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(1)

Qs: In which circumstances is liver triphasic examination performed? What is the general protocol for liver triphasic examination?

Ans:

Triphasic CT scan is a good non-invasive tool and can be used as first line imaging modality for differentiating benign and malignant focal liver lesions. Benign lesions like haemangioma can be reliably differentiated from malignant liver lesion; therefore unnecessary biopsies can be avoided.

Haemangioma which are benign tumors are often discovered incidentally during hepatic imaging by ultrasonography, CT, or magnetic resonance (MR). Although in the majority of cases hemangiomas are solitary, some patients have multiple lesions. Most hemangiomas have a characteristic appearance on CT. On unenhanced CT hemangiomas appear as a well-defined hypodense mass of the same density as other

(2)

blood-filled spaces, such as the inferior vena cava. After IV contrast administration the lesion shows progressive pooling of contrast in rounded or oval blood-filled spaces at the lesion periphery. In most cases, with further delay the lesions fills in slowly from the periphery, eventually becoming uniformly enhanced. Occasionally lesions may not fill in completely, likely because of central thrombosis. The liver is most often scanned just once, during the portal venous phase. However, for some indications scanning in more than one enhancement phase may improve the examination's sensitivity. Some tumors are supplied by an abnormal number of external blood vessels. (i.e., hypervascular tumors). Because of this increased blood supply these tumors will display more intense enhancement after an IV contrast injection. Tumors that are hyperenhancing relative to surrounding liver tissue are best detected during the late arterial phase. Liver metastasis

(3)

tend to be hypervascular in case of primary tumors of the thyroid or pancreatic islet cells, carcinoid tumors, renal cell carcinoma, some breast tumors, and melanoma.

The general protocol for liver triphasic examination is:-

CT Body Liver (Hypervascular)

Indications:

Rule out/follow up liver for hypervascular metastases from the following:

- Primary liver tumors.
- Renal cell carcinoma, leiomyosarcoma, thyroid tumors, carcinoid and other neuroendocrine tumors.
- Melanoma and breast (may be hypovascular)
- Pancreatic islet cell tumors, GIST (gastrointestinal stromal cell tumor)

Patient Preparation:

(4)

4-hr Fast

positive oral contrast 60/45/30/15 min prior, remainder immediately prior to scan.

H₂O may be suitable alternative (750 mL 30 min prior, 250 mL immediately prior to scan).

supine / feet first.

Imaging protocol: [2 Phase Liver 5mm (0.5mm)]

[Lrg 2 Phase Liver 5mm (1mm)]

Scan slice thickness	0.5mm x 64 (1mm x 32)
Pitch	Standard
KV	120
mA	^{SURE} Exposure 3D standard
Rotation Time	0.5s (0.75s)

Scan range:

	Arterial Phase	Portal venous Phase
Start	Top of higher hemidiaphragm	Top of higher hemidiaphragm
End	Iliac crests	Below ischium
Plane	Straight gantry	Straight gantry

(5)

Contrast:

Volume	70-120ml (depending on Patient weight)
Rate	4 mL/s
Delay	^{5 sec} Start TM , 180 HV in abdominal aorta + 10s. portal venous @ 65s fixed delay.

Image reconstruction:

5/5 mm volume	Body standard Axial Body standard volume
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Reformatting:

Multiview	Coronal	Sagittal
Start	Posterior	Left
End	Anterior	Right
Thickness	4 mm	4 mm
Spacing	4 mm	4 mm

(6)

Q2: Patient of age 45 years has complain of anosmia, which CT procedure is performed in such case and explain the complete protocol for that examination.

Ans:

Indications:

CT Head and Neck-Sinuses is performed in such case.

Sinusitis, Polyps, Post-nasal drip, # facial bones, anosmia.

Patient Preparation:

Supine / Head First, taking care to position head symmetrically

Always ask if Patient has had Previous Surgery and when it was performed, and document.

Imaging Protocol: (Sinuses HCT 5mm(0.5mm))

(7)

Scan slice thickness	0.5mm x64
pitch	Detail
kV	120
mA	150
Rotation time	0.5 s

Scan range:

Start	Below maxillary sinuses
End	Above frontal sinuses
Plane	Parallel to hard plate

Image reconstruction:

5/5 mm	Bone sharp
Volume	Bone sharp

(8)

Reformatting.

Multiview	Coronal	Sagittal.
Plane	Perpendicular to hard palate	Perpendicular to hard palate
Start	Anterior to frontals	Medial wall of left orbit
End	Posterior to sphenoids	Medial wall of right orbit
Thickness	2mm	2mm
Spacing	2mm	2mm

If the patient is not straight, reformatting may need to be performed manually to ensure correct anatomical position.

Comments:

- If there is a single opaque sinus or completely opaque sinuses, reconstruct 5/5mm axial sections, ^{sup}IQ™ - soft tissue standard.
- If clinical indication is anosmia, reconstruct 5/5mm axial sections, ^{sup}IQ™ - soft tissue standard, and be sure to check anterior cranial fossa for lesions (Requires post-contrast head study.)
- If scanning for a lump on the palate scan patient with mouth open.

(9)

Q3: A Patient was presented with the exacerbated chronic lower back pain in the sacral region with irradiation to the back of the left leg, producing a strong pain throbbing and burning behind the knee. Pain was aggravated when bending forward or in reaching out position, diagnosis is probably a sciatica. Identify the CT examination performed and explain the complete protocol for that examination.

Ans.:

CT Musculoskeletal-Lumbar Spine. is performed.

Indications:

Low Back Pain (LBP), Sciatica, femoral neuralgia, Spinal Canal Stenosis

Patient Preparation:

Supine/Feet first, Sponge under knees, can be scanned in lateral decubitus or prone position if unable to lie supine.

(10)

Imaging Protocol: [Lumbar Spine 3mm (0.5mm)]
[Lrg Lumbar Spine 3mm (0.5mm)]

Scan Slice Thickness	0.5mm x 64
Pitch	Detail
kV	135
mA	Sure Exposure 3D High Quality
Rotation Time	1.0s (1.5s)

Scan range:

Levels Specified, otherwise
Routine L2-S1
if Patient < 30 y.o, then L3-S1 unless
Specific Symptoms @ L2-3.
start Above Pedicle of L2.
End Below S1 (Increase Scan range to
obtain sufficient data for MPRs for
L5-S1 disc.)

Image	reconstruction
3/3 mm	Spine thoracic-Lumbar
3/3 mm	Bone standard
Volume	Spine Thoracic-Lumbar

(11)

Reformatting:

Use spine Program in MPR.

Q: Write the Patient Positioning and examination Protocol for the CT Procedure advised for tarsal Coalition.

Ans: CT Musculoskeletal - Ankle is advised for tarsal Coalition

Indications:

Tarsal Coalition, talar or calcaneal Pathology, ankle joint Pathology loose bodies.

Patient Preparation:

Supine / feet first, ankle of interest at center of FOV, other leg bent up.

Ankle / foot immobilized.

(12)

Imaging Protocol: [Ankle/foot 2mm (0.5mm)]	
Scan Slice Thickness	0.5 mm x 64
Pitch	Detail
kV	120
mA	100
Rotation Time	0.5s

Scan range:

Start	Above ankle joint
End	Below calcaneum
Plane	Straight gantry

Image reconstruction:

2/2 mm	Bone sharp
Volume	Bone sharp
Volume for 3D	Soft tissue Standard

(13)

Reformatting:

	Coronal	Sagittal
plane	True coronal	True Sagittal
start	Posterior to calcaneum	Lateral to fibula
End	Anterior to navicular	Medial to tibia
Thickness	2mm	2mm
Spacing	2mm	2mm

Comments:

If fractured, then 3Ds are required.

Q5: Which CT angiography procedure should be performed for investigating coronary artery disease (CAD). Explain the complete protocols for that CTA.

Ans: CT vascular - CTA Cardiac should be performed for investigating (CAD)

Indications:

Investigation of CAD,
assessment of coronary stents.
Note: we recommend our 10-step guide to coronary CTA for detailed

(14)

instructions for performing these studies.

Patient positioning / set-up:

Supine / Feet first

ECG dots placed on chest, arms above head.

Imaging Protocol: [Cardiac CTA (0.5mm)]

Scan Slice Thickness	0.5mm x 64
Pitch	Determined by ^{sub} Cardio™
KV	120
mA	400
Rotation Time	Determined by ^{sub} Cardio

Scan range:

Start	Carina
End	Below apex of heart
Plane	Straight gantry

(15)

Contrast:

Single-phase contrast injection protocol.

Phase 1	XX mL @ 4-5 mL/s
Phase 2 (saline)	50 mL @ 4-5 mL/s

$XX = (\text{Scan time} + 10) \times \text{injection rate}$
^{sure} Start on descending aorta at level of Pulmonary trunk.
Trigger at 180 HV.

Image reconstruction:

Use imageXact to determine the optimal phase for motion-free images.

Volume Cardiac CTA.

Comments:

^{sure} Cardio should be used to ensure that the Pitch, rotation speed, and reconstruction method are optimized for the scan.