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ABDOMEN RADIOGRAPHY WITH SUSPENSION OF CORPUS ALIENU AT HAJI ADAM MALIK CENTRAL GENERAL HOSPITAL, MEDAN

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ABSTRACT

An abdominal X-ray with suspected foreign body ingestion can be defined as an abdominal examination for sudden conditions involving foreign objects in the abdominal cavity that require immediate action. Foreign objects are a common cause of visits to the emergency room and can enter the human body in various ways, namely by swallowing, inhaling, and intentional insertion. Foreign objects can occur at any age, especially in children because they often put objects in their mouths. This study aims to determine how to perform an abdominal examination for suspected foreign bodies in pediatric patients. The projections used are Antero-Posterior Erect and Lateral, which can display the anatomy and location of foreign bodies in the abdominal cavity. The type of research conducted is a qualitative research method, with data collection techniques based on observation results. The results of the study show that abdominal radiography examinations with suspected foreign objects are performed using Digital Radiography (DR) film processing. The conclusion of this study is that the projections used at Haji Adam Malik General Hospital in Medan for abdominal examinations with suspected foreign objects are Antero-Posterior Erect and Lateral projections to see the location of the foreign object.

Keywords: Abdomen Corpus Alienum Radiography, Antero-Posterior Erect and Lateral

INTRODUCTION

A foreign object, or corpus alienum in medical terms, is an object originating from outside the body or from within the body that is not normally present. Foreign objects can be inserted into the body accidentally or intentionally [1]. Foreign objects can be swallowed and can also become lodged or stuck in various parts of the body, such as the ears, nose, eyes, and stomach, especially in children . Corpus alienum is a common cause of emergency department visits and can enter the human body through various methods, including swallowing, inhalation, and intentional insertion [2].

The abdomen is the largest cavity in the body, and there are many indications for abdominal radiography. Abdominal radiography is one of the most frequently performed radiological examinations and has a well-established role in the assessment of the acute abdomen, one of which is foreign bodies. Foreign bodies in the abdomen can be sharp or blunt objects [3]. Foreign bodies that enter the body are divided into two types: metal and non-metal. The type of foreign body swallowed is highly dependent on local customs and food. Ingestion of a foreign body can occur due to carelessness when putting something into the mouth, especially while eating.

As many as 80% of emergency cases in children occur due to accidental swallowing of foreign objects. The most commonly swallowed foreign bodies by children are needles, coins, toys, magnets, and batteries. Eighty to ninety percent of swallowed foreign bodies will pass spontaneously through the digestive tract, and a small number of cases require surgery [4]. However, some foreign bodies become

dangerous if they block smaller channels or if the object is sharp, causing injury or bleeding, and therefore require immediate action [5]. If a foreign body is found in the abdomen, it should be treated early because it can disrupt the digestive process in the abdomen. A foreign body can cause obstruction and compression of the airway, which can lead to death [6].

Based on this, the author will further examine the abdominal radiography technique with suspected corpus alienum in the form of a scientific paper entitled: "Abdominal Radiography with Suspected Corpus Alienum at Haji Adam Malik General Hospital, Medan".

Understanding the Concept

Definition of Examination

Abdominal radiography technique is a radiographic examination carried out using X-rays which aims to show the anatomy and abnormalities in the abdomen [7].

Abdominal examination techniques are divided into two, namely abdominal preparation and abdomen without preparation [8]. Abdominal preparation is a series of preparations carried out before performing an abdominal examination such as fasting or bowel cleansing, and can involve the use of contrast for clearer results, the projections are antero-posterior and lateral[8]. Abdomen without preparation is an abdominal radiographic examination that is carried out quickly without the need for fasting or special preparation, the projections are antero-posterior erect, antero-posterior supine, left lateral ducubitus and lateral [9].

Corpus alienum is included in radiography without preparation, or regional radiography according to the location of the foreign object. Because this examination is carried out directly, without special preparation, without fasting, and without giving contrast [10]. The aim is only to identify the location and shape of the foreign object [11].

Abdominal radiography with suspected swallowed foreign body can be defined as an abdominal examination for a sudden condition in the form of a foreign body in the abdominal cavity that requires immediate action. A foreign body can cause obstruction and pressure in the airway [12]. Therefore, this examination does not require special preparation because it requires immediate action [13].

The purpose of performing an abdominal radiographic examination with the suspicion of a foreign body swallowed by a needle is to determine the location of the foreign body in the body system, determine the type of foreign body that has entered and whether or not there is any disturbance to the surrounding organs due to the foreign body.

Anatomy

The word anatomy comes from Greek which means "to open a piece". Anatomy is the science that studies the structure of the human body and the physical relationships of the body systems involved, for example: studying the heart organ and its location in the human body [14]. Anatomy is a series of sciences about the structure and parts of the body that form a functional system in a normal state. Knowledge of every normal thing is an important tool for studying abnormal (pathological) things in every change in body structure [15].

Anatomy, or the science of analysis, studies the structure of the body and the relationships of its parts to one another [16]. The abdomen is the part of the torso bounded above by the diaphragm and below by the upper pelvic opening (pelvic inlet)

[17].

Boundaries of the abdominal cavity:

1. The upper boundary is the diaphragm, which is a sheet of muscle and connective tissue that separates it from the chest cavity.
2. The lower limit is the upper plane of the pelvic cavity.

The abdominal cavity contains most of the digestive tract (esophagus, stomach, small intestine, large intestine, rectum, and anus), the liver and pancreas, the spleen, the kidneys, and the adrenal glands, which are located above the kidneys. The abdominal cavity is lined with a protective membrane called the peritoneum [18].

Rongen Aircraft Engineering

An X-ray machine is a piece of radiology equipment that plays a crucial role in producing X-rays and providing images of objects on X-ray film after a washing process. X-ray technique is the procedure for using an X-ray machine.

This is to ensure the examination runs smoothly and produces optimal radiographic results [19].

Radiography Equipment

Digital Radiography (DR)

Digital Radiography is a form of X-ray imaging, where a flat-panel detector is used instead of film. With a DR system, images can be viewed on a monitor immediately after acquisition, which takes a few seconds, and can be stored or forwarded wherever needed [20]. The advantages of this system include the ability to process the resulting digital images further, for example with image processing techniques (image processing, pattern recognition, and image archiving), store them on a hard disk, and so on. The DR system consists of an X-ray source and an X-ray detector, both of which are capable of producing digital images without an image intensifier [21]. The detector that captures the X-rays can then convert them into an electrical signal. The magnitude of the converted electrical signal is proportional to the amount of X-ray transmission that penetrates the material. These electrical signals are then sent to a computerized image processing system for processing, which can then be printed and interpreted into a radiograph for imaging purposes. The resulting Digital Radiography (DR) image is two-dimensional, formed by a matrix of elements called pixels. In diagnostic imaging, each pixel represents the smallest unit in the image, a column, and a row (Lampingnano, 2018).

Digital Radiography Equipment

In a computer system connected to a monitor or laser printer, X-ray film is replaced by using an image capture device to record the X-rays and convert them into digital files that can be displayed or printed for reading or storage (Long BW, 2016).

a. Digital Radiography Film

In a computer system connected to a monitor or laser printer, X-ray film is replaced by using an image capture device to record the X-rays and convert them into digital files that can be displayed or printed for reading or storage [22].

b. Marker

Markers are signs or codes used to identify X-ray results, which consist of:

a. Examination time
b. Patient name / patient identity
c. Anatomical location marks

Right = anatomical sign of the right side of the body and Left = anatomical sign of the left side of the body.

c. Identity

Markers on DR(Digital Radiography) are set during processing in the image reader so we don't need to use

Manual markers. However, when photographing a foreign body due to puncture, manual markers are needed to identify the entry of the foreign object and determine how far it has penetrated the patient's body.

RESEARCH METHODS

Types of research

study of abdominal radiographs with suspected *corpus alienum* used qualitative research [23]. Data collection techniques were based on observations, study materials, and interviews. Qualitative research is an approach also called investigation because it typically involves collecting data through face-to-face interaction with individuals at the research site [24].

Time and Place of Research

Research period : April 29, 2025 to June 7, 2025 Research location: Haji Adam Malik Central General Hospital, Medan

Data collection technique

In this scientific paper research, the author can collect data in the following ways:

1. Interviews. Face-to-face interviews and direct question-and-answer sessions with the patient's family regarding the patient's illness. Discussions and collaboration with the radiographer and consultations with the supervising lecturer regarding examinations and writing scientific papers.
2. Literature review. To obtain theoretical support for the chosen research problem, the author read a lot of literature, both in the form of texts (theories), the results of other people's research, journals and guidance from the supervising lecturer who helped the author in compiling a scientific paper on abdominal radiography with suspected *corpus alienum* .
3. Observation. The author obtained data by directly observing and following the implementation of abdominal radiography with suspected corpus alienum at the Haji Adam Malik General Hospital, Medan.
4. Data Documentation. By studying the results of abdominal radiographs found during clinical practice, both normal and abnormal, especially abdominal radiographs suspected of *corpus alienum* . **(Sugiono.2020)**

Data analysis

Data analysis is the process of systematically searching for and compiling data obtained from interviews, field notes, and documentation, by organizing the data into categories, breaking it down into units, synthesizing it, arranging it into patterns, selecting what is important and what will be studied, and drawing conclusions so that it is easy for oneself and others to understand [25].

This research method uses an inductive qualitative method, nmely an analysis based on the data obtained, then developed into a hypothesis based on the hypothesis formulated from the data, then the data is searched for again repeatedly and then it can be concluded whether the hypothesis is accepted or rejected based on the data collected, if the hypothesis is accepted, then the hypothesis develops into a theory.

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RESULTS AND DISCUSSION

Results

Patient Identification

a. Patient Identity

Name : An.F
Age : 14 Years
Female gender
No. RM 960706
Examination Date : April 29, 2025
Examination : Abdominal radiography in 2 positions
Reader Doctor : Dr. Rudolf Hamonangan Pakpahan, Sp. Rad(K)
Temporary diagnosis : Swallowed needle

Chronology of the Disease

On April 29, 2025, the patient experienced pain in the stomach, then the patient came to the Emergency Room of the Haji Adam Malik Medan General Hospital with a clinical diagnosis of needle ingestion. The doctor on duty came to provide a referral letter. Then the patient came to Radiology with a referral letter with a clinical diagnosis of needle ingestion, the radiographer read the referral letter and identified the patient, then the patient was examined in the Radiology Installation room of the Haji Adam Malik Medan General Hospital.

Examination Procedure

The procedure for abdominal radiography examination with suspected *corpus alienum* is carried out at the Radiology Installation of Haji Adam Malik Medan General Hospital, with the following sequence:

1) Patients register at the Radiology Installation counter. Patients come with a referral letter from the doctor who sent them.
2) The radiology officer reads the photo cover letter, then identifies the patient and directs the patient's family to follow an examination procedure.
3) The radiologist performs editing, during which time the patient waits until the film is finished on the Output Device.
4) After that, the patient can leave the Radiology room with the X-ray results.

Patient Preparation

No special preparation is required; patients will simply need to remove any objects that could interfere with the radiography in the area being examined, such as belts, shirt buttons, and pants. Patients are advised to change into their patient gown [24].

Preparation of Examination Tools

Before the radiography procedure is carried out, the x-ray machine is first turned on, with the aim of ensuring that the components in the x-ray machine can work optimally, then the exposure factor is adjusted.

X-ray machine

The data on the X-ray machines used at the Haji Adam Malik Central Hospital in Medan are:

Type : Digital Radiography
Brand : Philips
Aircraft Services : Radiography
Maximum Current Radiography: 500mA Kv Range : 125 kV
Digital Radiography Machine

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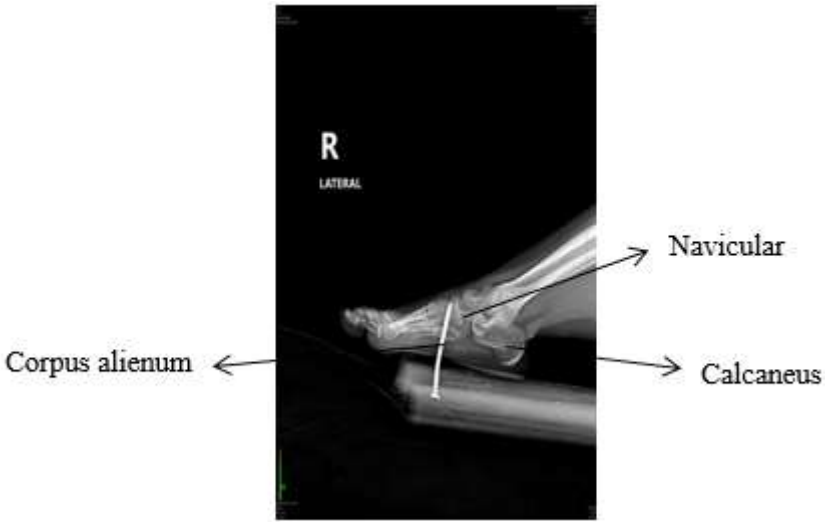

Figure 1. Control Table at Haji Adam Central General Hospital, Medan.

a. Inspection Equipment
   1. Radiographic Detector
   2. The detector used is 35 x 43 cm in size and uses carbon fiber.
   3. Immobilization device
   4. Marker
   5. Patient's clothes

Examination Techniques

The patient undergoing abdominal radiography with suspected *corpus alienum* was a 14-year-old child accompanied by his parents. Prior to the examination, the accompanying person was given an explanation of the examination to be performed [8].

The projections carried out in radiographic examination of the abdomen with suspected *corpus alienum* are:

Antero-Posterior Erect Projection

Purpose of the Examination : To show in general abdominal cavity and location of the foreign body.

Patient Position : The patient stands upright facing the tube.

Position legs slightly apart, make sure the sagittal plane of the body is centered on the midline of the bucky stand.

Object Position : Position your back leaning or Attached to the bucky stand with the upper border covering the diaphragm and the symphysis pubis as the lower border. Position both hands at the sides of the body [26].

Central Ray : Vertical perpendicular to the cassette. Center Point : Umbilicus.

FFD : 100 cm.

Irradiation Conditions : 63 kV, 10 mAs

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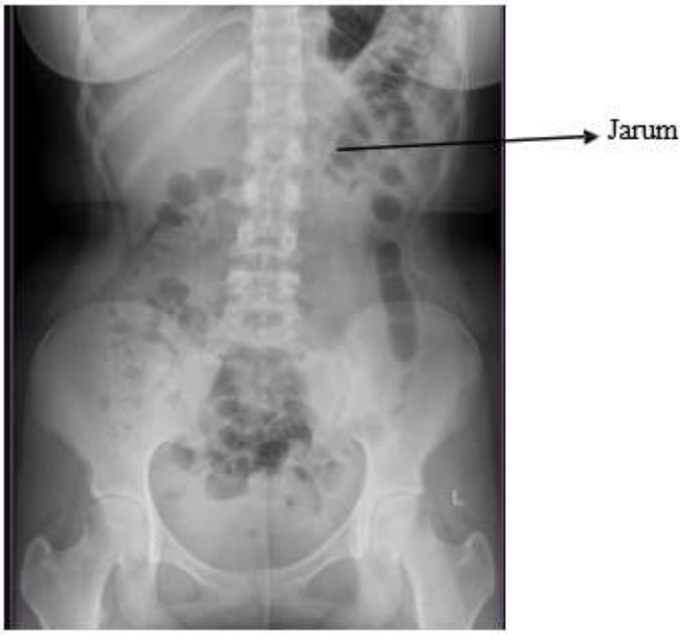

Figure 2. Antero-Posterior Erect Radiograph.

Lateral Erect Projection

Purpose of the Examination : To show in general abdominal cavity and location of the foreign body [27].

Patient Position : The patient stands tilted to the left, with one side of the left body is attached to the bucky stand

Object Position : Position the waist leaning or sticking on a bucky stand with the upper limit including the diaphragm and the symphysis pubis as the lower limit. The patient's arms are raised above the head.

Central Ray : Horizontal and perpendicular to the cassette.

Center Point : Approximately 2 inches (5 cm) above iliac crest.. FFD : 100 cm. Irradiation conditions: 63 kV, 10 mAs

Figure 3. *Lateral Erect Radiograph* .

Image Evaluation : Abdominal cavity image is visible

Overall, the L marker does not appear to obscure the abdominal cavity. The abdomen is symmetrical on the left and right with the vertebral column centered on the film; the ribs, pelvis, and hip joints are symmetrical on both sides. There is no rotation

of the patient, as indicated by the spinous processes centered on the lumbar vertebrae. The corpus alienum is opaqu [28].

impression in gastric projection.

Expertise Results

After conducting a radiographic examination of the abdomen with suspicion *of a foreign body* with an anterior-posterior erect projection, an evaluation of the radiographic image was carried out as follows [29]:

Results :

The preperitoneal fat line is good. The psoas line is smooth and symmetrical.

The contours of both kidneys are not visualized.

There is no opaque image of the urinary tract projection.

The distribution of intestinal air reaches distally, there is no visible widening of the caliber and thickening of the intestinal wall.

Bones and soft tissues are good.

An opaque (needle) foreign body is visible at the level of the L2-3 paravertebral on the left side, in a lateral position to the impression in the gastric projection.

Conclusion :

Corpus alienum opak (needle) impression in gastric projection.

Discussion

Formulation of the problem

After conducting a radiographic examination of the abdomen with the suspicion *of corpus alienum* and discussing the theoretical study of the examination, the author found problems as described in chapter one in accordance with the formulation of the problem, namely:

" What efforts are made to obtain a quality abdominal radiograph with suspected needle-swallowed *foreign body* that can confirm the diagnosis?" [30].

Cause of the Problem

b. Pediatric patient undergoing abdominal examination with suspected *foreign body* .

c. Parental concerns about swallowed objects.

Efforts to Solve Problems

The efforts made to overcome the problem are:

a. The patient was taken to the emergency room of the Adam Malik Hajj Central General Hospital in Medan for examination.
b. The doctor suggested performing an erect and lateral abdominal X-ray to see the foreign body in the digestive tract.
c. The radiographer carefully read the letter requesting an X-ray from the doctor.
d. To produce radiographic images of the abdomen with

suspected *foreign body* in the abdomen in optimal AP erect and lateral projections, the officer must be able to adjust the position of the object to be examined according to the patient's condition [31].

a. It's important to provide clear information to the patient or family before the examination to ensure smooth cooperation. If necessary, a family member can accompany the patient into the examination room wearing a gown and thyroid apron [9].
b. To produce optimal images, of course several things must also be considered, such as setting appropriate shooting conditions, the correct FFD distance, and setting the correct field width.

c. Okay, ma'am/sir, I understand that this situation makes you worried. Swallowing sharp objects like needles does sound scary, but we are here to help as much as possible to ensure your child's safety.

During the examination, we will place the child in a comfortable position. We will also try to keep him/her calm. You may accompany him/her by wearing a protective apron [32].

CONCLUSION

After the author followed and observed the implementation of abdominal radiography with suspected corpus alienum at the Haji Adam Malik Central General Hospital in Medan and based on the results of the discussion of the problem which had been written in the form of a scientific paper, several conclusions and suggestions were drawn, namely:

1. Good cooperation between the officer and the patient greatly influences the optimal results of the abdominal image.
2. The projections used at the Haji Adam Malik General Hospital in Medan for abdominal examination with suspected corpus alienum are the Antero-Posterior erect and Lateral projections to see the location of the corpus alienum.
3. Abdominal radiography with suspected corpus alienum is classified as an abdominal examination that does not require preparation.

Suggestion

1. It is best to communicate the explanation of the examination to the patient in a language that is easy for the patient to understand in order to ensure the examination runs smoothly.
2. In patients with foreign body, the results of the examination should be immediately released so that the patient can receive treatment from the doctor who sent the photo (surgeon) as soon as possible.
4. Selecting exposure factors and adjusting the area of the radiation field is highly recommended to obtain optimal images and reduce the occurrence of scattered radiation on the patient.

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