



SPECIALISED PROCEDURES (I)

LUYALI ETALE

DIAGNOSTIC PROCEDURES

- Lumbar puncture
- Biopsies
- Paracentesis (thoracis & abdominis)
- Urinary bladder irrigation
- Cholecystogram
- Cholangiogram
- Venogram
- Myelogram
- Hysterosalpingogram- **Assignment**
- Retrograde pyelogram
- Endoscopic retrograde cholangio-pancreatography (ERCP)
- Stoma care

RADIOLOGICAL EXAMINATIONS

- Common x-rays: Chest , Skull, Bones
- Computer tomography (CT) scan
- Magnetic resonance imaging (MRI)
- Endoscopies: Oesophagoscopy
Gastroscopy, Sigmoidoscopy,
Proctoscopy, Bronchoscopy,
Cystoscopy, Laparascopy
- EEG (electroencephalography)
- ECG(electrocardiogram)
- Ultrasound

OTHERS:

🧠 Urinary catheterization (Male & Female)



Specific objectives:

By the end of the course the student will be able to:

- Describe the various aseptic nursing procedures
- Describe the nursing management before, during and after the procedure
- Demonstrate ideal nursing skills involved in the care of the patient during and after the procedures



Nursing responsibilities:

1. Preparing equipment

- 💡 Gathering and preparing equipment is often done by nurses.
- 💡 Checking the equipment to ensure it is working properly and is ready for use on patients.
- 💡 Cleaning equipment before and after each use to prevent the spread of infection.

Nursing responsibilities cont...

2. Preparing patients

- Drawing blood or administering medication prior to testing.
- Collecting specimens, such as sputum or urine samples, and sending them to the lab.
- Patients may need to have an area sterilized or shaved for a surgical procedure or the application of electrodes.
- Mentally preparing patients for testing by answering questions, explaining the procedure or test and possible outcomes. (refer to hospital policies).

Nursing responsibilities cont..

3. Assist with testing

- Assisting both patients and other health care providers during diagnostic testing.
- They provide patient care during the test which may include administering medicines when needed.
- Position patients properly, like rolling the patient over, in order to complete the necessary diagnostic testing.
- Transporting patients to and from the test can be part of their job.

Nursing responsibilities cont..

4. Monitor patients during testing

- This includes monitoring their current medical condition, especially in those patients deemed unstable.
- They must check a patient's vital signs (blood pressure, pulse, breathing rate),
- Assess physical condition and keep an eye on any monitors that the patient needs to remain hooked up to during the tests, such as a heart monitor or ventilator.
- Nurses may also be required to connect or disconnect any monitors or devices that can interfere with the testing.

Nursing responsibilities cont..

5. Reporting results

- Test results are reported to the patient's doctor, specialists and others in need of the information by nurses. Results may be phoned in, faxed or sent electronically via a computer.
- It may be the nurse's responsibility to check for the results of the tests as well.
- They may be in charge of entering the results into the patient's medical record.
- Nurses must also notify the patient's physician when abnormal or critical results that require an immediate response, such as abnormal blood work with critical potassium levels, are found.



Liver biopsy

Liver biopsy

- Is a procedure where small pieces of liver tissue are removed in order to be sent to lab for examination
- It's helpful in the diagnosis of diseases that affect the liver E.g. liver cirrhosis

Purpose

- Diagnosis*: this allows establishment of very specific diagnosis
- Monitoring*: monitoring effectiveness of therapy that the patient is receiving for a liver disease. It can also provide warning if certain therapies the patients are receiving are damaging to the liver



Indications

- i. Alcoholic liver
- ii. Elevated liver enzymes of unknown origin
- iii. Jaundice and biliary tract obstruction
- iv. Hemochromatosis
- v. Hepatomegally of undetermined cause
- vi. Autoimmune liver disease
- vii. Cancers of the liver and non cancerous tumor
- viii. Chronic viral hepatitis
- ix. Liver transplantation- to rule out rejection



Procedure

Requirements on trolley:

As for bone marrow biopsy with addition of the following

- Scalpel or blade
- Specimen jar
- Menghini liver biopsy needle

Preparation

- a) Ascertain the results of coagulation tests- prothrombin time, partial thromboplastin time, and platelet count
- b) Check for signed consent- confirm that informed consent has been provided

Preparation cont...

- c) Take and record patient's vital signs immediately before biopsy
- d) Explain the procedure to the patient- steps of the procedure, sensations expected, after-effects expected, restrictions of activity and monitoring procedures to follow

Steps

1. Support the patient during the procedure
2. Expose the right side of the patients upper abdomen(right hypochondriac)
3. Instruct the patient to inhale and exhale deeply several times finally to exhale and to hold breath at the end of expiration(prevents puncturing of the diaphragm and risk of lacerating the liver is minimized)
4. The physician promptly introduces the biopsy needle by way of the trans thoracic (inter costal) or trans abdominal (sub costal) route, penetrates the liver, aspirates and withdraws. The entire procedure is completed within 5-10 seconds.
5. Instruct the patient to resume breathing



Nursing care post procedure

- 1) Immediately after biopsy, assist the patient to turn onto the right side; place a pillow under costal margin, and caution the patient to remain in this position, recumbent and immobile, for several hours.
 - Instruct the patient to avoid coughing or straining.
 - In this position, the liver capsule at the site of penetration is compressed against the chest wall, and the escape of blood or bile through the perforation is prevented.
- 2) Measure and record patients pulse, respiratory rate and BP at 10-15 minutes intervals for the first hour , then 30 minutes for the next 2hrs, or until the patient stabilizes.



• Changes in vital signs may indicate; bleeding, severe haemorrhage or bile peritonitis, most frequent complications of liver biopsy.

3) If the patient is discharged after the procedure, instruct the patient to avoid heavy lifting and strenuous activity for one week.

Complication


- i. Fever
- ii. Pain, swelling, redness or discharge around needle insertion site
- iii. Chest pains
- iv. Shortness of breathing
- v. Fainting or dizziness- sign of possible blood loss
- vi. Nausea and vomiting
- vii. Worsening abdominal pains - bleeding, leakage of bile

**Well thats not
a good sign.**





Renal biopsy



Renal biopsy(needle biopsy of the kidney)

- This is removal of a small piece of kidney tissue for examination.
- It can be done through;
 - i. Ultra sound guided kidney biopsy
 - ii. CT-guided kidney biopsy
 - iii. Or surgical biopsy

Indications

- 1) Protein in urine
- 2) Unexplained acute renal failure
- 3) Glomerulopathies
- 4) Transplant rejection

Contraindications

1. Bleeding tendencies
2. Uncontrolled hypertension
3. Solitary kidney
4. Morbid obesity

Nursing role before procedure

- Patient preparation
 - Coagulation tests to identify patients at risk of post biopsy bleeding
 - Starve the patient for 6-8hrs(incase of nephrectomy)
 - Vital signs: BP, Spo2, PR, RR
 - Establish an intravenous line
 - Urine specimen is taken before biopsy for baseline data
 - Explain the procedure to the patient
 - Place the patient in prone position and place a sandbag under the abdomen
 - Fold down the bed clothes and expose the lumbar region
 - Sedation, if ordered is given
 - Instruct the patient to hold his breath(to stop movement of the kidney) during the insertion of biopsy needle. If sedated place in prone with a sandbag under the abdomen



Procedure

➤ Requirements

- Top shelf: sterile renal biopsy set containing;
- Towel and gloves
- Towel with a hole for draping
- Gauze and cotton wool swabs
- Sponge holding forceps
- Dissecting forceps
- Small curved scissors trocar and cannula
- Renal biopsy needle
- Glass slides
- Specimen jar gallipots
- receiver

Requirements cont...

• 20mls and 5mls syringes and needles

• Scalpel

Bottom shelf:

- 2% lignocaine
- Antiseptic lotions; methylated spirit, savlon, and iodine
- Assorted sizes of syringes and needles
- Receiver
- Mackintosh and towel
- Shoulder blanket
- Sandbag
- Strapping
- Shaving tray
- collodion



Steps

- Explain the procedure to the patient
- Place the patient in prone position and place a sandbag under the abdomen
- Fold down the bed clothes and expose the lumbar region
- Cover patient with shoulder blanket
- Protect the bed clothes with mackintosh and towel
- Wash hands
- Assist as required
- Skin is cleaned with antiseptic

Procedure

- The skin at the biopsy site is infiltrated with a local anaesthetic
- The biopsy needle is introduced just inside the renal capsule of the outer quadrant of the kidney
- The location of the needle may be confirmed by fluoroscopy or by ultra sound, in which case a special probe is used
- With open biopsy, a small incision is made over the kidney allowing direct visualization .
- Preparation of open biopsy is similar to that of any major abdominal surgery
- The doctor withdraws the biopsy needle and the specimen is placed in the jar
- A very firm dressing is then applied over the

Nursing care

Post biopsy nursing care

- Ask patient to remain in prone position for 1hr and remain on bed rest for 24hrs to minimize the risk of bleeding
- Vital signs are taken every 5-15 minutes for the first 1hr, and then with decreased frequency as indicated.

Note;

- 💡 Kidney is a highly vascularised organ, bleeding can occur through the puncture site and collect in peri-renal space without being noticed and can lead to shock.
- A clot can form in ureters causing severe pain

Nursing care cont...

- Observe for any signs of shock
- Take post biopsy urine specimen for comparison with baseline
- Hb is assessed within 8hrs
- Incase of excessive bleeding;
 - Blood transfusion is commenced
 - Surgical intervention to control haemorrhage and drainage or'
 - Nephrectomy is done
- Advise patient to avoid strenuous activity and heavy lifting for two weeks to prevent trigger of delayed hemorrhage
- Patient should report back incase of any signs or symptoms of bleeding(haematuria, fainting, dizzyness)



THORACENTESIS

THORACENTESIS

🧠 A surgical perforation of the chest wall and pleural space with a large bore needle.

Indications

- i. To obtain specimens for diagnostic evaluation
- ii. Instill medication to the pleural space
- iii. Remove fluid (effusion) or air from the pleural space to relieve pleural

Specific indications

1. Potential diagnoses:

- Transudates (heart failure, cirrhosis, nephritic syndrome)
- Exudates (inflammatory, infectious, neoplastic conditions)
- Empyema
- Pneumonia
- Blunt, crushing, or penetrating chest injuries/trauma or invasive thoracic procedures such as lung and/ or cardiac surgery.

Indications cont...

2. Client presentation:

- 🔊 Large amounts of fluid in the pleural space compress lung tissue and can cause pain, shortness of breath, cough, and other symptoms of pleural pressure.
- 🔊 Decreased breath sounds , dull percussion sounds, and decreased chest wall expansion.

Nursing care

Pre procedure

🧠 Nursing actions:

- Ensure that the client has signed the informed consent.
- Gather all needed supplies.
- Obtain pre procedure x-ray as prescribed to locate pleural effusion and to determine needle insertion site.
- Position the client sitting upright with his arms and shoulders raised and supported on pillows or on an over bed table with his feet and legs well supported.

Nursing care cont...

- 💡 Client education.

- Instruct the client to remain absolutely still during the procedure and not to cough or talk unless instructed by the primary care provider.

Intra procedure

- 💡 Assist in the procedure by ensuring strict surgical aseptic technique.

- 💡 Prepare the client for a feeling of pressure with the needle insertion and fluid removal.

Nursing care (intra)

- Monitor the client's vital signs, skin color, and oxygen saturation throughout the procedure.
- Measure and record the amount of fluid removed from the client's chest.
- Label the specimens at the bedside and promptly send them to the laboratory.

NB: the amount of fluid removed is limited to 1 litre at a time to prevent cardiovascular collapse.

Nursing care cont...

Post procedure

- Apply a dressing over the puncture site and position the client on the unaffected side for one hour.
- Monitor the client's vital signs and respiratory status hourly for the first several hours after the procedure.
- Encourage the client to deep breathe to help in lung expansion.
- The client can resume normal activities after one hour if no signs of complications are present.
- Obtain post procedure chest x-ray (check resolutions and rule out pneumothorax)



Complications

- i. Pneumothorax
- ii. Subcutaneous emphysema
- iii. Bleeding
- iv. Infection
- v. Pulmonary oedema. (after sudden shift in mediastinal contents when large amounts of fluids are aspirated)



Abdominal Paracentesis

ABDOMINAL PARACENTESIS/ ABDOMINAL TAPPING

- 💡 This is the puncture of the abdomen and the withdrawal of fluid that has collected in the peritoneal cavity.
- 💡 The fluid build up is called **ascites**
- 💡 It relieves abdominal pressure and obtains specimen for laboratory analysis.

Indications

- To find the cause of ascites
- To diagnose infection in peritoneal fluid
- To check for certain types of cancer E.g liver cancer
- To remove large amounts of fluid that causes pain or difficulty in breathing or that affects kidney or bowel(intestine) functioning.

contraindications

- Mild hematologic abnormalities do not increase the risk of bleeding
- The risk of bleeding may be increased if:
 - prothrombin time > 21 seconds
 - international normalized ratio > 1.6
 - platelet count < 50,000 per cubic millimeter.

Absolute contraindication is acute abdomen that requires surgery



Relative contraindications are:

- i. Pregnancy
- ii. Distended urinary bladder
- iii. Abdominal wall cellulitis
- iv. Distended bowel
- v. Intra-abdominal adhesions

Preparation

- Signed consent form
- Prepare patient by providing the necessary information and instructions by offering reassurance.
- Instruct the patient to void.
- Gather appropriate sterile equipment and collection of receptacles.
- Place the patient in upright position on the edge of the bed or in a chair with feet supported on a stool.
- If the patient is confined in bed use fowlers position.
- Place sphygmomanometer cuff around patients arm

Nursing action post procedure

- ❑ Check rate of drainage and adjust to the required rate of flow
- ❑ Return patient to bed or to a comfortable sitting position
- ❑ Measure, describe and record the fluid collected
- ❑ Label samples of fluid and send them to lab
- ❑ Monitor vital signs every 25 minutes for 1hr, every 30 minutes for 2hrs, every hour for 2hrs and then every 4hrs



Nursing care(post procedure)

NOTE:

- ❑ BP and pulse may change as fluid shift occurs after removal of fluid.
- ❑ An elevated temperature is a sign of infection
- ❑ Assess for hypovolemia, electrolyte shifts, changes in mental status and encephalopathy which may occur with removal of fluid and fluid shifts and should be reported.
- ❑ Check puncture site for leakage or bleeding , leakage of fluid may occur because of changes in abdominal pressure and may contribute to further loss of fluid if undetected



Nursing care cont (post)...

Provide patient teaching regarding:

- i. Need to monitor for bleeding or excessive drainage from puncture site.
- ii. Importance of avoiding heavy lifting or straining.
- iii. Need to change position slowly
- iv. Frequency of monitoring for fever

Ascitic fluid analysis

- The serum-ascites albumin gradient can help determine the cause of the ascites.
- The ascitic white blood cell count can help determine if the ascites is infected.



Lumbar puncture

LUMBAR PUNCTURE (SPINAL TAP)

- Procedure performed to obtain information about cerebrospinal fluid (CSF).
- It can be diagnostic (to rule out bacterial meningitis or subarachnoid hemorrhage) or therapeutic (E.g. treatment of pseudo tumor cerebri by relieving increased intracranial pressure)
- The needle is inserted into the subarachnoid space between L3 and L4 or L4 and L5

Indications

- Suspicion of meningitis
- Suspicion of subarachnoid hemorrhage
- Suspicion of central nervous system diseases such as Guillain-Barre syndrome and carcinomatous meningitis
- Therapeutic relief of pseudotumour cerebri

Contraindications

🧠 Absolute contraindications to lumbar puncture are as follows:

- Unequal pressures between the supratentorial and infratentorial compartments, usually inferred by characteristic findings on the brain CT scan:
 - 👄 Midline shift
 - 👄 Loss of suprachiasmatic and basilar cisterns
 - 👄 Posterior fossa mass
 - 👄 Loss of the superior cerebellar cistern
 - 👄 Loss of the quadrigeminal plate cistern
- Infected skin over the needle entry site



Relative contraindications

- i. Increased intracranial pressure (ICP)
- ii. Coagulopathy
- iii. Brain abscess

Indications for brain CT scan prior to LPS

🧠 Include the following:

- i. Patients who are older than 60 years
- ii. Patients who are immunocompromised
- iii. Patients with known CNS lesions
- iv. Patients who have had a seizure within 1 week of presentation
- v. Patients with abnormal level of consciousness
- vi. Patients with focal findings on neurological examination
- vii. Patients with papilledema seen on physical examination with clinical suspicion of elevated ICP

Role of a nurse

Before procedure:

- Explain procedure to the patient: purpose, how and where its done, who will perform it.
- Obtain informed consent
- Reinforce diet: fasting is not required
- Promote comfort: to empty bladder and bowel
- Establish baseline data: vital signs(neurologic assessment of the legs)
- Positioning: place patient in lateral decubitus position, near edge of bed, neck knees and hips drawn towards chest(fetal position)/patient sits at the edge of the bed while leaning on a table.
- Instruct to remain still: unnecessary movement will cause traumatic injury



Role of a nurse cont....

After procedure:

- Apply brief pressure to puncture site: using a bandage to avoid bleeding
- Position: place patient on a flat bed: for 4 to 6 hours, do not elevate the head.
- Monitor vitals, neurologic status, input & output: every 4 hours
- Monitor puncture site for CSF leakage and drainage of blood: signs include positional headache, nausea and vomiting, neck stiffness, photophobia, imbalance, tinnitus & phonophobia (sensitivity to sound)
- Encourage increased fluid intake: up to 3000mls in 24 hours to replace drawn CSF
- Label and number specimen tube correctly and send to the lab
- Analgesia: administer as ordered due to headaches after procedure

CSF tubes

💡 Different institutions have different protocols for the studies sent from the various CSF tubes. Classically, CSF tubes 1-4 are sent for the following studies:

- 1 - Cell count and differential
- 2 - Glucose and protein levels
- 3 - Gram stain, culture and sensitivity (C&S)
- 4 - When indicated, viral titer or cultures, Venereal Disease Research Laboratory (VDRL) test, *Cryptococcus* antigen, India ink stain, angiotensin-converting enzyme (ACE) level, or other studies.

Abnormal findings:

❑ Pressure:

- 🧠 Increased ICP as a result of tumor, hemorrhage, hypo-osmolality resulting from hemodialysis, or TB-meningitis or trauma induced edema
- 🧠 Decreased ICP: may reveal spinal subarachnoid obstruction, leakage of spinal fluid, severe dehydration, hyper osmolality, or circulatory collapse

❑ Appearance:

- 🧠 Cloudy appearance=infection
- 🧠 Yellow to reddish- spinal cord obstruction or intracranial hemorrhage.
- 🧠 Brown to orange- increased protein levels or RBC breakdown.

Abnormal findings cont....

CSF protein:

- Increased protein-tumor, trauma, Dmor blood in CSF.
- Decreased protein- rapid CSF production.

Gamma globulin:

- Increased Gg- demyelinating diseases e.g. multiple sclerosis, neurosyphilis or Guillan-Barre syndrome.

CSF glucose:

- Increased-hyperglycemia
- Decreased-hypoglycemia, bacterial or fungal infection, TB or meningitis

Abnormal findings cont....

CSF cell count:

- 🧠 Increased WBC- meningitis, tumor, abscess, acute infection, stroke, demyelinating disease.
- 🧠 RBC in CSF- bleeding into spinal fluid or result of traumatic lumbar puncture.

CSF chloride:

- 🧠 Decreased- infected meninges

Gram stain:

- 🧠 Gram positive or negative organism indicates bacterial infection.

Complications

A. Post lumbar puncture headache:

- Due to leakage of CSF and reduction in the brain, it's the most frequent complication in 11-25% of patients.
- It may be mild or severe (throbbing frontal or occipital).
- It may occur a few hours later or after several days.
- It's severe when the patient stands and reduces when they lie down.
- ❖ Management:
 - ✓ Bed rest
 - ✓ Analgesics
 - ✓ Hydration with liberal administration of fluids especially those that contain caffeine E.g. coffee, tea, some sodas

Prevention of leakage

- Needle with a small gauge should be used for puncture
- Patient should remain prone for 3hrs, If larger amounts of CSF has been withdrawn (more than 20mls) then the patient should lie:
 - ✓ Prone for 2hrs
 - ✓ Lateral for 2hrs
 - ✓ Prone or supine for 6hrs




Complications cont....

- B) Herniation of cranial contents
- C) Abscesses : collection of pus in tissues causing swelling and inflammation around it.
- D) Hematomas : localized collection of blood within tissues
- E) Meningitis
- F) Back pain: trauma to soft tissue




PLAY VIDEO



URINARY BLADDER IRRIGATION

Types

- Intermittent (done for a short while with an intermittent catheter)
- Continuous (for a long period of time using a 3-way catheter)



Continuous bladder irrigation(CBI)

Purpose:

1. Prevent blood clot formation
2. Allow free flow of urine
3. Maintain indwelling catheter patency



CBI cont.....

Expected outcomes:

1. The catheter remains patent and urine is able to drain.
2. Patients comfort is maintained
3. Prevention of clot formation within bladder and indwelling catheter(IDC).
4. Prevent risk of UTI through aseptic technique during insertion and connection of catheter.

CBI cont.....

- Equipment:

- 3-way catheter

- 0.9% sodium chloride

- CBI set and enclosed urine bag with anti-reflux valve

- Non-sterile gloves

- Personal protective equipment

- Under pad

- I.V pole/drip stand



Procedure:

 **Students to do SDL on
this topic**

Ongoing management:

- Continue irrigation depending on hematuria degree
- After every i.v bag is complete, empty urine bag. Record output on chart prior commencement of another i.v. bag.
- Perform regular catheter care to minimize UTI, and document in cardex.
- Document : catheter care, degree of hematuria, I/O
- If output is less than input:
 1. Stop infusion and re-calculate I/O
 2. Ensure tubing is not kinked or looped below bladder level
- Palpate bladder for distension as routine assessment



Ongoing management cont....

💡 If there increased hematuria and clots:

1. Increase rate of irrigation
2. Irrigate catheter to aid in clot removal
3. Notify physician

💡 If patient complains of pain:

1. Palpate for distention
2. Check tubing for kinks
3. Observe drainage for adequate amount, presence of clots that may be blocking tube, check I&O



Ongoing management cont...

💡 If patient is confused/agitated:

1. Assess orientation
 2. Notify physician on changes in LOC
 3. Share with physician information on:
opioids received, amount of CBI
received, accurate I&O, time of onset
of ALOC
- If solution leaks:
 1. Assess for bladder spasms
 2. Consider administering
antispasmodic(buscopan)

Documentation:

- Patients pain/comfort level
- Color and type of drainage, presence of clots
- I&O
- Interventions
- Health education to patient and family
- Patients concerns
- Adverse reactions (continued bladder spasms, decreased total urine output)

CHOLECYSTOGRAM/CHOLECTOGRAPHY

- This is an x-ray procedure used to help evaluate gall bladder.
- For the procedure, a special contrast media is given in form of tablets which are swallowed to help visualize the gall bladder on x-ray.
- The test helps diagnose disorders of the liver and gall bladder including tumors and gall stones

Contrast media used:

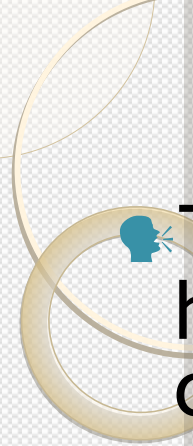
- It's oral and it's given according to the manufacturer's instructions. They include:
 - Orablix
 - Telepaque
 - Biloptin

Procedure preparation

- Contrast media is given the evening before, ensure it's not vomited (usually 6 tablets and shouldn't drink anything there after)
- An enema is given the night before to clear gas and faeces
- A day before test give fatty meal, evening give low fat meals

Procedure

- When contrast media tablets are given they are absorbed from intestines into the blood stream, removed from blood by liver, and excreted by liver into the bile.

- 
- The contrast media together with the bile is highly concentrated in the gall bladder, contrast media outlines the gall stones that are radiolucent(x-ray pass through them), and that are usually invisible on standard x-ray
 - Bile ducts themselves can not be seen on the x-ray in oral cholecystogram (OCG) because the contrast media is not concentrated on the ducts, therefore , any gallstones lodged in the ducts will go undetected on OCG
 - Depending on how well the contrast dye is absorbed, polyps and tumors may also be visible on x-ray film.

Note

- ✓ Due to development of improved technology, cholecystogram is no longer performed routinely, ultrasound and CT scan are faster and often more accurate in diagnosing conditions of the gall bladder
- ✓ Gall stones are usually seen as dark spots on x-ray films

After procedure care

- 🧠 Advise patient to drink a lot of water to flush out the dye from their system

CHOLANGIOGRAPHY

- Cholangiography is the imaging of the bile duct (also known as the biliary tree) by x-rays. There are at least two kinds of cholangiography:
 - 1. **Percutaneous Trans-hepatic Cholangiography (PTC):** Examination of liver and bile ducts by x-rays. This is accomplished by the insertion of a thin needle into the liver carrying a contrast medium to help to see blockage in liver and bile ducts.



2. Endoscopic Retrograde Cholangiography (ERC).


- This primarily examines the larger bile ducts within the liver and the bile ducts outside the liver
- The contrast media is given intravenously
- The procedure is used to locate gall stones within the bile ducts and identify other causes of obstruction to the flow of bile. E.g strictures of bile ducts and cancers that may impair normal flow of bile

Procedure

- To do an intravenous cholangiogram, an iodine containing dye is injected intravenously into the blood
- The dye is removed from the blood by the liver which excretes it into bile.
- The dye is concentrated enough just as it's secreted into the bile that it does not need to be further concentrated by the gall bladder in order to outline bile ducts and any gall stones that may form within them.
- several x-rays (radiographs) are taken as the liver excretes the dye

ERCP

- **Endoscopic retrograde cholangio-pancreatography (ERCP)** is a technique that combines the use of endoscopy and fluoroscopy (x-ray beams are used to show continuous image on a monitor) to diagnose and treat certain problems of the biliary or pancreatic ductal systems.
- Through the endoscope, the physician can see the inside of the stomach and duodenum, and inject dyes into the ducts in the biliary tree and pancreas so they can be seen on x-rays.



• ERCP is used primarily to diagnose and treat conditions of the bile ducts, including gallstones, inflammatory strictures (scars), leaks (from trauma and surgery), and cancer.

• ERCP can be performed for diagnostic and therapeutic reasons, although the development of safer and relatively non-invasive investigations such as **magnetic resonance cholangio-pancreatography (MRCP)** and endoscopic ultrasound has meant that ERCP is now rarely performed without therapeutic intent.



Diagnostic indications

- Obstructive jaundice - This may be due to several causes
- Chronic pancreatitis - a now controversial indication due to widespread availability of safer diagnostic modalities including endoscopic ultrasound, high-resolution CT, and MRI/MRCP
- Gallstones with dilated bile ducts on ultrasonography
- Bile duct tumors
- Suspected injury to bile ducts either as a result of trauma or iatrogenic
- Sphincter of Oddi dysfunction
- Pancreatic tumors no longer represent a valid diagnostic indication for ERCP unless they cause bile duct obstruction and jaundice. Endoscopic ultrasound represents a safer and more accurate diagnostic alternative



Therapeutic indications

- Any of the above when the following may become necessary
 - Endoscopic sphincterotomy (both of the biliary and the pancreatic sphincters)
 - Removal of stones
 - Insertion of stent(s)
 - Dilation of strictures (e.g. primary sclerosing cholangitis, anastomotic strictures after liver transplantation)



Contraindications

- Recent attack of acute pancreatitis, within the past several weeks.
- Recent myocardial infarction.
- Inadequate surgical back-up
- History of contrast dye anaphylaxis
- Poor health condition for surgery.
- Severe cardiopulmonary disease.

complications

- The major risk of an ERCP is the development of pancreatitis which can occur in up to 5% of all procedures.
- Gut perforation is a risk of any endoscopic procedure, and is an additional risk if a sphincterotomy is performed. As the second part of the duodenum is anatomically in a retroperitoneal location (that is, behind the peritoneal structures of the abdomen), perforations due to sphincterotomies are also retroperitoneal.
- Bleeding.
- Oversedation can result in dangerously low blood pressure, respiratory depression, nausea, and vomiting.
- There is also a risk associated with the contrast dye in patients who are allergic to compounds containing iodine.

Retrograde pyelography

- Is a radiologic technique of examining strictures of the collecting system of the kidney
- A radio opaque contrast medium is injected through a urinary catheter into the ureter and the calyces of the pelvis of the kidney using cystoscope

Indications

- 💡 Incases where IVP provides inadequate visualization
- 💡 Before extracorporeal shock-wave lithotripsy(to break kidney stones)
- 💡 Identification of filling defects E.g. kidney stones and tumors
- 💡 During replacement of ureteral stents

Contraindication

- Presence of infected urine
- Pregnancy
- Allergy to contrast media

Complications

- Infection
- Perforation of ureter
- haematuria

Myelogram/myelography

- This is a radiologic examination that uses contrast medium to detect pathology of the spinal cord, including location of spinal cord injury, cysts and tumors
- The procedure involves injection of radio opaque dye into cervical or lumbar spine followed by several x-ray projection
- A myelogram may help find the cause of pain not found by an MRI or CT



Indications

- The cause of leg or arm numbness, weakness or pain
- Narrowing of the spinal canal (spinal stenosis)
- Tumor or infection causing problems with the spinal cord or nerve roots
- A spinal disc that has ruptured (herniated disc)
- Inflammation of the membrane covering the brain and spinal cord
- Problems with blood vessels to the spine




Pre procedure care

- Explain the procedure to the patient
- Obtain a signed consent
- Starve the patient before the procedure for the prescribed time
- Remove dentures and metal ornaments or objects

Procedure

- ❖ Patient lies prone on the x-ray table with lower extremities tightly secured with straps to the table
- ❖ Skin area is infiltrated with local anaesthesia, dye is then injected into the spinal sac, then the table is slowly rotated into circular motion

- 
- ❖ First down at the head end for 4-6 minutes then rotated up at the head end for the same duration
 - ❖ Several more minutes the process is completed. This movement ensures the contrast has sufficiently worked it's way through the spinal cord, followed by x-rays, CT or MRI scans
 - ❖ If the dye introduced in spinal tap was oil based, the physician conducting the procedure will remove it after the procedure. If water based dye is used it's not removed as it is eventually absorbed by



Post procedure care

- Patient should be in recumbent position for 24hrs with head raised
- Observe for neurologic signs especially headache as a result of CSF leakage
- Encourage the patient to increase fluid intake to enhance dye excretion
- Instruct the patient to avoid strenuous activities and heavy lifting at least a day after test

Assignment:

Hysterosalpingogram:

1. Role of a nurse before and after procedure
2. Steps in performing procedure



ENDOSCOPY

ENDOSCOPY

- 💡 This is the use of a hollow instrument to look inside the body cavities or organs . It uses flexible tube that has a small (camera)on the end of it.
- 💡 The instrument is referred to as an endoscope
- 💡 An endoscope is passed through a natural body opening or via a small incision. For example a laparoscope is inserted through small surgical incision in the pelvic or abdominal area
- 💡 If an ultra-sound probe is added to endoscope E.g. GIT endoscope this is called endoscopic ultrasound



A flexible endoscope



BRONCHOSCOPY

BRONCHOSCOPY

This is the direct inspection and examination of larynx(laryngoscopy), trachea and bronchi through a flexible or rigid bronchoscope

PURPOSES

❖ DIAGNOSTIC

- 💡 Lung growth, lymph nodes ,atelectasis or other changes seen on x-ray or imaging tests
- 💡 Coughing up blood(haemoptysis)
- 💡 Suspected interstitial lung disease
- 💡 Cough that has lasted for more than 3months without any other explanation
- 💡 To determine if a tumor can be removed surgically (resected)
- 💡 To obtain a tissue for biopsy
- 💡 To diagnose lung rejection after lung transplant

Purpose cont..

❖ THERAPEUTIC

- To remove foreign bodies from the trachea
- Remove fluid or mucus plugs from airways
- Widen (dilate) blocked or narrowed airway
- Drain an abscess
- Treat cancer using a number of different techniques
- Wash out an airway (therapeutic lavage)

NURSING ROLE

Before the procedure:

- ❖ Informed consent to be signed by the patient
- ❖ Starve patient 6-12hrs
- ❖ Explain procedure to patient to allay anxiety
- ❖ Advise patient to avoid aspirin, brufen and other anticoagulants before the procedure
- ❖ Give pre-medication :
 - atropine 0.6mg-1mg(iv,sc,im)
 - sedative(diazepam 5-10mg) or narcotic analgesic to inhibit stimulation of the vagus nerve and prevent vomiting , suppress cough reflex ,sedate & relieve anxiety.
- ❖ Dentures are removed and all artificial prothesis
- ❖ Assist in spraying local anaesthesia if its to be used
- ❖ If a rigid bronchoscope is used general anaesthesia is given

NURSING ROLE

After the procedure:

- For an hour after the procedure observe patients vital signs
- Monitor and report changes in breathing , chest pain or oxygen saturation levels ,hypertension , tachycardia, hemoptysis
- Patient should be nil per oral until cough reflex and effects of local anaesthesia have worn off.
- Cracked ice is given to suck, later fluid.
- Observe for confusion and lethargy in elderly
- When the patient is no longer experiencing effects of sedation they can be allowed to sit up



complications

- i. Aspiration
- ii. Bronchospasm
- iii. Hypoxemia
- iv. Pneumothorax
- v. Bleeding
- vi. Abrasion of lining of airways leading to swelling, inflammation and infection



PLAY VIDEO



OESOPHAGOSCOPY & GASTROSCOPY

UPPER GIT FIBRE (ENDOSCOPY)

- Also called esophagogastroduodenoscopy(OGD). It visualizes the upper part of the GI tract up to duodenum
- It's a minimally invasive procedure since it doesn't require an incision into one of the major body cavities and doesn't require significant recovery after procedure (unless sedation or anaesthesia have been used)
- It allows direct visualization of gastric mucosa thru a lighted endoscope for suspected gastric tumors and diseases , colored photos or motion pictures can also be taken
- Mouth guard are used during the procedure to prevent the patient from biting the scope

OESOPHAGOSCOPY AND GASTROSCOPY

- An esophagoscopy is a procedure to view the inside of the esophagus
- Gastroscopy is a procedure to view inside of stomach
- Duodenoscopy is a procedure to view duodenum .
- These procedures are performed as a single procedure and are collectively referred to as an upper endoscopy or oesophagogastroduodenoscopy (OGD)

Purposes

- Examine esophagus for ulcers and tumors
- Taking biopsy
- Removal of foreign bodies
- Dysphagia(difficulty in swallowing) or odynophagia(painful swallowing)
- Persistent nausea and vomiting
- Dyspepsia(indigestion)
- Acute upper GIT bleeding
- Chronic anaemia/or iron deficiency anaemia after non gastro-intestinal origin has been eliminated.
- Gastro-esophageal reflux with warning signs i.e. weight loss, dysphagia, bleeding and anaemia



• Peptic ulcer disease

Role of a nurse before procedure:

- Starve 6-8hrs(stomach must be empty for clear view)
- Explain procedure
- Gain informed consent
- Vital signs
- Narcotic analgesia is given 30minutes before
- Patients throat maybe sprayed with local anaesthesia to help prevent discomfort, or they gargle local anaesthetic agent for mouth and throat or
 - i. IV diazepam 5-10mg is given just before the procedure
 - ii. Atropine 0.6-1.0mg IM/IV is also given to reduce secretions
 - iii. Organon 0.5-1.0mg IM is given to relax smooth muscles

Procedure

- Local anaesthesia is sprayed in mouth or throat or sedation is done
- Endoscope is then passed smoothly and slowly in the areas being examined
- The procedure takes 10-20 minutes
- The doctor may inject moderate amount of air to expand the stomach allowing better visualization
- Biopsy is taken for examination or images of the digestive tract are taken for documentation of any abnormality; esophageal varices can be banded, resecting or ablating mucosal tissue

After procedure care

- Patient should not eat 3-4hrs after procedure until gag reflex returns to prevent aspiration
- Observe for vital signs post procedure
- Observe for signs of perforation E.g. pain, hematemesis
- Minor throat discomfort may occur after procedure and last up to 24hrs, it can be relieved with lozenges, cool saline gargle or analgesics
- Advise the patient to report any unusual or severe abdominal pain or bleeding following the procedure



Complications

- Bleeding
- Infection
- Perforation
- Cardiopulmonary problems
- Adverse reactions to medications

LOWER GIT ENDOSCOPY

- These are procedures for direct viewing of the lumen of the lower bowel using;
- Anoscope ; - to examine the anal canal
- Proctoscope ; - for the rectum
- Sigmoidoscope ; - for the colon

Purpose

- To check presence of ulceration, tumors, polyps, and lesions
- To take a biopsy
- Removal of polyps



Indications

- Gastrointestinal problems such as unexplained bleeding
- Persistent changes in bowel habits
- Anaemia
- Age 50yrs; 5 yearly then 3 yearly
- To diagnose colitis or colon/rectal cancer

Preparation

- The patient should take only clear oral fluids and not to consume any food for at least 24hrs before the exam
- Laxatives and enemas may be required before the start of exam to clear the lower bowel




Anoscopy & protoscopy



Anoscopy / proctoscopy

Procedure

- Explain the procedure to the patient
- Put the patient in knee chest position with feet beyond the edge of the bed, knees apart to give support, head resting on the couch, fore arms on either side of the head and hands placed one on top of the other above the head
- The patient is told of the progress, the possibility he might feel like moving his bowel and thanked for

- 
- Suction may be done to remove secretions
 - Biopsy may be taken
 - Polyps may be removed and the area cauterized to prevent bleeding
 - The tissue removed is placed on moist gauze and then in the appropriate container, labeled , and sent to the pathology lab with the request form.
 - After each use the tubes are washed thoroughly
 - Disposable tubes should be disposed safely



Colonoscopy & Sigmoidoscopy

Colonoscopy/ sigmoidoscopy

- 💡 This is endoscopic examination of the large bowel and distal part of the small bowel with an endoscope passed through the anus. (colonoscope)
- 💡 The colonoscope has a small camera attached to a flexible tube that can reach and examine the entire length of the colon.

Indications

Diagnostic:

- Colon cancer, inflammatory bowel disease, GIT haemorrhage, ulceration, polyps, and removal of biopsy; changes in bowel habit(unexplained).

Prophylactic:

- Removal of polyps

Therapeutic:

- Removal of foreign bodies

Screening:

- Every 10yrs from 50yrs for colorectal cancer




Patient preparation

- Explain the procedure to the patient
- Starve the patient of solid foods for 3 days to empty the GIT
- Laxatives are given for two days
- On day of examination an enema is given until rectum is clear
- Narcotic analgesic may be ordered and administered
- Diazepam is given to sedate the patient

Procedure

- Sigmoidoscopy; position the patient in knee chest
- Colonoscopy; the patient lies on left side with legs drawn up
- The first step is usually a digital rectal examination to examine the tone of the anal sphincter and to determine if the preparation is adequate
- Patient is sedated, the endoscope is then passed through the anus up the rectum and colon(sigmoid, descending, transverse, and ascending colon, the caecum) and ultimately the terminal ileum

- 
- The bowel is occasionally inflated with air to maximize visibility (procedure that may give false sensation of need to have a bowel movement)
 - Biopsies are then taken for histology or examination and diagnostic evaluation of colon is done.

Post procedure care

- Advise the patient to refrain from operating heavy machinery until a day after the procedure
- The patient resumes other normal activities after effects of sedation wear off E.g. eating and drinking normally
- Advise patient to report signs of, chills, fever, rectal bleeding (more than a tablespoon) swelling or redness at IV site or severe abdominal pain or bloating



 Mild abdominal pain and bloating is expected after the procedure

Complications

- ❖ Perforation
- ❖ Haemorrhage
- ❖ Inflammation of the bowel



cystoscopy

Cystoscopy

- This is endoscopy of the urinary bladder via the urethra
- A cystoscope is used
- Diagnostic cystoscopy is carried out using local anaesthesia, GA is sometimes used for operative cystoscopic procedures.
- To enable clear visualization, sterile irrigation solution is instilled to distend the bladder and wash away any clots



Indications

- ✓ Urinary tract infections
- ✓ To assess the ureter and kidney pelvis
- ✓ Haematuria
- ✓ Incontinence(loss of bladder control)
- ✓ Unusual cells found in urine sample
- ✓ To remove renal calculi(kidney stones)
- ✓ Urinary blockage E.g. prostate enlargement and stricture
- ✓ Unusual growth, polyp, tumor or cancer and obtain biopsy




Patient preparation

- Explain the procedure to the patient
- Patient may take 1-2 glasses of water (or as instructed) before going for the examination
- They should not urinate for a sufficient period of time, such that they are able to urinate prior to the procedure

Procedure

- ✓ Patient lies on their back(supine) with their knees slightly apart, they may also need to flex their knees especially when doing rigid cystoscopy examination.
- ✓ For flexible cystoscopy , **local** anaesthesia is used
- ✓ Local anaesthesia is applied directly from a tube or needleless syringe into the urinary tract

- 
- The doctor gently inserts the tip of the cystoscope into the urethra and slowly guide it up the bladder
 - The procedure is more painful for men than women due to length and narrow diameter of the male urethra, relaxing pelvic muscles helps ease this pain
 - A sterile liquid(water, saline, glycine solution) will flow through the cystoscope to slowly fill the bladder and stretch it so that there is a better and clear view of the bladder wall
 - The procedure takes 15-20 minutes
 - Flexible cystoscopy(just to look inside the bladder), Rigid cystoscopy(if you need treatment for a problem in the bladder).

After procedure care

- Relief of expected discomfort i.e burning and frequency of micturation by encouraging patient to increase oral fluid intake
- Warm bath or compresses also relieves the burning feeling
- Incase of blood tinged urine -relieve this by application of moist heat to the lower abdomen
- Warm sitz bath are also recommended for urinary retention from edema
- An indwelling catheter may have to be inserted



Play video



COMPUTED TOMOGRAPHY

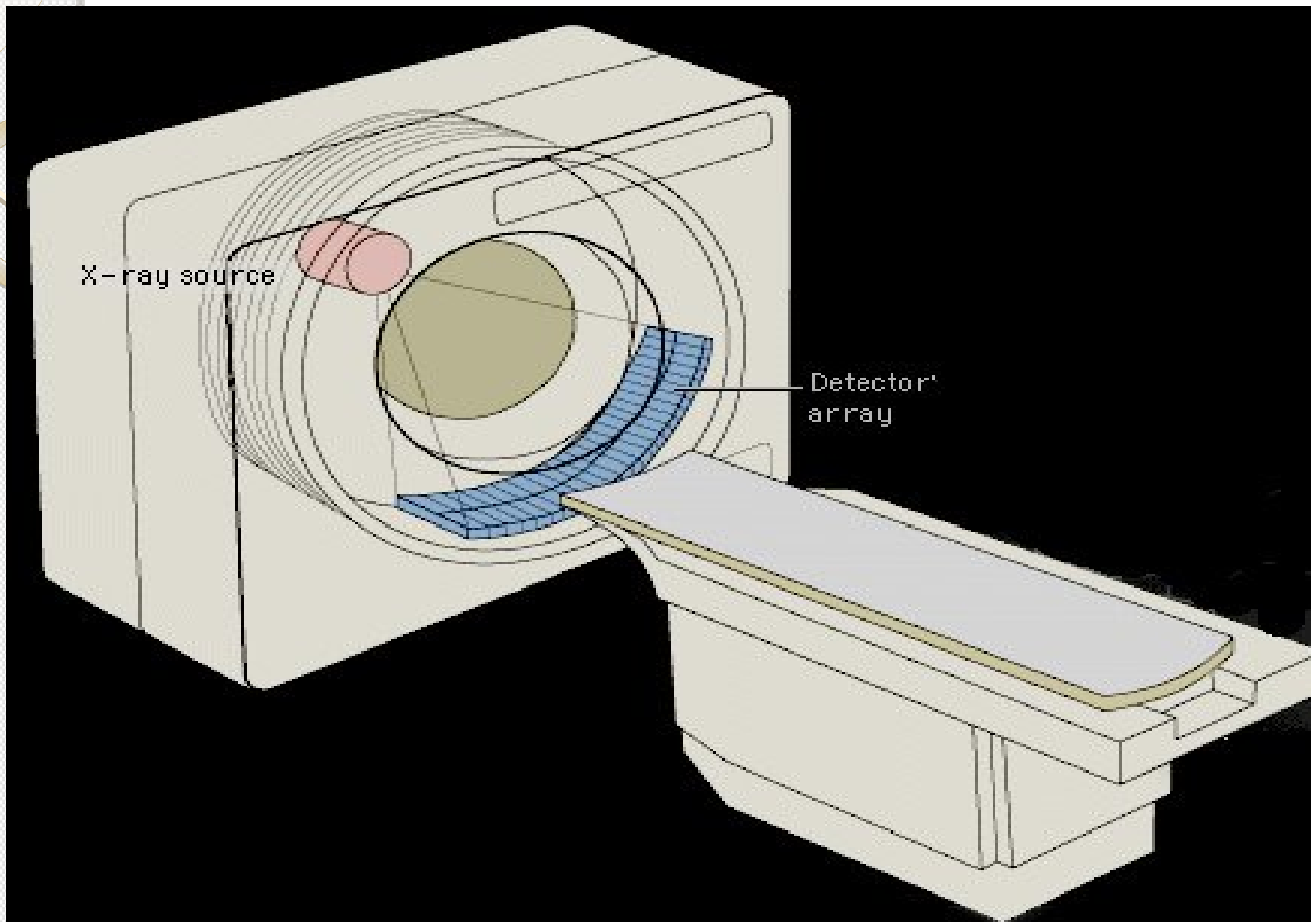
Computed tomography

- Computed tomography (or computerized axial tomography) is an examination that uses X-ray and computer to obtain a cross-sectional image of the human body.



Computed tomography

- 💡 When X-rays are irradiated on the human body, some of the rays are absorbed and some pass through the body to produce an image.
- 💡 In plain X-ray imaging, the film directly absorbs penetrated X-rays. In CAT scanning, an electronic device called a "detector array" absorbs the penetrated X-rays, measures the X-ray amount, and transmits the data to a computer system.
- 💡 A sophisticated computer system, in turn, calculates and analyzes data from each detector in each level, and finally reconstructs multiple, two-dimensional, cross-sectional images.



Nurses role:

Before procedure:

- Obtain informed consent
- Look for allergies: to iodine or shellfish
- Obtain health history: recent illness, medical conditions, current medications.
- NPO status: not to eat or drink prior procedure especially if contrast media will be used.
- Dressing up: wear comfortable, loose fitting clothing.
- Information about contrast medium: inform there will be mild pain from needle puncture and flushed sensation while injecting the medium I.V.
- Instruct patient to remain still during procedure but should report itching, D.I.B., dysphagia, nausea and vomiting, dizziness and headache.
- Inform patient duration of the procedure: 5minutes to 1 hour depending on type of CT scan
- Remove all jewelry and dentures.



Nurses role:

After procedure:

- 💡 Diet as usual: resume diet and activities as usual
- 💡 Fluid intake: increase fluid intake if contrast was given to promote excretion of dye.

Contraindications:

- Pregnant patient
- Known iodine allergy
- Patients with claustrophobia
- Patients with renal impairment, unless benefits outweigh the risks.
- Patients with hyperthyroidism or toxic goiter
- Patients with complications after previous contrast administration
- Patients with severe obesity

Computed tomography

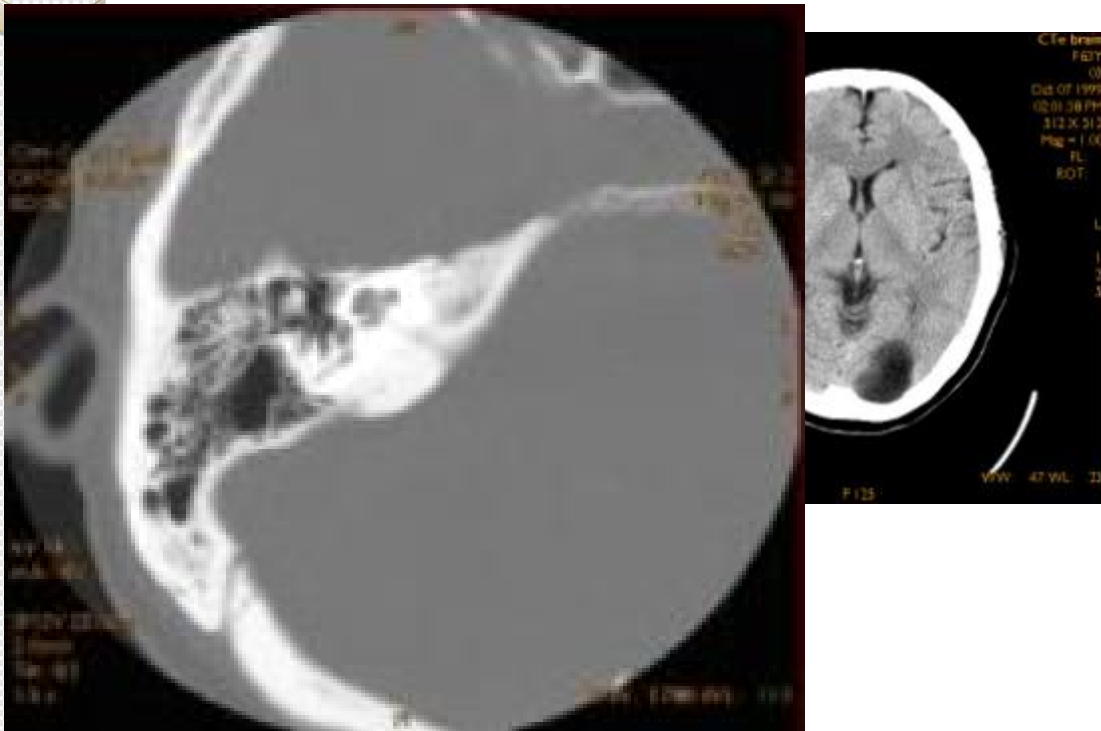


Gantry and Table



Operation console

Computed tomography



Computed tomography



Feet first



Head first

Computed tomography

Risks

- Iodine is the usual contrast dye. Some patients are allergic to iodine and may experience a reaction that may include nausea, breathing difficulty, or other symptoms.
- The amount of radiation used during a CT procedure is considered minimal; therefore, the risk for radiation exposure is very low.
- Radiation exposure during pregnancy may ET/AL be harmful to the fetus.

Before the Procedure

- Explain the procedure to the patient.
- If the procedure involves the use of contrast dye, consent should be signed from the patient.
- Ask the patient if he has ever had a reaction to any contrast media.
- Generally, there is no fasting requirement prior to a CT scan, unless a contrast media is to be used. (**abdomen and pelvis need fasting and cleaning the colon - iv contrast need fasting 4 hours before the examination**).

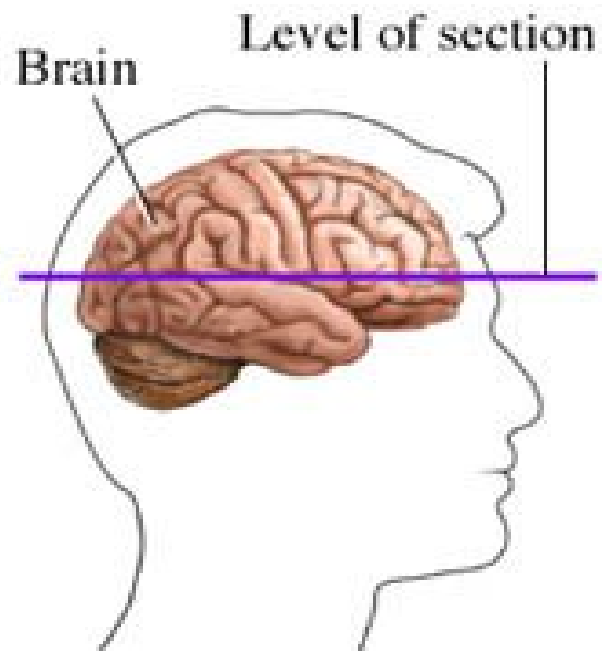
CAT scan examination

- CT angiography
- Dynamic CT
- CT Diffusion and perfusion
- High resolution technique
- CT fluoroscopy
- Virtual real endoscopy

CT Scan of the Brain

- An imaging technique of the brain that reveal tumors, blood clots, hemorrhages, or other abnormal anatomy.
- A series of computerized images of the brain at various levels are taken to reveal normal anatomy or any abnormality.

CT Brain






CT scan

CT Brain

- A CT scan is recommended to help:
- Evaluate acute cranial-facial trauma
- Determine acute stroke
- Evaluate suspected subarachnoid or intracranial hemorrhage
- Evaluate headache
- Determine if there abnormal development of the head and neck

CT Brain

Positioning

-  Supine
-  Arms along the sides of the body
-  Head immobilized in the head holder



CT Brain



CT Bone

Possibility of fracture



Two films are printed :

- 1) The 1st is soft tissue.
- 2) The second is bone window.



CT of the neck

Patient preparation:

Fasting for 3Hours before the examination

Contrast:

Depend on the examination

100-150 ml nonionic contrast medium (omnipaque 300) **Bolus injection of the contrast for spiral CT**



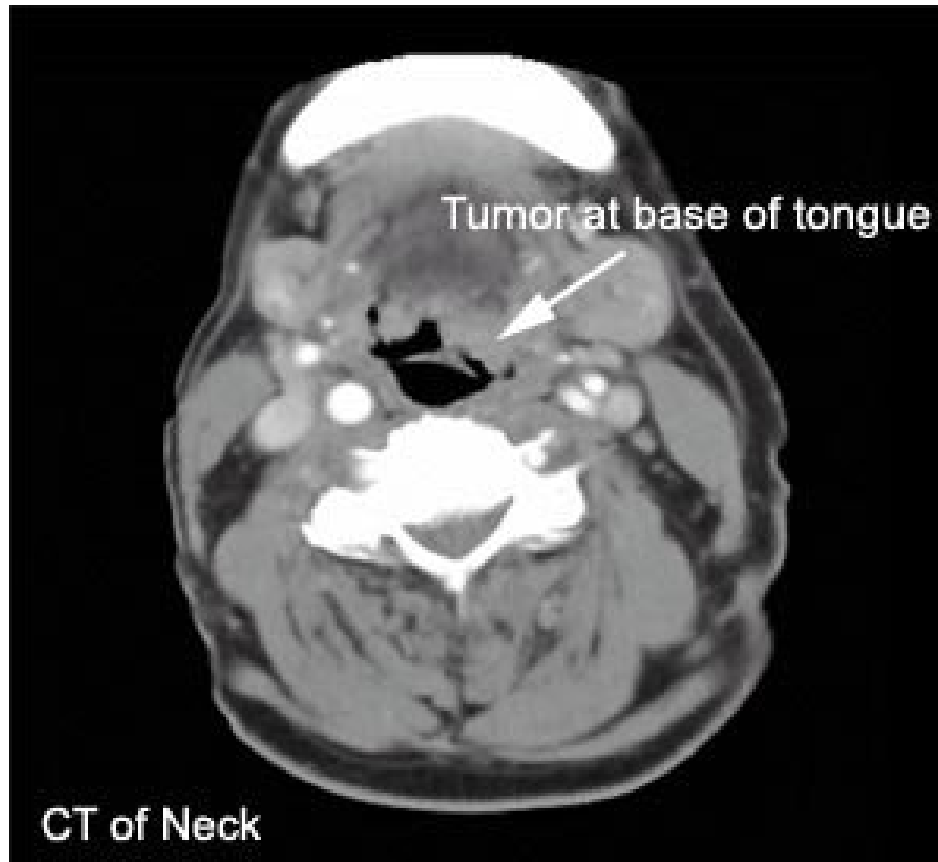
Positioning:

- Supine
- Arms along the sides of the body
- Immobilization of the head

Parameters:

- Starting at floor of the mouth
- Ending at supraclavicular fossa
- Respiration suspended in expiration with no swallowing.

Computed tomography





Computed tomography

CT scan of the chest

CT Chest

Patient preparation:

- Fasting for 3Hours before the examination
- Chest x-ray in two projection

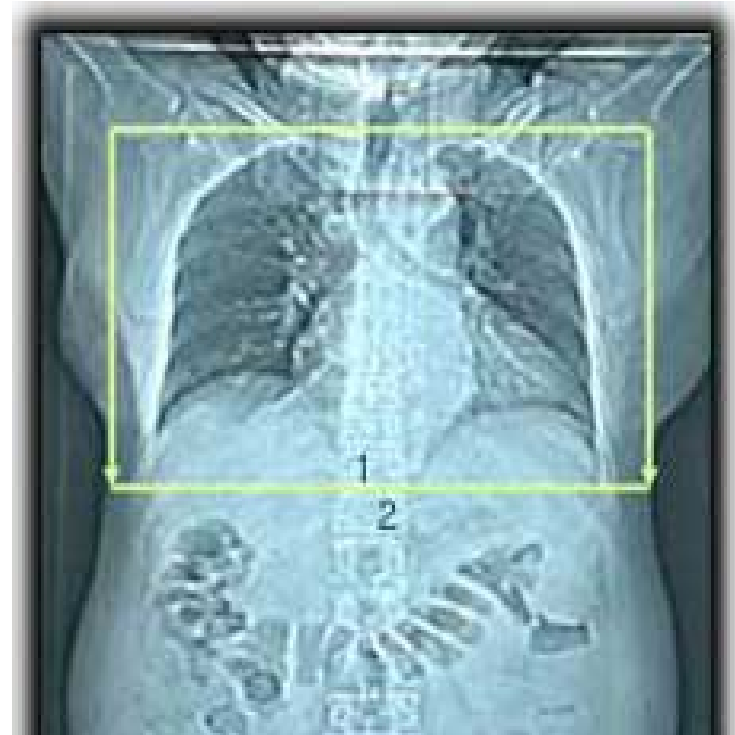
Positioning:

- Supine
- Arms folded behind the head

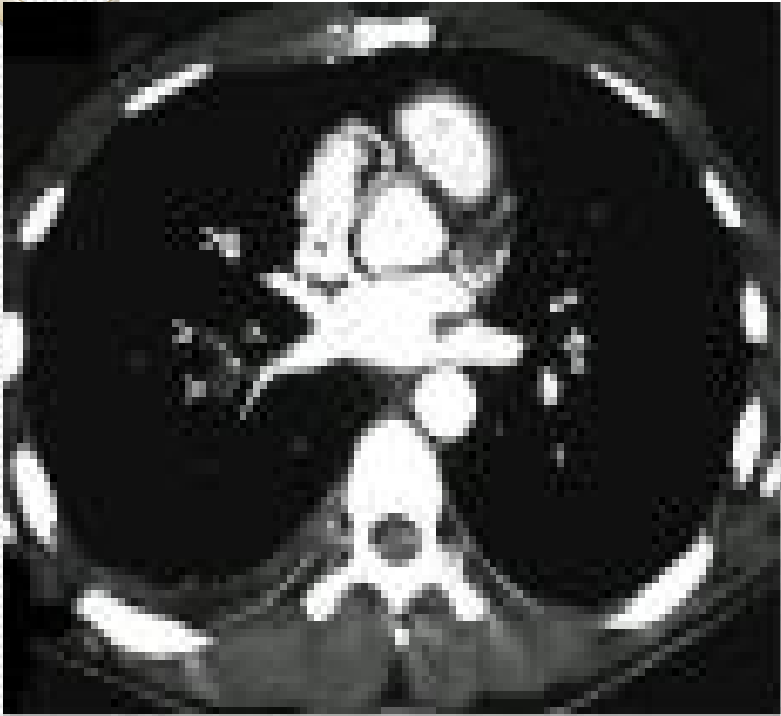
CT Chest

Parameter:

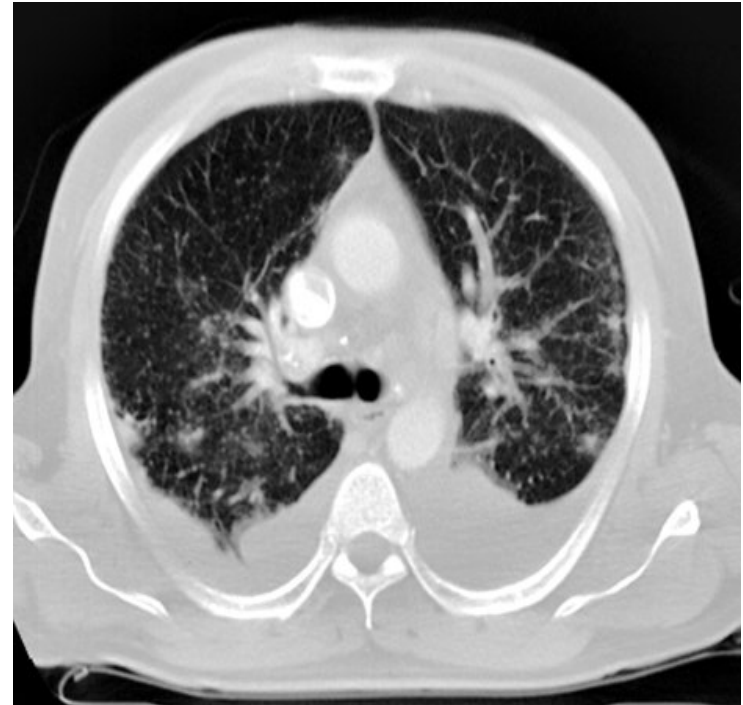
- Starting at the lung apex
- Respiration suspended in inspiration



CT Chest



Mediastinal window



Lung window



CT Scan of the Abdomen

CT Abdomen

💡 Certain factors or conditions may interfere with the accuracy of a CT scan of the abdomen.

These factors include:

- metallic objects within the abdomen, such as surgical clips
- barium in the intestines from a recent barium study
- stool and/or gas in the bowel

CT Abdomen

Patient preparation:

- Fasting 4-6 hours before the examination
- Radiologist sometime needs abdominal U.S
- Oral laxative must be given
- I/V buscopan is required at the time of examination
- Any metallic foreign must be removed
- Preferably the patient should be in hospital gown

CT Abdomen

Contrast Media:

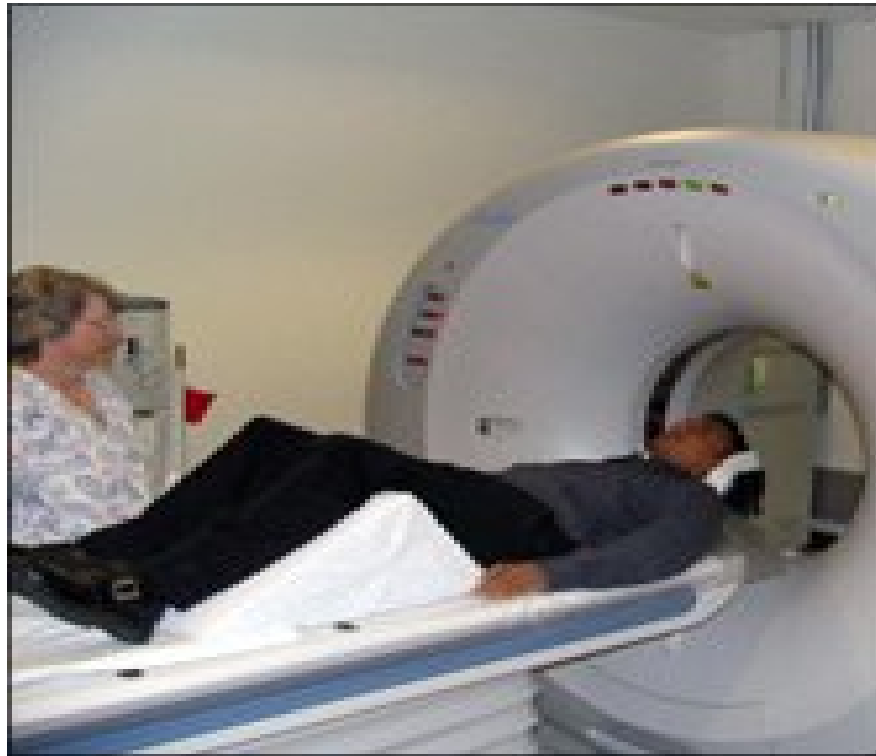
Oral contrast

- At mid night before the day of the examination .800ml of contrast media (5% Gastrografin + 95% water), the patient asked to drink 700ml during these hours
- The last 100ml immediately before the exam
- Replaced now by oral water and mannitol.

I.V. contrast

- 100 ml nonionic contrast (omnipaque 300)

Computed tomography



CT Abdomen

□ Non contrast CT of the abdomen include

1. Urinary tract evaluation (stone protocol)
2. Emergency CT for appendicitis
3. Abdominal trauma



CT for lumbar spine

CT Lumbar spine

Patient preparation:

- For routine test no preparation

Contrast:

- No contrast in routine examination

Computed tomography



CT Lumbar spine

Positioning:

- Supine and feet first
- Arms above the head
- The knees flexed 30°

Parameters:

- Starting at xiphoid process
- Ending at the level of hip joint
- Respiration suspended in expiration



CT Lumbar spine



Bone window



Soft-tissue window



MAGNETIC RESONANCE IMAGING (MRI)

MRI

- ❑ Magnetic resonance imaging (MRI) is an imaging technique used primarily in medical settings to produce high quality images of the soft tissues of the human body.
- ❑ It is based on the principles of nuclear magnetic resonance (NMR), a spectroscopic technique to obtain microscopic chemical and physical information about molecules
- ❑ MRI has advanced beyond a tomographic imaging technique to a volume imaging technique



WHAT CAN BE DIAGNOSED BY AN MRI SCAN?

- Most ailments of the brain, including tumours
- Sport injuries
- Musculoskeletal problems
- Most spinal conditions/injuries
- Vascular abnormalities
- Female pelvic problems
- Prostate problems
- Some gastrointestinal tract conditions
- Certain ear, nose and throat (ENT) conditions
- Soft tissue and bone pathology/conditions



WHO CAN'T HAVE AN MRI SCAN?

- A cardiac pacemaker
- Certain clips in your head from brain operations
- A cochlear implant
- A metallic foreign body in your eye
- Had surgery in the last 8 weeks
- If you are pregnant



PRINCIPLE

- MRI makes use of the magnetic properties of certain atomic nuclei.
- Hydrogen nucleus (single proton) present in water molecules, and therefore in all body tissues.
- The hydrogen nuclei partially aligned by a strong magnetic field in the scanner.

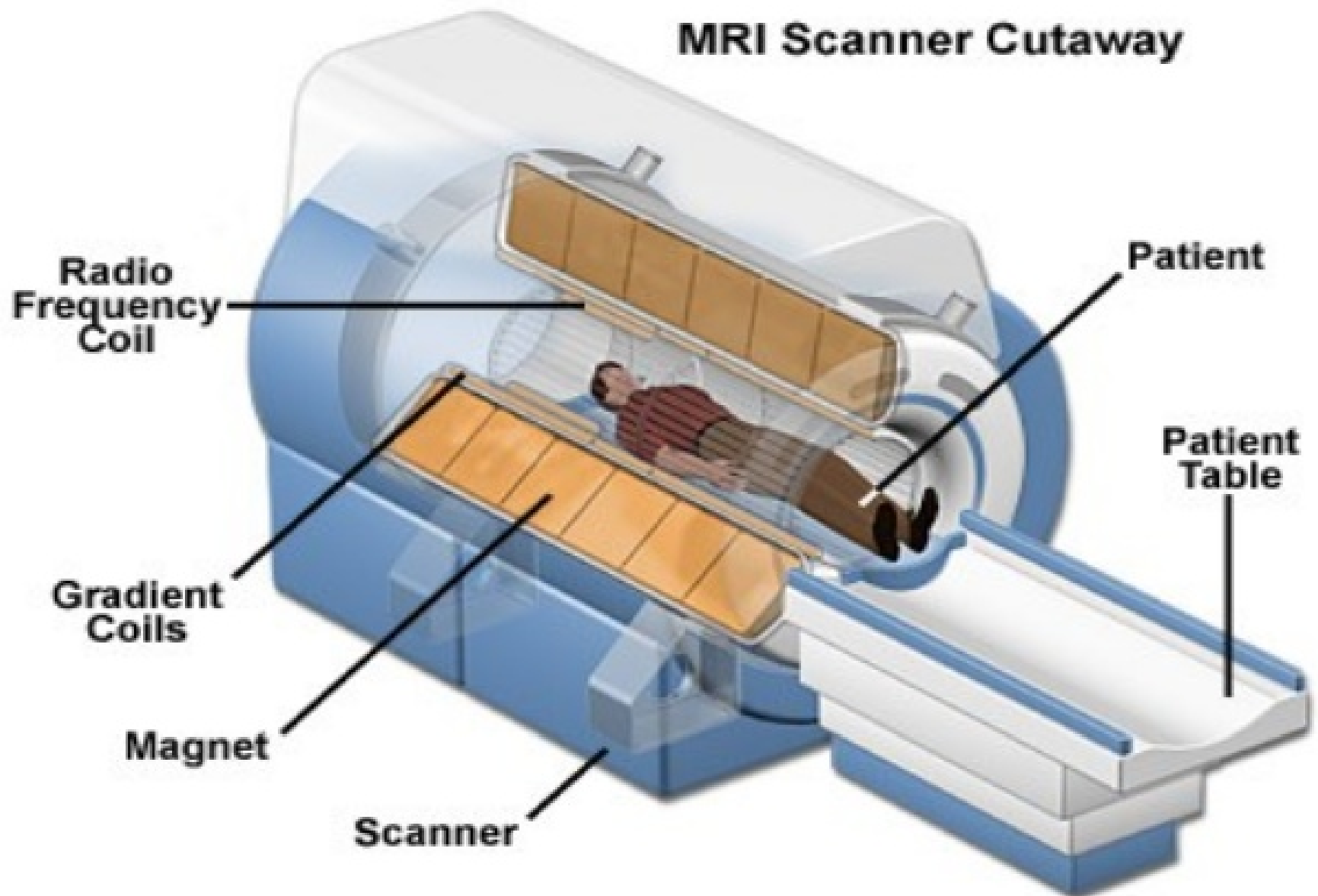


CONTI..

- The nuclei can be rotated using radio waves, and they subsequently oscillate in the magnetic field while returning to equilibrium.
- Simultaneously they emit a radio signal.
- This is detected using antennas (coils)
- Very detailed images can be made of soft tissues.



MRI Scanner Cutaway





ADVANTAGES OF MRI

- No ionizing radiation
- Variable thickness in any plane
- Better contrast resolution
- Many details without iv contrast



DISADVANTAGES OF MRI

- Very expensive
- Dangerous for patients with metallic devices placed within the body
- Difficult to be performed on claustrophobic patients
- Movement during scanning may cause blurry images
- RF transmitters can cause severe burns if mishandled



● Comparison between X-ray CT system and MRI system

	X-ray CT system	MRI system
Principle of imaging	Absorption of X-ray	Magnetic resonance phenomenon
Radiation exposure	Yes	No
Tissue resolution	Good (physical information)	Excellent (scientific information)
Dynamic diagnostic information	Difficult	Easy
Influence by bone, air	Yes	No
Image plane	Transverse plane	Arbitrary section plane
Examination noise	Comparatively quiet	Large
Examination time	Short (5~10 min.)	Long (15~30 min.)
Preferred area	Lung, abdomen, bone, etc.	Brain, spinal cord, junction, etc.

ELECTRO- ENCEPHALOGRAM(EEG)

- Is a non invasive procedure that assesses the electrical activity of the brain.
- The brain's spontaneous electrical activity is recorded over a short period of time, 20-40 minutes from multiple electrodes placed on the scalp
- The electrodes are connected to wires then a machine which records electrical impulses, the results are printed out or displayed on a computer monitor
- Different patterns of electrical impulses can denote various form of neurological problems E.g. epilepsy




Indications

- ✓ Evaluation of brain disorders
- ✓ Determine brain death
- ✓ To determine whether to wean off anti-epileptic medications

NOTE

- 🧠 most EEG show the type and location of the activity in the brain during a seizure thus evaluates people with problems associated with brain function E.g. confusion, coma, tumors, long term difficulties with thinking or memory, or weakness of specific parts of the body like in coma



Used to prove if someone on life support machine has no chance of recovery


Patient preparation

- Head is shaved or patient avoids hair styling products on the day of exam
- Tranquilizers and stimulants are withheld for 24-48 hours
- Drinks that are stimulants are also withheld
E.g. coffee, tea, cola etc.
- Explain the procedure to the patient i.e. takes 45-60 minutes, doesn't cause electric shock, it's a test not a form of treatment



Procedure

- Patient lies on the table, about 16-20 electrodes are attached to the scalp with a conductive gel or paste
- Each electrode is attached to an individual wire
- Electrode location and names are specified by the international 10-20 system
- The patient is asked to relax, lies with eyes open, then later with eyes closed
- The patient may be asked to breath deeply and rapidly or stare at a flashing light, these activities produces changes in the brain wave patterns.
- If being evaluated for sleep disorder, EEG may be performed continuously through out the night when the patient is sleeping.



• The brain's electrical activity is recorded continuously through out the exam on special EEG paper.

• EEG results are interpreted by a neurologist

After procedure care

• Instruct the patient when to resume medications especially anti-seizure medications that had been with held

• Patient doesn't require recovery time but instruct them to report to hospital if;

- I. Number of seizures increase
- II. An altered mental status
- III. Having new loss of function

ELECTROCARDIOGRAPHY(ECG)

- Is a test that records the electrical activity of the heart, it's used to detect and locate the source of heart problems
- It shows the heart rate, rhythm and records the strength and timing of the electrical signals as they pass through each part of the heart

Purpose

- Measure the rate and regularity of the heart beats
- Size and position of the heart chambers
- Presence of any damage to the heart
- Effects of drugs or devices used to regulate the heart E.g pacemaker

Indications

- Symptoms of myocardial infarction
- Symptoms of pulmonary embolism
- Cardiac murmurs
- Syncope or collapse
- Seizures
- Perceived cardiac dysrhythmias
- Assessing patients with systemic diseases
- Monitoring during anaesthesia and critically ill patients



Patient preparation

- Explain the procedure to the patient
- Patient should avoid exercising or taking cold water immediately before ECG as this may give false results
- Shaving hair where electrode will attach

Procedure

- The technician attaches 12 soft patches called electrodes to the skin on the chest arms and legs
- The patient lies still on the table in supine position while electrodes detect the electrical signals of the heart
- A machine then records these signals on graph paper or displays them on the monitor
- Entire test takes about 10 minutes , after the test the electrodes are removed from the skin and discarded.
- Graph is interpreted and diagnosis established.

ASSIGNMENT:

▣ X-RAYS(Chest, Bone, skull):

1. Role of a nurse before and after procedure
2. Steps in performing procedure



COLOSTOMY CARE

THE PERSON WITH AN OSTOMY

An Ostomy is the surgical creation of an artificial opening

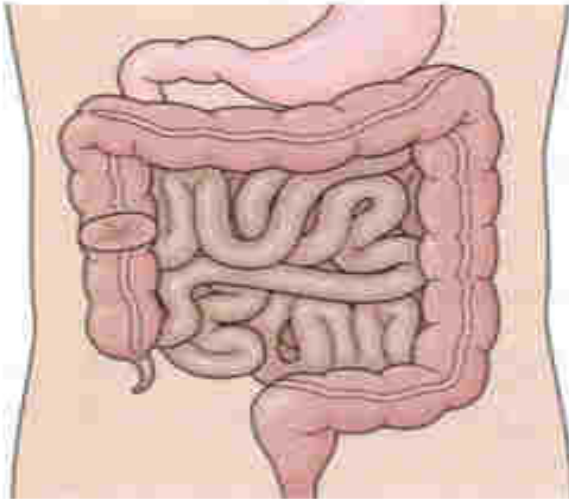
The opening is called a stoma

A colostomy is the surgical creation of an artificial opening between the colon and the abdominal wall

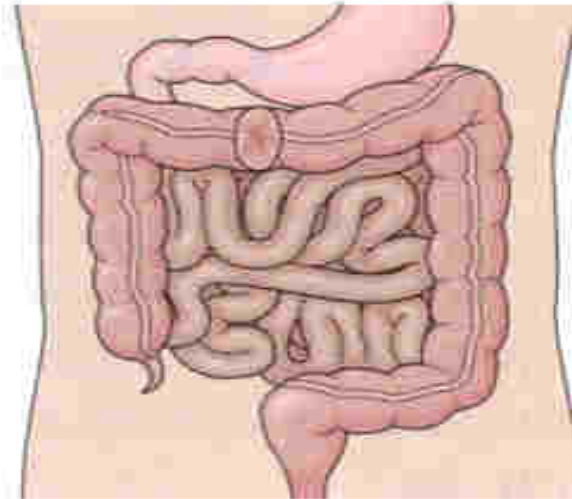
An ileostomy is a surgically created opening between the small intestine and the abdominal wall

COLOSTOMY SITES

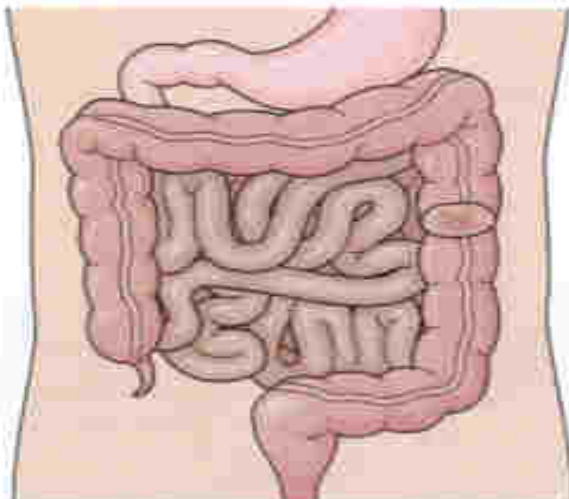
Ascending colostomy



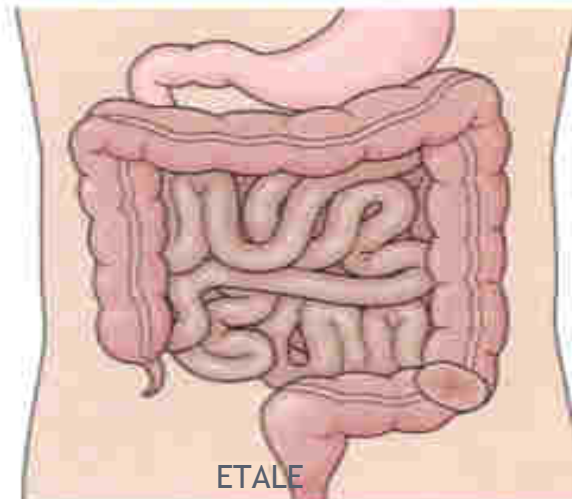
Transverse (single barrel) colostomy



Descending colostomy



Sigmoid colostomy

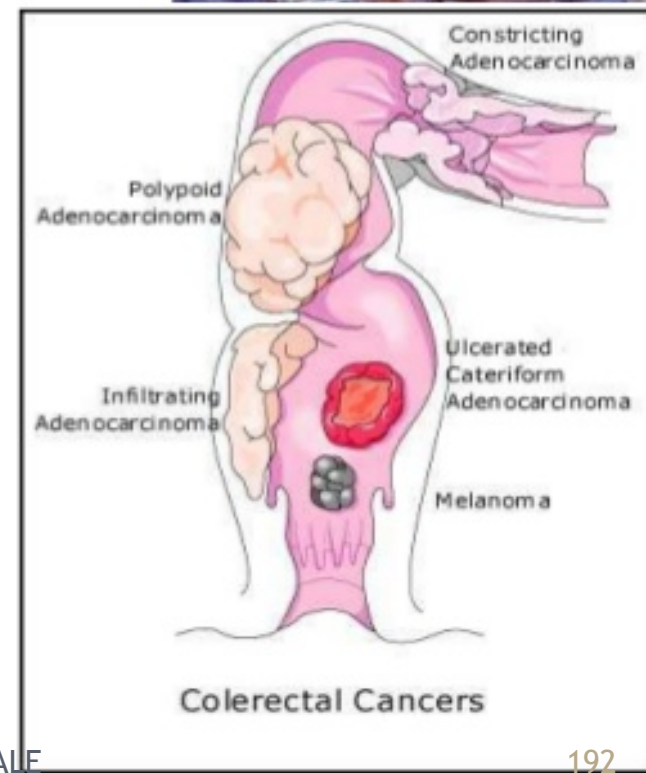


When you find yourself in a hole,
stop digging.

U. S. Grant

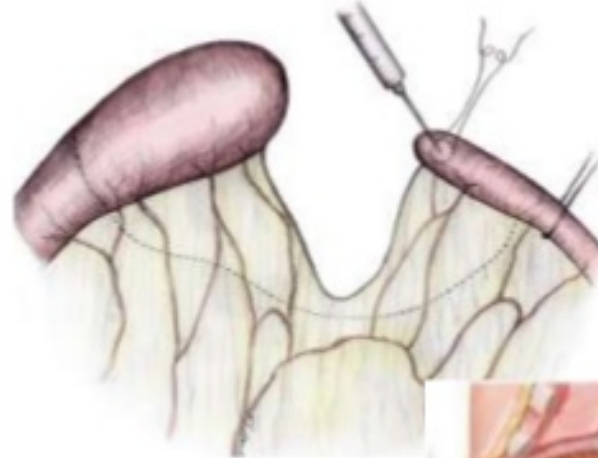
Aetiology /Indication

- Adults;
- Colorectal ca
- Obstruction
- Traumatic perineal injury
- Fistulae
- Protect a distal anastom.
- Ruptured diverticulum,
- Ischemia
- Inflammatory bowel disorder.



Aetiology /Indication

- Children
 - Necrotizing enterocolitis
 - Hirschsprung disease
 - *Meconium ileus*
 - Imperforate anus
 - *Complex hindgut anomalies*
 - Intestinal malrotation
 - Intestinal volvulus
 - Intestinal atresia, stenosis, and webs
 - *Trauma*



POST-OPERATIVE NURSING CARE

Skin Care: Assess skin for sign of irritation or breakdown; apply skin barrier paste.



Psychosocial Adaptation: The nurse should help the patient to accept the colostomy and teach patient the necessary care and management.

Nutrition: the colostomate is started on a light, low-residue diet (Patel, 2012).

Patient Education: provide written, verbal and psychomotor instruction on colostomy care, pouch management, skin care and irrigation for the client.

Medications: Some medications or nutritional supplements may change the color, odor, or consistency of stool just like before surgery. Patient education and post-medication observation are therefore necessary.

Control of Odor: control odor by a clean odor free, well-fitting appliance; regular change of bag, cleaning, and use of deodorant.

Applying an ostomy appliance: The stoma must be measured so that the right size appliance can be chosen. The pouch attaches over the stoma and is fastened unto the faceplate.

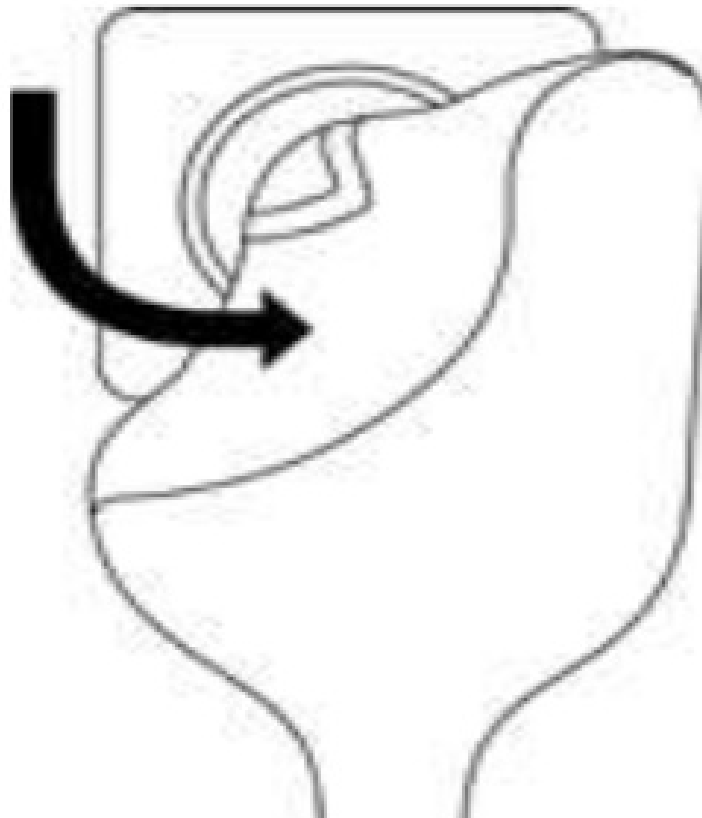
To empty ostomy pouch

Before you start:

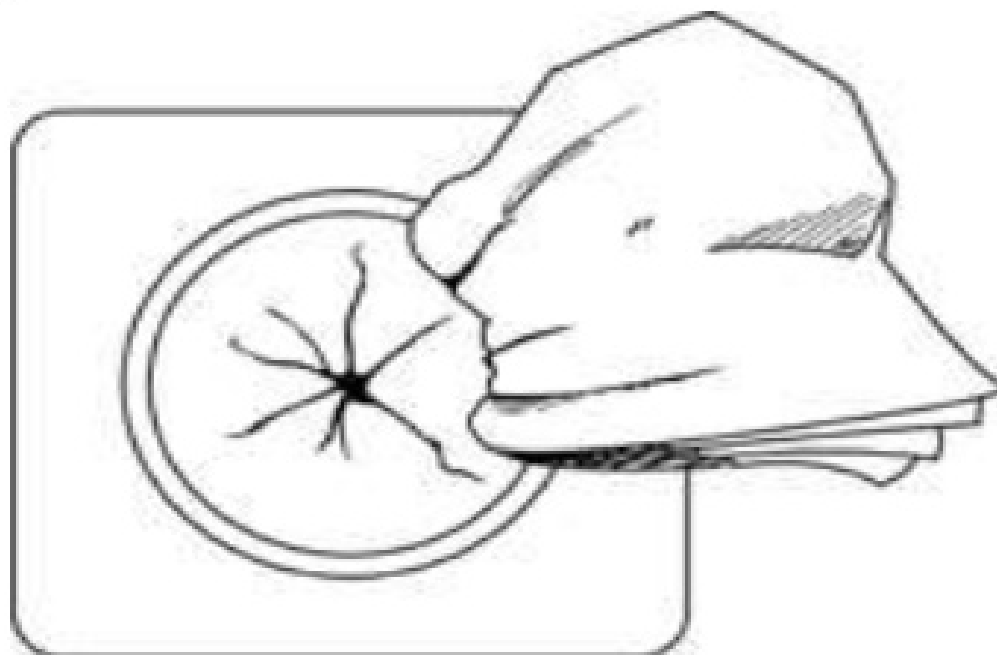
- put water in a cup or a squeeze bottle to rinse the pouch
- place a piece of toilet paper on the surface of the water in the toilet to prevent splashing up when you empty the pouch

To remove and clean the pouch:

1. Remove pouch from flange.



- 2. Wipe inside of flange with clean toilet paper.



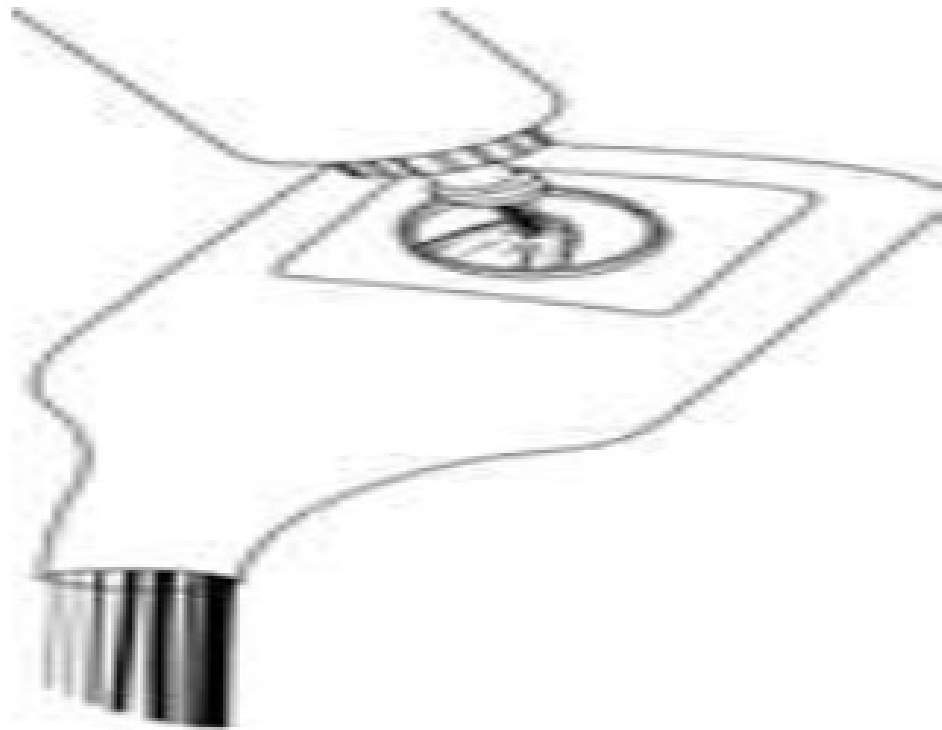
3. Hold pouch by rim, lift bottom of pouch up, remove clamp.



- 4. Empty contents into toilet.



5. Hold pouch by rim, rinse with water through rim opening and out the bottom.



6. Dry bottom, replace clamp add deodorant.
7. Attach pouch to flange.



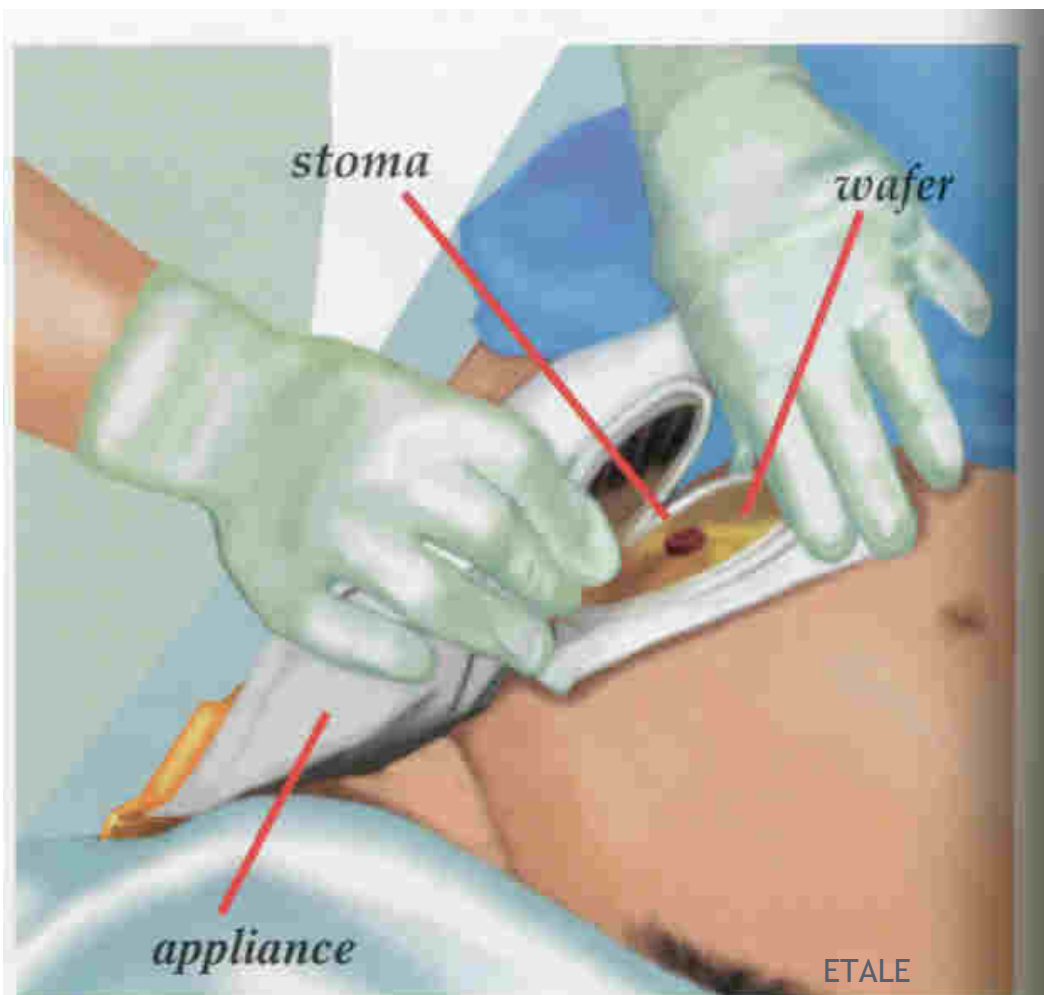
8. Wash hands.



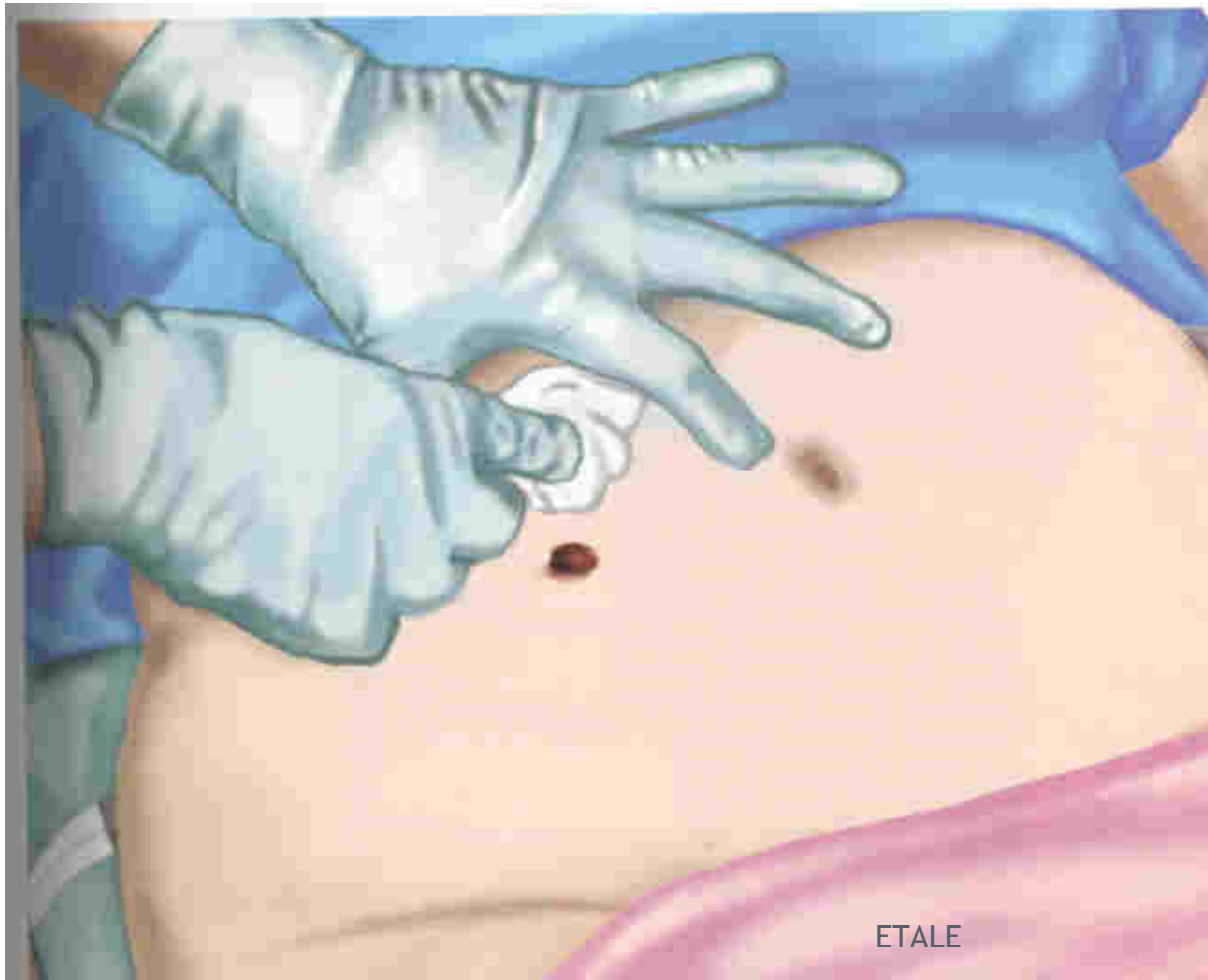
COMPLICATIONS

- Problems breathing
- Reactions to medications
- Bleeding inside your belly
- Damage to nearby organs
- Development of a hernia at the site of the surgical cut
- Falling in of the stoma (prolapse of the colostomy)
- Infection, especially in the lungs, urinary tract, or belly
- Narrowing or blockage of the colostomy opening (stoma)
- Scar tissue forming in your belly and causing intestinal blockage
- Skin irritation
- Wound breaking open (**Johns Hopkins Medicine, 2012**).

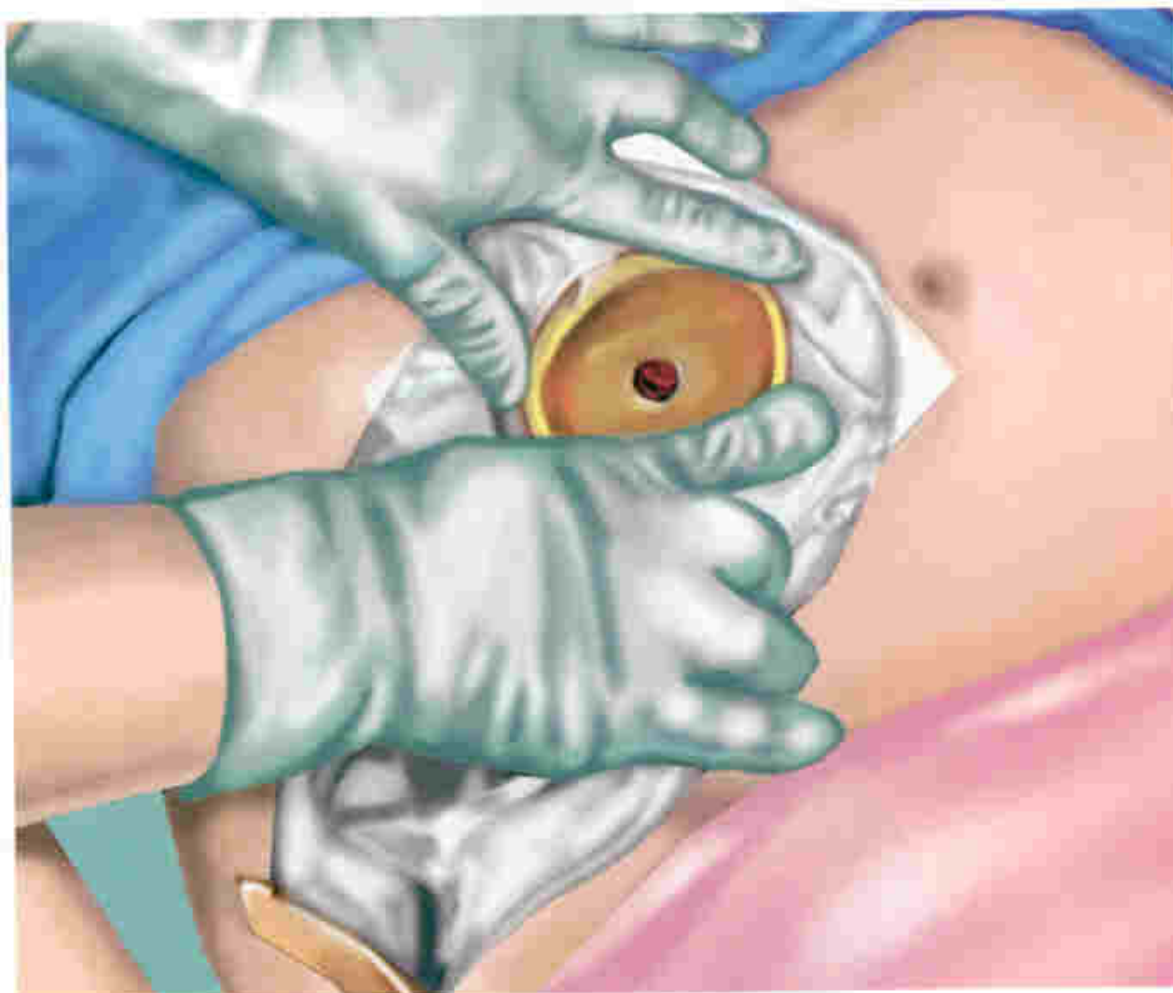
GENTLY REMOVE THE COLOSTOMY APPLIANCE (COLOSTOMY BAG) AND PLACE IT IN THE BEDPAN.



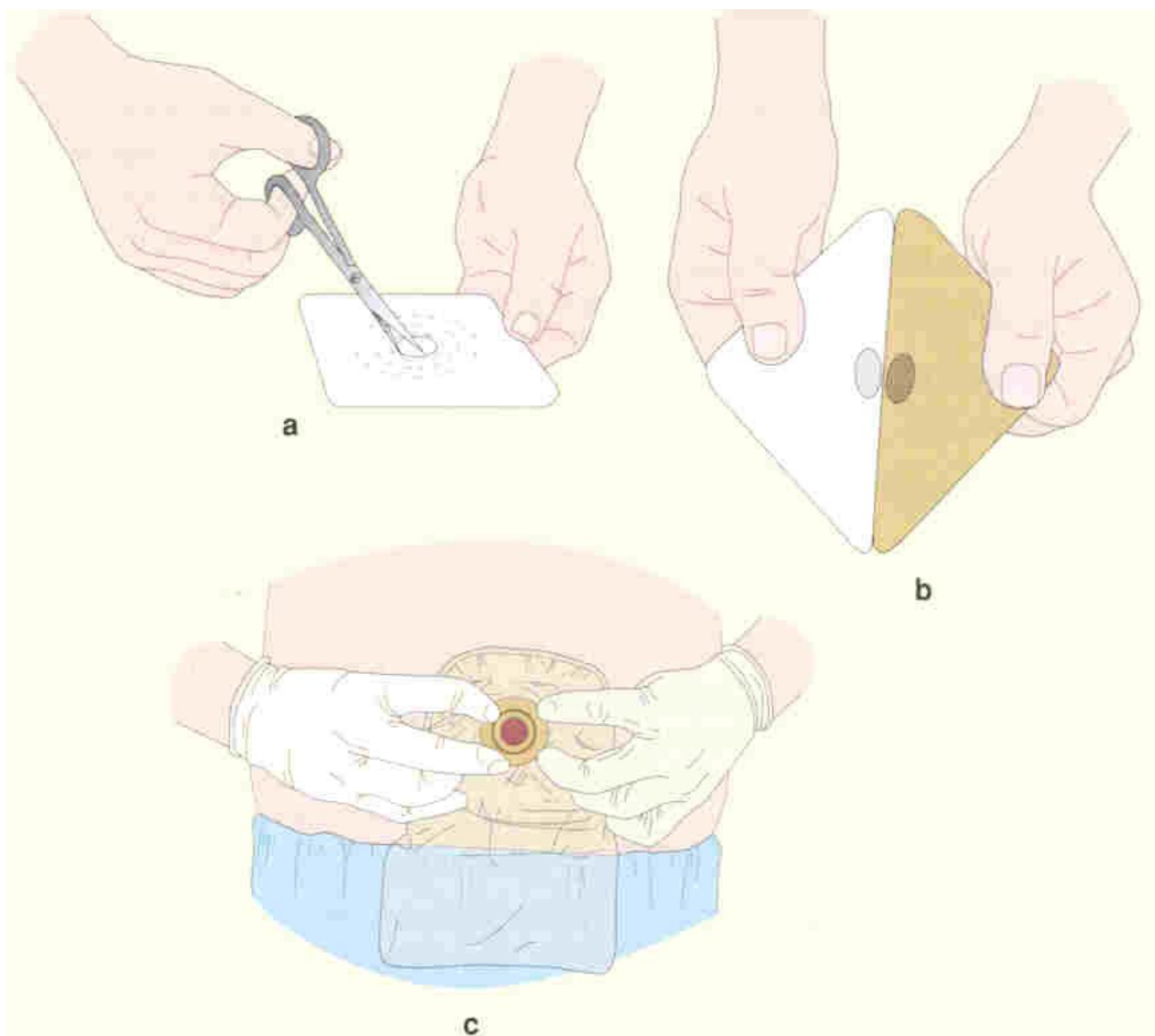
CLEAN AROUND THE STOMA WITH SOAP (MILD) AND WATER



REMOVE THE ADHESIVE BACKING AND CENTER THE POUCH OVER THE STOMA. APPLY GENTLE PRESSURE.
FASTEN THE CLAMP AT THE BOTTOM OF THE BAG.



DEODORANT IS PLACED IN THE BAG TO PREVENT ODORS.
DO NOT LET THE PERSON SHOWER OR BATHE FOR 1-2 HOURS AFTER APPLYING THE POUCH.



THE WAFER MAY HAVE TO BE CUT TO THE PROPER STOMA SIZE



URINARY CATHETERIZATION



OBJECTIVES

- By the end of the lesson the learners will be able to describe the performance of urinary catheterization for male and female clients or patients.
- Describe the performance of suprapubic catheter insertion

IMPORTANCE PRIOR KNOWLEDGE

- Anatomy and physiology of urinary system
- Rationale for procedure
- Necessary equipment
- Competence in performing skill

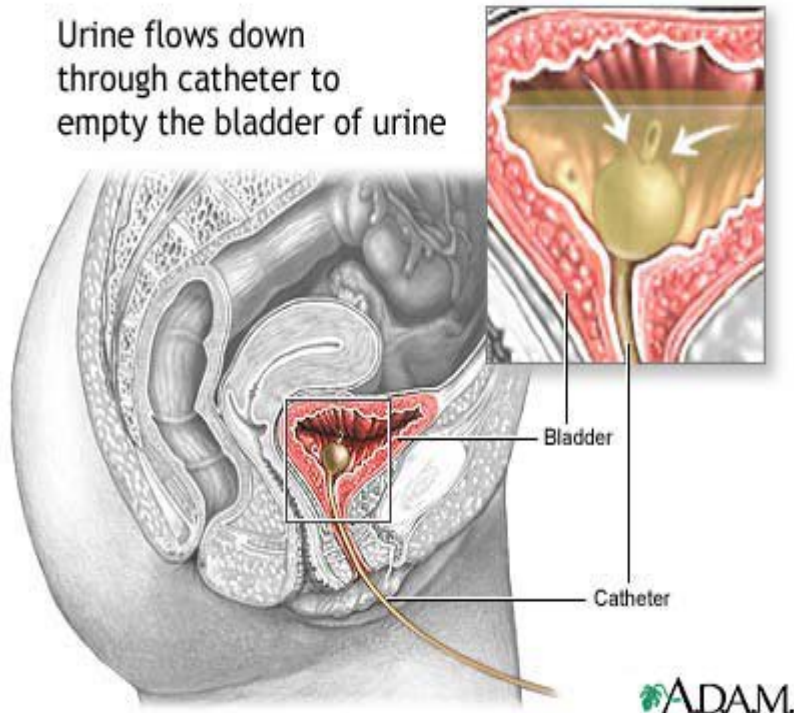


DEFINITION

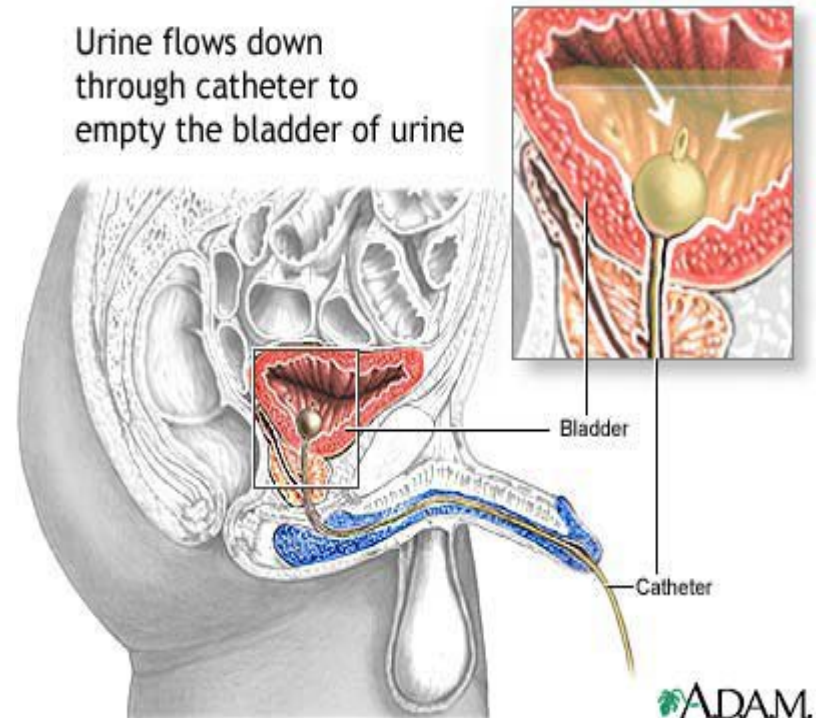
- Urinary catheterization is the process of inserting a catheter through the urethra into the urinary bladder for withdrawal of urine or instillation of drugs.

Principles of Catheterisation

Urine flows down through catheter to empty the bladder of urine



Urine flows down through catheter to empty the bladder of urine



Indications for catheterisation

- Collection of urinary samples
- Acute urinary retention or obstruction
- Surgical procedures involving pelvic or abdominal surgery repair of the bladder, urethra and surrounding structures
- In critically ill patients to monitor urinary output
- Bladder irrigation following surgery
- Instillation of drugs
- To promote healing of perineal ulcers

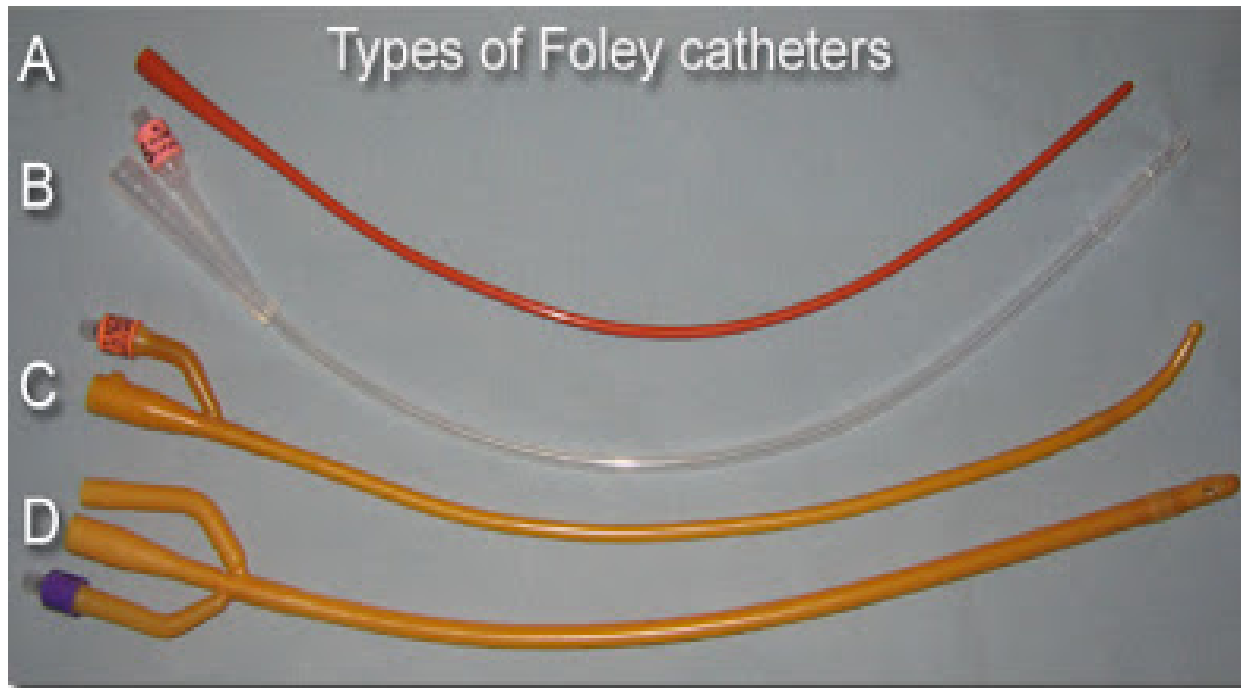
Contraindications

- Traumatic injury to the lower urinary tract (eg, urethral tearing) in women and men
- Urinary tract infections

Equipment required

- Sterile catheterisation pack containing gallipots, receiver, swabs, disposable towel
- Disposable under pad for patient
- Sterile gloves and disposable plastic apron
- Appropriate catheter
- Sterile anaesthetic lubricating jelly
- Water for injections to inflate catheter balloon
- Universal specimen container
- Antiseptic solution
- Drainage bag

TYPES OF CATHETERS



A. Robinson one-way catheter ("straight cath")

B. Robinson two-way catheter, silicon

C. Coude two-way catheter, latex

D. Robinson three-way catheter, latex

Catheter types

short term

Catheter material	Duration	Comments	
PVC –polyvinyl chloride	14 days	Rigid, painful	
Latex	14 days	Can cause discomfort and tissue trauma due to high surface friction	
Teflon-coated latex	28 days	Smoother, resistance to encrustations	

Catheter types

longer term

Catheter material	Duration	Comments
Silicone elastomer-coated latex	12 weeks	Resistance to bacterial adherence
Silicone	12 weeks	Smooth, resistance to encrustations, non-inflammatory
Hydrogel-coated latex	12 weeks	Resistance to bacterial adherence, improved patient comfort, non-inflammatory

Catheter sizes

- Catheters are available in both different sizes and lengths
- Variation in length is due to the difference in length of the male and female urethra
- Male catheters are 41- 45cm in length
- Female catheters are 20- 25cm in length

Cont. sizes

- The size is the diameter of the internal lumen of the catheter and is measured in Charriere (Ch) named after its French inventor
- The most common sizes are 10F(3.3mm) to 28F(9.3mm) -F is French catheter scale
- The nurse should select a size large enough to allow free flow of urine, and large enough to control leakage of urine around the catheter.
- A larger size is necessary when the urine is thick or bloody .

Female catheterisation

- Remember to use the right sized catheter for the purpose it is needed for
- If anaesthetic gel is used this should be placed into the urethra 5 minutes prior to catheterisation
- Two pairs of sterile gloves should be used to avoid cross contamination when cleansing and instilling gel. The outer pair is removed after cleansing and prior to catheter insertion



Female catheterization cont.

- 💡 If the catheter is accidentally inserted into the vagina, leave it in place to prevent it happening again
- 💡 Use a new catheter
- 💡 Once this is successfully in place remove the first catheter from the vagina

Procedure (female)

- Explain the procedure to the patient and gain informed consent
- Take the pre prepared trolley to the bedside and place on left or right depending on nurses dominant hand
- Raise the bed to an appropriate height and ensure a good light source and position the patient
- Expose the genital area with consideration for patient dignity and place a disposable pad beneath the patient
- Wash and dry hands

Procedure cont

- Ensure asepsis is maintained and open packs and equipment onto the trolley
- Open the catheter but do not remove it from the internal wrapper and place it in the sterile receiver on the trolley
- Pour an appropriate cleanser or solution into the galipot
- Open the catheter bag and arrange it on the side of the bed, ensuring the attachment tip is accessible and remains sterile
- Squeeze small amount of lubricant or anaesthetic gel onto a gauze swab

Procedure cont.

- Draw up the amount of sterile water to inflate the balloon
- Wash hands again and put on two pairs of sterile gloves
- Place the sterile dressing towel between the patients legs and over the patients thighs
- Using a gauze swab and the non dominant hand retract the labia minora to expose the urethral meatus. This hand is used to maintain labial separation until procedure is completed

Procedure cont.

- Clean the perineal area using a new gauze swab for each stroke cleansing from the front towards the anus
- Place the receiver holding the catheter on the sterile towel between the patients legs
- Expose the tip of the catheter by pulling off the top of the wrapper at the serrated or notched edge
- Lubricate the catheter tip with anaesthetic or lubricating gel
- Hold the catheter so the distal end remains in the receiver

Procedure cont.

- Gradually advance it out of the wrapper into the urethra in an upward and backward direction for approximately 5-7cm or until urine flows
- Advance a further 5 cm, do not force the catheter
- Inflate the balloon with the correct amount of water
- Attach the catheter drainage bag and position so there is no pulling on the catheter

Male catheterisation

- Ensure the patient has no history of prostatic hypertrophy
- It is important to hold the penis at 60 to 90 degrees to the body, this reduces the risk of strictures or narrowing of the urethra

Male catheterisation cont.

- Anaesthetic lubricating jelly should be placed into the urethra and the practitioner must wait 5 minutes for this to be effective
- If the patient complains of any severe discomfort during the procedure then the procedure should be stopped immediately
- If resistance is felt increasing the traction on the penis may reduce the spasm of the external sphincter
- Encouraging the patient to cough may also ease the passage of the catheter

Procedure (male)

- Explain the procedure to the patient and gain informed consent
- Take the pre prepared trolley to the bedside and place on left or right depending on nurses dominant hand
- Raise the bed to an appropriate height and ensure a good light source
- Expose the genital area with consideration for patient dignity and place a disposable pad beneath the patient
- Wash and dry hands

Procedure (male) cont

- Ensure asepsis is maintained and open packs and equipment onto the trolley
- Open the catheter but do not remove it from the internal wrapper and place it in the sterile receiver on the trolley
- Pour an appropriate cleanser into the galipot
- Open the catheter bag and arrange it on the side of the bed, ensuring the attachment tip is accessible and remains sterile

Procedure (male) cont

- Prepare the anaesthetic lubricating gel and remove end tip
- Draw up the amount of sterile water to inflate the balloon
- Wash hands again and put on two pairs of sterile gloves
- Place the sterile dressing towel between the patients legs and over the patients thighs
- Using a gauze swab and the non dominant hand retract the fore skin to expose the urethral meatus.
- Clean the area

Procedure (male) cont

- using a new gauze swab for each stroke
- Hold the penis at 60-90 degrees to the body
- Warn the patient the anaesthetic gel may sting and instil the gel via the urethral meatus
- Place a finger over the meatus and hold penis at same angle for 5 minutes to allow the gel to work
- Place the receiver holding the catheter on the sterile towel between the patients legs

Procedure (male) cont

- Expose the tip of the catheter by pulling off the top of the wrapper at the serrated edge
- Hold the catheter so the distal end remains in the receiver
- Gradually advance it out of the wrapper into the urethra until urine flows
- Advance a further 5 cm, do not force the catheter
- Inflate the balloon with the correct amount of water
- Attach the catheter drainage bag and position so there is no pulling on the catheter



Points for consideration

- ❖ Catheter valves can be used instead of urine drainage bags for bladder training purposes
- ❖ Catheter retention balloons should not be over filled so as to avoid urinary bypassing
- ❖ Leg bags can be used in mobile patients
- ❖ Following male catheterisation always roll the fore skin back over the glans penis to prevent a paraphimosis occurring-(foreskin cannot return to its position)

Complications associated with urethral catheterisation

- Urinary tract infection
- Urethral injury
- Encrustation and blockage
- Bypassing -leakage of urine
- Patient discomfort

Intermittent self catheterisation

- This refers to the periodic insertion of a catheter through the urethra to empty urine from the bladder
- Procedure is commonly used by patients requiring intravesical(to the bladder) medication instillation, or patients with neurogenic(nerves) voiding problems
- Self lubricating PVC or silicone catheters are often used for the procedure



Procedure has several advantages over urethral catheterisation:

- Allows more patient independence
- Decreased impact upon patient body image
- Less discomfort
- Can allow the patient to continue with their sexual relationships

Suprapubic catheterisation

- Procedure involves insertion of specially designed catheter into the bladder via the abdominal wall
- Procedure is performed under either local or general anaesthesia



Indications

- Urinary retention or voiding problems caused by prostatic obstruction or infection
- Urethral stricture
- When urethral catheterisation is not possible
- If trauma present to pelvis or urinary tract
- Patients undergoing surgery to pelvis or urinary tract



Contraindications

- ❖ Patients with haematuria
- ❖ Known bladder tumour
- ❖ Small fibrotic bladders
- ❖ Prosthetic devices in the lower abdomen



Risk factors of procedure

- Bowel perforation/ haemorrhage at cystostomy formation
- Cystostomy complications, e.g. localised infection
- Pain, discomfort, irritation
- Urethral leakage especially in females

Procedure

- Surgical procedure performed in some hospitals by urology clinical nurse specialists
- Local or general anaesthesia
- Cystostomy (surgical opening) is formed between internal bladder and external abdominal wall
- Specially designed self retaining catheter is inserted which forms a complete seal
- Catheter is connected to urine drainage bag as normal

Conclusion

- Catheterisation is a commonly performed procedure in clinical practice
- Urethral catheterisation of both male and female patients is a nursing procedure
- The nurse needs an awareness of the anatomy and physiology of the urinary system
- The steps of the procedure including the rationale and potential complications

Conclusion

- Patients who perform intermittent self catheterisation require good health education
- The nurse needs a good awareness of the procedure to promote this health education
- Suprapubic catheters may also be used but performed as a minor surgical procedure possibly by a urology clinical nurse specialist or doctor



