電腦斷層測驗

Computed Tomography

2019 年 8 月 25 日星期日

1. 除題意不清楚或是圖片有問題，禁止詢問與試題有關的問題。

2. 應答時禁止使用任何文件。

3. 請在電腦答案卡上圈選作答

項目	填寫內容
姓名	您的中文與英文姓名
試題名稱	CT Test
項目	不用填寫
科目	不用填寫
受試者識別代碼	您的准考證號碼 25XXX 將您選定之數字的圓圈塗滿。
科目代碼	不用填寫
地點代碼	不用填寫
作答方式	本測驗共有 90 題問題。請使用 1 到 90 作答欄位。 請將測驗卷 Q1 的答案填入答案卷的答案選擇 1。Q2 = 答案選擇 2，Q3 = 答案選擇 3…Q90 = 答案選擇 90。

Q1. Which of the follow is correct description of Vicarious excretion in process of contrast agent discharge?
1. Discharge through liver and a digestive organ
2. Leakage except blood vessel in dynamic enhancement CT image
3. Contrast agent is discharged through renal excretion
4. Discharge through surrounding tissue and organs because of osmotic pressure
5. Contrast agent is discharged through retroperitoneum because of punch in a digestive organ

Q2. Select the one that is a constituent part of a CT device.
1. RF coil
2. CR reader
3. Slip ring
4. Compression plate
5. Flattening filter

Q3. Select the name of one device with multiple data collection systems.
1. Helical CT
2. IVRCT
3. Multi-slice CT
4. Cluster CT
5. Pencil beam CT

Q4. What is the reason why metformin diabetes medicine prohibit internaluse for 48 hour before and after in CT contrast agent examination?
1. Blood pressure rise
2. Diabetes value rise
3. Cause nausea and vomiting
4. Cause arrhythmia in CT contrast agent examination
5. Cause lactacidemia to patients with renal function degradation

Q5. Which of the following is normal range of GFR (Glomerular Filtration Rate)?

1. Below 15
2. 15~29
3. 30~59
4. 60~89
5. Over 90

Q6. Select the one that is not included when evaluating performance of CT.
  1. SD
  2. Slice thickness measurement
  3. Contrast scale
  4. Spatial resolution
  5. T1 measurement

Q7. When the heart system that make electricstimulus and delivery it naturally have a problem, heart beat may drive or slow. What is this symptom?
  1. Arrhythmia
  2. Cardia insufficiency
  3. Myocardial infraction
  4. Ventricular fibrillation
  5. Miocardia

Q8. Which of the following is correct sterilization method for bacillus contamination?
  1. Cleanliness
  2. Prevention
  3. Disinfection
  4. Medical asepsis
  5. Sterilization

Q9. Which of the following is not correct about contamination management in CT room?
  1. Replace the sheet with patient body fluid directly
  2. Put a used needle in a needle container or trash bin
  3. Wear protection glasses and a mask in possibility of patient blood exposure
  4. Wipe a table with antiseptic after an examination of patient having Multi-drug resist ant flora like VRE and MRSA
  5. Wear a N95 mask in an examination of the patient with active tubercularbacillus

Q10. Select the correct statement from the following statements.
  1. CNR is the noise-to-slice thickness ratio.
  2. The slice sensitivity profile is a scale of amplitude of the noise component that corresponds to each frequency.
  3. NPS is affected by the reconstruction filter function.
  4. CT dose index (CTDI) is defined as line integrated dose multiplied by X-ray beam width (BW).

5. The CTDIvol decreases when the pitch factor (PF) is decreased with respect to the X-ray beam width.

Q11. Select the correct statement from the following statements.
1. The dual energy method and the metal artifact reduction method are two methods for removing bone artifacts.
2. The virtual endoscopy (VE) method is a perspective projection method.
3. Reducing slice thickness increases the influence of partial volume effect.
4. Increasing helical pitch reduces helical artifacts in the axial plane.
5. A function focused on high contrast resolution is chosen when observing soft tissue using the VR method.

Q12. Which of the following is the result of this artifact?

 Fig.1

1. Increasing CT HU
2. Increasing noise
3. Loss of contrast resolution
4. Low CT HU
5. Detector failure

Q13. Which of the following is correct location of Defibrillator peddle?
1. Both sternum next
2. Both clavicle under
3. Left clavicle under and right outside under rib
4. Right under clavicle and left under outside rib
5. Right inside rib and under both clavicle

Q14. Which of the following is a factor that affect CT images contrast directly ?
1. kVp meter
2. mA meter
3. Magnetic plate
4. Beam collimation

5. Window width

Q15. Select the correct statement from the following statements.
　　1. The CT value depends on the dose.
　　2. Scatter artifacts cannot be suppressed using software.
　　3. A CT value consists of 10 bits.
　　4. Half reconstruction improves temporal resolution.
　　5. Exposure from overbeaming can be neglected during clinical operations.

Q16. Which of the following is a method to decide slice thickness in Multi detector (MDCT)?
　　1. Control pixel size
　　2. Control beam width like single detector
　　3. Control collimator composed of several slits
　　4. Control collimator in tube and detector
　　5. Control detector row configuration

Q17. Select the correct statement from performance evaluation of CT systems.
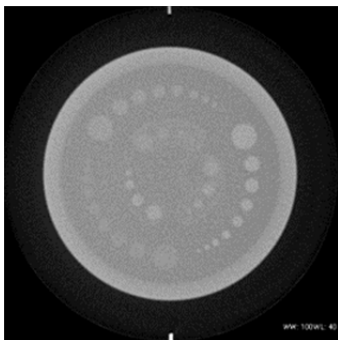
WW 100, WL40　;Fig.2

　　1. Figure2. is a CT image of a low contrast resolution phantom.
　　2. Spatial resolution is to check small differences in CT values.
　　3. Reconstruction function does not affect noise.
　　4. Spatial resolution is evaluated using noise power spectrum.
　　5. Spatial resolution measures the standard deviation of CT values.

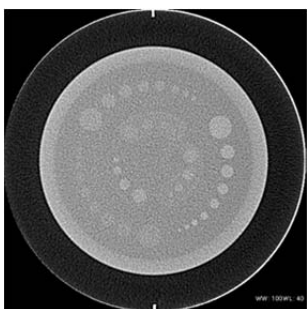Q18. Select the <u>wrong</u> statement from performance evaluation of CT systems.

 Fig.3

1. Fig.3 shows an image reconstructed by a high-frequency algorithm.
2. Priority is given to low contrast resolution for head and abdomen.
3. Bone and lung give priority to spatial resolution.
4. When the slice thickness is changed from 4 mm to 2 mm, the SD of the CT value becomes √2 times.
5. The slice thickness and the image noise are correlated and are proportional to the square root of the ratio of the slice thickness.

Q19. What is the meaning of Y axis in sinogram ?
1. Back projection
2. Number of pixel
3. Number of detector
4. Number of projection
5. X-ray irradiation rotation angle

Q20. What is the main factor that cause hardening artifact occurrence ?
1. Lack of equipment uniformity
2. Lack of equipment linearity
3. Back projector trouble
4. Large x-ray absorb difference
5. Equipment performance

Q21. Select the correct statement from the following statements.
1. A bowtie filter is placed to adjust slice thickness.
2. The range of CT value shown with contrast is -200 to +50 when WW is 200 and WL is 50.
3. The image reconstruction interval is not a factor that affects the quality of three-dimensional images.
4. The spatial resolution is an index that shows the minimum size that can be distinguished.
5. In general, the filming dose and reconstruction filter function do not affect the results of SSP/z.

Q22. Select the correct statement from the following statements.
1. The absorption dose is categorized as a protection quantity.
2. CTDI cannot be used to control accuracy.
3. A smaller dose efficiency results in larger exposure.
4. The dose linearly increases with increasing X-ray tube voltage.
5. Scanning is performed such that the diagnostic reference level is never exceeded.

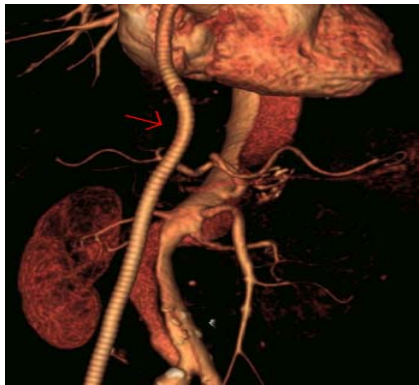Q23. Which of the following is it?

 Fig.4

1. Graft
2. Gelform
3. IVC Filter
4. Balloon catheter
5. Stone basket

Q24. Select the correct statement from the following statements.
1. CTDIvol decreases with increasing X-ray tube current.
2. DLP is not affected by scanning length.
3. X-ray tube current is a factor that affects CNR
4. Multiple reflections affect artifacts on the CT image.
5. Barium sulfate remaining in digestive organs does not appear as artifacts.

Q25. Which of the following is a correct anatomic term of arrow area?

 Fig.5

1. Putamen
2. Caudate
3. Hypothalamus
4. Cerebellopontine cistern
5. Pituitary gland

Q26. Select the wrong statement how to deal with serious side effects caused by contrast agents.
1. Stop injection of the contrast medium.
2. Infusion of glucose solutions into a peripheral vein.
3. Confirmation Vital Sign.
4. Infusions of the Adrenocortical Steroids.
5. Give adrenaline a dilute solution by intravenous injection.

Q27. Which of the following is correct description of this image?

 Fig.6

1. Frontal sinus is observed
2. Image without contrast agent
3. Fracture of inferior concha is observed
4. Inflammation in maxillary sinus is observed
5. Fracture of nasal septum is observed

Q28. Which of the following is correct lung disease in this image?
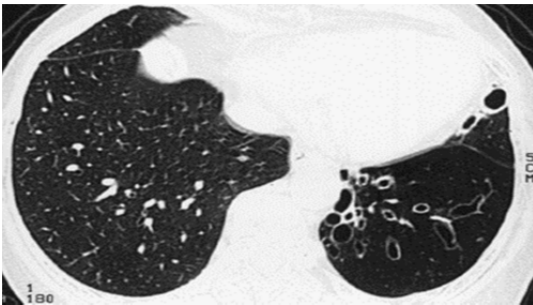
 Fig.7

1. Pneumonia
2. Fibrosis
3. Pneumothorax
4. Bronchiectasis
5. Tuboclosis

Q29. Select the correct statement from the following statements.
1. Changing the X-ray tube voltage changes the CT value.
2. Increasing the X-ray tube current increases noise.
3. Changing the helical pitch does not change slice thickness, noise, nor temporal resolution.
4. A wire phantom is used to measure density resolution.
5. NPS is an index of spatial resolution.

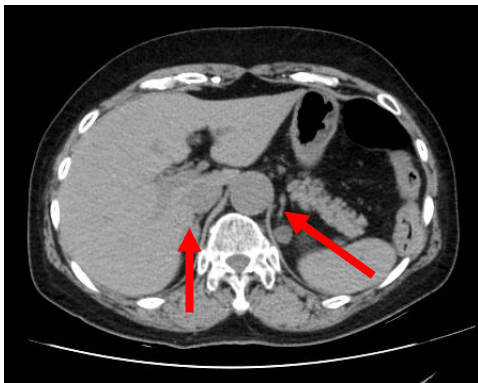Q30. Which of the following are correct anatomic terms and hormones secreted of arrow are as?

 Fig.8

1. Pancreas – Insulin
2. Adrenal gland – Epinephrine
3. Pituitary gland – Epinephrine
4. Adrenal gland – Testosterone
5. Thyloid gland – estrogen

Q31. Select the correct statement from the following statements.
1. The reconstruction function can be convoluted with both raw data and image data.
2. The 180-degree reconstruction method uses only actual data to achieve high density sampling.
3. The effective slice thickness increases in proportion to the helical pitch in single helical CT, but does not always depend on the helical pitch in multi-slice CT.
4. The ECG-gated reconstruction method makes examination possible with a low exposure dose and can be used in patients with high heart rate.
5. A noise reduction filter reduces noise by a smoothing process, and there is no degradation of resolution properties.

Q32. Which of the following is the correct diagnosis of an arrow area ?

 Fig.9

1. Acute renal failure
2. Renal infarct
3. ADPKD
4. Renal artery dissection
5. Renovasculer hypertension

Q33. Which is the following is the method for reduction of artifact?

 Fig10

1. Increasing tube current
2. Decreasing slice thickness
3. Fixing the patient head
4. Using high resolution
5. Using low resolution

Q34. Which of the following is correct description of stereotactic CT

1. Normally do axial scan and coronal scan
2. Use bone algorithm for accurate diagnosis near cancer area
3. Use 20-25cm DFOV like brain CT
4. Be able to calculate target location using pin and metal ruler in the image
5. This is for radiation planning and focusing on cancer target with radiation.

Q35. Which one is the appropriate method to improve this kind of low quality image?

 Fig.11

1. Increase the pitch.
2. Hold a respiration.
3. Remove the metal.
4. Magnify the SFOV.
5. Increase tube voltage

Q36. Select the correct statement from the following statements.
1. For parts where high resolution images are necessary, such as bone or inner ear, an image (post-process) filter is applied to a function for soft tissue to increase reconstruction FOV.
2. An isotropic boxel is a pixel with large CT value.
3. VR is a general name for MPR, CPR, and MIP.
4. The image reconstruction interval affects density resolution of a three-dimensional image.
5. Non-linear filters are commonly used to reduce image noise.

Q37. Which is the following is correct side effect in this examination ?

 Fig.12

1. Pneumonia
2. Pneumothorax
3. Lung metastasis

4. Pleural effusion

5. Pyothorax

Q38. Select the correct statement from the following statements.
1. The SD value was high, therefore the current was decreased to lower the SD value.
2. Shoulder artifacts were prominent, therefore the X-ray tube voltage was decreased.
3. Motion artifacts were prominent, therefore the X-ray tube rotation speed was increased.
4. Motion artifacts were prominent, therefore the helical pitch was decreased.
5. The helical pitch was decreased to shorten CT scan time.

Q39. What is the diagnosis for the image below?
1. Acute subdural hematoma
2. Chronic subdural hematoma
3. Thalamic bleeding
4. Sheath bleeding
5. Brainstem hemorrhage
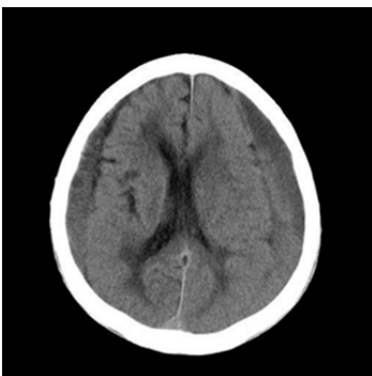
 Fig.13

Q40. Select the number of cranial nerves that penetrate the cranial base.
1. 9
2. 10
3. 11
4. 12
5. 13

Q41. Select the number of bones in a carpal.
1. 8
2. 9
3. 10
4. 11
5. 12

Q42. Choose one blood vessel with aneurysms in a Figure.
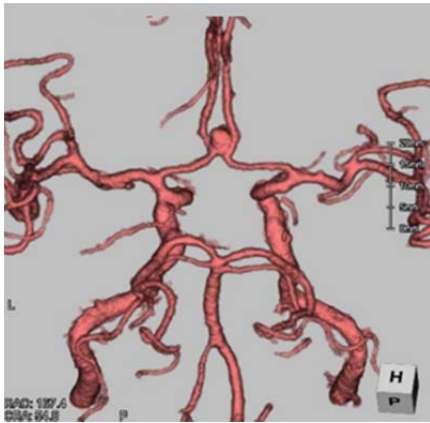
 Fig.14

1. Internal carotid artery bifurcation
2. Middle cerebral artery
3. Previous traffic artery
4. Front cerebral artery
5. Basilar artery

Q43. Select the number of sections in the coronary artery as defined by the American Heart Association (AHA).

1. 12
2. 13
3. 14
4. 15
5. 16

Q44. Select the feeding vessel of the lung.

1. Pulmonary vein
2. Brachial artery
3. Bronchial artery
4. Internal mammary artery
5. Celiac artery

Q45. This is image of a woman in her 20s who have dysponea, heart failure, cyanosis during exercising. What is diagnosis ?
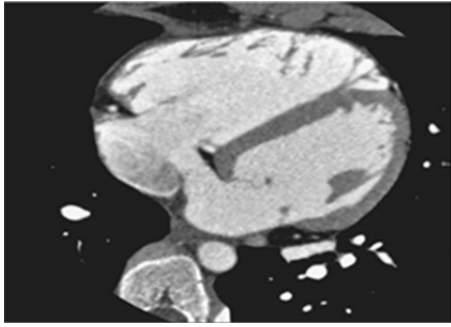
Fig.15

1. Teralogy of Fallot
2. Pulmonary stenosis
3. Aterial septal defect
4. Tricuspid insufficiency
5. Hypertrophic cardiomyopathy

Q46. What is the diagnosis for the image below?
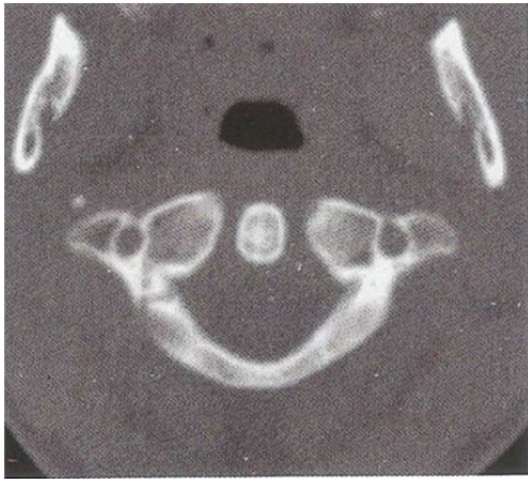
Fig.16

1. Occipital condyle fracture
2. C1 fracture
3. C2 fracture
4. C3 fracture
5. C4 fracture

Q47. Select the organ where the feeding vessel is the inferior mesenteric artery.
1. Rectum
2. Liver
3. Lung
4. Kidney
5. Adrenal gland

Q48. Teenager with pain in the leg. What is the diagnosis?
1. bone infarct
2. Osteoidosteoma
3. Osteosarcoma
4. Osteoarthritis
5. varix
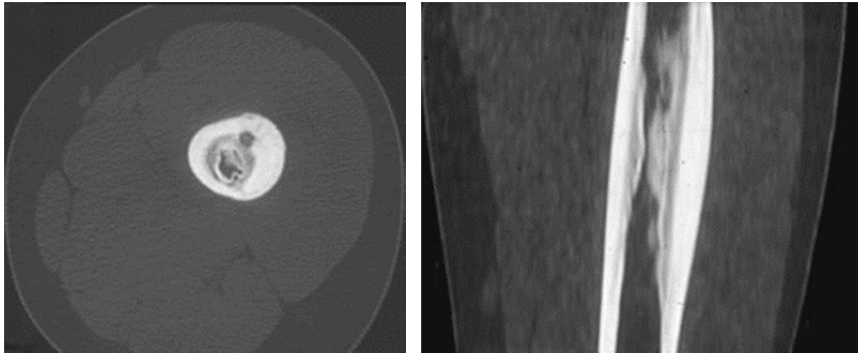
 Fig.17

Q49. Select the change in settings that reduces exposure.
1. Decreasing helical pitch
2. Increasing X-ray tube current
3. Decreasing X-ray tube rotation speed
4. Decreasing SD in auto exposure control (AEC) settings
5. Decreasing X-ray tube voltage.

Q50. Which of the following is correct method to get the images ?

 Fig.18

1. Don't need NPO for Pre-treatment
2. Use Usability contrast agent
3. Inject contrast agent with drip infusion method
4. Using subtraction method to get the image
5. Using contrast agent with high viscosity and a big particle

Q51. Which of the following is the correct diagnosis of this image?
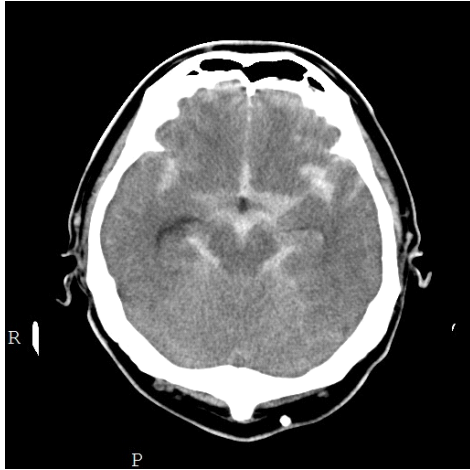
 Fig.19

1. Cerebral infaction
2. Epidural hemorrhage
3. Subdural hemorrhage
4. Subarachnoid hemorrhage
5. Intra ventricular hemorrhage

Q52. Regarding scanning conditions, select the part where the SD is to be set to the smallest value.

1. Head
2. Breast
3. Abdomen
4. Pelvis
5. Joint

Q53. Arrow in CT image points to.

 Fig.20

1. Aorta
2. SVC
3. IVC
4. Right Pulmonary Artery
5. Main Pulmonary Artery

Q54. Select the disease where image diagnosis using simple CT is superior to using MRI.

1. Acute phase stroke
2. Hepatoma
3. Cerebral hemorrhage
4. Cerebral aneurysm
5. Anterior cruciate ligament tear

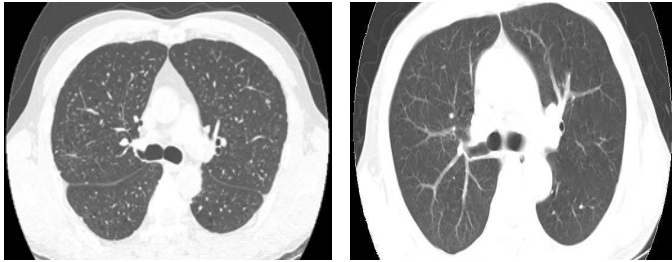Q55. what is the scan parameter that makes difference between two images ?

 Fig.21

1. kVp
2. Reconstruction algorithm
3. mAs
4. Slice thickness
5. Scan time

Q56. Which of the following is correct disease of the nodule shown at the images of liver 3 phase CT?

Fig.22

1. Cyst
2. Abscess
3. Hemangioma
4. Hepatocellular carcinoma
5. Hematoma

Q57. Which of the following is correct examination method for the arrow area in the image?

 Fig.23

1. Urinate before examination

2. Inject saline to vein before examination

3. Post voiding images is essential in this examination

4. Intake water enough for bladder filling before examination

5. After getting pre contrast images, take only arterial phase enhancement images

Q58. Choose the correct disease of below image.

 Fig.24

1. Renal artery dissection
2. ADPKD
3. Renal infarct
4. ARF(acute renal failure)
5. Renal angiomyolipoma

Q59. Which of the following is correct name of the arrow area?
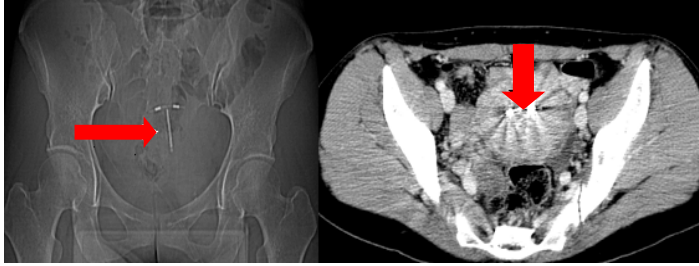
 Fig.25

1. D-J Catheter
2. Stent
3. Pig tail Catheter
4. Bladder stone
5. Intrauterine contraceptive devices

Q60. Which of the following is correct about this image?

 Fig.26

1. MIP (Maximum intensity projection)
2. SSD (Shaded surface display)
3. RIMA (Right internal mammary artery)
4. CABG (Coronary artery bypass graft)
5. MinIP (Minimum intensity projection)

Q61. Select the reconstruction function that is most suitable in high resolution CT (HRCT).

1. Function for soft part
2. Function for head
3. Function for bone
4. Function for 3D uses
5. Function for low contrast

⑤

Q62. Select the maximum slice thickness appropriate in HRCT.

1. 10mm
2. 8mm
3. 5mm
4. 3mm
5. 2mm

Q63. Which of the following is correct anatomic term of this image ?
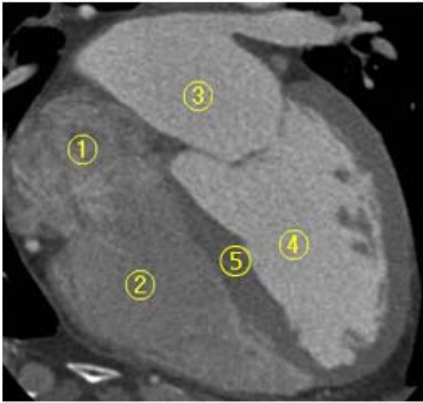
 Fig.27

1. ① – Left atrium
2. ② - Right atrium
3. ③ – Right ventricle
4. ④ – Left ventricle
5. ⑤ - Interventricular

Q64. Choose the disease shown at below images.
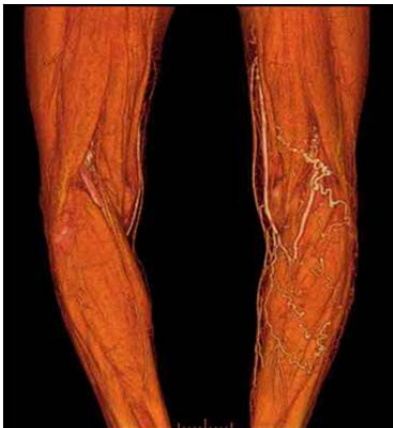
 Fig.28

1. Muscle hematoma
2. Muscle rupture
3. Varicose vein
4. Muscle tumor
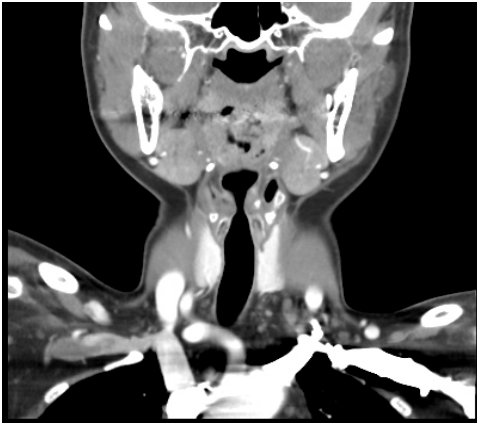5. Lower extremity edema

Q65. Which of the following is correct description like this examination ?

 Fig.29

1. Let patient keep swallowing this saliva during the scan
2. Let patient sound ah to reduce artifact
3. Coronal reformation with thin slice data is applied in this image after helical axial s can
4. Inject slow to reduce artifact at subclavian vein
5. High resolution algorithm is used to improve spatial resolution

Q66. Select the phenomenon that is not a side effect of iodine contrast agents.
1. Vomiting
2. Rubefaction
3. Decrease of blood pressure
4. Difficulty in breathing
5. Convulsive seizure

Q67. Which of the following is correct anatomic term of the arrow are?
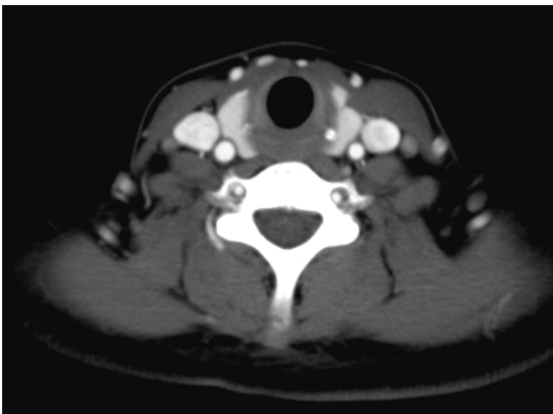
 Fig.30

1. Trachea
2. Esophagus
3. Bronchus
4. LT Jugular vein
5. LT Common carotid artery

Q68. Select the term that is not related to coronary artery CT.

1. Prospective gating
2. Retrospective gating
3. ECG mA modulation
4. Test borus method
5. Xenon contrast agent

Q69. Select the image processing that is not used in coronary artery CT.

1. MIP
2. MinIP
3. VR
4. Curved MPR
5. Stretch MPR

Q70. Which of the following is correct imaged processing method of this image?

 Fig.31

1. Shaded surface display
2. Volume rendering technique
3. Maximum Intensity Projection
4. Virtual Endoscopy
5. Curved Planar Reformation

Q71. Which of the following is correct anatomy observed in this image?

 Fig.32

1. Esophagus
2. Bronchus
3. Descending aorta
4. Iinferior vena cava
5. Pulmonary artery

Q72. Which of the following is correct anatomic term of the arrow area ?
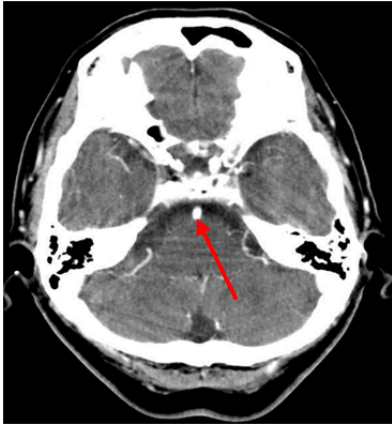
 Fig.33

1. basilar artery
2. Vetebral artery
3. Internal carotid artery
4. Posterior cerebral artery
5. Middle cerebral artery

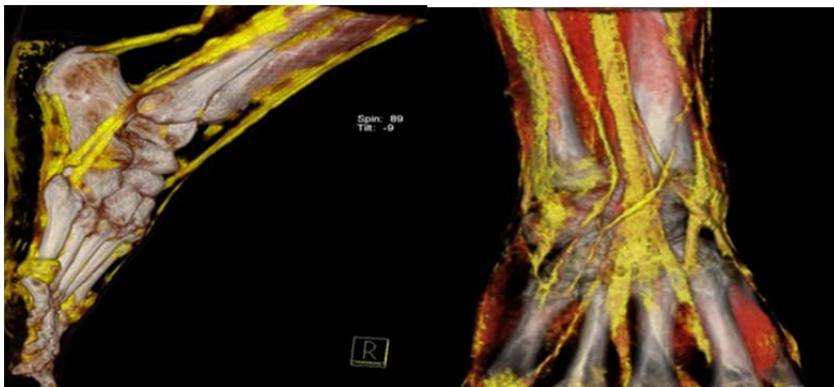Q73. Which of the following is correct about below image?

 Fig.34

1. For diagnosis of fracture
2. Fusion image of two images
3. For diagnosis of tendon
4. The single source is better than the dual sources
5. For diagnosis of muscle

Q74. This is image of a woman in her middle age who have lower abdominal pain. What is diagnosis?
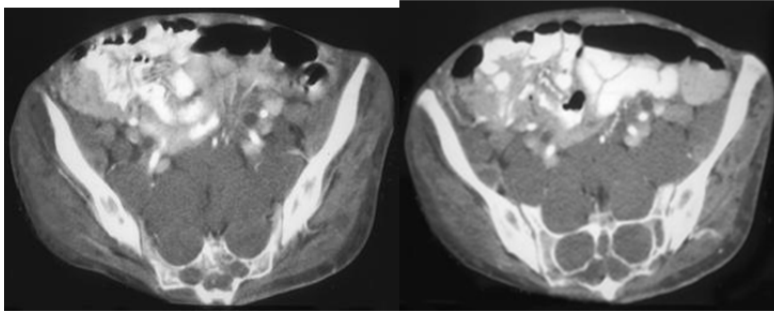
 Fig.35

1. Lymphoma
2. Ovarian cancer
3. Ovarian cysts
4. Uterinemyoma
5. Neurofibromatosis

Q75. Choose the disease shown at below images.

 Fig.36

1. Aortitis
2. Aortic dissection
3. Aortic aneurysm
4. Lung cancer
5. Thymic tumor

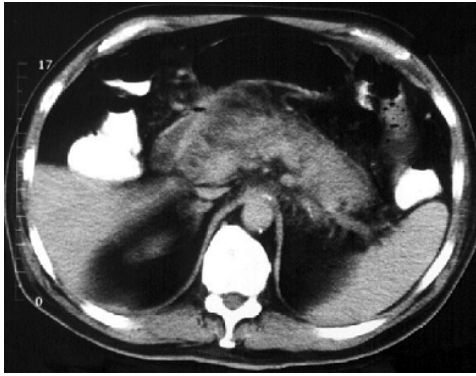Q76. Which of the following is correct diagnosis of this image?

Fig.37

1. Pancreatitis
2. Cholecystitis
3. Pyelonephritis
4. renal cell carcinoma
5. hemangioma

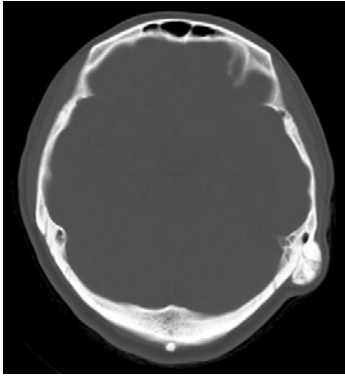Q77. Choose the disease shown at below images.

Fig.38

1. Hematoma
2. Fracture
3. Lipoma
4. Meningioma
5. Exostosis

Q78. This is Biliary & GB CT image. Which of the following is the correct description of these images?
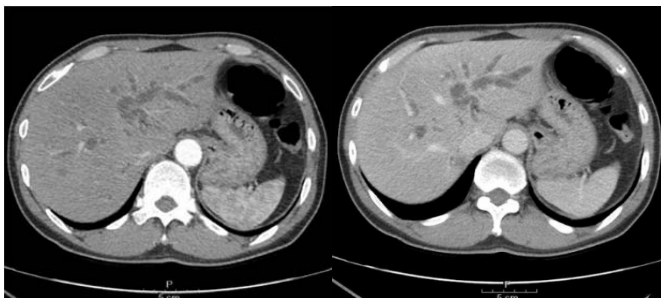

Fig.39

1. Dilated gallbladder is observed
2. Dilated common bile duct is observed

3. Dilated Intrahepatic bile duct is observed
4. Minip method is used to observe dilated bile duct
5. Dilated hepatic vein is observed

Q79. Select the part where image processing is <u>not</u> carried out using the virtual endoscopy method.
1. Large intestine
2. Cerebral aneurysm
3. Bronchi
4. Aorta
5. Spinal cord cavity

Q80. Select the correct statement regarding head CT angiography (CTA).
1. Screening of cerebral aneurysm is more highly recommended than MR.
2. The scan slice thickness should be 1 mm or less.
3. The borus tracking method is not recommended.
4. Beam hardening correction is not related to CTA.
5. FOV should be as large as possible.

Q81. Choose the disease shown at below images.

 Fig.40

1. Acute pancreatitis.
2. Irrhosis of the liver.
3. Gallstone.
4. Hepatocellular carcinoma.
5. Iileus.

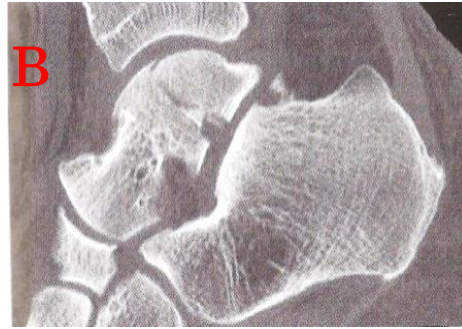Q82. Which of the following is correct anatomic term of the facture area in this image?

Fig.41

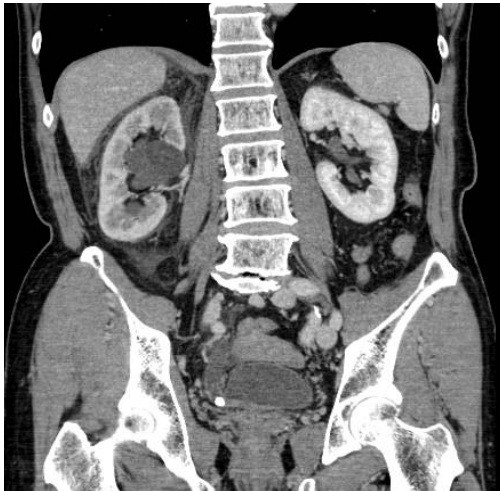|	A	B
1.	Scaphoid	Talus
2.	Capitate	Cuboid
3.	Trapezium	Calcaneal
4.	Trapezoid	Navicular
5.	Cuboid	Scaphoid

Q83.　Choose the disease shown at below images.

Fig.42

1. Gallstone.
2. Ureter stone.
3. Iliopsoas abscess.
4. Dscitis.
5. Splenic infarction .

Q84. Size of pixel is 0.5mm and matrix is 512 x 512. What is FOV?

1. 100 mm
2. 256 mm
3. 320 mm
4. 512 mm
5. 1024 mm

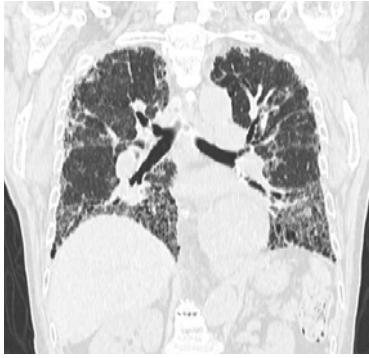Q85. Choose the disease shown at below images.

 Fig.43

1. COPD.
2. Lung cancer.
3. Bronchiectasis.
4. Tuberculosis.
5. Pulmonary edema.

Q86. Which of the following is correct description of AAPM phantom

1. Phantom for calibration
2. Phantom designed by FDA of USA
3. Capacity estimation phantom of some specific CT manufacture
4. Standard phantom for QA
5. Phantom for reconstruction algorithm error measurement

Q87. Select the wrong statement regarding clinical application of dual energy CT.

1. Ureteral calculus analysis
2. Iodine mapping
3. Automated bone removal
4. Virtual simple CT image
5. Virtual contrast CT image

Q88. Select the correct statement regarding CT urography.

1. Scanning is performed on the dorsal position.
2. Scanning time after making contrast is irrelevant.
3. Differences between individuals do not contribute to images in CTU.
4. MIP processing is to be conducted.
5. Scanning after a dynamic exam is difficult.

Q89. Which of the following is correct effect according to pitch increased in Multi-slice CT ?

1. Scan range is increased and scan time is extended
2. Overwork of x-ray tube is increased

3. Patient's radiation dose is increased
4. FWHM is decreased and spiral artifact is decreased
5. Slice width and patient's radiation exposure is almost same but resolution of z-axis is decreased

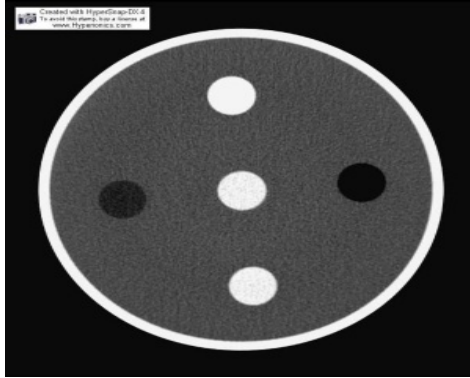Q90. Which of the follow is correct capacity in CT?

 Fig.44

1. Ability to discriminate adjacent matters with high dose reduction coefficient
2. Ability to estimate CT number uniformity of several axial
3. Ability to show variation CT number like water
4. Ability to show each tissue CT number because of line absorption coefficient
5. Ability to control artificial artifact