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Question No: 1

If there is non-visualization of ureteral segment on IVU and CTU Which alternative Procedure will be Perform? What is the general Protocol for Performing thats procedures

When non-visualization of ureteral segment on IVU and CTU then we used retrograde Pyeloureterography to Performing these Procedure. A retrograde Pyelogram is a type of X-ray that allow visualization of the bladder, ureters, and renal pelvis. Generally this test is Performed during a Procedure called cystoscopy evaluation of the bladder with an endoscope. During a cystoscopy, contrast dye, which help enchance the X-ray images, can be introduced into the ureters via a catheter-

* General Protocol for these Procedures:

1 Before Procedure:

Before having an Retrograde Pyelography done, there are a few thing you should do in Preparations:

1 Fast for a few hours before the Procedure: Many doctors will tell you to stop eating and drinking after midnight on the day of the procedure. You may not be able to eat or drink from 4 to 12 hours before the procedure.

2 Take a laxative: You may be given an oral laxative or an enema to make sure your digestive system is cleaned out.

3 Take some time off work: This is an outpatient procedure, meaning it only takes a few hours. However, your doctor will likely give you general anesthesia to keep you asleep during the procedure. You probably won't be able to go to work and will need someone to drive you home.

4 stop taking certain medications: Your doctor may tell you to stop taking thinners or certain herbal supplements before the test.

5 Taking any medications or herbal supplements to tell your doctor before hand if you are.
6 Tell your doctor befor hand if your are Pregnant or think you might be Pregnant.
7 Tell your doctor you have allergic to any kind of contrast dye or Iodine.
8 Tell your doctor that you have allergic to certain medications, metals, or materials that may be used in the Procedure, such as latex or anesthesia.

2 During Procedure:
Before this Procedure, you will be asked to:
1 Remove all jewelry and, in some cases, your clothing.
2 Put on a hospital gown (if you are asked to remove your clothing).
3 An intravenous (IV) tube will be inserted in a vein in your arm to give you anesthesia.
4 You will be asked to lies face upon the x-ray table and place your legs in stirrups.
5 You may receive a sedative or general anesthesia in the IV prior to the insertion of the endoscope.

6 An endoscopy will be inserted through the urethral opening and advanced into the bladder. Once the endoscope is in place, the bladder can be examined and a catheter may be inserted into one or both ureters.

7 The contrast will be injected through the catheters.

8 A series of X-rays will be taken at timed intervals.

9 The catheter will be removed.

10 The doctor will check for retention of the contrast.

3 After Procedure:

Your doctor may ask you to watch your urine for blood or other abnormalities for a few days to make sure there are no complications. call your doctor right away if you notice any of these symptoms.

1 high fever (101°F or higher)
2 bleeding or swelling around your urethral opening.
3 blood in your urine
4 trouble urinating.
5 Increase pain around the urinary opening.

Question NO:2
Which radiological Procedure is commonly Performed for assessing congential anomalies of renal System? Explain detail the Whole Procedure.

Intravenous Pyelography (IVP):

An intravenous Pyelography (IVP) also called an intravenous urography (IVU) or excretory urography (EU) is a radiological Procedure used to visualize abnormalities of the urinary system, including the kidneys (renal Parenchyma, Pelvicalyceal system), ureters, and bladder.

Indications:

check for normal function of kidneys
check for anatomical variants or congential anomalies (e.g horse-shoe kidney)
check the course of the ureters
detect and localize a ureteric obstruction (urolithiasis).
Assess for synchronous upper tract disease in those with bladder transitional cell carcinoma (TCC).

* Contraindications:
- Contrast allergy
- Hepato-renal syndrome
- Thyrotoxicosis
- Raised serum creatinine.

* Contrast Media:
- HOCM or LOCM 370 are acceptable but the following "high-risk" groups should receive LOCM:

1 Infants and small children and the elderly.
2 Those with renal and or cardiac failure.
3 Poorly hydrated patients
4 Patients with diabetes, myelomatosis or sickle-cell anaemia
5 Patients who have had a previous severe contrast medium reaction with LOCM or those with a strong allergic history.

- Adult dose:
  50ml
- Paediatric dose:
  1 ml kg-1

* Patient Preparation:

- No food for 5h prior to the examination. Dehydration is not necessary and dose not improve image quality.
- Patients should preferably, be ambulant for 2h prior to the examination to reduce bowel gas.
- The routine administration of bowel preparation fails to impove the diagnostic quality of the examination and its use makes the examination more unpleasant for the patients.
- If the examination is to be performed on a patients who has previously had a severe contrast medium reaction, consideration should be given to administering methyl Prednisolone 32mg orally 12 and 2 h prior to injection of contrast medium in addition to ensuring that a LOCM is used.

* Preliminary Films:

- Supine, full length AP of the abdomen, in inspiration. The lower border of the cassette is at the level of the symphysis pubis and the x-ray beam is centred in the mid-line at the level of the iliac crests. The position of overlying opacities may be further determined by:

- Supine AP of the renal areas, in expiration. The X-ray beam is centred in the mid-line at the level of the lower costal margin.
- 35° posterior oblique views, or
- Tomography of the kidneys at the level of a third of the AP diameter of the patient (approx, 8-11 cm). The optimal angle of swing is 25-40°.

* Techniques
- The median antecubital vein is the Preferred injection site because flow is retarded in the cephalic vein as it pierces the clavipectoral fascia.
- A 19-G needle is advanced up the vein to reduce the risk of a Perivenous injection and the injection is given rapidly as a bolus to maximize the density of the nephrogram.
- Upper arm or shoulder pain may be due to stasis of contrast medium in the vein. This is relieved by abducation of the arm.

Films:
Immediate film: AP of the renal areas. This film is exposed 10-14s after the injection. It aims to show the nephrogram, i-e. the renal parenchyma opacified by contrast medium in the renal tubules.
5-min film: AP of the renal areas. This film is taken to determine if excretion is symmetrical and is invaluable for assessing the need to modify technique, e.g. a further inject of contrast medium if there has been poor initial opacification.
A compression band is now applied around the patient's abdomen and the balloon positioned midway between the anterior superior iliac spines, i-e precisely over the ureters as they cross the pelvic brim.
The aim is to produce better pelvicalyceal distension.
Compression is contraindicated:
after recent abdominal surgery
after renal trauma
If there is a large abdominal mass when the 5-min film show already distended calyces.

15-min film: AP of the renal areas. There is usually adequate distension & the Pelvicalyceal system with opaque urine by this time. Compression is released when satisfactory demonstration of the pelvicalyceal system has been achived.

Release film: Supine AP abdomen. This film is taken to show the whole urinary tract. If this film is satisfactory the patient is asked to empty their bladder.

After micturition film: Based on the clinical findings and the radiological findings on the earlier films. This will be either a full-length abdominal film or a coned view of the bladder with the tube angled 15° caudad and centred 5cm above the symphysis pubis.

Complications:

Due to the contrast medium

Due to the technique: Incorrectly applied abdominal compression may produce intolerable discomfort or hypotension.

Question No: 3
Which Procedure is performed for investigation of extrahepatic billary obstruction Disscuss the general protocal followed for that procedure.

Ans Investigation of extrahepatic billary obstruction the Proceduse may be used that are ERCP. Endoscopic retrograde Cholangiopancreatography is a technique that combines the use of endoscopy and flurroscopy to diagnose and treat certain Problems of the billary or pancreatic ductal systems.

→ Although percutaneous transhepatic Cholangiography (PTC) has higher success rate for demonstrating bile ducts. ERCP has three advantages over PTC.

1 The ability to visualize and biopsy ampullary lesions.
2 The demonstration of billary tree and Pancreatic ducts
3 Greater therapeutic potential

ERCP is usually performed by Physicians or surgeons rather than radiologists.

* Indications:
- Investigation of extrahepatic billary obstruction
- Post-cholecystectomy syndrome
- Investigation of diffuse biliary disease e.g sclerosing Cholangitis.
- Pancreatic disease.

* Contraindications:
- Australia antigen-positive; HIV-positive
- Oesophageal obstruction. varices; Pyloric Stenosis
- Previous gastric surgery
- Acute pancreatitis
- Pancreatic pseudocyst
- When glucagon or Buscopan are contraindicated
- Severe cardiorespiratory disease.

* Contrast Medium:
Pancreas
LoCM 240
Bile ducts
LoCM 150; dilute contrast medium ensures that calculi will not be obscured

* Equipment:
- Side-viewing endoscope
- Polythene catheters
- Fluoroscopic unit with spot film facilities

* Patient Preparation:
- Nil orally for 4 h prior to procedure
- Premedication
- Antibiotic cover

* Preliminary film:
Prone AP and LAO of the upper abdomen, to check for opaque gallstones and pancreatic calcification/calculi.

* Technique:
- The pharynx is anaesthetized with 4% Xylocaine spray and the patient is given diazepam 5mg min-1 i.v. until sedated.
- The patient then lies on the left side and the endoscope is introduced
- The ampulla of Vater is located and the patient is turned prone.
- A polythene catheter prefilled with contrast medium is inserted into the ampulla, having ensured that all air bubbles are excluded.
- A small test injection of contrast under fluoroscopic control is made

to determine the position of the cannula.
- It is important to avoid over-filling of the Pancreas. If it is desirable to opacify both the biliary tree and pancreatic ducts, then the latter should be cannulated first. A sample of the bile should be sent for culture and sensitivity if there is evidence of biliary obstruction.

* Films:
Pancreas (using fine focal spot)
1. Prone, both Posterior obliques
Bile ducts
1. Early filling films to show calculi.
a. Prone - straight and posterior obliques
b. Supine - straight, both obliques; Trendelenburg to fill intrahepatic ducts; semi-erect to fill lower end of common bile duct and gall bladder.
2. Films following removal of the endoscope, which may obscure the duct.
3 Delayed film to assess the gallbladder and emptying of the common bile duct.

After Care:

Nil orally until sensation has returned to the Pharynx (0.5-3h).
Pulse, temperature and blood Pressure half-hourly for 6h.
Maintain antibiotics if there is biliary or pancreatic obstruction.
Serum/urinary amylase if pancreatitis is suspected.

Complications:

Due to the contrast medium
Allergic reactions - rare
Acute pancreatitis - more likely with large volumes, high pressure injections.
Due to the technique
Local:
Damage by the endoscope
Distant:
Bacteraemia, septicaemia, aspiration pneumonitis, hyperamylasaemic (approx 70%)
Acute pancreatitis (0.7-7.4%).

General Protocol of ERCP:-

You may have diet and or medication restrictions the week before the ERCP test. Please ask your physician for detailed instructions. Be sure to let your physician know if you take any

type of blood thining medication.

2. You will not be allowed any heavy meal for at least 8 hours before the Procedure, light meals or opaque liquid for 6 hours before or clear liquids for at least 2 hours before.

3 Plan to take the day off from work.

4 Plan to have someone you know drive you home. Because the procedure is performed with general anesthesia, you will not be allowed to drive after the Procedure or return to work until the next day.

5 Let your Physican know about any special needs, medical conditions, allergies (such as latex) and all current medications you are taking. In some cases, your doctor may Prescribe an antibiotic before the Procedure.

6 In some cases, when patients need certain therapeutic intervention during an ERCP Procedure, they may be admitted to the hospital overnight for observation.

7 Plan to arrive 30 minutes before your scheduled procedure time.

8 You will have an intravenous line placed, because the Procedure is Performed with anesthesia.

You will be positioned on your stomach with your head turned to the right side.
After the Procedure is completed, you will recover for about 60 to 90 minutes.
You may experience a sore throat.
Once you have met the discharg criteria, Your physician will discuss the Preliminary findings with you and let you know if you need to undergo additional testing. You also will find out when you can resume taking your usual medications.
Tell your doctor if you are, or may be Pregnant. If you are Pregnant and need ERCP to treat a Problem, the doctor performing the procedure may make changes to Protect the fetus from X-rays. Research has found that ERCP is generally safe during Pregnancy.

Question NO:4
Which radiological Procedure is recommended for evaluating the cause of female infertility? Explain the Procedure in details?

Ans Hysterosalpingography (HSG):
Hysterosalpingography is a Procedure where X-rays are taken of a woman's reproductive tract after a dye is injected. Hystero means uterus and salpingo means tubes, so hysterosalpingography literally means to take pictures of the uterus and fallopian tubes. This Procedure may also be called hysterography (HSG).

* Indications of Hysterosalpingography:
1 Infertility (tubal patency, Asherman's Syndrome)
2 congenital uterine anomalies
3 Recurrent miscarriage
4 Abnormal uterine bleeding
5 Diagnosis of uterine mass (fibroids)
6 Evaluation following pelvic trauma.

* Contraindication of HSG:
1 Pregnancy
2 Bleeding
3 Immediate Premenstrual or Postmenstrual Phase.

Recent untreated pelvic infection
Tubal or uterine surgery within last 6 weeks.
Contrast medium sensitivity.

Contrast Mediums
Oily contrast medium is no longer recommended
HOCM or LOCM 300. Volume 10-20 ml.
LOCM has no advantage with regard to imag quality or side effect but the nonionic dimer, Iobrolan is associated with a lower incidence and decreased severity of delayed pain.

Equipments:
Fluoroscopy unit with spot film device
Vaginal speculum
Vulsellum forceps
Uterine cannula, Leech-Wilkinson cannula, olive or 8-F Paediatric Foley catheter.

Patient Preparation:
The patient should abstain from intercourse between booking the appointment and the time of the examination unless she uses reliable method of contraception or the examination can be booked between the fourth and tenth days in a

Patient with a regular 28-day cycle.
Apprehensive (fearful) patients may need premedication.

Preliminary Film:
Coned AP view of the pelvic cavity.

Technique:
The patient lies supine on the tables with knees flexed, legs abducted and heels together.
Using aseptic technique the operator inserts a speculum and cleans the vagina and cervix with chorhexidine.
The anterior lip of the cervix is steadied with the vulsellum forceps and the cannula is inserted into the cervical canal.
If 1 Foley catheter is used, there is usually no need to grasp the cervix with the vulsellum forceps.
Care must be taken to expel all air bubbles from the syringe and cannula, as these would otherwise cause confusion in interpretation. Contrast medium is injected slowly under intermittent fluoroscopic control.
Spasm of the uterine cornu may be relieved by i.v. glucagon.

- NB: Opiates increase pain by stimulating smooth muscle contraction.

* Films:
- Using the undercouch tubes:
1. As the tubes begin to fill.
2. When peritoneal spill has occured and with all the instruments removed.

* After care:
- It must be ensured that the patient is in the no serious discomfort nor has significant bleeding before she leaves.
- The patient must be advised that she may have bleeding per vagina for 1-2 days and pain may persist for up to 2 weeks.

* Complications:
- Pain (because of dilatation of uterus, spillage into peritonium).
- Bleeding
- Vasovagal episode
- Infection (Pelvic)
- Pregnancy irradiation
- Allergic reaction (to iodinated contrast media)
- Failure
- Intravasation (secreted by kidney causing obscure fallopian tube).

Detectable Pathology:
Conditions which may be detected with HSG include:

Uterine Pathologies:
uterine congential anomalies
submucosal uterine fibroids
uterine malignancy
adenomyosis
intrauterine adhesions
uterine (endometrial) polyps

Tubal pathologies:
tubal polyps
tubal malignancy
hydrosalpinx
salpingitis isthmica nodosa (SIN)
tubal spasm: can be physiological
salpingectomy
obliteration of fallopian tubes.

Question No: 5
Explain in detail the conventional radiological Procedure used for diagnosing the disorders of joints, ligaments and tendons

Arthrography:
Method:
Single Contrast (contrast)
Double contrast (air)

* Indications:

- Joint capsule born
- Joint cavity
- Synovial membrane
- Articular cartilage, labrium
- Ligments
- Tendons
- Loose bodies with in joint
- Prosthesis assessment (loosening, infection)

* Contraindication:

- Active arthritis
- Joint infection
- Bleeding problems
- Previous sensitivity to contrast media

* Equipments:

- Fluoroscopy with spot films devices

* Preliminary film:

- Routine plain film radiograph.
- AP and true Lateral of the joint of interest.
- Axial in shoulder and oblique view inversion/eversion in ankle.
- Radial and ulnar deviation in wrist joint.

* **After Care:**
- Avoid driving for two days
- Joint pain may occur.

* **Complication:**
- Allergic reaction
- Synovitis (inflammation of synovial membrane).
- Pain capsular rapture
- Trauma to adjacent structure eg nerves and vessels.

* **Knee Joint Arthography:**
- The Pabient is lying supine.
- Using sterile technique the skin and underlying soft tissue are anesthetised Posterior to mid point of the patella.
- 21g needle is inserted in to the joint space and then slightly angle anteriorly so that the tip of the needle comes to lie against the Posterior surface of Patella.
- An effusion is aspired and small dose of contrast is injected to ensure the correct positioning of the needle.
- Then full volume of contrast medium (4ml) is injected followed by 40ml of air for double contrast
- The needle is then removed and the limb is exercised for uniform

distribution of contrast.

Hip Arthography:

The patient is lying supine with legs internally rotated so that entire length of femoral neck is visualised.
The position of the femoral vessels are visualised to avoid puncture.
The skin is clean using aseptic technique.
A point marker is placed at the site of entry and should be parallel to inter trochanter line, after local anaesthesia 20 or 22g needle is then advance in the femoral neck.
Test injection of contrast will demonstrate correct positioning of the needle.
Any fluid in joint is aspired and sent for examination.
Inject 6 to 8ml of contrast under fluoroscopic control.
The needle is then removed and joint is exercised for equal distribution of contrast within joint.

Shoulder Arthography:

The patients is lying supine with arm of side under examination close to the body external rotation. So that the head of biceps is out of the path of needle. Using sterile technique the skin and soft tissue are anaesthetised 1cm inferior and 1 cm lateral to the coracoids process a spinal needle 21g is inserted vertically in to the joint space under fluoroscopy guidance and test dose of contrast is injected followed by full injection 15ml for single contrast or air (2ml) to distend the synovial sac (double contrast). The needle is then removed and joint is exercised for uniform distribution of contrast medium.

Common uses of the Procedure:

Arthrographic images help physicians evaluate alterations in structure and function of a joint and help to determine the possible need for treatment, including arthroscopy, open surgery or joint replacement.

The procedure is most often used to identify abnormalities within the

shoulder
elbow
wrist
knee
ankle
hip

The Procedure is often used to help diagnose persistent, unexplained joint pain or discomfort. In some cases, local anesthetic medications or steroids may be injected into the joint along with the contrast material. These medications may temporarily decrease joint-related pain or inflammation and provide physicians additional information about possible source of pain.