RADIOGRAPHY TECHNIQUE OF OSSA PELVIS WITH SUSPECTED FRACTURE OF OS PUBIS IN RADIOLOGY INSTALLATION OF EFARINA ETAHAM HOSPITAL, BERASTAGI, KARO DISTRICT, IN 2020

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Abstract

Fractures are broken bones, usually caused by trauma or physical exertion, the force and angle of the force, the condition of the bone itself, and the soft tissue around the bone will determine whether the fracture is complete or incomplete. A complete fracture occurs when the entire bone is broken, whereas an incomplete fracture does not involve the entire thickness of the bone. There are several terms used to describe the type of fracture, namely: Transverse Fractures, Longitudinal Fractures, Segmental Fractures, Compression Fractures and Avulsion Fractures. The examination aims to determine the results of radiographic images, if a fracture or collision occurs and is caused by an KLL factor (traffic accident). The aim of the study was to find out how the technique for radiographic examination of the Ossa Pelvis with the suspicion of Oss Pubis Fracture at the Radiology Installation of Efarina Berastagi Hospital in 2020. This type of research is descriptive research with data collection techniques by observation, documentation study and literature (library) study. The results of the examination of the Ossa Pelvis with the suspicion of Oss Pubic Fracture at the Radiology Installation of Efarina Etaham Berastagi Hospital are generally using the AP (Anterior Posterior) projection. The ideal X-Ray device for Ossa Pelvis radiography is a portable X-Ray unit or mobile X-Ray unit with relatively low capabilities. The x-ray film used is a high speed type combined with a fast screen intensifying (IS) where this type of film and intensifying screen (IS) can produce images with good detail and sharpness. Thus the radiation dose can also be reduced for the patient and the operator himself. The x-ray film washing process used should use Automatic Processing. It is hoped that it can be used as a reference for radiographic results, especially in cases of Os Pubis Fractures.

Keywords: Pelvic Ossa, Os Pubis fracture

INTRODUCTION

Fractures according to Price, 2005 are fractures, usually caused by trauma or physical exertion, the strength and angle of the force, the state of the bone itself, and the soft tissue around the bone will determine whether the fracture that occurs is complete or incomplete. A complete fracture occurs when the entire bone is broken, whereas an incomplete fracture does not involve the entire thickness of the bone. There are several terms used to describe the type of fracture, namely: Transverse Fractures, Longitudinal Fractures, Segmental Fractures, Compression Fractures and Avulsion Fractures (Price, 2005)

According to Kahle (1997), the pelvic bones are composed of three bones, namely the coxae (coxae), sacrum (sacrum), and coccygeus (coccygeus). The pubic bone consists

of the superior and inferior ramus of the pubic bone. The two rami are bounded by the obturator foramen. The coccygeal bone is formed from three or four vertebrae which gradually decrease from top to bottom. (Kahle, 1997)

According to Noor Zairin 2016 Pelvic ossa fracture is a disconnection of the pelvic bones, either the pubic bone or ilium bone caused by a trauma. (Noor, Zairin, 2016)

Radiological examination is a very appropriate examination to determine the anatomy and physiology of an organ so that abnormalities in pathology and trauma can help in making a diagnosis. From the research that the authors have done, there are many events or cases involving pelvic fractures or broken bones. So the authors conducted a study on "Radiographic Examination Techniques of the Pelvic Ossa With Suspicion of a Pubic Oss Fracture at the Radiology Installation of Rs Efarina Etaham Berastagi".

Scope of Writing

At this writing the authors choose the projection used is the AP (Anterior Posterior) projection. The ideal X-Ray device for radiography of the Pelvis oss in the Pubis examination is a portable X-Ray unit or a mobile X-Ray unit with relatively low capabilities. The x-ray film used is high speed type and combined with a fast intensifying screen (IS) where this type of film and intensifying screen (IS) can produce images with good detail and sharpness. Thus the radiation dose can also be reduced for the patient and the operator himself. The x-ray film washing process used should use Automatic Processing

Research purposes

To find out more about examination techniques and radiographic projections that are commonly performed or used in examination of Pelvic Fractures at the Pubic Os at the Radiology Installation of Efarina Etaham Berastagi Hospital, Karo Regency in 2020.

LITERATURE REVIEWS

Anatomy and Physiology

According to Pearce 2009 Anatomy is the study of the structure of the body and the relationship of its parts to one another. (Pearce, 2009)

According to Ethel Sloane 2003 in her book physiology is the science that studies the functions of a living body, such as anatomy and physiology which also cover specific fields of function of certain organs. (Ethel Sloane, 2003)

According to Asih Puji Utami, Sudibyo Dwi Saputra and Fadli Felayani in their book Pelvis functions to connect the spine to the lower extremities, the pelvis is composed of four bones namely, two hip bones (also called coxae or innominate), one sacrum bone and one cocigeus bone (Asih Puji Utami, Sudibyo Dwi Saputra, Fadli Felyani, 2014)

Pathology

According to Price (2005), pathology is the science or study of disease. In its broadest meaning, pathology is literally abnormal biology, the study of inappropriate biological processes or the study of sick or disturbed individuals (Price, 2005).

According to Price (2005) Fractures are fractures, usually caused by trauma or physical exertion, the strength and angle of the force, the condition of the bone itself, and the soft tissue around the bone will determine whether the fracture that occurs is complete or incomplete. A complete fracture occurs when the entire bone is broken, whereas an incomplete fracture does not involve the entire thickness of the bone (Price, 2005).

Etiology

According to Price 2005, etiology is the determination of disease and the factors that cause certain diseases (Price, 2005)

- According to Price 2005, the etiology of pelvic fractures is as follows (Price, 2005)
- Traffic accidents or work accidents
- Iatrogenic trauma, such as gynecological and pelvic surgery or the result of endoscopic procedures, such as transurethral surgery
- Blunt trauma
- Sharp trauma from stab or gunshot wounds

Radiography Technique

According to Clark S, 2005 Radiographic technique is the science that studies the procedures for shooting objects examined using x-rays to obtain radiographic images, so as to be able to establish a precise and accurate diagnosis (Clark S, 2005)

The radiographic techniques performed to show pelvic ossa fractures on the pubis are (Bontrager, 2001)

AP projection

- Objective : Examines the pelvis and shows fractures, dislocations, degenerative disease and bony lesions.
- Patient position: Patient supine, arms placed at sides and crossed over chest, for comfort place pillow under patient's head.
- Object position: The cassette is arranged transversely, the edge of the cassette is set slightly above the iliac crest, so that the image of the crista will not be cut off. The lower edge of the cassette conforms to or slightly below the symphysis pubis. The MSP of the patient's body is aligned in the middle of the cassette. Legs straight, feet internally rotated 15-20 degrees (collum femoris appears in the longest position (true AP). Make sure that the pelvis does not rotate.

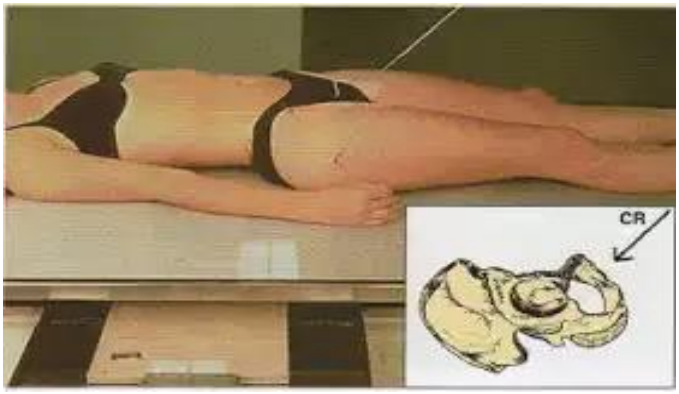

Figure : AP Projection (Bontrager, 2001)

Central Point (CP)	: At MSP 2"(5cm) below SIAS
Central Rey (CR)	: Perpendicular to the cassette
FFD	: 100 cm
Cassette	: 30cm x 40cm
exposure	: When the patient is not moving
Radiography Criteria	: -Visible pelvic bones
	-Appears L5, sacrum, and coccygeus
	- Visible head of the greater trochanter femur

Figure: AP Projection (Bontrager, 2001)

X-ray Aircraft Engineering

Rasad 2005, wrote in his book that an X-ray machine is an aircraft or equipment that can produce x-rays. Where in the medical field it is used as a tool to diagnose and treat a disease (Rasad, 2005)

Examination of the pelvic bones with suspected pubic fracture was carried out using a conventional unit at the Radiology Installation of Efarina Etaham Berastagi Hospital in 2020

- Aircraft Type : SDR 15030501

- Aircraft Brand : EST 5000 S/F601 HF HIGE
- Number of Tubes : 2 pieces
- Aircraft Capacity : 125 kV,500 mA
- Aircraft Service : Radiography
- Input Voltage : 110V – 220V
- KV Range : 40 KV – 125 KV
- Exposure Time : 0.04 s – 5 s

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METHODS

Types of research

This type of research is qualitative data research. According to Hidayat, 2007 Qualitative data research is a research method that is carried out by collecting data by viewing or analyzing documents in a hospital. The main purpose is to conclude about a situation objectively. (Hidayat, 2007)

Location and Time of Research

- Research sites
  The location of this research was carried out at the Radiology Installation of Efarina Etaham Berastagi Hospital, Karo Regency in 2020
- Research time
  Time of research and data collection of the Ossa Pelvis case with suspected Oss Pubic Fracture at the Efarina Etaham Berastagi Hospital Installation, Karo Regency in 2020

A. Data Checking Techniques

The data checking technique is Secondary Data. The method used in writing scientific papers uses a qualitative method, while the approach used is a case with a technique. (Hidayat, 2007)

1. Observation and physical examination by direct observation of the client on matters relating to the client's problems.
2. Documentation studies are carried out by seeking sources of information obtained from the patient's status and matters relating to the patient's problems. Literature study, namely by studying books, papers and other sources to obtain scientific basis related to Ossa Pelvis with suspected Oss Pubic Fractures so as to be able to compare between theory and implementation in cases in hospitals. In this study, the study observed the implementation of Ossa Pelvic Radiography starting from the initial examination of the Ossa Pelvis with cases of Oss Pubis Fractures until completion.

Research schedule

NO	Activity	May	June	July	August	September
1.	Proposal Making					
2.	Proposal Seminars					
3.	Proposal Improvements					
4.	Data collection					
5.	Writing KTI					
6.	KTI Exam					

Research Schedule Table

RESULTS AND DISCUSSION

RESULTS

1. Overview of Research Locations

   At the Radiology Installation of Efarina Etaham Berastagi Hospital, Karo District

2. Research result
   a) Patient identity

Patient's name	: Mrs. Emmy
Gender	: Woman
Age	: 37 years
No. RM	: 00-109181
Address	: Kabanjahe

Checking type : RO Pelvis
Ket. Clinical : KLL
Examination Date : July 17, 2020

b) Disease History

The patient came to the hospital as a result of an KLL (traffic accident) and was brought to the emergency room and ordered by the doctor on duty to do an X-ray of the Pelvis because the patient who had fallen had sat down from a motorbike. On June 17 2020, around 4:26 p.m. the patient was taken to the radiology room to take an X-ray of the Pelvis.

3. Examination Execution
   1. Photo request letter

   The patient brings a letter requesting a photo of Ossa Pelvis, then the patient is taken to the examination room and the cover letter is read by the officer (radiographer) and carries out an examination according to the examination procedure.
   2. Tools preparation

a. X-ray machine used

X-ray plane

- Name/Brand : EST 5000 S/F601 HF HIGE
- Tube serial no : 640191713
- kV Maximum : 500 kV
- tube type : Double Focus

b. Accessories

The completeness of the radiography needed in the Ossa Pelvic examination are:

a. The tape and film used is 30 cm x 40 cm in size as much as 1 sheet
b. The film used is Green sensitive with high speed
c. The marker is used as a sign or code for patient identification, namely the anatomical position mark (R)
d. The intensifying screen used is Green emitting with High Speed.
e. Grid to absorb scattered radiation that is not in the same direction as it comes from the exposed object.

4. Examination Technique

The radiographic techniques performed to show abnormalities in the examination of the Ossa Pelvis suspected of a Fracture of the Oss Pubis are:

1. AP projection

- Objective : Exposing the Pelvic Ossa and showing fractures, dislocations, degenerative disease and bone lesions.
- Patient position: Patient supine, arms placed at sides and crossed over chest, for comfort place pillow under patient's head.

- Object position: The cassette is arranged transversely, the edge of the cassette is set slightly above the iliac crest, so that the crista image will not be cut off. The lower edge of the cassette conforms to or slightly below the symphysis pubis. The MSP of the patient's body is aligned in the middle of the cassette. Both legs straight, feet internally rotated as far as 15-20 degrees neck femoris looks in the longest position (true AP). Ensure that the pelvis is not rotated.

Image Criteria Image Projection AP (Anterior-Posterior)

Central Point (CP)	: At MSP 2"(5cm) below SIAS
Central Rey (CR)	: Perpendicular to the cassette
Projection	: Kv 67, mAs 160, ms 110
FFD	: 100 cm
Cassette	: 30 cm x 40 cm with grid
exposure	: When the patient is not moving
Radiographic criteria	: -Visible pelvic bones
	-Appears L5, sacrum, and coccygeus
	- Visible head of the greater trochanter femur

5. Evaluation of Photo Results

After carrying out a radiographic examination of the Ossa Pelvis, starting from the implementation of radiography and the chemical washing process of the film, the resulting X-rays can be evaluated as follows:

1. Evaluation of the results of the AP (Anterior Posterior) projection examination
    1. View of the anatomy of the Ossa Pelvis from the AP (Anterior-Posterior) position
    2. The film size is 30 cm x 40 cm.
    3. Image sharpness is sufficient.
    4. The radiographic image density is sufficient
    5. Radiographic image details are sufficient
    6. Radiographic image contrast is sufficient

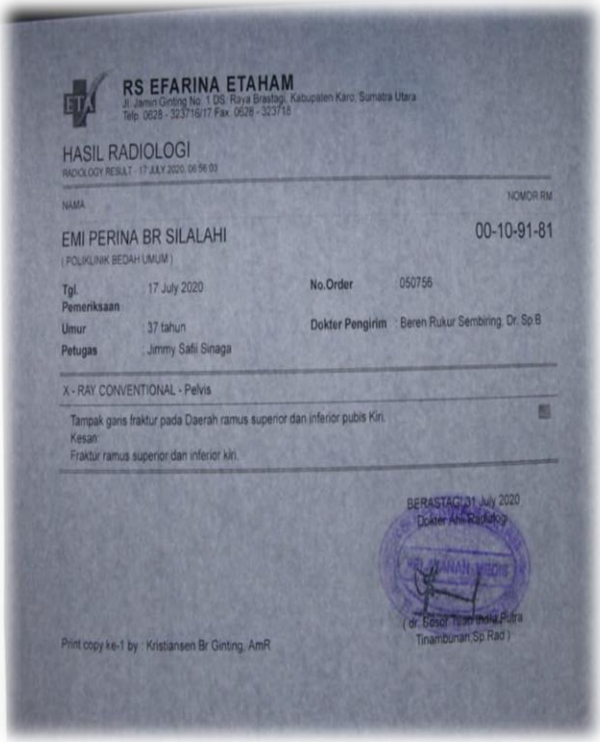
6. Film Processing

Film processing carried out at the Radiology Installation at Efarina Etaham Berastagi Hospital is Automatic processing, which takes about 2-3 minutes for the washing process

7. Radiology Specialist Reading Results

The Radiology Specialist at Efarina Hospital Etaham Berastagi mentions the photo readings in the AP (Anterior Posterior) projection (appendix 1), namely:

- A fracture line is seen in the left superior and inferior pubic ramus area.
- Left superior and inferior ramus fracture impression.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Jl. Jamin Ginting No. 1 DS. Raya Brastagi, Kabupaten Karo, Sumatra Utara
Telp. 0628 - 323716/17 Fax. 0628 - 323718

HASIL RADIOLOGI
RADIOLOGY RESULT - 17 JULY 2020, 06:56:03

NAMA: EMI PERINA BR SILALAHI (POLIKLINIK BEDAH UMUM)
NOMOR RM: 00-10-91-81

Tgl. Pemeriksaan : 17 July 2020
No.Order : 050756
Umur : 37 tahun
Dokter Pengirim : Beren Rukur Sembiring, Dr, Sp B
Petugas : Jimmy Safri Sinaga

X - RAY CONVENTIONAL - Pelvis

Tampak garis fraktur pada Daerah ramus superior dan inferior pubis Kiri.
Kesan:
Fraktur ramus superior dan inferior kiri.

BERASTAGI, 21 July 2020
Dokter Ahli Radiologi
(dr. Sasor Tavi Indra Putra Tinambunan,Sp.Rad)

Print copy ke-1 by : Kristiansen Br Ginting, AmR

Image: Appendix of the Radiology doctor's reading results

Contents of Discussion Results

Based on the radiography that has been obtained regarding the examination of the pelvic bone in cases of fracture in the area of the superior and inferior ramus of the left pubis at the Radiology Installation of the Efarina Etaham Hospital Berastagi, Karo Regency, in general, the examination of the pelvic bones in cases of fracture in the area of the left superior and inferior ramus pubis uses the AP projection. Axial because this projection can reveal abnormalities suspected of Ossa Pelvis, one of which is a fracture in the area of the left superior and inferior ramus pubis.

In my opinion, when viewed from a theoretical point of view, the projection that provides a clearer radiograph regarding the examination of the Ossa Pelvis is the AP Axial projection because this projection can provide information about the suspected abnormality

and the radiographic appearance shows a picture of a fracture in the area of the superior and inferior ramus of the left pubis.

The advantage of a Radiological Examination of the Ossa Pelvis is that the patient can clearly see the description of the Fracture in the left pubic superior and inferior ramus area based on anatomy, and besides that the radiation received by the patient is smaller because the area of the irradiation field is carried out as needed. The disadvantage of this examination is that the patient feels pain due to the hip being moved in order to get a good picture.

CLOSING

Conclusion

After carrying out a radiographic examination of the Pelvic Ossa in the case of Oss Pubis Fracture at Efarina Etaham Berastagi Hospital, Karo Regency, the authors draw the following conclusions:

1. In Ossa Pelvis Radiography, detail and image sharpness are needed. In writing my scientific paper for radiographic examination of Ossa Pelvis, a large focus is used which is useful for increasing the optimization and sharpness of radiographic images.
2. It is very important to note the wide use of the irradiation field, so that the object to be seen is in the center of the film. In writing this scientific paper, I am careful in determining the upper limit of the object and the lower limit of the object so that the object is in the middle of the film and determines the area of illumination that corresponds to the size of the object to be photographed. Then the area of the irradiation field used is from L5 to the greater trochanteric femoral head.
3. Lighting conditions affect the size of the object to be photographed. In writing my scientific work on the AP (Anterior-Posterior) projection using the irradiation conditions Kv : 67, mAs : 160, ms : 110 and FFD : 100 cm, the size of the cassette used is 30 x 40 cm.
4. In terms of protection, protection against radiation is very important to note, so that the dose received by patients, personnel and the surrounding community is as small as possible. So avoid the danger of radiation. In writing my scientific paper, the protection used is by giving the exposure time as little as possible so that the patient avoids the large amount of scatter radiation caused by radiation, and for the pelvic part because if given an apron it will cover the part of the Pelvis to be examined so that the patient is only given patient clothes, personnel (radiographers) wear aprons and film badges during the examination, and order the patient's family to wait outside the examination room so as not to be exposed to harmful scatter radiation.
5. The process of washing the film also affects the high or low shooting conditions. In writing my scientific work using Automatic Processing. By using automatic processing, we can adjust the irradiation composition with the temperature and age of the liquid, especially the developer, to produce radiographic images that have clear sharpness. If the liquid has weakened, it is necessary to replace the automatic

fluid with a new one stirred or by increasing the irradiation conditions with the aim of producing a clear radiographic picture.

Suggestions and Acknowledgments

To improve the quality of radiographic images the authors can provide the following suggestions:

1. For radiographic examination of the pelvic bones a large focus is used, where a large focus is useful for increasing the optimization of the radiographic image and for sharpness.
2. The radiographer must be careful in determining the upper and lower limits of the object to be photographed, so that the object is in the middle of the film and nothing is cut off.
3. Radiographers must be careful in determining the irradiation conditions with the size of the object to be photographed.
4. It is recommended that the radiographer use an irradiation field area that is in accordance with the size of the object to be photographed, the exposure time setting, the distance between the tube and the cassette, and the shield (shield) needed during the examination, to reduce scatter radiation that is harmful to patients, personnel and the surrounding community .
5. We recommend that washing the film in Automatic Processing be adjusted between the irradiation conditions and the temperature and age of the liquid, especially the developer.

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