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Department
Bs (Radiology) 6th semester
Final term viva
Assignment

Question no :1
Ans Human Heart MRI:

Magnetic resonance imaging (MRI) uses magnets and radio waves to capture images inside your body without making a surgical incision. It allows your doctor to see the soft tissues in your body, along with your bones.

An MRI can be performed on any part of your body. However, a heart or cardiac MRI looks specifically at your heart and nearby blood vessels.

Unlike a CT scan, an MRI does not use ionizing radiation. It's considered a safer alternative for pregnant women. If possible, it's best to wait until after the first trimester.

Why a heart MRI is done
Your doctor might order a heart MRI if they believe you're at risk for heart failure or other less severe heart problems.

A cardiac MRI is a common test used to assess and diagnose several conditions. Some of these include:

congenital heart defects
coronary heart disease
damage from a heart attack
heart failure
heart valve defects
inflammation of the membrane around the heart (pericarditis)
Because MRIs show cross sections of the body, they can also help explain or clarify the results of other tests, such as CT scans and X-rays.

The risks of a heart MRI
There are no risks for an MRI and few side effects, if any. The test does not use ionizing radiation, and to date, there have been no documented side effects from the radio and magnetic waves it uses. Allergic reactions to the dye are rare.

If you have a pacemaker or any sort of metal implant from previous surgeries or injuries, you may not be able to receive an MRI because it uses magnets. Be sure to tell your doctor about any implants you have before the test.

If you are claustrophobic or have a hard time in enclosed spaces, you may feel uncomfortable in the MRI machine. Try to remember that there is nothing to fear. Talk to your doctor about your concerns before the test. They may prescribe an anti-anxiety medication to help with your discomfort.

Question no :2
Ans Bone of upper limb :

Clavicle.
Scapula.
Humerus.
Radius.
Ulna.
Carpus.
Metacarpus. ...
Phalanges.

Clavicle:

The clavicle, or collar bone connects the trunk to the upper limb by extending from the manubrium of the sternum to the acromion of the scapula. It is technically a long bone with a shaft and two ends, it can be readily palpated, and it is one of the most commonly fractured bones in the body (usually at the junction of its medial two thirds and lateral one third).
The clavicle is the first bone to begin ossification, which occurs in connective tissue ("membrane") during the seventh postovulatory week. The clavicle may be defective or absent in cleidocranial dysostosis. An epiphysial center usually develops at the medial end only.

Scapula:

The scapula, or shoulder blade (figs. 6-3, 6-4, 6-5, 6-6, 6-7, 6-8, 6-9 and 6-10), is a large, flat, triangular bone that connects the clavicle to the humerus. Its body rests on the superior part of the posterolateral thorax, and the bone includes both a spine that articulates with the acromion and a coracoid process.

The scapula is highly mobile. In the anatomical position, the glenoid cavity is directed anteriorward as well as lateralward. Thus, abduction of the arm in the plane of the scapula moves the arm in an anterolateral direction.
The body of the scapula is triangular and has a concave costal surface (subscapular

fossa) applied to the thorax and a dorsal surface, which is divided by the spine of the bone. The smaller superior part is the supraspinous fossa, and the inferior portion is the infraspinous fossa. The superior border of the scapula has the suprascapular notch. The medial border, usually convex, can be seen and felt. The inferior angle and the medial border usually ossify from separate epiphysial centers. The superior part of the lateral border ends in the infraglenoid tubercle. The superolateral part of the scapula is the location of the piriform glenoid cavity for articulation with the head of the humerus. The supraglenoid tubercle lies superior to the cavity.

Humerus:

The humerus is the bone of the shoulder and arm. It articulates with the scapula at the shoulder and with the radius and ulna at the elbow.

The proximal end consists of the head, anatomical neck, and greater and lesser tubercles separated from each other by an intertubercular groove. The head, almost hemispherical, faces medial, superior, and posterior. The anatomical neck is at the periphery of the head, The greater tubercle projects laterally, beyond the acromion. Unless the shoulder is dislocated, a ruler will not make contact simultaneously with the acromion and the lateral epicondyle. The greater tubercle is covered by the deltoid muscle, which is responsible for the normal, rounded contour of the shoulder. The lesser tubercle projects anteriorward . The intertubercular groove contains the tendon of the long head of the biceps. The surgical neck, a common site of fracture of the humerus, is the point at which the superior portion of the bone meets the shaft. The axillary nerve lies in contact with the surgical neck .

Radius:

The radius is shorter than and lateral to the ulna. The proximal end articulates with the humerus, the medial aspect with the ulna, and thedistal end with the carpus.

The proximal end consists of a head, neck, and tuberosity. The superior, concave surface of the head articulates with the capitulum of the humerus. The circumference of the head articulates with the ulna medially but is elsewhere covered by the annular ligament . The head of the radius can be felt immediately inferior to the lateral epicondyle (in the "valley" behind the brachioradialis), particularly during rotation. The tuberosity of the radius is situated on the anteromedial aspect, immediately distal to the neck.

The shaft has anterior, posterior, and lateral surfaces and anterior, posterior, and interosseous borders. The interosseous border is attached by the interosseous membrane to a corresponding border on the ulna .

The distal end of the radius terminates in the styloid process laterally. The process is palpable between the extensor tendons of the thumb. It gives attachment to the radial collateral ligament. The styloid process of the radius is about 1 cm distal to that of the ulna. This relationship is important in the diagnosis of fractures and in the verification of

their correct reduction. On its medial side, the distal end of the radius has an ulnar notch, for articulation with the head of the ulna. At about the middle of the convex dorsal aspect of the distal end of the radius, a small prominence, the dorsal tubercle, may be felt . The inferior surface of the distal end articulates with the lunate (medial) and the scaphoid (lateral).

Ulna:

The ulna is longer than and medial to the radius. It articulates with the humerus proximally, the radius laterally, and the articular disc distally.

The proxiaml end includes the olecranon and the coronoid process. The olecranon is the prominence of the posterior elbow, which rests on a table when a subject leans on his elbow. The lateral epicondyle, the tip of the olecranon, and the medial epicondyle are in a straight line when the forearm is extended, but form an equilateral triangle when the forearm is flexed. The superior aspect of the olecranon receives the insertion of the triceps. The posterior aspect, covered by a bursa, is subcutaneous. The antierior part of the olecranon forms a part of the trochlear notch, which articulates with the trochlea of the humerus. The coronoid process, which completes the trochlear notch, projects anteriorward and engages the coronoid fossa of the humerus during flexion. It is prolonged inferiorward as a rough area termed the tuberosity of the ulna. The radial notch is on the lateral aspect of the coronoid process and articulates with the head of the radius.

The shaft has anterior, posterior, and medial surfaces and anterior, posterior, and interosseous borders. The posterior border is completely subcutaneous and readily palpable. It separates the flexor from the extensor muscles of the forearm.

The distal end includes the styloid process and the head. The styloid process, small and conical, is situated on its posteromedial aspect and is readily palpable. The head of the ulna articulates with the ulnar notch of the radius. The inferior aspect of the head is separated from the carpus by the articular disc.

The shaft begins to ossify during the eighth postovulatory week, and centers appear postnatally for the distal and proxiaml ends of the bone .

Carpus:

The carpal bones, usually eight in number, are arranged in two rows of four. Their names are scaphoid, lunate, triquetrum (or triquetral), pisiform, trapezium, trapezoid, capitate, and hamate. The pisiform lies anterior to the triquetrum, whereas each of the other carpals has several facets for articulation with adjacent bones.

The posterior aspect of the intact carpus is convex and the anterior aspect is concave, where it is bridged by the flexor retinaculum to form the carpal canal or tunnel for the flexor tendons and tkhe median nerve. Hence, the posterior surfaces of the

carpals are generally larger than the anterior, with the exception of the lunate, where the converse holds. The flexor retinaculum extends between the scaphoid and trapezium laterally and the triquetrum and hamate medially. These four bones can be distinguished by deep palpation.

Metacarpus :

The carpus is connected to the phalanges by five metacarpal bones, referred to collectively as the metacarpus. They are numbered from 1 to 5, from the thumb to the little finger. The first is the shortest and the second the longest. They contribute to the palm, and their posterior aspects can be felt under cover of the extensor tendons.

Each metacarpal is technically a long bone, consisting of a base proximally, a shaft, and a head distally. The base articulates with the carpus and, except for that of the first, with the adjacent metacarpal(s) also. The base of the first metacarpal has a saddle-shaped facet for the trapezium. The head of each metacarpal articulates with a proximal phalanx and forms a knuckle of the fist.

The shaft of each metacarpal begins to ossify during fetal life, and centers appear postnatally in the heads of the four medial bones and in the base of the first metacarpal. Accessory centers termed "pseudoepiphyses" are sometimes seen in the head of the first and in the base of the second metacarpal.

Phalanges:

The thumb has two phalanges, whereas each of the other fingers has three. They are designated proximal, middle, and distal. Each phalanx is technically a long bone, consisting of a base proximally, a shaft, and a head distally. The base of a proximal phalanx articulates with the head of a metacarpal, and the head of the phalanx presents two condyles for the base of a middle phalanx. Similarly, the head of a middle phalanx presents two condyles for the base of a distal phalanx. Each distal phalanx ends in a rough expansion termed its tuberosity.

Each phalanx begins to ossify during fetal life, and centers appear postnatally in their bases.

Sesamoid bones are found related to the anterior aspects of some of the metacarpophalangeal and interphalangeal joints. Two located anterior to the head of the first metacarpal are almost constant.

Question no :3

Ans There are three basic reference planes used in anatomy: the sagittal plane, the coronal plane, and the transverse plane.

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An anatomical plane is a hypothetical plane used to transect the body, in order to

describe the location of structures or the direction of movements. In human and animal anatomy, three principal planes are used:

The sagittal plane or median plane (longitudinal, anteroposterior) is a plane parallel to the sagittal suture. It divides the body into left and right.
The coronal plane or frontal plane (vertical) divides the body into dorsal and ventral (back and front, or posterior and anterior) portions.
The transverse plane or axial plane (lateral, horizontal) divides the body into cranial and caudal (head and tail) portions.

Question no :5
Ans : cervical spine

The cervical spine, your neck, is a complex structure making up the first region of the spinal column starting immediately below the skull and ending at the first thoracic vertebra. The neck is unique in that it supports the weight of your head (10 to 11 pounds) and allows a variety of head/neck movement, such as turning your head from side to side, nodding, and looking up and down. The cervical column is comprised of 7 bones (C1 to C7) uniquely shaped to protect the spinal cord that descend from the base of your skull and the spinal nerves or root that exit the spine between each set of bones.

Cervical Arterial Dysfunction If you treat the neck then you need to understand the concept of CAD Sign up My first experience of learning with Physioplus I was impressed by the variety of information all available on my phone giving me freedom and flexibility to learn when and where I want. See •
Structure
Cervical vertebrae.png
Cervical vertebra.png
Cervical Vertebra side view.png
The cervical spine is made up of two anatomically and functionally different segments. These two segments work together to produce rotation, lateral flexion, flexion and extension of the head and neck.[1][2]

It is made up of 7 vertebrae. The first 2, C1 and C2, are highly specialized and are given unique names: atlas and axis, respectively. C3-C7 are more classic vertebrae, having a body, pedicles, laminae, spinous processes, and facet joints.

C1 and C2 form a unique set of articulations that provide a great degree of mobility for the skull. C1 serves as a ring or washer that the skull rests upon and articulates in a pivot joint with the dens or odontoid process of C2. Approximately 50% of flexion extension of the neck happens between the occiput and C1; 50% of the rotation of the neck happens between C1 and C2.

The cervical spine is much more mobile than the thoracic or lumbar regions of the spine. Unlike the other parts of the spine, the cervical spine has transverse foramina in each

vertebra for the vertebral arteries that supply blood to the brain .

Typical Cervical Vertebra (C3-C7) [2]
Vertebral Body
The bodies of these four vertebrae are small, and transverse diameter is greater than anterio-posterior and height dimensions.
The anterior and posterior surfaces are flattened and of equal depth; the former is placed on a lower level than the latter, and its inferior border is prolonged downward, so as to overlap the upper and forepart of the vertebra below.
The upper surface is concave transversely, and presents a projecting lip posterolaterally on either side (Uncinate Process).
The lower surface is concave from front to back, convex from side to side, and presents laterally shallow concavities which receive the corresponding projecting lips of the underlying vertebra.

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Vertebral Foramen

Large, triangular in shape.

Bony Structures

The pedicles are short and project posterolaterally. They are attached to the body midway between its upper and lower borders, so that the superior vertebral notch is as deep as the inferior.

The laminae are long, narrow, and thinner above than below. They curve posteromedially.

The spinous process is short and bifid (to allow ligamentum nuchae to run through). Because the spinous processes are so short, certain superficial muscles (the trapezius and splenius capitis) attach to the nuchal ligament rather than directly to the vertebrae; the nuchal ligament itself attaching to the spinous processes of C2-C7 and to the posterior tubercle of the atlas.

The superior and inferior articular processes of cervical vertebrae have fused on either or both sides to form articular pillars, columns of bone that project laterally from the junction of the pedicle and lamina.

The articular facets are flat and of an oval form:

the superior face backward, upward, and slightly medially.

the inferior face forward, downward, and slightly laterally.

The transverse processes are short and house the foramen transversarium, which, in the upper six vertebrae, gives passage to the vertebral artery and vein, as well as a plexus of sympathetic nerves. Each process consists of an anterior and a posterior part. These two parts are joined, outside the foramen, by a bar of bone that exhibits a deep sulcus on its upper surface for the passage of the corresponding spinal nerve.

The anterior portion is the homologue of the rib in the thoracic region, and is therefore named the costal process or costal element. It arises from the side of the body, is

directed laterally in front of the foramen, and ends in a tubercle, the anterior tubercle. The posterior part, the true transverse process, springs from the vertebral arch behind the foramen, and is directed forward and laterally; it ends in a flattened vertical tubercle, the posterior tubercle.

Atypical Cervical Vertebrae (C1-C2)

C1

The Atlas, C1, is the topmost vertebra, and along with the Axis; forms the joint connecting the skull and spine. Its chief peculiarity is that it has no body, and this is due to the fact that the body of the atlas has fused with that of the Axis. [2]

C2

The Axis, C2, forms the pivot upon which the Atlas rotates. The most distinctive characteristic of this bone is the strong odontoid process (dens) that rises perpendicularly from the upper surface of the body. The body is deeper in front than behind, and prolonged downward anteriorly so as to overlap the upper and front part of the third vertebra. [2]

Question no :4

Ans : Protocols of CT Abdomen:

Indication

.Screening ,control or Baseline scans

.Pathology

.Cyst

.Abscess

.mass

.Tuberculosis

.Vascular lesion

.Calculus

.lymphadnopathy

.Metastasis

.Taruma- rupture

.congenital anomalies- genesis, ectopic

.Contraindications:

Relative

.Hypersensitivity to iondinated contrast media

.Renal insufficiency

.pregnancy

Patient preparation:

.Nil per oral from 5-6 hours

.use laxative as well as water anema for colon examination
.First explain all about examination and its complications to patient.
.Take informed consent from patient or his/her close relatives
.Radiopaque material should be removed from area of examination.

Technique for Routine abdomen

.Injection rate :2-3 m/sec
.Scan delay :40/60sec
.slice thickness; 3-5mm
.slice interval : 1.5 -2.5
.3D reconstruction: MPR,MIP
.Then ,one third oral contrast just before examination
.patient position: Head first, supine with arms extended above the level of head.

Modification in CT Technique Of abdomen

.There are some modification on CT technique depend upon the pathology of different part inside abdomen .
.This modified technique are described as follows.

%% THE END %%