Journal of Applied Health Management and Technology Vol 6, No 1 (2024)

Journal of Applied Health Management and Technology

p-ISSN: 2715-3061
e-ISSN: 2715-307X

http://ejournal.poltekkes-smg.ac.id/ojs/index.php/JAHMT

THORAX RADIOGRAPHY EXAMINATION PROCEDURE IN PNEUMONIA WITH A SPECIFIC PROCESS OF PULMONARY TUBERCULOSIS IN THE RADIOLOGY INSTALLATION OF SEMARANG DISTRICT HOSPITAL

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ABSTRACT

Pneumonia is inflammation or acute inflammation of the lung tissue caused by various microorganisms such as bacteria, viruses, parasites, fungi, exposure to chemicals or physical damage to the lungs. Meanwhile, pulmonary tuberculosis is caused by the bacterium Mycobacterium tuberculosis (M. tuberculosis) and is an infectious disease. The use of thorax radiography is one of the most common radiological examinations in diagnosing diseases in the area of the heart and lungs. This study aims to find out how the thorax radiographic examination procedure is carried out in cases of pneumonia with a specific process of pulmonary tuberculosis in the Radiology Installation of Semarang District Hospital. This type of research is descriptive with a case study approach. The research subject used in this study was 1 patient who underwent a thorax radiography examination with indications of pneumonia with a specific process of pulmonary tuberculosis. From the results of the data obtained, it is known that in the procedure for examining thorax radiography in cases of pneumonia with a specific process of pulmonary tuberculosis there is no special patient preparation, the patient is only asked to remove objects that can interfere with radiographic images in the area of the thoracic cavity being examined. The tools used include x-ray machines, bucky stands, imaging plates and computed radiography. The projection used is the postero anterior projection. The conclusion obtained is that the basic projection used is the postero anterior projection which is considered effective in confirming the diagnosis.

Keywords: *thorax radiograph*; *pneumonia*; *pulmonary tuberculosis*

Introduction

Pneumonia is inflammation or acute inflammation of the lung tissue caused by various microorganisms such as bacteria, viruses, parasites, fungi, exposure to chemicals or physical damage to the lungs (Perhimpunan Dokter Paru Indonesia, 2020). Pneumonia is a global health problem and has a very high mortality rate. This health problem affects developed countries like the

United States, Canada and other European countries as well as underdeveloped countries. Pneumonia (TB) has overtaken heart disease and tuberculosis as the leading cause of death in America (Kaunang CT, Runtunuwu AL, 2016). According to the 2001 National Health Survey (SKN), respiratory diseases, especially pneumonia, cause 22.8% of deaths in children under five years of age and 27.6% of deaths in infants in Indonesia (Jeri *et al.*, 2020). The use of thorax radiography is one of the most common radiological examinations in diagnosing heart and lung disease (Nyoman, Putu and Bagus, 2007). Radiography of the lungs is necessary to confirm the diagnosis of pneumonia. Thorax radiography is a routine and practical examination performed in every hospital. Therefore, thorax radiography can be an alternative to determine the severity and prognosis of the disease (Sari Latif, 2022).

Pulmonary tuberculosis, which is often known as pulmonary tuberculosis, is caused by the bacterium Mycobacterium tuberculosis (M. tuberculosis) and is an infectious disease (Syahrin Vidyastari and Riyanti, 2019; Dewi Kristini and Hamidah, 2020). If it is not treated or the treatment is not complete, tuberculosis can cause dangerous complications up to death (RI, 2015). Pulmonary tuberculosis is still a global health problem (Guno *et al.*, 2016). In 2017 WHO reported that there were 1.3 million deaths due to pulmonary tuberculosis and 300,000 deaths due to pulmonary tuberculosis with HIV. Indonesia is the third ranked country after India and China in cases of pulmonary tuberculosis. Two-thirds of the world's tuberculosis cases are occupied by eight countries, including India 27%, China 9%, Indonesia 8%, Philippines 6%, Pakistan 5%, Nigeria and Bangladesh each 4% and South Africa 3% (WHO, 2018). The prevalence of pulmonary tuberculosis in Indonesia is divided into three regions, including Sumatra 33%, Java and Bali 23%, and eastern Indonesia 44% (Sugiarti *et al.*, 2018). Pulmonary tuberculosis germs spread to other people through transmission or airflow (sputum droplets of smear-positive pulmonary tuberculosis patients) when the patient coughs or sneezes (Lingkungan, 2011). Pulmonary tuberculosis is one of the diseases that most often attacks productive age between 15-49 years (Nurjana, 2015; Sugiarti *et al.*, 2018; WHO, 2018). The accuracy of the diagnosis of pulmonary tuberculosis depends on the method of taking examination material and the availability of diagnostic tools, for example microbiological tests, anatomical pathology, serology, thorax radiography and others. In most pulmonary tuberculosis, the diagnosis is made primarily by microscopic examination of the sputum and does not require thorax radiography. However, under certain conditions a thorax radiographic examination needs to be carried out according to indications (Menteri Kesehatan Republik Indonesia, 2009).

Based on the background above, the authors are interested in knowing how the procedure for examining thorax radiography in cases of pneumonia with a specific process of pulmonary tuberculosis in the Radiology Installation of Semarang Regency Hospital.

Methods

This type of research is a descriptive qualitative research with a case study approach that is used to describe or describe the original situation in a systematic and accurate manner regarding the procedure for examining thorax radiographs in cases of pneumonia with a specific process of pulmonary tuberculosis at the Radiology Installation of Semarang District Hospital. The research subject used in this study was 1 patient who underwent a thorax radiography examination with indications of pneumonia with a specific process of pulmonary

tuberculosis at the Radiology Installation of Semarang District Hospital on May 27 2023.

Results and Discussion

Illustration of a thorax radiographic examination case in a case of pulmonary tuberculosis at the Radiology Installation of the Semarang District Hospital

A 53-year-old male patient named Mr. MN came to the Radiology Installation at the Semarang Regency Hospital with a letter requesting a thorax radiograph. The patient came from the Pulmonary Polyclinic.

Procedure for thorax radiographic examination in cases of pulmonary tuberculosis at the Radiology Installation of the Semarang District Hospital

Based on the research data obtained, for the procedure of thorax radiographic examination in cases of pneumonia with a specific process of pulmonary tuberculosis at the Semarang District Hospital Radiology Installation there was no special patient preparation, the patient was only asked to remove objects that could interfere with the radiographic image in the area of the thoracic cavity being examined. The tools used include x-ray machines, bucky stands, imaging plates and computed radiography.

Figure 1. X-Ray Machine at the Radiology Installation of the Semarang District Hospital

Figure 2. Bucky Stand at the Radiology Installation of Semarang District Hospital

Figure 3. Imaging Plate at the Radiology Installation of Semarang District Hospital

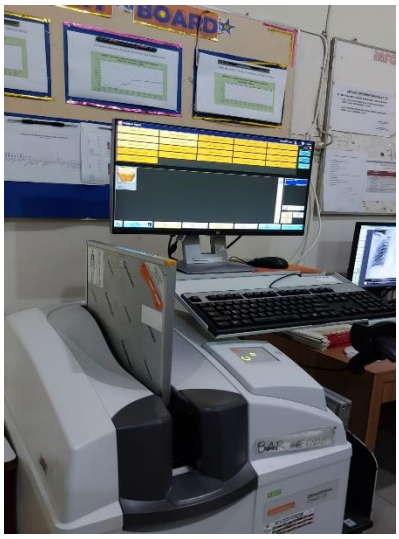

Figure 4. Computed Radiography Equipment at the Radiology Installation of the Semarang District Hospital

The projection used in thorax radiographic examination in cases of pneumonia with a specific process of pulmonary tuberculosis Mr. MN at the Radiology Installation of Semarang District Hospital is the postero anterior projection. The patient is in an upright position facing the imaging plate. Then set the MCP of the patient's body parallel to the imaging plate, adjust the height of the imaging plate so that the VII thoracic vertebra is in the middle of the imaging plate and the upper limit of the imaging plate is about 4-5 cm above the shoulder. Set the imaging plate perpendicular to the center of the MSP of the body at the level of the VII thoracic vertebra and expose it on the second full inspiration.

Figure 5. Results of thorax radiographs of the patient Mr. MN

Based on the research results obtained, the procedure for examining thorax radiographs in cases of pneumonia with a specific process of pulmonary tuberculosis carried out at the Semarang District Hospital Radiology Installation was in accordance with the theory of (Ballinger and Frank, 2003) including that the patient had no special preparation, but the patient was asked to remove objects that can interfere with the radiographic picture of the thoracic organs being examined such as necklaces, safety pins, shirt buttons, underwear (such as breastholders / bras). For the preparation of the tools used include x-ray machines, cassettes, grids. The projection used is the basic projection, postero anterior in

accordance with the theory of (Ballinger and Frank, 2003) and (Bontrager and Lampignano, 2014).

Conclusion

The procedure for thorax radiographic examination in cases of pneumonia with a specific process of pulmonary tuberculosis at the Radiology Installation of the Semarang Regency Hospital it is in accordance with theory, namely using the postero anterior projection, which is the basic projection which is considered effective in establishing a diagnosis.

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