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Q1 If there is non visualization of urethral segment on IUV and CTU which alternative procedure will you perform.

## RETROGRADE PYLOURETERO-GRAPHY:

Also referred to a retrograde pyeloureterography. This procedure is use as alternative for IUV if there is non visualization of urethral segment on it.

## PROCEDURE:

Procedure includes

Indications.

Contraindications.

Contrast medium.

Equipment, patient preparation, preliminary films.

Technique

Films.

After use.

Complications.

# GENERAL PROTOCOLS:

Tell health care providers if you are

- Pregnant or think you may be. Radiation exposure during pregnancy may lead to birth defect.
- Are allergic or sensitive to any medicines, contrast dye or iodine because there is risk of allergy due to contrast dye.
- Have kidney failure or other kidney problem. In some cases contrast dye can cause kidney failure.

Possible complications include:  
Sepsis, Urinary tract infections,  
Bladder tear, Bleedings  
nausea vomiting.



Q2) Which radiological procedure is commonly performed for assessing congenital anomalies of renal system. Explain in detail the whole procedure.

## INTRAVENOUS PYELOGRAPHY:

Intravenous pyelography (IVP) also called an intravenous urography (IVU) or excretory urography (EU) is a radiological procedure use to visualize abnormalities of urinary system, including the kidneys (renal parenchyma, pelvicalyceal system), ureters and bladder.

### INDICATIONS:

- ⇒ Check for normal function of kidneys.
- ⇒ Check for anatomical variants or congenital anomalies (e.g horse shoe kidney).
- ⇒ Check the course of ureters.



obstruction

→ 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:

HO CM and LO CM 370 are acceptable but the following high risk groups should receive CO CM.

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 anemia.

5' Patients who have a previous severe contrast medium reaction with IOPM or those with strong allergic history.

Adult dose: 50 ml.

Paediatric dose: 1ml kg<sup>-1</sup>

### PATIENT PREPARATION:

- 1' No food for 5h prior to the examination. Dehydration is not necessary and doesn't improve image quality.
- 2' Patients should preferably be ambulant for 2h prior to the examination to reduce bowel gas.
- 3' The routine examination of bowel preparation fails to improve the diagnostic quality of the examination and its use makes the examination more unpleasant.



for patient.

4. If examination is to be performed on a patient who previously had a severe contrast medium reaction, consideration should be given to administering methyl prednisolone 32 mg orally 12 and 2 h prior to injection of contrast medium in addition to ensuring that a LOCM is used.

## PRELIMINARY FILM:

1. Supine, full length AP of abdomen in inspiration. The lower border of cassette is at the level of symphysis pubis and x-ray beam is centred in the midline at the level of iliac crest.

The position of overlying sparticles may be further determined by.

2. Supine, AP of renal areas, in expiration. The x-ray beam is centred in the midline at the level of lower costal margin.



3. 35% posterior oblique views or

4. Tomography of kidneys at the ~~mid~~ level of a third of the AP diameter of patient (approx. 8-11 cm). The optimal angle of swing is  $25-40^\circ$ .

### TECHNIQUE:

The median antecubital vein is preferred injection site because flow is retarded in cephalic vein as it pierces the clavipectoral fossa.

A 19-G needle is advanced up the vein to reduce the risk of a perivascular injection and the injection is given rapidly as a bolus to maximize the density of nephrogram.

Upper arm or shoulder pain may be seen due to stasis of contrast medium in the vein. This is relieved by abduction of the arm.



# FILMS:

## 1. Immediate film:

AP of renal areas. This film is exposed 20-145 after the injection (arm to kidney time). It aims to show nephrogram i.e. renal parenchyma specified by contrast medium in the renal tubules.

## 2. 5-min film:

AP of renal areas. This film is taken to determine if excretion is symmetrical and is invaluable for assessing the need to modify technique, e.g. further injection of contrast medium if there has been poor initial specification.

A compression band is now applied around the patient's abdomen and balloon positioned midway between the anterior superior iliac spine 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 large abdominal mass.
- When the 5-min film shows already distended calyces.

### 15-min film:

AP of renal areas. There is usually adequate distension of pelvicalyceal systems with opaque urine by this system. Compression is released when satisfactory demonstration of pelvicalyceal system has been achieved.

### Release film:

This film is taken to show the whole urinary tract. If film is satisfactory the patient is asked to empty the bladder.

### After micturition film:

Based on the



clinical findings and radiological findings on the earlier films, this will be either a full length abdominal film or a coned view of the bladder with tube angled  $15^{\circ}$  caudad and centred 5 cm above the symphysis pubis.

The principal value of the film is to assess bladder emptying, to demonstrate a return to normal of dilated upper tracts with relief of bladder pressure, to aid the diagnosis of bladder tumours, to confirm ureterovesical junction calculi and uncommonly to demonstrate a urethral diverticulum in females.

### ADDITIONAL FILMS:

1.  $35^{\circ}$  posterior obliques of the kidneys, ureters or bladder.
2. Tomography - when there are confusing overlying shadows.
3.  $30^{\circ}$  caudad angulation of the



tube for the renal area. This may throw a faecal laden transverse colon clear of the kidneys.

4. Prone abdomen may provide better visualization of ureters/kidneys by making them more dependent.

## COMPLICATIONS:

Due to the contrast medium.

Due to technique. Excessively applied abdomen compression may produce intolerable discomfort or hypotension.

- Q3: Which procedure is performed for investigation of extra hepatic biliary obstruction? Discuss the general protocol followed for that procedure.

# ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY



Endoscopic retrograde cholangiopancreatography is a technique that combines the use of endoscopy and fluoroscopy to diagnose and treat certain problems of biliary and pancreatic ductal systems.

## ~~GENERAL~~ STANDARD PROTOCOLS: (Procedure)

### INDICATIONS:

1. Investigation of extrahepatic biliary obstruction.
2. Post cholecystectomy syndrome.
3. Investigation of diffuse biliary disease e.g. sclerosing cholangitis.
4. Pancreatic disease.

### CONTRAINDICATIONS:

1. Australia antigen - positive, HIV positive.
2. Oesophageal obstruction; varices  
pyloric stenosis.
3. Previous gastric surgery.
4. Acute pancreatitis.
5. Pancreatic pseudocyst.
6. Severe cardiorespiratory disease.



# CONTRAST MEDIUM:

Bile ducts

20 CM 250 i dilute contrast medium ensures that calculi will not be obscured.

Pancreas

10 CM 240.

# EQUIPMENT:

1. Side viewing endoscope.
2. Polythene catheters.
3. Fluoroscopic unit with spot film facilities.

# PATIENT PREPARATION:

1. Nil orally for 4h prior to procedure.
2. Premedication.
3. Antibiotic cover.

# PRELIMINARY FILM:

Prone AP and LAO of the upper abdomen, to check for opaque gallstones and pancreatic



calcification.

## TECHNIQUE:

The pharynx is anesthetized with 4% xylocaine spray and the patient is given diazepam 5 mg  $\text{min}^{-1}$  iv until sedated. The patient then lies on the left side and endoscope is introduced.

The ampulla of Vater is located and patient is turned prone.

A polythene catheter prefilled with contrast medium is inserted into ampulla having ensured that all air bubbles are excluded.

A small test injection of contrast medium under fluoroscopic control is made to determine the position of cannula.

It is important to avoid overfilling of pancreas. If it is desirable to opacify both the biliary tree and pancreatic duct, then the latter should be



accumulated first id sample of bile should be sent for culture and sensitivity if there is evidence of biliary obstruction.

## FILMS:

Bile ducts.

2. Early filling films to show calculi -
  - a. Prone - straight and postero-obliques.
  - b. Supine - straight, both obliques; Trendelenburg to fill intra-hepatic ducts; semi-erect to fill lower end of common bile duct and gallbladder.
2. Films following removal of endoscope which may obscure the duct
3. Delayed films to assess the gallbladder and emptying of the common bile duct.



## AFTERCARE:

1. Nil orally until sensation has returned to pharynx.
2. Pulse, temperature and blood pressure half-hourly for 6h.
3. Maintain antibiotics if there is biliary obstruction.

## COMPLICATIONS:

Due to contrast medium:

1. Allergic reactions rare.
2. Acute pancreatitis - more likely with large volumes, high pressure injections.

Due to technique:

Local:

Damage by endoscope e.g. rupture of oesophagus, damage to ampulla, proximal pancreatic duct and distal common duct.

Distant:

Bacteraemia, septicaemia, aspiration pneumonia, hyperamylasaemia (approx 70%).  
Acute pancreatitis (0.7-7.4%).



# GENERAL PROTOCOLS:

⇒ You should ask your doctor about any allergy or medical conditions you have and all prescribed medications you take, including:

Arthritis medicines,

Aspirin,

Blood thinners,

Blood pressure medicine,

Diabetes medicine,

NSAIDS.

⇒ Doctor may ask you to stop taking (temporarily) medicines

⇒ Tell your doctor if you are pregnant, If you are pregnant the procedure may make changes to protect the fetus from X-rays.

⇒ For safety you can't drive for 24 hours after ERCP as sedatives need time to wear off.

⇒ Don't eat, drink etc anything before the procedure.



Q4: Which radiological procedure is recommended for evaluating the cause of female infertility. Explain procedure in detail.

## HYSTEOSALPHINGOGRAPHY

This procedure is used to detect the cause of infertility in women.

Also known as hysterosalpingography and is a fluoroscopic technique (examination) of uterus and fallopian tubes.

### INDICATIONS:

1. Infertility -
2. Recurrent miscarriages.
3. Following tubal surgery.
4. Assessment of integrity of a caesarean uterine scar.

### CONTRAINDICATIONS:

1. Pregnancy.
2. A purulent discharge on inspection of vulva or cervix, or diagnosed



3. PID in the preceding 6 months.
3. Recent dilation and curettage or abortion or immediately post menorrhagia. This applies only to oily contrast medium because of risk of intravasation
4. Contrast sensitivity

## CONTRAST MEDIUM:

Oily contrast medium is no longer recommended.

HO CM or LO CM 300 volume  
10 - 20 ml.

LO CM have no longer advantage with regard to image quality or side effects but the nonionic dimer iodolan, is associated with a lower incidence and decreased severity of delayed pain.

## EQUIPMENT:

1. Fluoroscopy unit with spot film device.
2. Vaginal speculum.
3. Bivalve forceps.
4. Uterine cannula, Leach Mickson cannula.



## PATIENT PREPARATION:

1. The patient should abstain from intercourse between booking the appointment and the time of examination unless she uses a reliable method of contraception or the examination

can be booked between the fourth and tenth days in

Apprehensive patients may need pre medication.

## PRELIMINARY FILM:

Cored PA view of pelvic cavity

## TECHNIQUE:

1. The patient lies supine on the table with knees flexed, legs abducted and heels together.
2. Using aseptic technique the operator inserts a speculum and cleans the vagina and cervix with chlorhexidine.
3. The anterior lip of cervix



is steadied with the vulsellum forceps and the cannula is inserted into the cervical canal

4. Care must be taken to expell all air bubbles from the syringe and cannula.
5. Spasm of uterine cornu may be relieved by iv glucagon.
6. NO: Opiates increases pain by stimulating smooth muscle contraction.

## FILMS:

Using undersauch tube:

1. As tubes begin to fill.
2. when peritoneal spill has occurred and with all instruments removed.

## COMPLICATIONS:

1. Pain may be severe.
2. Bleeding from trauma to uterus or cervix.
3. Transient nausea, vomiting and headache.



Q.5: Explain in detail the conventional <sup>on</sup> radiological procedures for diagnosing disorders of joints, tendons and ligaments.

## ARTHOGRAPHY:

This procedure is use for diagnosing disorders of joints, tendons and ligaments.

### METHOD

Single contrast.  
Double contrast (air).

### INDICATION:

Joint capsule torn.  
Joint cavity.  
Synovial membrane.  
Ligaments.  
Tendons.

### CONTRAINPICATTON:

Acute arthritis.  
Joint infection.  
Bleeding problems.  
Previous sensitivity to contrast media.



## EQUIPMENT:

Fluoroscopy with spot film devices

## PRELIMINARY FILM:

Routine <sup>plain</sup> film radiograph  
AP and true lateral of joint  
interests.

Acial in shoulder and oblique  
view / inversion / eversion in ankle.  
Radial and ulnar deviation  
in wrist joint.

## TECHNIQUE:

Technique varies depending on  
the joint being investigated.  
In general patient should be  
positioned in a comfortable  
position that allows him/her  
to remain immobile.

## AFTER CARE:

Avoid drinking for two days.  
Joint pain may occur.



## COMPLICATIONS

Allergic reaction.

Synovitis.

Joint capsular rupture.

Trauma to adjacent structure.