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Increasing Radiographers' Knowledge Through Socialization of Research Results Pocket Book in The Radiology Unit of Reksodiwiryo Hospital in Padang

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Abstract

Radiology is a medical science that focuses on imaging technology. with results in the form of images /images for. to establish a diagnosis by looking at parts of the human body using X-rays so as to be able to provide professional examination services. The results of research that have been conducted at Aulia Hospital regarding the selection of CT scanogram settings for head scans with clinical chepalgia using the upper limit of the vertex and the lower limit of the mandibular because the location of the abnormality in the patient is not known whether in the nerve or sinus, if the scanogram is made to the lower limit of the petrous pars it still cuts the cerebrum so that the sinuses are still cut. whereas in the Radiology installation of Reksodiwiryo Padang Hospital uses a scanogram of the lower limit of the cranii base and the upper limit of the vertex to minimize the radiation received by the patient. Based on this, socialization activities through a pocket book of research results were carried out at Reksodiwiryo Padang Hospital on August 10, 2023 starting at 08.00 - 12.00 WIB, with participants being radiographers in the Radiology installation of Reksodiwiryo Padang Hospital. The methods used were lecture, discussion and question and answer. With communication that is two way traffic, there is a direct reciprocal relationship between the speaker and the participants or vice versa. This method applied can focus the attention of participants in training to develop thinking power and skills to express opinions in the form of exchanging information in solving a problem. The results of the socialization of the pocket book of research results on the effectiveness of CT scan management of the head with clinical chepalgia were 98% able to increase radiographers' knowledge in the selection of scanogram settings on CT scans of the head with chepalgia able to produce images that enforce dignosa.

Keywords : *CT scan Brain, Scanogram, pocket book*

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1. Introduction

Radiology installation is a supporting facility in a hospital that provides radiological examination services with examination results in the form of photographs or images using and utilizing X-ray equipment, to diagnose a disease. X-rays are a type of ionizing radiation. Computer Tomography (CT) is a diagnostic tool with radiography techniques that produce transverse images of body parts based on the determination of X-rays on body slices displayed on a black and white TV monitor screen. One of the examinations on a CT Scan is a head CT Scan. CT scan can assess brain volume, brain parenchyma fraction, brain radiodensity, and brain radiomass (Cauley, 2021). Radiological installations in hospitals serve as important supporting facilities that provide examination services using X-rays to diagnose diseases. X-rays, as a type of ionizing radiation, allow the creation of images of the inside of the patient's body by identifying differences in tissue density. One of the main tools in radiology is the Computer Tomography (CT) Scan, which uses radiographic techniques to

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produce transverse images of the body. CT Scan displays images on a monitor screen and can provide very clear details. A CT scan of the head, in particular, allows for an in-depth assessment of various aspects of the brain, such as brain volume, brain parenchymal fraction, brain radiodensity, and brain radiomass. It is very useful for detecting conditions such as head trauma, stroke, and tumors. With this capability, CT Scan has become an invaluable tool in medical diagnosis and planning.

Cephalgia is pain or pain around the head area, including pain behind the eyes or pain between the neck and the back of the head. According to PERDOSSI, cephalgia can be divided into two types, namely primary cephalgia and secondary cephalgia. Almost 90% of cephalgia or head pain is not dangerous, but doctors must be able to choose cephalgia that is not dangerous with cephalgia that can be dangerous and life threatening (Hidayati, 2016). One of the diagnostic support modalities that can help diagnose cephalgia or headache pain is by performing a CT-Scan examination (Sarjani et al., 2022). Cephalgia, or headache, refers to pain felt in the area of the head, including behind the eyes or between the neck and the back of the head. According to the Indonesia Association of Neurologists (PERDOSSI), cephalgia can be divided into two main categories: primary cephalgia and secondary cephalgia. Primary cephalgia is a headache that is not caused by other medical conditions, such as migraines characterized by throbbing pain often accompanied by nausea and sensitivity to light, tension headaches that feel like they are tied around the head due to stress or muscle tension, as well as cluster headaches that are very intense and appear in a series of attacks. In contrast, secondary cephalgia is caused by other medical conditions or disorders, such as infections (e.g. sinusitis or meningitis), head trauma, vascular disorders such as aneurysms or strokes, or other medical conditions such as brain tumors or hypertension. Understanding these differences is important for proper diagnosis and effective treatment planning.

According to Wijokongko, et al (2016), the scan area used is from the base of the cranii to the vertex, with a slice thickness of 5-8 mm, kV 120, mAs 190-250, but the use of scan parameters in each hospital can be different following the standard of the equipment used. Meanwhile, the theory according to Merril (Long et al., 2016) the parameters used are scan area from the base of the cranii to the vertex, slicethickness 5 mm, kV 120, mAs 250, FOV 220 cm. Also, the theory according to Bontrager (Lampignano & Kendrick, 2018) scan area used from the base of the cranii to the vertex with a slice thickness of 5-8 mm using soft tissue, brain, and bone windows. In a CT scan of the head, the area scanned covers from the base of the cranii (skull) to the nodes, with the thickness of the incision ranging from 5 to 8 mm. Other parameters used include a kilovolt voltage (kV) of 120 and a milliampere-second current (mAs) between 190 to 250. However, it is important to note that the parameters of these scans can vary between hospitals depending on the standard of equipment used. These guidelines provide a basis for adjustments to scanning techniques that can vary depending on the CT equipment used and the specific needs of each examination. By following these guidelines, medical professionals can ensure that the CT scan images of the head produced are of high quality and the information necessary for an accurate diagnosis..

Based on research that has been conducted at the Radiology Installation of Aulia Hospital Pekanbaru with the title CT-Scan Examination of the head with clinical chepalgia. the scanogram starts from the upper limit of the vertex and the lower limit to the mandibular. The results showed that the reason for using a scanogram with the upper limit of the vertex and the lower limit of the mandible on CT Scan brain with clinical chepalgia is to see the entire head because it is not known where the patient's abnormality is whether in the nerve or in the sinus. Clinical patients with chepalgia if the scanogram is made to the lower limit of the pars petrous then the sinus is cut. If a scanogram is made with the lower limit of the basis cranii and the upper limit of the vertex, if there is fluid in the mandibular sinus it will not be seen and if there is a fracture or dislocation of the mandible it is also not visible. The standard of a good picture is seen starting from the sinus, cerebri parenchyma, brain stem, including the entire intracranial. Meanwhile, observations made at the Radiology Installation of Reksodiwiryo Hospital Padang CT Scan examination of the head uses a scanogram starting from the base of the cranii to the vertex to minimize the radiation received by the

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patient. Based on these differences, the author needs to conduct socialization to radiographers with the aim of increasing and improving radiographer knowledge.

2. Method

This activity begins with the preparation stage and the implementation stage. In the preparation stage, namely conducting a field survey at the Radiology Installation of Reksodiwiryo Padang Hospital, coordinating between the service team and the radiology installation of Reksodiwiryo Hospital regarding the things that will be presented in the service activities to be carried out, preparing research results in the form of pocketbooks, printing pocketbooks of research results and coordinating the date, time, and place of implementation and target of socialization activities in community service. The implementation stage begins with opening and prayer. handing over the pocket book represented by the head of the medical support field at Reksodiwiryo Padang Hospital and then the book is distributed to all participants, presenting the material, evaluating the presentation of the material in the form of discussion and question and answer.

The methods used in the service activities consisted of lecture method, question and answer method and discussion method. This lecture method is applied by lecturing or conveying information verbally to participants in order to encourage participants to become more focused. The second method, namely question and answer, is applied so that direct communication occurs which is two way traffic, because at the same time a dialog occurs between the speaker and the participants. the speaker asks the participants to answer or vice versa, the participants ask the speaker to answer. In this communication, there is a direct reciprocal relationship between the speaker and the participants. This method is applied in order to focus the attention of participants in training to develop thinking power and skills to express opinions. The third method is discussion, discussion can be applied in groups in the form of exchanging information in solving a problem.

3. Results and Discussion

The activity of increasing radiographer knowledge through the socialization of pocket books of research results was carried out at Reksodiwiryo Padang Hospital, on August 10, 2023 starting at 08.00 - 12.00 WIB, with participants being radiographers who worked in the radiology installation of the hospital. Reksodiwiryo numbered 11 people. As for the results of activities to increase radiographer knowledge through the socialization of pocket books, the results of this study obtained 98% of participants, namely radiographers in the radiology installation of Reksodiwiryo Padang Hospital, can understand and understand the selection of scanogram settings in CT scan brain examination techniques with clinical chepalgia..

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Figure 1. Distribution of research handbooks and photos of activities

Source: Data Research

The following is a survey before the socialization on the use of scanograms on CT scans of the head with clinical chepalgia, there were 10 participants, 10 people used scanograms from the base cranii to the vertex while 1 person used scanograms from the mandibular to the vertex.

Table 1. Scanogram Setting Survey Before Socialization Activity

Participans	Scanogram Setting	Reason For Use
1	Bases of cranii to vertex	Minimize the dose the patient receives
2	Bases of cranii to vertex	Minimize the dose the patient receives
3	Bases of cranii to vertex	Minimize the dose the patient receives
4	Bases of cranii to vertex	Minimize the dose the patient receives
5	Bases of cranii to vertex	Minimize the dose the patient receives
6	Bases of cranii to vertex	Minimize the dose the patient receives
7	Bases of cranii to vertex	Minimize the dose the patient receives
8	Bases of cranii to vertex	Minimize the dose the patient receives
9	Bases of cranii to vertex	Minimize the dose the patient receives
10	Bases of cranii to vertex	Minimize the dose the patient receives
11	Mandibular to vertex	If there are sinus symptoms causing the headache

Source: Data Processing

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Table 2. Results after pocket book socialization activity

Participans	Scanogram Setting	Reason For Use
1	Bases of cranii to vertex or mandibular to vertex	Due to the many causes of cephalgia such as infection, sinusitis, tumors, teeth entering the sinuses and others, it is necessary to use a cranii or vertex base scanogram.
2	Bases of cranii to vertex or mandibular to vertex	If the patient's complaint leads to cesinusitis, we need to make a scanogram from the mandibular to the vertex.
3	Bases of cranii to vertex or mandibular to vertex	The use of scanograms from base to vertex we use depending on the patient's complaint if the complaint is in the area and ears then we can make the base to vertex, if such as infection, sinusitis and others then made mandibular to vertex.
4	Bases of cranii to vertex or mandibular to vertex	If the clinical patient is not in the maxillary sinus to the mandibular then we can make the base cranii to the vertex to reduce the radiation received but if it is because of the maxillary sinus we need to make the mandibular to the vertex.
5	Bases of cranii to vertex or mandibular to vertex	Due to the many causes of cephalgia such as infection, sinusitis, tumors, teeth entering the sinuses and others, it is necessary to use a cranii or vertex base scanogram.
6	Bases of cranii to vertex or mandibular to vertex	Due to the many causes of cephalgia such as infection, sinusitis, tumors, teeth entering the sinuses and others, it is necessary to use a cranii or vertex base scanogram.
7	Bases of cranii to vertex or mandibular to vertex	If the clinical patient is not in the maxillary sinus to the mandibular then we can make the base cranii to the vertex to reduce the radiation received but if it is because of the maxillary sinus we need to make the mandibular to the vertex..
8	Bases of cranii to vertex or mandibular to vertex	Due to the many causes of cephalgia such as infection, sinusitis, tumors, teeth entering the sinuses and others, it is necessary to use a cranii or vertex base scanogram.
9	Bases of cranii to vertex or mandibular to vertex	If the patient's complaint leads to cesinusitis, we need to make a

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		scanogram from the mandibular to the vertex.
10	Bases of cranii to vertex or mandibular to vertex	If the clinical patient is not in the maxillary sinus to the mandibular then we can make the base cranii to the vertex to reduce the radiation received but if it is because of the maxillary sinus we need to make the mandibular to the vertex.
11	Bases of cranii to vertex or mandibular to vertex	If the clinical patient is not in the maxillary sinus to the mandibular then we can make the base cranii to the vertex to reduce the radiation received but if it is because of the maxillary sinus we need to make the mandibular to the vertex.

Source: Data Processing

The implementation of the radiographer knowledge improvement activity through the socialization of the pocket book of the research results was conducted face-to-face. This is done to make the communication more interactive and effective, so that radiographers can ask directly about head CT scan examination techniques. The benefits obtained from this activity can be applied by radiographers in accordance with the clinical patient. The supporting tools used include the first pocket book, this pocket book aims to be read again because the material presentation is only obtained during the presentation. In addition, this activity can be used as an additional reference for radiographers. The second supporting equipment is a laptop that is used by the speaker to deliver the material, the third supporting equipment is an LCD projector to display presentation slides and the fourth is a laser pointer to point to parts of the slide to make it easier during the presentation. Discussion and questions and answers are carried out one by one to the service participants This community service activity also involves students, so that it can increase students' knowledge and insights regarding head CT scan examination techniques with clinical chepalgia and the role of scanogram settings on CT scans.

Al-Nabhani's research (2014) explains the use of scan areas from mandibular angulus to vertex in this study because cephalgia can be caused by sinus. Sarjani (2022) explains that the addition of the scan area will cause the radiation dose received by the patient to increase. additional scan areas are carried out, this is because to see the overall cause of cephalgia including infection, sinusitis, tumors, teeth entering the sinuses and others. Sinusitis and headache itself is a common complaint with overlapping symptoms with a real prevalence worldwide.

Susanto's research on CT-Scan examination of the clinical head of cephalgia used a scan area from the lower limit of the maxillary sinus and the upper limit of the vertex with a single range and slice thickness of 5 mm, using a window base with window with 80 and window level 40, kV 110, mAs 220, and using axial, coronal and sagittal cuts. the use of scan areas from the maxillary sinus to the vertex is due to the many causes of cephalgia including infection, sinusitis, tumors, teeth entering the sinuses and others. The cause of cephalgia is most commonly caused by sinusitis or tooth roots that enter the sinus (Susanto et al., 2019).

Kanna's research (2022) describes the CTscan examination of the clinical head of cephalgia using parameters with a slice thickness setting of 5 mm with a scan area setting from cervical to vertex, using window brain with window with 80 and window level 40 and only using axial and coronal cuts. The use of scan areas from cervical to vertex aims to obtain the entire anatomy of the cause of cephalgia, because cephalgia can be caused by many abnormal factors, such as abnormalities in the brain, eyes, sinuses, tooth impaction

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and also narrowing of the cervical. However, the use of this scan area should be done in patients with cervical pain after anamnesis, so that the radiation dose received by the patient is not too large and is still below the existing standards (Madani & Masrochah, 2022).

The following are the results after the activity of increasing radiographers' knowledge through socialization of the pocket book of research results carried out at Reksodiwiryo Padang Hospital.

According to the International Commission on Radiological Protection (ICPR), the principles of radiation protection consist of three principles of radiation protection, including the principles of justification, optimization, and limitation. The principle of justification is that radiation exposure must have more benefits than consequences, meaning that it is necessary to make scanogram arrangements in considering the right diagnosis for the patient.

3. Conclusions

Providing a pocket book of results to all radiographers of Reksodiwiryo Hospital has increased and improved radiographers' knowledge in the selection of scanogram settings on head CT scans in clinical chepalgia. Need to increase scientific meetings with peers in order to improve quality and professional radiology services. The research results of the pocket book socialization activity carried out at Reksodiwiryo Padang Hospital on August 10, 2023, succeeded in increasing radiographers' knowledge regarding the selection of scanogram settings in head CT scan examinations for clinical cephalgia cases. With 98% of the 11 radiographers participating in the socialization showing good understanding, they are now able to apply the appropriate scanogram settings, either from the base of the cranii to the node or from the mandible to the node, based on the patient's clinical complaints. This socialization is carried out face-to-face using various supporting tools to facilitate interactive and effective communication. This activity also involves students to expand their understanding of the CT scan technique. Overall, this activity is in line with the principle of radiation protection, ensuring that the use of a scanogram can minimize radiation dose while meeting precise diagnostic needs.

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