NAME: HAMID ULLAH

ID: 14603

Q1.Write a note on Suprarenal glands.

ANS: *SUPRARENAL GLAND:*

The adrenal (or suprarenal) glands are paired endocrine glands situated over the medial aspect of the upper poles of each kidney.

They secrete steroid and catecholamine hormones directly into the blood.

In this article, we shall look at the anatomy of the adrenal glands – their location, structure and vascular supply.

Anatomical Location and Relations:

The adrenal glands are located in the posterior abdomen, between the superomedial kidney and the diaphragm. They are retroperitoneal, with parietal peritoneum covering their anterior surface only.

The right gland is pyramidal in shape, contrasting with the semi-lunar shape of the left gland.

Perinephric (or renal) fascia encloses the adrenal glands and the kidneys. This fascia attaches the glands to the crura of the diaphragm. They are separated from the kidneys by the perirenal fat.

Anatomical Structure

The adrenal glands consist of an outer connective tissue capsule, a cortex and a medulla. Veins and lymphatics leave each gland via the hilum, but arteries and nerves enter the glands at numerous sites.

The outer cortex and inner medulla are the functional portions of the gland. They are two separate endocrine glands, with different embryological origins:

Cortex – derived from the embryonic mesoderm.

Medulla – derived from the ectodermal neural crest cells.

The cortex and medulla synthesise different hormones.

Cortex:

The cortex is yellowish in colour. It secretes two cholesterol derived hormones – corticosteroids and androgens. Functionally, the cortex can be divided into three regions (superficial to deep):

Zona glomerulosa – produces and secretes mineralocorticoids such as aldosterone.

Zona fasciculata – produces and secretes corticosteroids such as cortisol. It also secretes a small amount of androgens.

Zona reticularis – produces and secretes androgens such as dehydroepiandrosterone (DHES). It also secretes a small amount of corticosteroids.

Medulla

The medulla lies in the centre of the gland, and is dark brown in colour. It contains chromaffin cells, which secrete catecholamines (such as adrenaline) into the bloodstream in response to stress.

These hormones produce a ‘flight-or-fight‘ response. Chromaffin cells also secrete enkephalins which function in pain control.

Vasculature:

The adrenal glands have a rich blood supply via three main arteries:

Superior adrenal artery – arises from the inferior phrenic artery

Middle adrenal artery – arises from the abdominal aorta.

Inferior adrenal artery – arises from the renal arteries.

Right and left adrenal veins drain the glands. The right adrenal vein drains into the inferior vena cava, whereas the left adrenal vein drains into the **left renal vein.**

Q2.What do you know about Ureteric calculus? Also explain the shape of bladder.

ANS:*URETERIC CALULUS:*

Ureteral stones are kidney stones that have become stuck in one or both ureters (the tubes that carry urine from the kidneys to the bladder).

If the stone is large enough, it can block the flow of urine from the kidney to the bladder. This blockage can cause severe pain. Kidney stones are formed from excess concentrations of minerals and salts in the urine. These minerals form crystals that grow into stones. Most kidney stones are calcium-based.

Many kidney stones are tiny. Some are too small to see with the naked eye, pass through the urine, and do not cause a problem. Larger stones that get stuck in the urinary tract can cause pain that may be severe.

COMMON ARE URETERIC CALCULUS:

Each year in the United States, about 1 in 1,000 adults is hospitalized for urinary tract stones. They are most common among middle-aged adults. Over your lifetime you have a 1 in 8 chance of forming a stone.

SYMPTOMS ARE URETERIC CALULUS:

Tiny stones that pass through the urinary system on their own may not cause any symptoms. However, stones that block the ureter or any of the kidney's drainage tubes may cause symptoms that include:

- Severe, intermittent (comes and goes) pain in the upper flank (in the back, under the lower ribs) that can radiate (spread) to the lower abdomen, and;
- Nausea and vomiting.

URETERIC CALCULUS DIAGNOSED:

Kidney or ureteral stones are diagnosed by your doctor. He or she may:

Give you a physical exam and ask about your medical history.

Test your urine to see if it contains substances that form stones.

Test your blood to see if you have health problems that may have led to stones.

Order an imaging test to find the location of the stones. Imaging tests may also help to see if you have health problems that may have led to stones. Ultrasound is an effective imaging test to look for blockage. A computed tomography (CT) scan will help guide therapy by informing the doctor of the size, location, and hardness of the stone.

URETERIC CALCULUS TREATMENT:

Treatment of ureteral stones depends on the size and location of the stones and the substances from which they are formed.

Treatment may also be directed by your current circumstances, such as obesity, the use of anticoagulants (blood thinners), and other considerations. The size and location of the stone will give you an idea of the likelihood that you can pass it.

Shock wave lithotripsy: During this procedure, you are set up with a machine that produces focused shock waves to break up the stones. The small pieces of the stones then pass through your urinary tract when you urinate. This is the least invasive option.

Ureteroscopy: The urologist feeds a long tube with an eyepiece, called an ureteroscope, into your urethra (the hole where urine leaves your body). The doctor feeds the scope through the bladder into the ureter, finds the stones, and removes or breaks them up with lasers.

Percutaneous nephrolithotomy: This procedure, which is used for larger or irregularly shaped stones, uses a scope to find and remove the stones. The scope is inserted directly into your kidney through a small incision (cut) in your back.

SHAPE OF BLADDER:

Generally, the bladder is a hollow, muscular, and pear-shaped distensible elastic organ that sits on the pelvic floor. It receives urine via the **ureters,** which are thick tubes running from each kidney down to the superior part of the bladder.

Urine is collected in the **body** of the bladder, and finally it is voided through the **urethra**. The **fundus** is the base of the bladder, which is formed by the posterior wall and contains the trigone of the bladder, and is lymphatically drained by the external iliac lymph nodes. The **trigone** is the structure that contains the outlet (urethra) of the bladder.

While the general volume of the human bladder will vary from person to person, the range of urine that can be held in the bladder is roughly **400 mL (~13.5 oz) to 1000 mL (~34 oz),** with the average capacity being **400 to 600 mL.**

One **mnemonic** often heard in clinical settings related to the bladder is**: "water (ureters) under the bridge."** This phrase describes an anatomical relationship, between the ureters and the uterine arteries (female) or the vas deferens (males). During a hysterectomy, where the uterus and uterine artery are removed, the ureter is in danger of being accidentally damaged. With this mnemonic you remember the relationship of these structures. Or to give another mental image, the ureters are posterior to the ovarian/testicular artery.

Q3.Briefly explain the anatomy of duodenum.

ANS: ***DUODENUM:***

The duodenum is the first section of the small intestine in most higher vertebrates, including mammals, reptiles, and birds. In fish, the divisions of the small intestine are not as clear, and the terms anterior intestine or proximal intestine may be used instead of duodenum. In mammals the duodenum may be the principal site for iron absorption. The duodenum precedes the jejunum and ileum and is the shortest part of the small intestine.

In humans, the duodenum is a hollow jointed tube about 25–38 cm (10–15 inches) long connecting the stomach to the jejunum. It begins with the duodenal bulb and ends at the suspensory muscle of duodenum.It can be divided into four parts.

STRUCTURE:

The duodenum is a 25–38 cm (10-15 inch) C-shaped structure lying adjacent to the stomach. It is divided anatomically into four sections. The first part of the duodenum lies within the peritoneum but its other parts are retroperitoneal.

PARTS:

The first part, or superior part, of the duodenum is a continuation from the pylorus to transpyloric plane. It is superior to the rest of the segments, at the vertebral level of L1. The duodenal bulb about 2 cm long, is the very first part of the duodenum and is slightly dilated. The duodenal bulb is a remnant of the mesoduodenum, a mesentery which suspends the organ from the posterior abdominal wall in fetal life. The first part of the duodenum is mobile, and connected to the liver by the hepatoduodenal ligament of the lesser omentum. The first part of the duodenum ends at the corner, the superior duodenal flexure.

Relations:[citation needed]

Anterior

- Gallbladder
- Quadrate lobe of liver
- Posterior
- Bile duct
- Gastroduodenal artery
- Portal vein
- Inferior vena cava
- Head of pancreas

Superior

- Neck of gallbladder
- Hepatoduodenal ligament (lesser omentum)

Inferior

- Neck of pancreas
- Greater omentum
- Head of pancreas

The second part, or descending part, of the duodenum begins at the superior duodenal flexure. It goes inferior to the lower border of vertebral body L3, before making a sharp turn medially into the inferior duodenal flexure, the end of the descending part.

The pancreatic duct and common bile duct enter the descending duodenum, through the major duodenal papilla. The second part of the duodenum also contains the minor duodenal papilla, the entrance for the accessory pancreatic duct. The junction between the embryological foregut and midgut lies just below the major duodenal papilla.

The third part, or horizontal part or inferior part of the duodenum is 10~12 cm in length. It begins at the inferior duodenal flexure and passes transversely to the left, passing in front of the inferior vena cava, abdominal aorta and the vertebral column. The superior mesenteric artery and vein are anterior to the third part of duodenum. This part may be compressed between the aorta and SMA causing superior mesenteric artery syndrome.

The fourth part, or ascending part, of the duodenum passes upward, joining with the jejunum at the duodenojejunal flexure. The fourth part of the duodenum is at the vertebral level L3, and may pass directly on top, or slightly to the left, of the aorta.

FUNCTION:

The duodenum is largely responsible for the breakdown of food in the small intestine, using enzymes. The duodenum also regulates the rate of emptying of the stomach via hormonal pathways. Secretin and cholecystokinin are released from cells in the duodenal epithelium in response to acidic and fatty stimuli present there when the pylorus opens and emits gastric chyme into the duodenum for further digestion. These cause the liver and gall bladder to release bile, and the pancreas to release bicarbonate and digestive enzymes such as trypsin, lipase and amylase into the duodenum as they are needed.

The villi of the duodenum have a leafy-looking appearance, which is a histologically identifiable structure. Brunner's glands, which secrete mucus, are found in the duodenum only. The duodenum wall consists of a very thin layer of cells that form the muscularis mucosae.

Q4.Explain the anatomy of Spleen.

ANS: *SPLEEN:*

The spleen is an organ located in the upper left abdomen, and is roughly the size of a clenched fist. In the adult, the spleen functions mainly as a blood filter, removing old red blood cells. It also plays a role in both cell-mediated and humoral immune responses.

In this article, we shall look at the anatomy of the spleen – its anatomical position, structure and vasculature.

ANATOMICAL POSITION:

The spleen is located in the upper left quadrant of the abdomen, under cover of the diaphragm and the ribcage – and therefore cannot normally be palpated on clinical examination (except when enlarged). It is an intraperitoneal organ, entirely surrounded by peritoneum (except at the splenic hilum)

The spleen is connected to the stomach and kidney by parts of the **greater omentum** – a double fold of peritoneum that originates from the stomach:

Gastrosplenic ligament – anterior to the splenic hilum, connects the spleen to the greater curvature of the stomach.

Splenorenal ligament – posterior to the splenic hilum, connects the hilum of the spleen to the left kidney. The splenic vessels and tail of the pancreas lie within this ligament.

STRUCTURE:

The spleen has a slightly oval shape. It is covered by a weak capsule that protects the organ whilst allowing it to expand in size.

The outer surface of the spleen can be anatomically divided into two:

Diaphragmatic surface – in contact with diaphragm and ribcage.

Visceral surface – in contact with the other abdominal viscera.

It has anterior, superior, posteromedial and inferior borders. The posteromedial and inferior borders are smooth, whilst the anterior and superior borders contain notches.

In enlargement of the spleen (known as splenomegaly), the superior border moves inferomedially, and its notches can be palpated.

ANATOMICAL RELATION:

It lies in close proximity to other structures in the abdomen:

Anterior

- Stomach

Posterior

- Diaphragm
- Left lung
- Ribs 9-11

Inferior

- Left colic flexure (splenic flexure)

Medial

- Left kidney
- Tail of the pancreas

VASCULATURE:

The spleen is a highly vascular organ. It receives most of its arterial supply from the splenic artery. This vessel arises from the coeliac trunk, running laterally along the superior aspect of the pancreas, within the splenorenal ligament. As the artery reaches the spleen, it branches into five vessels – each supplying a different part of the organ.

These arterial branches do not anastomose with each other – giving rise to vascular segments of the spleen. This enables a surgeon to remove one of these segments without affecting the others (a procedure known as a subtotal splenectomy).

Venous drainage occurs through the splenic vein. It combines with the superior mesenteric vein to form the hepatic portal vein.

Q5.What do you know about Gall bladder. Explain

ANS: ***GALLBLADDER:***

The gallbladder is an organ that's found in your abdomen. Its function is to store bile until it's needed for digestion. When we eat, the gallbladder contracts, or squeezes, to send bile into your digestive tract.

Gallbladder disorders such as gallstones are common digestive conditions. It's estimated that up to 20 million Americans have gallstones. Keep reading to learn more about the gallbladder, its function, and the signs of a gallbladder problem.

LOCATION OF GALLBLADDER:

Gallbladder is located in the right upper quadrant of your abdomen. This is the area on the right side of your abdomen that ranges from the bottom of your sternum (breastbone) to your navel.

Inside your body, the gallbladder can be found under the liver. It's approximately the size of a small pear.

SYMPTOMS OF GALLBLADDER:

One of the most common symptoms of a gallbladder issue is pain. This pain can:

Come on suddenly

Intensify quickly

Occur in the upper right area of your abdomen, but may also be felt in the upper right part of your back

Happen following a meal, often in the evening hours

Last a varying amount of time, from minutes to hours

Other indications that you may have a gallbladder issue are digestive symptoms. These can include nausea and vomiting.

GALLBLADDER CONDITION:

Gallstones (cholelithiasis): For unclear reasons, substances in bile can crystallize in the gallbladder, forming gallstones. Common and usually harmless, gallstones can sometimes cause pain, nausea, or inflammation.

Cholecystitis: Infection of the gallbladder, often due to a gallstone in the gallbladder. Cholecystitis causes severe pain and fever, and can require surgery when infection continues or recurs.

Gallbladder cancer: Although rare, cancer can affect the gallbladder. It is difficult to diagnose and usually found at late stages when symptoms appear. Symptoms may resemble those of gallstones.

Gallstone pancreatitis: An impacted gallstone blocks the ducts that drain the pancreas. Inflammation of the pancreas results, a serious condition.

GALLBLADDER TEST:

Abdominal ultrasound: a noninvasive test in which a probe on the skin bounces high-frequency sound waves off structures in the belly. Ultrasound is an excellent test for gallstones and to check the gallbladder wall.

HIDA scan (cholescintigraphy): In this nuclear medicine test, radioactive dye is injected intravenously and is secreted into the bile. Cholecystitis is likely if the scan shows bile doesn't make it from the liver into the gallbladder.

Endoscopic retrograde cholangiopancreatography (ERCP): Using a flexible tube inserted through the mouth, through the stomach, and into the small intestine, a doctor can see through the tube and inject dye into the bile system ducts. Tiny surgical tools can be used to treat some gallstone conditions during ERCP.

Magnetic resonance cholangiopancreatography (MRCP): An MRI scanner provides high-resolution images of the bile ducts, pancreas, and gallbladder. MRCP images help guide further tests and treatments.

Endoscopic ultrasound: A tiny ultrasound probe on the end of a flexible tube is inserted through the mouth to the intestines. Endoscopic ultrasound can help detect choledocholithiasis and gallstone pancreatitis.

Abdominal X-ray: Although they may be used to look for other problems in the abdomen, X-rays generally cannot diagnose gallbladder disease. However, X-rays may be able to detect gallstones.

GLAABLADDER TREATMENT:

Gallbladder surgery (cholecystectomy): A surgeon removes the gallbladder, using either laparoscopy (several small cuts) or laparotomy (traditional "open" surgery with a larger incision).

Antibiotics: Infection may be present during cholecystitis. Though antibiotics don't typically cure cholecystitis, they can prevent an infection from spreading.

Chemotherapy and radiation therapy: After surgery for gallbladder cancer, chemotherapy and radiation may be used to help prevent cancer from returning.

Ursodeoxycholic acid: In people with problems from gallstones who are not good candidates for surgery, this oral medicine is an option. Ursodeoxycholic acid may help dissolve small cholesterol gallstones and reduce symptoms. Another oral solution is called chenodiol.

Extracorporeal shock-wave lithotripsy: High-energy shockwaves are projected from a machine through the abdominal wall, breaking up gallstones. Lithotripsy works best if only a few small gallstones are present.

Contact solvent dissolution: A needle is inserted through the skin into the gallbladder, and chemicals are injected that dissolve gallstones. This technique is rarely used.