

Name: Umair Hayat
ID: 15291
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Q-1

Ans Intravenous pyelograms

It is also called an Intravenous Urogram is a radiological procedure used to visualize abnormalities of the urinary system, including the kidney, ureters and bladder. Unlike a kidney ureters and bladder X-ray, which is a plain radiograph, an IVP uses contrast to highlight the urinary tract.

Procedure:

An injection of X-ray contrast medium is given to a patient through a needle or cannula into the vein, typically in the antecubital fossa of arm. The contrast is excreted or removed from the bloodstream via the kidneys, and the contrast media becomes visible on X-rays almost immediately after injection. X-rays are taken at specific time intervals to capture the contrast. This gives a comprehensive view of the patient's anatomy and some information on the functioning of the renal system.

Normal Appearances:

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Immediately after the contrast is administered, it appears on an x-ray as a renal blush. This is the contrast being filtered through the cortex. At an interval of 3 minutes, the renal blush is still evident, but the calyces and renal pelvis are now visible. At 9-13 minutes the contrast begins to empty into the ureters and travel to the bladder. To visualize the bladder correctly, a post micturition x-ray is taken.

An IVP can be performed in either emergency or routine circumstances.

Emergency IVP:

This procedure is carried out on patients who present to an Emergency department, usually with severe renal colic and positive hematurial test. In this circumstances, the attending physician required to know whether a patient has a kidney stone and if it is causing any obstruction in the urinary system.

Sometimes discharged based on the size.

Patient with a kidney stone and obstruction are usually required to

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Stay in hospital for further treatment.
An Emergency IVP is carried out roughly as follows.

- plain KUB or abdominal x-ray.
- an injection of contrast media, typically, 50 ml.
- delayed abdominal x-ray taken at roughly 15 minutes post injection.

Routine IVP:

This procedure is most common for patients who have unexplained microscopie or microscopie hematuria. It is used to ascertain the presence of a tumour or similar anatomy altering disorder. The sequence of images is roughly as follows.

- plain or control KUB image
- immediate x-ray of just the renal area.
- 5-minute x-ray of just the renal area.
- 15 minute x-ray of just the renal area.

At this point, compression may or may not be applied.

In pyelography, compression involves pressing on the lower abdominal area which results in distension

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the upper urinary tract.

- If compression is applied: a 10-minute post-injection X-ray of the renal area taken, followed by a KUB on release of the compression.
- If compression is not given: a standard KUB is taken to show the ureters emptying.
- A post-micturition X-ray is taken afterwards. This is usually a coned bladder view.

Image Assessment:

The kidneys are assessed and compared for:

- Regular appearance, smooth outlines, size, position, equal filtration and flow. The ureters are assessed and compared for:
- Size, a smooth regular and symmetrical appearance. A standing column is suggestive of a partial obstruction. The bladder is assessed for:
- Regular smooth appearance and complete voiding.

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Q-2

Ans Intravenous Pyelography:

• An Intravenous Pyelography (IVP) is also called an Intravenous Urography (IVU) or excretory Urography (EU), is a radiological procedure to visualize abnormalities of the urinary system including the kidney, ureters and bladder.

Indications:

- Check for normal function of kidneys.
- Check for anatomical variants or congenital anomalies.
- Check the course of the ureters.
- detect and localize a ureteric obstruction
- assess for synchronous upper tract disease in those with bladder transitional cell carcinoma.

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.
- Infants and small children and

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the elderly.

- Those with renal or cardiac failure
- Poorly hydrated patients.
- Patients with diabetes, myeloma-lysis or sickle-cell anaemia.
- Patients who have had a previous severe medium reaction with LDM or those with a strong allergic history.
- Adult dose (50 ml)
- Paediatric dose (1 ml kg^{-1})

Patient Preparation:

- No food for 5 h prior to the examination. Dehydration is not necessary and does not improve image quality.
- Patient should preferably be ambulant for 2 h prior to the examination to reduce bowel gas.
- The routine administration of bowel preparations fails to improve the diagnostic quality of the examination and its use makes the examination more unpleasant for the patient.
- If the examination is not to be performed on a patient.

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who has previously had a severe contrast medium reaction. Consideration should be given to administering methylprednisolone 32 mg orally or 2 h prior to injection of contrast medium in addition to ensuring that a LOCM is used.

Preliminary films:

- 1- 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:
- 2- Supine AP of the renal areas, expiration, the x-ray beam is centred in the mid-line at the level of the lower costal margin.
- 3- 35° posterior oblique view or
- 4- Tomography of the kidneys at the level of the level of the AP diameter of the patient. The optimal angle of swing is $25-40^\circ$.

Technique:

- The medium antecubital vein is the preferred injection site b/c flow is retarded in the cephalic vein as it pierces the clavipectoral fascia.
- Upper arm or shoulder pain may be due to clasp of contrast medium in the vein. This is relieved by abduction of the arm.

Film:

- 1- Immediate film: AP of the renal areas. This film is exposed 10-14 after the injection.
- 2- 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.
- 3- 15-min film: AP of the renal areas. There is usually adequate distension of the pelvicalyceal systems with opaque urine by the time.
4. Release film: Supine AP abdomen. This film is taken to show the whole urinary tract.
- 5- After micturition film: Based on

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The clinical findings and the radiological findings on the earlier films, this will be either a full-length abdominal film or a coed view of the bladder:

Complications:

- Due to the contrast medium
 - Due to the technique: incorrectly applied abdominal compression may produce intolerable discomfort or hypotension.
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Q-3

Ans The procedure which is performed for investigation of extrahepatic biliary obstruction is cholecystectomy and an ERCP.

A cholecystectomy is the removal of gallbladder if there are gallstones. An ERCP may be sufficient to remove small stones from the common bile duct.
ERCP:

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

contains.

Indications:

- Ductal antigen positive
- HIV Positive
- Oesophageal obstruction; varices; pyloric stenosis
- Previous fistula
- Acute pancreatitis
- When glucagon or Buscopan are contraindicated
- Pancreatic pseudocyst
- Severe cardiorespiratory

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Contrast medium:-

pancreas

LOCM 240

Bile ducts

LOCM 150; dilute contrast medium ensures that calculi will not be obscured.

Equipment:-

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

Patient preparation:

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

Preliminary films:

Prone AP and LAO of the upper abdomen, to check for opaque gallstone and pancreatic calcification/calculi.

Technique:-

- The pharynx is anesthetized with 4% xylocaine spray and the patient is given diazepam 5mg min^{-1} i.v. until sedated.
- The patient is 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 overfilling of the pancreas. If it is desirable to opacify both the biliary tree and pancreatic duct, then the latter should be cannulated first. A sample of bile should be sent for culture and sensitivity if there is evidence of biliary obstruction.

Films:-

Pancreas (using fine focal spot)

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

AFTER CARE:-

1. Nil orally until sensation has returned to the pharynx (0.5-3h).
2. Pulse, Temperature and blood pressure half hourly for 6 hours.

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3. Maintain antibiotics if there is biliary or pancreatic obstruction.
4. Serum/urinary amylase if pancreatitis is suspected.

Complications:-

Due to the contrast medium

1. 'Allergic reactions' - rare.
2. Acute pancreatitis, more likely with large volume, high pressure injection.

Due to the technique
local.

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

Distant

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

Q

Q4:

Ans: The following Tests may be recommended as part of female infertility evaluation:

Hysterosalpingogram (HSG):

This is an X-ray procedure to see if the fallopian tubes are open and to see if the shape of the uterine cavity is normal. A catheter is inserted into the opening of the cervix through the vagina. A liquid containing iodine is injected through the catheter. The contrast fills the uterus and enters the tubes, outlining the length of the tubes, and spills out their ends if they are open.

Transvaginal Ultrasonography:

An ultrasound probe placed in the vagina allows the clinician to check the uterus and ovaries for abnormalities such as fibroids and ovarian cysts.

Ovarian Reserve Testing:

When attempting to test for a woman's ovarian reserve, the clinician is trying to predict whether she can produce an egg of good quality and how well her ovaries are responding to the hormone

signals from her brain. The most common test to evaluate ovarian reserve is a blood test for follicle-stimulating hormone, drawn on cycle day 3. In addition to the FSH level, the physician may recommend other blood tests, such as estradiol and inhibin-B, as well as transvaginal ultrasound to do an antral follicle count.

Ovarian reserve testing is more important for women who have a high risk of reduced ovarian reserve, such as women who:

- are over age 35 years
- have a family history of early menopause;
- have a single ovary;
- have a history of previous ovarian surgery, chemotherapy or pelvic radiation therapy;
- have unexplained infertility or
- have shown poor response to gonadotropin ovarian stimulation.

Other blood tests:

Thyroid stimulating hormone and prolactin levels are useful to identify thyroid disorder and hyperprolactinemia which may cause problems with fertility.

menstrual irregularities and repeated miscarriages

Urinary luteinizing Hormone:

over-the-counter "ovulation predictor kits" detect the presence of LH in urine and can detect a rise in this hormone that occurs one to two days before ovulation. However, these tests can be expensive and should only be used by women with menstrual cycles that are consistently 25-35 days length.

Sonohysterography:

This procedure uses transvaginal ultrasound after filling the uterus with saline. This improves detection of intrauterine problems such as endometrial polyps and fibroids compared with using transvaginal ultrasound alone.

Hysteroscopy:

This is a surgical procedure in which a lighted telescope like instrument is passed through the cervix to view the inside of the uterus. Hysteroscopy can help diagnose and treat abnormalities inside the uterine cavity such as polyps, fibroids, and adhesions.

Laparoscopy:

This is a surgical procedure in which a lighted telescope like instrument is inserted through the wall of the abdomen into the pelvic cavity. Laparoscopy is useful to evaluate the pelvic cavity for endometriosis, pelvic adhesions and other abnormalities. It is not a first line option in the evaluation of a female patient. Because of its higher costs and potential surgical risks, it may be recommended depending on the results of other testing and a woman's history, such as pelvic pain and previous surgery. For best results, the infertility evaluation should be individualized based on each woman's specific circumstances.

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Q-5

Ans Method:

- Single contrast (contrast)
- Double contrast (air)

Indications:

- > Joint capsule torn
- > Joint cavity
- > Synovial membrane
- > Articular cartilage, labrum
- > Ligaments
- > Tendons
- > loose bodies within joint
- > Prosthesis assessments

Contraindication:

- > Active arthritis
- > Joint infection
- > Bleeding problems
- > Previous sensitive contrast media

Equipment

- > Fluoroscopy with films devices

Preliminary Film

- Routine plain film radiography
- AP and true lateral of the joint of interest
- Axial in shoulder and oblique view in ankle.
- Radial and ulnar deviation in wrist joint.

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After care:

- Avoid driving for two days
- Joint pain may occur

Complication:

- Allergic reaction
- Synovitis
- Pain capsular rupture
- Trauma to adjacent structure.

Knee Joint Arthrography:

- The patient lying supine
- Using sterile technique the skin and underlying soft tissue are anaesthetised posterior to mid point of the patella.
- 21g needle is needed inserted into the joint space and then slightly angle inferiorly so that the tip of the needle comes to lie against the posterior surface of patella.

- An infusion is aspirated and small dose of contrast is injected to ensure the correct positioning of the needle.

- It is then removed and the limb is exercised for uniform distribution of contrast.

Hip Arthrography:

The patient is lying

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- Supine with legs internally rotated so that the entire length of femoral neck is visualized.
- The position of the femoral vessels are visualized to avoid puncture.
- The skin is clean using aseptic techniques.
- A point marker is used at the site of entry and should be parallel to the trochanter line.
- Test injection of contrast will demonstrate correct positioning of the needle.
- Any fluid in joint is aspirated and sent for examination.
- Inject 6-8 ml of contrast under fluoroscopic control.
- The needle is then removed and joint is exercised for equal distribution of contrast within joint.

Shoulder Arthrography:

The patient is lying supine with arm of side under examination close to the body external rotation. So that the head of humerus is out of the path of needle.

Using sterile techniques, the skin and soft tissue are anesthetized 1cm

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inferior and 1 cm lateral to the coracoid process a spinal needle 21 g is inserted vertically into the joint space under fluoroscopy guidance and test dose of contrast is injected followed by full injection (5ml) for single contrast or air to distend the synovial sac.

The needle is then removed and joint is exercised for uniform distribution of contrast medium.

