that could interfere with the radiograph results or image. The tools and materials used are: Phillips brand CT scan aircraft, operator console, fixation equipment, blanket and printer.

Position the patient supine on the examination table with the head close to the gantry or head first then adjust the patient's position straight to the examination table.

The object position is to position the patient's head on the head holder. The patient is fixed on the head with head straps and the patient's hands and feet are fixed with body straps on the examination table. After that, insert the examination table into the gantry by pressing the incoming direction button, then adjust the Mid Sagittal Plane (MSP) of the body parallel to the longitudinal indicator light, Mid Coronal Plane (MCP) of the body parallel to the horizontal indicator light with the upper limit of the 2 vertex fingers and the lower cervical limit 7. Next, press the "0" button to control the movement of the examination table.

Setting the examination parameters: AP and lateral cranium scannogram, gantry tilt 00, slice thickness 5 mm, FOV 504 mm according to the width of the object, length 150.0 mm used to adjust the length of the scanning and filming area with lock number 19. Then set the scanning parameters using the wide scan area used for CT scans of the head with mild clinical head injuries is from the vertex to the cervical spine 7, because this has become the SOP for radiology, especially for cases of head trauma. After the scanning process is complete and the appropriate image results have been obtained, the image of the axial section of the brain and bone is reconstructed and using the addition of a 3D image. The print out results include 1 scannogram, 19 axial brain, 17 axial bone and 1 3D image of the AP head.

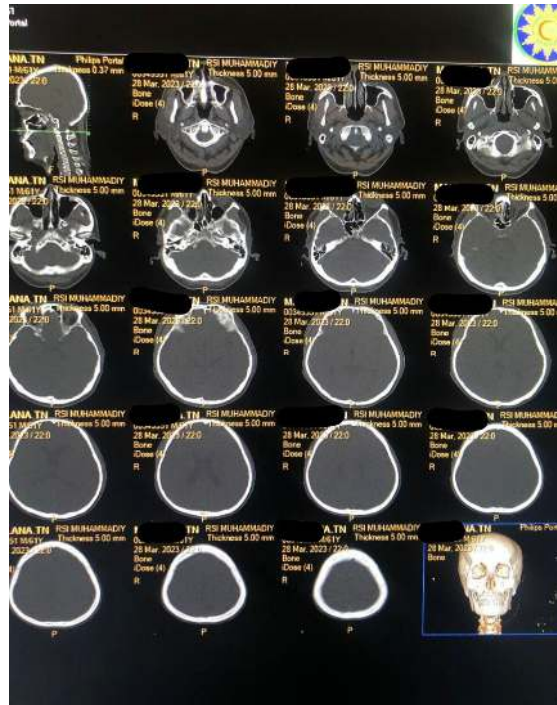


Figure 1 CT Scan Image of the Head Axial Brain Window

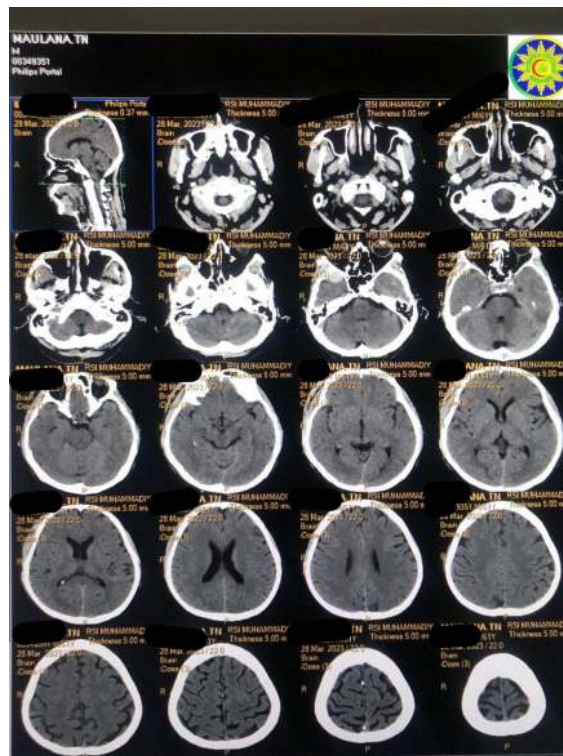


Figure 2 CT Scan Image of the Head Axial Bone Window

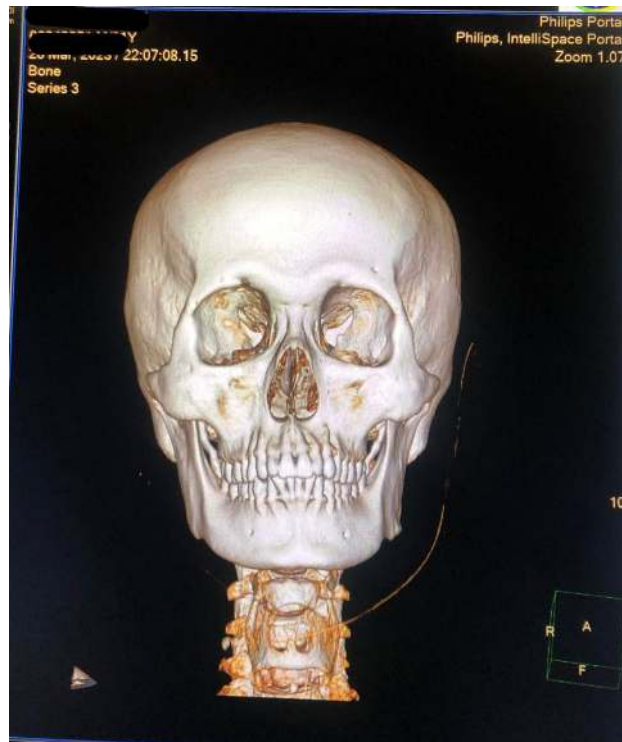


Figure 3 CT Scan Image of the 3D AP



Figure 4 CT Scan Image of the 3D Lateral

There are differences in the procedure for CT scans of the head with clinical mild head injuries between those carried out at Muhammadiyah Islamic Hospital Kendal and in theory, including the scan area and the reasons for adding 3D images of the head in diagnosing mild head injuries.

According to the radiographer, the reason for using a scan of the area from vertex to cervical 7 at Muhammadiyah Islamic Hospital Kendal is to see the entire anatomy of head trauma patients and can provide more detailed information whether there are abnormalities in the cervical 7 area to the vertex area, which basically the radiographer cannot confirm. where there are abnormalities just by looking at the areas on the patient that have bruises, abrasions or bleeding.

CT scan procedure for head trauma uses a scan of the area from basis cranii to the vertex (Saputri et al., 2023). A helical CT scan can depict significant fractures that cannot be shown on conventional radiography and should be added at the beginning of the screening for suspected cervical trauma, it can help doctors establish a diagnosis in patients with a diagnosis of head injury, replacing the image in the AP, lateral, RPO and LPO projections, so that hopefully no diagnostic information will be missed, in other words, in this case the addition of an area scan Can be done if there is a patient with clinical head trauma. However, head CT scans have a justification principle, namely that the greater the radiation used, the greater the benefits obtained (Nurcahyo et al., 2019).

The author believes that using a scan of the area from cervical 7 to the vertex is not good, because it can cause a lot of radiation for the patient. It is best to take a scan of the area at the Muhammadiyah Islamic Hospital Kendal by paying attention to the patient's injury or condition. This is to minimize the dose received by the patient, besides that it can also shorten the scanning time.

According to patient Mr. The following are the results of expert readings from a radiology specialist:

- a) A biconvex hyperdense lesion appears in the right temporal region
 - b) A hyperdense lesion appears in the left temporal lobe
 - c) The right and left cortical sulcus and sylvian fissure appear normal
 - d) Differentiation of white matter and lining appears good
 - e) The left, right, III and IV lateral ventricles appear normal
 - f) The perimesencephalic cistern is not narrowed
 - g) No midline shifting is visible
 - h) Pons and cerebellum are good
 - i) There is discontinuity in the right zygomatic bone
 - j) There is gloominess in the right and left sphenoid sinuses
- Impression:
- a) Epidural hemorrhage in the right temporal region
 - b) Intracerebral hemorrhage in the left temporal lobe
 - c) There are no visible signs of increased intracranial pressure
 - d) Fracture of the right zygomatic bone
 - e) Hematosinus in the right and left sphenoid sinus

CONCLUSION AND SUGGESTION

Conclusion in this studi is the reason for using a scan of the area from cervical 7 to the vertex in CT scans of the head with clinical mild head injury at the Radiology Installation at the Muhammadiyah Islamic Hospital Kendal is to see the overall anatomy of head trauma patients, providing more detailed information on whether there are any abnormalities in the cervical area 1 to cervical 7, abnormalities in the cervical area 7 to the vertex area where basically the radiographer cannot confirm which parts there are abnormalities just by looking at the area of the patient that has bruises, abrasions or bleeding. The anatomical information obtained is the anatomy of the right and left lateral ventricles, III, IV, pons, cerebellum, hemorrhage, and fractures.

Suggestion in this study it is best for a CT scan of the head with clinical mild head injury to scan the area by looking at the patient's trauma condition, because this is to minimize the dose received by the patient.

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