

Multidetector spiral CT angiography: 3D imaging

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Section: Cardiovascular

Imaging Technique: CT

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Case Type: Anatomy and Functional Imaging

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Patient: 56 years, male

Clinical History:

A 56 years old man with history of hypertension recent, "claudicatio" intermittens and continuous pain on the right leg, underwent CT angiography.

Imaging Findings:

A 56 years old man smoking 20 cigarettes per day since his 16th birthday with history of hypertension (170/97), presented with a right leg "claudicatio" intermittens started a few months before. He went to the vascular surgeon for continuous pain on the right leg and he decided for a minimally-invasive angiographic study: a multislice spiral CT Angiography was performed. A large volume was acquired by means of this technique: from the celiac trunk to distal arteries of both lower limbs. No contrast filling in the right femoral artery was observed on axial images. Volume data were transferred to a free-standing workstation using a Volume Rendering algorithm in order to generate a "panoramic" 3D angiography.

Discussion:

Peripheral arteries obstructive disease frequently occurs on elderly patients, particularly if high atherosclerosis risk factors are present. Diffuse and mono-pluri segmental lesions distribution represent two patterns of this disease. In order to evaluate stenosis, obstructions and vascular supplyings, US (Doppler and Power Doppler), DSA (Digital Subtraction Angiography) and MRA are actually performed. Nowadays multidetector spiral CT angiography allows acquisition of large volumes displaying the whole abdominal aorta and inferior limbs arterial tree. Moreover, 3D imaging, particularly Volume Rendering, provides further information on spatial arrangement of vascular structures. Volume Rendering technique, despite MIP (a projective method which may entail problems if calcifications or bony structures are included in the volume of interest), Surface Shaded Display (in which each voxel within a data set is included or excluded whether its density reaches a selected threshold value), uses the entire data set with no information loss as happens on both projectional and surface algorithms. A selective visualization of different structures is obtained by modulating relative opacities and transparencies, using dedicated curves. In order to visualise vascular structures only, bones can be excluded from CT acquisitions by means of sculpture tools.

Differential Diagnosis List: Peripheral arteries obstructive disease

Final Diagnosis: Peripheral arteries obstructive disease

References:

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Figure 1

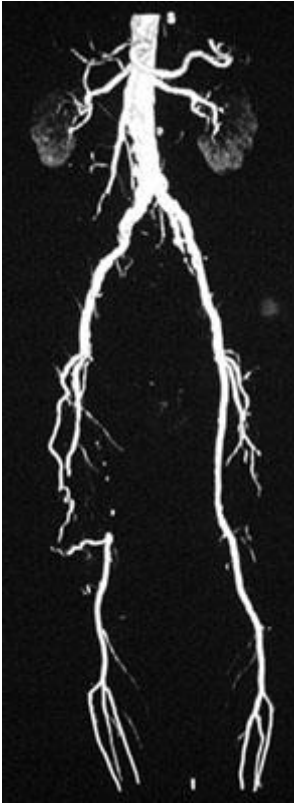
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Description: A very large volume acquired (120 cm) with 3d reconstruction shows the peripheral arterial tree from the celiac trunk to the distal arteries of the legs **Origin:**

Figure 2

a



Description: Post-processing bone segmentation allows to better visualize the obstruction of the right superficial femoral artery with recanalization due to collateral circles from the right deep femoral artery.

Origin: