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LUMBAR VERTEBRAE RADIOGRAPHY WITH SUSPECTED SPONDYLOSIS AT MEDAN ADVENTIST HOSPITAL

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ABSTRACT

Lumbar X-ray with suspected spondylosis is an examination to display the anatomy and abnormalities of the lumbar spine using X-rays. The purpose of this study is to describe the degenerative changes that occur in the articular components of the spine. Spondylosis can be described as the development of osteophytes (bone growths) along the vertebral joints and intervertebral discs. The projections used were antero-posterior and lateral X-ray fields using a general X-ray unit with a current of 200 mA. Image recording was performed using Digital Radiography (DR). The type of research conducted was qualitative and descriptive. The data collection techniques used were documentation and observation. The results of the Lumbar Radiography study with suspected Spondylosis were examinations to show the anatomy and abnormalities of the lumbar spine using X-rays. Spondylosis is a term used to describe degenerative changes that occur in the articular components of the spine. Spondylosis can be described as the development of osteophytes (bone growths) along the vertebral joints and intervertebral discs. The projections used were antero-posterior and lateral X-ray fields using a general X-ray unit with a current of 200 mA. Image recording was performed using Digital Radiography (DR). The type of research conducted was qualitative and descriptive. The data collection techniques used were documentation and observation. In spinal radiography with suspected lumbar spondylosis, the anteroposterior and lateral views used were. The results of the study showed that cooperation between radiology technicians and patients or their families was very important to ensure that the examination ran smoothly. Based on the results of the study conducted on the lumbar vertebral column examination of several respondents with suspected lumbar spondylosis, the author draws the following conclusions and recommendations: In radiography of the vertebral column with suspected lumbar spondylosis, the anteroposterior and lateral projections used are. Cooperation between radiology technicians and patients or their families is essential to ensure that the examination runs smoothly..

Keywords: *Lumbar Vertebrae, Spondylosis, Digital Radiography.*

INTRODUCTION

The lumbar vertebrae, or lumbar vertebrae, are the largest. Their bodies are very large compared to the other vertebrae and are kidney-shaped. Their spinous processes are wide and shaped like small axes. Their transverse processes are long and slender. The fifth vertebra forms a joint with the sacrum, called the lumbosacral [1].

The vertebral column has different shapes, but in general the parts of each vertebra have the same size. The vertebral column is divided into two main parts, namely the vertebral corpus and the vertebral arch, between the corpus and the arch there is a cylindrical foramen and is composed of subtantia compacta tissue. The posterior and superior parts of the vertebral corpus are flat and covered by articular cartilage tissue [2]. Meanwhile, in the vertebral arch there are several parts including two pedicles, two laminae, four processes generally concave in shape this causes a hole located in the posterolateral of the vertebral corpus called the intervertebral foramen. This foramen is used for the exit of nerve roots from the spinal cord [3].

Several clinical conditions often occur in the lumbar vertebral column that can

disrupt the physiology of the spine, one of which is spondylosis [4].

Lumbar spondylosis can be defined as changes in the spinal joints characterized by increasing degeneration of the intervertebral discs followed by changes in bone and soft tissue, or it can mean excessive growth of bone (osteophytes), which are mainly located on the anterior, lateral, and sometimes posterior aspects of the superior and inferior edges of the central vertebrae (corpus) [5].

Spondylosis is a term used to describe degenerative changes that occur in the articular components of the spine. Spondylosis can be described as the development of osteophytes (bone spurs) along the joints of the vertebral bodies and intervertebral discs. However, when viewed in the context of other changes that occur with aging, spondylosis is not some aggressive disease that seems to attack the body, but rather a natural consequence of stress on the spine [6].

A large epidemiological study in Japan reported a prevalence of radiographic lumbar spondylosis of 75.8% in people over 60 years of age. Only 28.8% of these individuals had symptoms of low back pain. Risk factors for spondylosis include aging, trauma, lifestyle habits, height, obesity, physical activity, smoking, and alcohol use [7].

People with spondylosis may have degenerative disc disease or develop spinal stenosis. Osteophyte development is simply a natural response to the mechanics of lumbar spine changes due to more fundamental biochemical changes in the intervertebral discs. Spondylosis, a morphological change that often occurs with age, has negative functional effects and can lead to loss of spinal mobility [8].

According to Lampignano, the lumbar radiography technique uses three projections, namely AP, Lateral, and Oblique with the addition of AP Axial projection (Ferguson Method) which is used to visualize the lumbar joints.

To obtain an image of the lumbar vertebral column in cases of suspected spondylosis, a radiological examination can be performed. Radiology is a branch of medicine that deals with the use of radiation for imaging to support health services. Through the development of radiology, X-ray examinations have successfully uncovered various types of diseases that were previously considered a mystery. This activity is known as radiodiagnostics, which later developed into diagnostic imaging [9].

To establish a correct diagnosis, radiographic techniques appropriate to the organ being examined are required [10]. Broadly speaking, radiographic techniques include image acquisition techniques, cassette size selection, collimation determination, beam distance, and exposure factors [11]. Not only are these techniques necessary, but the quality of the image on the X-ray film must also be taken into account [12].

Determining a disease diagnosis also depends on the quality of the resulting radiographic image [13]. For example, sharpness and detail are prioritized in radiographic images of the lumbar vertebral column [14]. In our observations, many radiographic images of the lumbar vertebral column were rejected due to poor image quality, for example, insufficient sharpness, which prevented clear boundaries between adjacent objects [10].

Therefore, based on the background that has been described, the author will conduct a scientific paper with the title "Lumbar Vertebrae Radiograph with Suspected Spondylosis at Medan Adventist Hospital"

RESEARCH METHODS

Types of research

This study on lumbar radiography in cases of spondylosis used descriptive

qualitative research [15]. Data collection techniques were based on observations and interviews [16]. Qualitative research techniques are descriptive in nature and tend to emphasize analysis and the subject's perspective [17]. In this study, a theoretical basis was used to guide the research focus so that it aligns with the facts on the ground [18]. The theoretical basis was also useful for providing an overview of the writing background and as material for discussing the research results [19].

Descriptive research is a type of fact-finding with precise interpretation. Descriptive research examines societal problems, prevailing procedures, and specific situations, including the relationships between activities, attitudes, perspectives, ongoing processes, and the influence of a phenomenon. Descriptive research is a research method that seeks to describe the object or subject being studied as it is.

The patient data obtained by the author came from an examination on January 23, 2025, so this study is retrospective.

Time and Place of Research

Radiographic examination *of the lumbar vertebrae with suspected spondylosis*

1. Research Period : April-May 2025
2. Research Location : Radiology Installation, Medan Adventist Hospital

Data collection technique

To obtain correct and accurate data in compiling this paper, the author uses several methods as below:

1. Learning Observation
   By applying the knowledge gained during lectures and clinical practice.
2. Interview
   The author conducted interviews with patients, or patients' families, radiographers and radiology specialists.
3. Observation

Direct observation by researchers can be realized by recording information related to the radiology room at Medan Adventist Hospital . They can also directly observe and follow the radiographic examination of the lumbar vertebrae suspected of having spondylosis. Therefore, researchers can conduct direct observations to obtain evidence related to the research object.

Analysis of Results

The data analysis stage is the most crucial and decisive stage in any research. The data obtained is then analyzed with the goal of transforming it into information so that its characteristics or properties can be easily understood and useful in addressing research-related issues [20].

This analysis is carried out based on observations in the field or experience based on data obtained from interviews and observations, then compiled and conclusions drawn [21].

RESULTS AND DISCUSSION

Results

1. Patient Identification

The results of the evaluation of the Lumbar radiographic examination with suspected spondylosis at Medan Adventist Hospital with the following patient data:

Name: Mrs. ES
No. RM: 00973225001

Date of Birth: November 28, 1958
Female gender
Type of examination: Lumbar
Diagnosis: Spondylosis
Examination Date: January 23, 2025

2. **Examination Procedure**

Standard Operating Procedures (SOP) at Medan Adventist Hospital:

a) Patients come to register at the first registration point at Medan Adventist Hospital.
b) The cashier unit registers the patient and requests payment for the examination, then hands the patient over to the radiographer.
c) Allow patients to change clothes with clothes provided by the hospital.
d) Perform radiological examination procedures.
e) Evaluate the image. If the X-ray is not satisfactory, repeat the image and explain it to the patient. If the image is satisfactory, the patient can return to the room/go home.
f) The radiology specialist makes a report on the examination results.

3. **Patient Preparation**

In radiographic examination of the lumbar vertebrae with suspected spondylosis, no special preparation is required [22]. Before conducting the examination, explain to the patient to follow the directions of the radiographer when positioning the patient and so that the patient does not move when the officer performs the exposure [23].

4. **Preparation of inspection tools**

a) X-ray machine

Before performing a radiography procedure, the X-ray machine is first turned on. The machine used at Medan Adventist Hospital has the following data:

Aircraft Brand: MEDONICA
Aircraft type: BLD-02A (Collimator)
Data :2018.11
Maximum Condition: 150kV/500mA
Aircraft Services: Radiography
Number of Tubes: 1 piece

Figure 1. General X-ray unit at Adventist Hospital

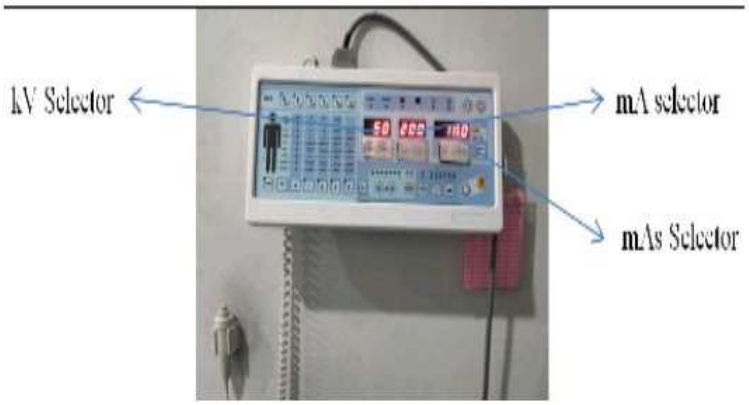

Figure 2. Adventist Hospital Monitor and Control Table

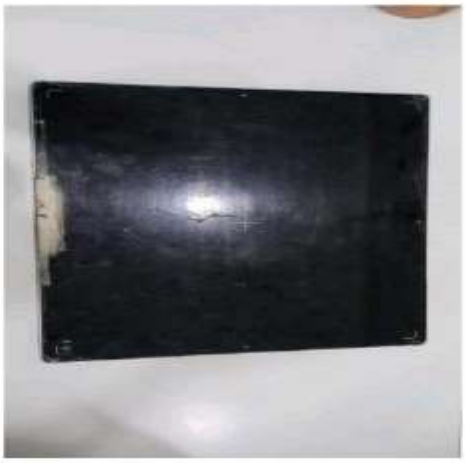

Figure 3. Medan Adventist Hospital Detector

5. **Examination Techniques**

The projection carried out here is in accordance with the examination carried out by the author on the patient, namely the Antero-Posterio projection [24].

a. Antero-Posterior Projection

Purpose of the examination : To show in general
Lumbar vertebrae from the side
Antero-Posterior

Patient position : Supine (lying on back) on the table
Examination, the midline of the body is parallel

Object position : Mid sagittal plane of the body is adjusted precisely
On the mid line of the table, both hands
Place the object on the chest
In the middle the cassette is placed
Horizontal using grid

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Figure 4. Antero-posterior projection of the lumbar spine

FFD : 90 cm
Ray direction : Vertical and perpendicular to the grid
Ray center : At lumbar III
Film size : 30 x 40 cm
Exposure factor : 80 kV, 20 mAs

Image Evaluation : - Upper border of Thoracic XII is visible
-Shows the anatomy of the lumbar spine
Vertebrae bodies, intervertebral joints,
Spinous and Transverse processes sacrum
-The lower border of the pubic symphysis is visible.

Figure 5. Lateral Projection of the Lumbar

FFD : 90 cm
Ray direction : Vertical and perpendicular to the grid
Ray center : At lumbar III
Film size : 30 cm x 40 cm
Exposure factor : 90 kV, 32 mAs
Image Evaluation : - The upper limit of Thoracic XII is visible, the lower limit Coccyx not cut
-L1 and L5 are visible

6. Evaluation and Examination Results

of the lumbar vertebrae was performed with suspected *spondylosis* with the following results:

Name: Mrs. ES
Age: 66 years
Female gender
Examination time: 01-23-2025
Type of examination: *Lumbar Vertebrae Radiography*
Diagnosis: Spondylosis

a. Attached

After all procedures have been carried out, namely preparation of the patient and equipment, as well as carrying out the examination by recording images using Digital Radiography (DR), the author will show the image evaluation as follows [25]:

The projections used are Antero-Posterior projection and Lateral projection, image sharpness and image detail as needed, The position of the lumbosacral and coccygeal vertebrae bones is normal, no listhesis is visible. No fractures are visible, spurs in the vertebral corpus, Disc space is normal [26].

Conclusion
No visible listhesis/fracture
Lumbar spondylosis

DISCUSSION

How are efforts made to obtain optimal radiographic images *of the lumbar vertebrae* with suspected *spondylosis ?*

The discussion of the problem formulation is as follows:

1. *Lumbar vertebrae* radiography with suspected *Spondylosis* performed with Antero-Posterior Projection [27].
2. In the implementation of Lumbar Vertebrae radiography with suspected Spondylosis The image recording is done using Digital Radiography (DR) with the aim of work efficiency and good X-ray photo quality [28]. However, the exposure factor used is adjusted to the size of the object and must not exceed the permitted tolerance, meaning it must not be too high (*overexposure*) or too low (underexposure) [29].
3. In carrying out radiography *of the lumbar vertebrae* with suspected *spondylosis* , the Standard Operating Procedure (SOP) is used, starting from the registration counter, the radiography action process, the image recording process to the X-ray results [30].
4. In carrying out radiography *of the Lumbar Vertebrae* with suspected *Spondylosis* , cooperation with the patient is needed, to ensure the examination runs smoothly and to avoid repeating the photos. Therefore, before carrying out the

radiography procedure, the radiographer should provide information about the things that will be done in the examination procedure [31].

5. Patient position in relation to the *Lumbar Vertebrae Radiographic examination* with suspected *Spondylosis,* the patient is advised to lie on his back on the examination table and not move in order to obtain optimal image results and to see the diagnosis.

CONCLUSION

Based on the results of observations that have been carried out on the examination of the lumbar vertebral column of several respondents, with the suspicion of lumbar spondylosis, the author draws the following conclusions and suggestions In radiography of the Vertebral Column with suspected Lumbar Spondylosis , the Antero-posterior and Lateral Projections used are. Cooperation between the radiographer and the patient or the patient's family is very necessary to ensure the examination runs smoothly. Patient comfort is also very important to ensure the examination runs smoothly.

SUGGESTION

1. It is best that before the examination is carried out the radiographer explains the procedure so that the examination can run smoothly.
2. In carrying out radiography, only basic projections are used, namely Antero-Posterior and Lateral Projections , both projections have shown abnormalities in the lumbar spine .
3. Before the examination takes place, it is a good idea to choose the right exposure factor.

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