



Cystographic Examination Technique With Clinical Vesicorectal Fistula At The Radiology Installation Of Sleman Hospital

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ABSTRACT

Abstract: Background: *Vesicorectal fistula* is a rare condition characterized by the formation of an abnormal channel between the urinary bladder and the rectum. One of the contrast-media radiological examinations effective for establishing the diagnosis of this condition is *cystography*. At the Radiology Installation of RSUD (Regional General hospital) Sleman Regional Hospital, *cystography* examinations for clinical *vesicorectal fistula* use plain AP, post-contrast AP, lateral, and *Left Posterior Oblique* (LPO) projections; the RPO projection is not used in *cystography* examinations for clinical *vesicorectal fistula*. This case therefore differs from the theory and is rarely found at the Radiology Installation of RSUD Sleman. This study aims to determine the *cystography* examination technique and the role of each projection used at the Radiology Installation of RSUD Sleman. Methods: This study employed a qualitative method with a case study approach. The study was conducted at the Radiology Installation of RSUD Sleman from September to October 2025. Data were collected through direct observation, interviews, and documentation. The data were then presented narratively, verified against the literature, and used to draw conclusions. Results: The *cystography* examination for clinical *vesicorectal fistula* at Sleman Regional Hospital was performed without special preparation, as the patient arrived with a catheter already in place. The contrast medium used iohexol diluted with water (ratio 1:4), administered in a volume of 200 cc through the catheter. The radiographic projections employed plain AP pelvis, post-contrast AP, lateral, and LPO. The use of the lateral projection was crucial for separating the visualization of the urinary bladder and rectum anatomy in the sagittal plane, while the LPO projection served to open up the superposition of the fistula area. Based on the radiologist's expert assessment, the contrast medium was seen to directly fill the rectosigmoid area up to the descending colon due to the presence of a wide fistula channel. Conclusion: The *cystography* examination procedure for clinical *vesicorectal fistula* at RSUD Sleman has been carried out effectively and informatively. The combination of routine projections was considered optimal for showing the location of contrast leakage and visualizing the fistula channel. The RPO projection was not used because the required diagnostic information was already fulfilled through the LPO projection, thereby minimizing examination time, optimizing radiation protection, and maintaining patient comfort

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1. INTRODUCTION

Radiology examinations are generally divided into two, namely contrast and non-contrast examinations. In radiological examination, contrast media is inserted into the patient's body to provide a differentiating effect between organs and tissues on the radiographic image. Contrast media is a material that has radioopaque and radiolucent properties when exposed to X-rays, thus allowing the distinction between organs and surrounding tissues. Contrast media is divided into two types, namely positive and negative. One type of radiological examination that uses positive contrast media is *cystographic* examination (Rica Febri Shafitri, 2020). Therefore, radiological examinations using contrast media, such as *Cystography*, can be used to help establish the diagnosis of various abnormalities in the bladder, including *vesicorectal fistulas*.

Pathology *Fistula vesicorectal* It is a rare abnormality in the form of abnormal ducts forming between the bladder and rectum. Common causes of these fistulas include infections, tumors, trauma, or congenital abnormalities. Symptoms that may appear as a result *fistula vesicorectal* These include pneumaturia, which is the discharge of air when urinating, fecaluria, which is the discharge of feces through urine, and urinary tract infections that often occur (Sabila, 2017). To establish a diagnosis of this condition, one of the supporting examinations that can be done is an examination *cystografi*.

Inspection *Cystografi* is an important diagnostic procedure for the examination of the urinary tract, especially in the bladder and urethra. This process begins with inserting contrast material through the urethra using a catheter to fill the bladder. This contrast material serves to increase the visibility of the structure being examined. Once the bladder is filled, images are taken with X-rays or other imaging methods, allowing the doctor to see the anatomical details and function of the bladder more clearly. This procedure is often used to diagnose conditions such as urinary tract infections, bladder stones, *fistula vesicorectal*, as well as to assess other problems related to the bladder. Along with the advancement of medical technology, engineering *cystografi* has evolved, improving the accuracy and effectiveness of the diagnosis (Fauzi Suardani, 2021).

According to Scott, (2017) **Inspection *Cystografi* With Clinical *fistula vesicorectal*** using AP plain projection, AP post contrast, RPO, LPO, lateral, double contrast lateral, and post evacuation AP. The examination begins with a plain photo (pelvis AP) without contrast to assess the initial condition. After that, a positive contrast medium (Iopamidol:aquades with a ratio of 1:4) of 150 cc was inserted retrograde through a catheter using a 50 cc syringe. The catheter is then clamped so that the contrast medium does not come out. The projections carried out include plain AP with a perpendicular ray direction, post contrast AP with a perpendicular ray direction, RPO with an inclined angle of 45°, LPO with an inclination angle of 45°, and right lateral. After the radiologist suspected a fistula connecting the urinary vesica to the rectum based on the initial picture, a negative contrast medium (air) of 100 cc was gradually added when the patient was in a lateral position. Then double-contrast lateral photos were taken and AP post evacuation was carried out after the contrast was removed.

According to Gabriella Sabatani Ikun, (2025) **Inspection *Cystografi* With Clinical *fistula enterovesika*** using AP plain, post contrast, lateral and obliq AP projections. For cystographic examinations there is no special preparation, but before performing the examination the patient is asked to empty the bladder. For contrast media used How to insert contrast media before contrast media is inserted, a catheter is first inserted into the urethra. The act of performing this catheterization must be completely sterile. For this reason, the catheter is smeared with gel which is disinfected before being inserted into the urethra. After the catheter is installed, the contrast media is mixed with aquades and then inserted into the bladder until the bladder is filled with an amount of 150-500 ml in a ratio of 1:5.

Based on the results of observations carried out at the Radiology Installation of Sleman Hospital, *cystographic* examination with clinical *Vesicorectal Fistula* using plain AP, post contrast AP, Lateral, and LPO projections. In *cystographic* examination with clinical *vesicorectal fistula* does not use RPO projection. The purpose of this study is to find out the cystographic examination technique with the clinical *vesicorectal fistula* and the role of each projection in the Radiology Installation of Sleman Hospital.

2. LITERATURE REVIEW

1. Anatomy and Physiology of the Urinary System

The urinary system is made up of organs that produce urine and remove it from the body. This system is one of the main systems for maintaining homeostasis. The urinary system is a system where the blood filtration process occurs so that the blood is free from substances that are not used by the body. And absorb substances that are still used in the body. Substances that are not used by the body are soluble in water and excreted in the form of urine (urine) (Lampignano & Kendrick, 2018).

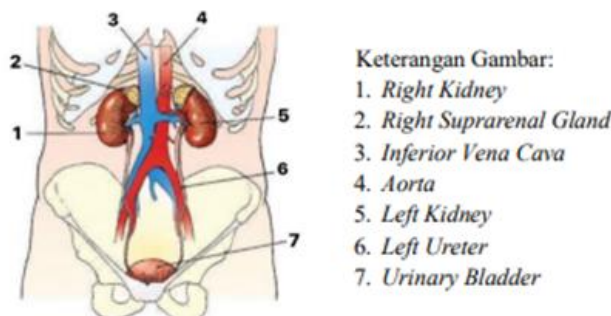


Figure 1 Anatomy of the Urinary System
(Jameson et al., 2018)

a. Kidney

The kidneys are excretory organs that will filter waste substances in the blood that will be excreted in the form of urine. The location of the right kidney is lower than the left kidney due to the presence of the liver. The shape of the kidneys resembles that of soybeans. The kidneys measure approximately 11.5 cm long, 5-7.6 cm wide, 3 cm thick. The position of the kidneys is in the posterior abdomen as high as the lumbar three. The kidneys are wrapped in a thin, shiny fibrous tissue called the renal fibrous capsule attached to the renal parenchyma (Lampignano & Kendrick, 2018).

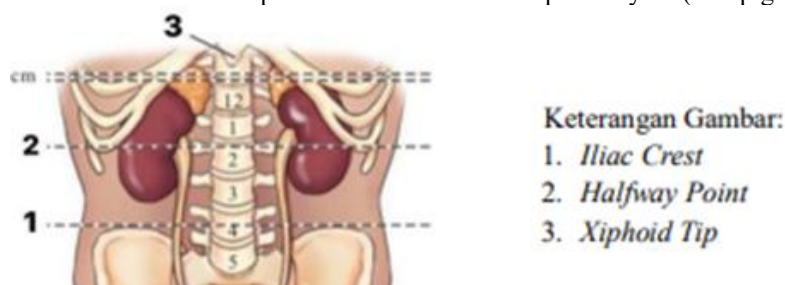


Figure 2 Anatomy of the Kidneys
(Jameson et al., 2018)

b. Ureter

The ureters are one of the organs of the urinary system. The urinary has a length of approximately 25-30 cm and a diameter of 3-4 mm. The ureters extend from the peritoneum to the front of the psoas past the posterior inferior wing and end in the urinary vesica. The ureters function as secretion pathways from the kidneys to the urinary vesica. There are 3 parts of narrowing in the ureteral canal, located at the ureteropelvic junction where the ureter that crosses the iliac blood vessel common on the pelvic edge and on the ureter that enters the wall of the urinary vesica (Gabriella Sabatani Ikun, 2025).

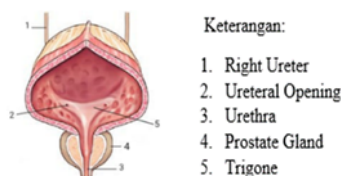


Figure 3 Anatomy of the Male Ureter (Jameson et al., 2018)

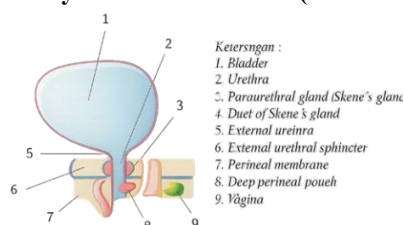
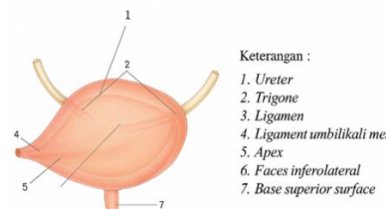


Figure 4 Anatomy of the female ureters (Gabriella Sabatani Ikun, 2024)

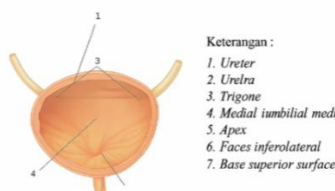


c. Urinary Bladder

The urinary vesica or bladder is a hollow organ composed of three layers of interconnected destrutor muscles. The innermost layer is called the mucosa, the middle layer consists of smooth muscle, while the outer layer is fibrous tissue. The main function of the urinary vesica is to temporarily store the urine produced by the kidneys before it is expelled from the body through the urethra. Anatomically, this organ is located in the anterior part of the abdominal cavity. The shape, size, and position of the urinary vesica can vary from individual to individual, depending on the age and volume of urine it contains. In adults, the empty bladder is somewhat rounded and is entirely inside the pelvic cavity. However, when fully filled, the position can rise until it reaches the level of the umbilical cord (navel) (Gabriella Sabatani Ikun, .2024)



Gambar 5 Vesika Urinari, Superior Lateral View
(Gabriella Sabatani Ikun,.2024.)



Gambar 6 Vesica Urinari Anterior View
(Gabriella Sabatami Ikun,.2024.)

d. Urethra

The urethra is a small duct that runs from the internal urethral orifice in the bladder to the outside of the body. In men and women the urethra is the last part of the urinary system and also as a conduit for the exit of urine from the body. The female urethra is much shorter than the male urethra. These anatomical differences cause higher ascendant urinary tract infections in women (Gabriella Sabatani Ikun, 2024).

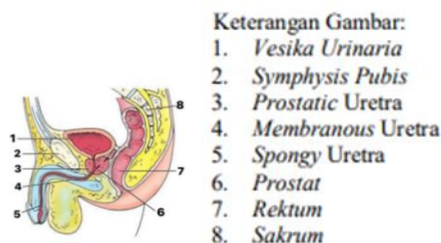


Figure 7 Urethra (Diandra, 2020)

2. Patologi Fistula Vesicorectal

Pathology Vesicorectal fistula is a rare abnormality in the form of abnormal ducts forming between the bladder and rectum. Common causes of these fistulas include infections, tumors, trauma, or congenital abnormalities. Symptoms that may appear due to vesicorectal fistula include pneumaturia, which is the discharge of air when urinating, fecaluria, which is the discharge of feces through urine, and urinary tract infections that often occur (Sabila, 2017). A good understanding of the pathophysiology of the fistula formation process is essential for proper management and prevention. Several causes can lead to these complications. Depending on the cause, the process of developing a fistula can range from monthly to yearly. To establish a diagnosis of this condition, one of the supporting examinations that can be done is a *cystography examination*.

3. Cystographic Examination Techniques

a. Patient Preparation

No special preparation is required on the patient for the examination *cystografi*, but before the examination, the patient is asked to urinate first to empty the bladder, the patient only needs to come to the radiology with a catheter that has been installed by the urologist for the insertion of the contrast media, and provide an explanation to the patient about the examination (Lampignano & Kendrick, 2018).

b. Examination Indications

1. Bladder calculi
2. Bladder carcinoma
3. Cystitis
4. Fistula vesicorectal
5. Benigna prostatica hyperplasia (BPH)

c. Contraindications

1. Contrast media allergy
2. Tumor Ganas
3. Disorders of the liver
4. Heart failure
5. Anemia
6. Acute and chronic kidney failure
7. Ureter perforation

d. Preparation of Tools & Materials

Non-steril

1. X-ray plane or fluroscopy
2. Cassettes size 24 x 30 cm
3. Grid
4. Computer Console Monitor
5. Marker

Sterile

Iodine contrast media

1. Syringe 10 ml
2. Mangkok steril
3. Handscoon
4. Catheter
5. Cash register sterile
6. Clamp clamp
7. NaCl Solution

e. Contrast Media Insertion Techniques

The inclusion of contrast media in *cystographic* examination can be done by two methods, namely *antegrade* and *retrograde*.

1. Antegrade contrast media insertion is a technique for providing contrast media that is carried out in the direction of the physiological flow of organs or body channels. In the urinary system, contrast media is inserted through the upper urinary tract so that it flows from the kidneys to the ureters, urinary vesicles, and urethra.

2. The *retrograde method* is a contrast media insertion technique whose direction is opposite to the physiological urine flow, namely through the external urethral meatus to the urethra to the bladder using a syringe connected to a catheter or special device, so that the contrast media fills the urethral lumen to evaluate the urethral anatomy and detect abnormalities such as urethral stricture, trauma, fistula, or obstruction due to prostate enlargement.

How to insert contrast media before the contrast media is inserted, then the catheter is first inserted into the urethra. The act of performing this catheterization must be completely sterile. For this reason, the catheter is smeared with a gel that is disinfected, before being inserted into the urethra After the contrast media catheter is installed mixed with aquades and then inserted into the bladder until the bladder is filled with an amount of 150-500 ml with a ratio of 1-5. When inserting contrast media, try not to rush with low pressure so as not to cause rupture in the bladder (Lampignano & Kendrick, 2018).

f. Cystographic Examination Techniques according to (Lampignano & Kendrick, 2018)

1. Axial AP Projection
- a. Patient Position: Patient sleeps on his back on the examination table



- b. Object Position: The pelvic area is just above the tape.
- c. CR: Center 2 inches (5 cm) above the pubic symphysis, with a caudal tube angle of 10° to 15° to project the pubic symphysis below the bladder). To indicate urinary reflux, center it higher as high as the iliac crest.
- d. FFD : 100 cm
Cassette Size : 24 x 30 cm
Exposure: Expiration
- e. Criteria: The distal end area of the ureter, bladder and proximal part is visible Contrast clearly shows contrast in the bladder, distal ureter and proximal ureter.



**Figure 9 Axial AP Projection 10-150 Caudal
(Lampignano & Kendrick, 2018)**



**Figure 10 Axial AP Projection Radiography
(Lampignano & Kendrick, 2018)**

2. Right/Left Oblique Projection

- a. Patient Position: The supine patient is on the examination table, then the body is rotated to the right or left as far as 40-60°. Then one of the hands is used as a cushion and crossed in front of the body. Some legs are bent for fixation, and some are straightened.
- b. Object Position: The patient's body in the middle of the cassette is at 5 cm superior symphysis pubis media towards SIAS.
- c. CR: Vertical perpendicular center 5 cm (2 inches) above the pubic symphysis and 5 cm in) in the medial to the superior anterior iliac spina to indicate urinary reflux, centered as high as the iliac crest.
- d. FFD: 100 cm
Tape size: 24x30
Exposure: Breath-resistant expiration
- e. Radiographer Criteria: The distal end area of the ureter, bladder and proximal part Pubic bone is projected below the bladder neck and proximal urethra is depicted Contrast clearly shows the bladder, distal ureter and proximal urethra, there is a superimposition of the bladder by the upper thigh.



Figure 11 Oblique Projection (RPO) (Lampignano & Kendrick, 2018)



Figure 12 Oblique Projection Radiography (RPO)

(Lampignano & Kendrick, 2018)

3. Lateral Projection
 - a. Patient Position: The patient is positioned in true lateral (without rotation) Both hands are flexed just below the head for cushioning and as a fixation, the MCP of the body in the middle of the cassette
 - b. Object Position: The pelvis is in the middle of the tape.
 - c. CR : Be perpendicular to the center 2 inches (5 cm) above and behind the pubic symsis.
 - d. CP : At MCP as high as the pubic sympsy
 - e. Cassette Size : 24x30 cm
 - f. FFD: 100 cmExposure: Breath-resistant expiration
 - g. Radiographer Criteria: The distal end area of the ureter, bladder and proximal urethral section. The contrast clearly shows the bladder and distal ureters proximal The bladder and distal ureters can be visualized through the pelvis.



Figure 13 Lateral Projection
(Lampignano & Kendrick, 2018)

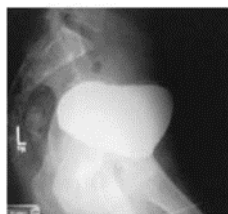


Figure 14 Radiography of lateral projection
(Lampignano & Kendrick, 2018)

3.RESEARCH METHODS

This research method uses a qualitative method with a case study approach. This research was carried out at the Radiology Installation of Sleman Hospital from September to October 2025. Data collection was carried out by interviews, observations, and documentation. Then the researcher presents the data in the form of a narrative, to then be verified based on the theory that has been established and conclusions are drawn.

Results

1. Patient Identity

Name : Mr. S
Age : 65 Years
Gender : Female
Address : -
No.RM : -
Sending Physician : Dr. Urology
Diagnosis :Fistula Vesicorectal
Photo Request : Cystografi
Date
Inspection : 16 September 2025

2. Patient History

On September 16, 2025, the patient came to the outpatient poly. The complaint felt by patients is that it is difficult to urinate (BAK). Then the doctor examines the patient, thus the doctor makes a radiology request letter to request a



cystographic examination. After that, the patient comes to the radiology installation to perform an examination with a request for a cystography photo aimed at seeing if there are abnormalities in the urinary vesica area.

3. Cystographic examination procedure with clinical *vesicorectal fistula* at the Radiology Installation of Sleman Hospital

a. Patient Preparation

There is no special preparation, the patient is asked to urinate first to empty the bladder, the patient only needs to come to the radiology with a catheter that has been installed by the urologist

This is in accordance with Informant 3: "For the preparation of the first patient on *cystography*, namely explaining the examination procedure to the patient, then the second in the *cystography examination* there is no special preparation that is carried out only the installation of a catheter" (15 Radiographer 3)

b. Preparation of Tools and Materials

1. Pesawat Fluoroscopy



Figure 1 Siemens Fluoroscopy Aircraft (Radiology Installation of Sleman Hospital)

2. Computer Console Monitor



Figure 2 Computer Console Monitor (Radiology Installation of Sleman Hospital)

3. Iohexol Contrast Media

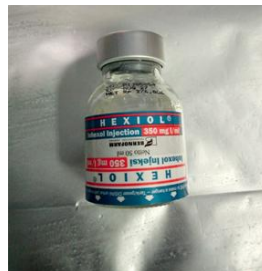


Figure 3 Iohexol Contrast Media (Radiology Installation of Sleman Hospital)

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This is in accordance with informant 3: "The preparation of the equipment and materials is the first fluoroscopy aircraft, the urinary catheter is installed on the patient, the third is a contrast medium we use iohexol, a 20 cc syringe, a sterile handscoon and a digital detector" (15 Radiographer 3)

c. Input of Contrast Media

The contrast medium used at Sleman Hospital is iohexol. The insertion of iohexol contrast media through a 15 cm foley catheter with a ratio of 1:4 between iohexol (50 ml) and aqua (200 ml) contrast media that has been mixed is diluted. Before inserting the contrast media, AP Polos was photographed first. The initial stage of inserting a 200 cc contrast media is inserted retrograde through a catheter on the urethra, then photographed post contrast, lateral, and LPO.

This is in accordance with informant 1: "Photographed plain, then inserted in diluted contrast (50ml + 200ml) water, initial stage insert 200 cc contrast first through a catheter, then photographed AP Contrast, Lateral, and LPO" (13 Radiographer 1)

d. Cystographic *Examination Technique* with Clinical *Vesicorectal Fistula* at the Radiology Installation of Sleman Hospital

The AP Polos photo aims to show an initial picture of the urinary vesica and surrounding organs .

1. Plain Posterior Anteros (AP) Projection

The examination begins with

Plain Photo Capture

Using Projection

Anteroposterior(AP). The patient is positioned supine on the examination table with the Median Sagittal Plane (MSP) in the middle of the examination table and both hands at the sides of the body. Irradiation was carried out with a perpendicular vertical central ray directed at the central point about 5 cm above the pubic symphysis. The examination used a Focus Film Distance (FFD) of 100 cm, a digital detector, and an exposure factor of 62.90 mAs 79.7



**Figure 11 Radiography Results of Smooth Pelvic AP Projection
(Radiology Installation of Sleman Hospital)**

This is in accordance with informant 2: "If the Plain AP is clear, yes, every examination uses the Plain Letter to find out the initial condition of the organ that we want to examine when viewed from this plain, either to determine the next exposure factor or to determine the next projection and to determine the organ that is seen". (14 Radiographer 2)

2. Post Contrast Projection (AP)

This projection is carried out by inserting a contrast medium of 200 cc. The patient is supine positioned or sleeping on his back on the examination table, both legs straight and hands at the sides of the body. Object Position: Mid Sagittal Plane (MSP) body in the middle of the examination table. The direction of the vertical beam is perpendicular to the Central Point Mid sagittal plane (MSP) cassette 5 cm above the pubic symsis, FFD: 100 cm, Exposure Factor: kV: 62.90 mAs: 79.7



**Figure 14. Post Contrast AP Projection Radiography Results
(Radiology Installation of Sleman Hospital)**



.....

This is in accordance with informant 4: "Yes, ideally we go through AP projections with eee.. because the position is more comfortable for the patient for the operator, actually it can be from the lateral position, the oblique is only expected to be entered through AP only but the projection for taking ordinary pictures is AP, Lateral, Oblique right and left, Prone, depending on the situation but in the condition of the patient like this we do find that there is a *vesicorectal* fistula which is prominent or wide so that indeed the contrast moves another organ from the urinary vesica may be ee.. the contrast that is not much held there" (15 Radiology Specialist 4)

3. Lateral Projection

The examination was followed by taking a lateral projection radiograph to see the urinary vesica and rectum so that the fistula could be clearly seen. The patient is positioned to sleep on his side on one of the left side of the body. Object position Slightly bend the patient's knees in a comfortable position and set the body's Mid Coronal Plane (MCP) in the middle of the tape. Bend both elbows of the patient and then place your hands under your head.

Beam direction: The direction of the vertical beam is perpendicular. Central point: The central point on the Mid Coronal Plane (MCP) is 2 inches (5cm) high above the symphysis pubis. Exposure Factor kV: 89.80 mAs: 74.3



Figure 15. Lateral Projection Radiography Results
(Radiology Installation of Sleman Hospital)

This is in accordance with informant 2: "Lateral is mandatory, especially if the fistula must be visible, either the AP or the lateral must be able to do so". (14 Radiographer 2)

4. LPO projections

The examination was followed by taking a projection radiograph of the LPO to show a separate picture of the rectum and sigmoid due to the AP superposition. The patient is positioned on his back on the examination table. Object position Rotate the patient's body 40-60 degrees LPO. Arrange the patient so that the pubic curve closest to the examination table is parallel to the middle of the grid. Extend and abduct the uppermost femur just enough to avoid overlapping with the area of the vesica urinaria. Beam direction: The direction of the beam is vertical perpendicular, the Central point Central is perpendicular to the IR 2 inches (5cm) above the pubic symphysis and 2 inches (5cm) to the medial direction of the lower ASIS. Exposure Factor kV: 89.80 mAs: 72.1



Figure 16 LPO Projection Radiograph Results
(Radiology Installation of Sleman Hospital)

This is in accordance with Informant 2: "Because the fistula is around the left side, the doctor may want the examination to be left or there is another possibility so that it does not overlap from other objects, we take the LPO projection because the intended object is not superpositioned" (14 Radiographer 2)

1. The role of projection was used in *cystographic examination with clinical vesicorectal fistula* at the Radiology Installation of Sleman Hospital.

Based on the results of observations and interviews with informants, the role of each projection used in the *cystography examination* with the *clinical vesicorectal fistula* at the Radiology Installation of Sleman Hospital is as follows:

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Plain AP to show an initial image of the urinary vesica and surrounding organs, Post Contrast AP to show a contrast image in the rectosigmoid up to the descent, Lateral to show an image from the side, LPO to show a separate picture of the rectum and sigmoid due to AP superposition.

This is according to informant 3: "For a plain AP it is to see the initial condition of the urinary vesica before inserting contrast to its contrast AP to see the condition of the urinary vesical and contrast leakage, the lateral condition to see the urinary vesical and rectum so that the fistula can be clearly seen again then for the LPO to see the fistula from an oblique angle" (14 Radiographer 3)

2. Radiography Readings

The results of the radiograph reading from the radiologist at the *cystography examination* of Mr. S are as follows:

Based on the results of the radiologist's expertise, the results of the *cystographic examination* were obtained, namely structure and trabeculation, no *discontinuity* was seen, contrast was inserted through a catheter, contrast appeared to fill the bulge, the form of bulging was difficult to assess, contrast directly filled the *rectum-sigmoid et descendens*.

4.DISCUSSION

1. *Cystographic examination procedure* with clinical *vesicorectal fistula* at the Radiology Installation of Sleman Hospital

a. Patient Preparation

Cystographic examination with clinical *vesicorectal fistula* at the Radiology Installation of Sleman Hospital did not have any special preparations. Patients only need to come to the radiology with a catheter that has been installed by the urological doctor. Furthermore, the radiographer gives *Informed Consent* to the patient and an explanation to the patient about the examination that will be carried out that in this examination fluid and tools will be inserted into the urethra, after which the patient is directed to change the patient's clothes and remove metal objects or objects that can interfere with the radiography picture.

According to Scott, (2017) The patient is given a contrast media prescription to be redeemed in the pharmacy section. On the day of the examination, the patient came to the urology polyclinic for catheter installation at 07.00 WIB, then headed to the radiology installation at 08.15 WIB. The examination began at 08.30 WIB in the radiology examination room.

The researcher argues that the two procedures remain in harmony in prioritizing patient safety through the provision of clear education and the signing of informed consent before action is taken.

b. Preparation of Tools and Materials

The preparation of tools and materials used at the Radiology Installation of Sleman Hospital consists of a siemens fluoroscopy aircraft, computer console monitor, iohexol contrast media, 20 cc syringes, 15 cm folley catheters, sterile bowls, aqua, clamps, gels, underpads, patient clothes.

According to (Lampignano & Kendrick, 2018) *Cystographic examination* requires tools and materials such as: X-ray or fluoroscopy planes, Cassettes and films, Grids, Computer Console Monitors, Markers, Iodine contrast media, Syringes, Sterile bowls, Handscoons, Catheters, Sterile cassettes, Clamping clamps, NaCl Solutions.

According to Scott, (2017) The tools and materials used in this study include the Allengers 525 FC X-ray aircraft (Toshiba), CR imaging plate size 35 x 35 cm (Carestream), CR image processing tool (Carestream Classic CR), film printer (DryView 5950 Laser Image), 14x17-inch film, positive contrast media (Iopamidol) and aquades with a ratio of 1:4 as much as 150 cc, negative contrast media (air) as much as 100 cc, 50 cc syringe, sterile bend, urine catheter, clamps, personal protective equipment (mask and handsoon), and patient clothes.

The researcher argues that when compared to the theory put forward by Lampignano and Kendrick (2018), most of the tools and materials used at Sleman Hospital are suitable, such as the use of fluoroscopy aircraft, computer console monitors, iodine contrast media, syringes, catheters, sterile bowls, and clamps. However, there are some differences, namely the use of tapes and films because the imaging system at Sleman Hospital has used digital fluoroscopy technology so that the image results can be directly displayed and stored in digital form. When compared to Sabila's (2017) research, there are several similarities, namely the use of X-ray planes or fluoroscopy, positive contrast media made of iodine, urine catheters, syringes, sterile bowls, clamps, and patient clothes. Meanwhile, the difference lies in the type of contrast media and imaging system used. Sleman Hospital used iohexol contrast media diluted with water, while Sabila's research used iopamidol contrast media with a dilution ratio of 1:4 of 150 cc and negative contrast media in the form of air as much as 100 cc for the double contrast technique



c. *Cystographic Examination Technique* with Clinical *Vesicorectal Fistula* at the Radiology Installation of Sleman Hospital

The *cystographic* examination with the *vesicorectal fistula clinic* at the Radiology Installation of Sleman Hospital begins with the installation of a catheter that has been installed by the urological doctor, then the patient begins with a plain photo (pelvis AP) without contrast to assess the initial condition. After that, supine patients on the examination table were retrograde inserted into the urethra using iohexol and aqua contrast media that had been mixed with a 1:4 ratio of 200cc then photographed AP post contrast with the direction of the beam perpendicularly, lateral, and LPO with an angle of inclination of 45°.

According to Lampignano & Kendrick, (2018) On Inspection *cystografi* contrast media only enters the urinary vesica but on examination *cystografi* With Clinical *fistula vesicorectal* which is carried out at the Radiology Installation of Sleman Hospital not only on the urinary vesica but also on the rectum because it is caused by a wide fistula.

According to Scott, (2017) The examination begins with a plain photo (pelvis AP) without contrast to assess the initial condition. After that, a positive contrast medium (Iopamidol:aquades with a ratio of 1:4) of 150 cc was inserted retrograde through a catheter using a 50 cc syringe. The catheter is then clamped so that the contrast medium does not come out. The projections carried out include plain AP with a perpendicular ray direction, post contrast AP with a perpendicular ray direction, RPO with an inclined angle of 45°, LPO with an inclination angle of 45°, and right lateral. After the radiologist suspected a fistule connecting the urinary vesica to the rectum based on the initial picture, a negative contrast medium (air) of 100 cc was added gradually when the patient was in a lateral position. Then double-contrast lateral photos were taken and AP post evacuation was carried out after the contrast was removed.

The researcher argues that when compared to the theory put forward by Lampignano and Kendrick (2018), the examination stages carried out at Sleman Hospital are basically appropriate, starting with the insertion of retrograde contrast media into the urinary bladder to evaluate the anatomy and the possibility of leakage. However, in theory it is explained that contrast media only fills the urinary vesicles, while in the examination with the clinical *vesicorectal fistula* at Sleman Hospital, the contrast media is seen flowing to the rectum. When compared to Sabila's (2017) research, the examination procedure has several similarities, namely starting with a plain photograph of the pelvic AP, the inclusion of a positive contrast media that has been diluted with a ratio of 1:4 through a retrograde catheter, then a post contrast AP radiograph, 45° oblique projection, and lateral projection are carried out. The difference lies in the amount of contrast media used, namely Sleman Hospital uses a mixture of iohexol as much as 200 cc, while Sabila's research uses iopamidol as much as 150 cc

d. The role of each projection used in *cystographic* examination with clinical *vesicorectal fistula* at the Radiology Installation of Sleman Hospital

The role of each projection at Sleman Hospital is the plain AP to see the initial condition of the urinary vesica before inserting the contrast to the contrast AP to see the condition of the urinary vesica and contrast leakage, lateral condition to see the urinary vesica and rectum so that the fistula can be seen clearly again then for the LPO to see the fistula from an oblique angle.

According to Lampignano & Kendrick, (2018) The projection cystography examination used by AP Polos, AP Post Contrast, RPO, and LPO, However, in the cystographic examination with clinical vesicorectal fistula at the Radiology Installation of Sleman Hospital did not use RPO projection because it was enough to see the fistula.

According to Scott, (2017) AP Plain to assess the normal image of the pelvis, AP Post Contrast to see Contrast appears to fill the vesica urinaria, partial contrast enters the rectum, Lateral to Positive contrast is seen in vesica urinaria and rectum with superposition, LPO to see Contrast appears in vesica urinaria and rectum

The researcher argues that when compared to theory, most of the projections used at Sleman Hospital are appropriate, namely plain AP, post contrast AP, and LPO. However, there is a difference because in theory it is also recommended to use Right Posterior Oblique (RPO) projection, while at Sleman Hospital the projection is not carried out. And there are some similarities in the use of AP plain, post contrast, lateral, and LPO projections. In the study, plain AP projection was used to assess the normal picture of the pelvis before the administration of contrast media, post contrast AP to see contrast filling in the urinary bladder and contrast leakage to the rectum, lateral projection to show contrast in the urinary bladder and rectum, while LPO projection was used to clarify the distribution of contrast media in the two organs.

5.CONCLUSION

Based on the results of the research that has been carried out at the Radiology Installation of Sleman Hospital, it can be concluded that cystographic examination with a clinical vesicorectal fistula does not require special preparation. The patient is only asked to empty the bladder and come with a catheter that has been installed by the urological doctor. The examination was carried out using iohexol contrast media mixed with aqua in a ratio of 1:4,



then inserted through a catheter as much as 200 cc. The projections used include plain AP, post contrast AP, lateral, and LPO. An important role in providing diagnostic information is plain AP to see an initial picture of the urinary vesica and surrounding organs, post contrast AP to see the spread of contrast media, lateral to show an image from the side, and LPO to clarify the rectum and sigmoid images that are superposed on AP projections.

ADVICE

Based on the results of the research that has been carried out, the implementation of cystographic examinations at the Radiology Installation of Sleman Hospital has run very well and efficiently. However, the researcher suggests that the radiology installation coordinate closely with the radiologist during the fluoroscopy screen monitoring to ensure that the imaging of lateral and LPO projections is carried out in time before the contrast media has filled the entire colon system, so that the visualization of the shape of the fistellar mouth can be recorded in a more informative manner.

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