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Evaluating the Impact of Preoperative CT scans in Revisional Bariatric Metabolic Surgery: A Single-Institute Experience.

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Appendix 1: Examination and techniques

Abdominopelvic computerized tomography (APCT)
The patient was placed supine on the MDCT table, and an intravenous wide-bore cannula was inserted. Imaging was performed using either the Aquilion ONE/PRISM Edition dynamic volume CT system with 320-detector rows or a multidetector 64-detector row helical CT scanner (GE Medical Systems). The imaging parameters included a section collimation of 3-5 mm, high-quality mode, a 7.5 mm/sec table speed, and 50% overlap reconstruction. Two sets of images were obtained. The first set (pre-contrast phase) was acquired before oral or intravenous contrast administration. During this phase, the patient was instructed to hold their breath while a CT study of the abdomen and pelvis was conducted from the lower chest to the inguinal region. Next, the patient swallowed a diluted water-soluble contrast material, and a bolus of 100 mL of contrast media [Omnipaque, 350 mg iodine/mL (Iohexol, GE Healthcare Ireland, Cork, Ireland)] was injected. The patient was then asked to hold their breath again, and CT images, including the port venous phase, were obtained. The estimated radiation dose per patient ranged from 15.2 to 47.8 mSv, depending on the machine used, the DLP, and the patient's BMI.

Virtual gastroscopy (VG)
Multi-detector computed tomography MDCT virtual gastroscopy, and 3D reconstruction were performed. Image acquisition was performed in the supine position and limited to the stomach, which is adequately inflated with gas on the topo gram. Data were transferred to a dedicated 3D workstation. Three-dimensional volume-rendering images were created using manual and semi-automatic segmentation tools. Different masks were created to represent the various relevant structures in different colors.
Patients were instructed to fast for at least 4 h before examination and given an intravenous injection of 40 mg butyl-scopolamine, then asked to swallow 2 to 4 packs of effervescent granules (sodium bicarbonate) as tolerated on the table with no water.

Triphasic CT of the liver:
The recommended patient position for the scan is supine, with their arms positioned above their head. The scout should be taken from the diaphragm to iliac crests, and the scan extent should also be from the diaphragm to iliac crests, The recommended scan direction is craniocaudal and contrast injection considerations such as bolus tracking and monitoring slice at the level of the diaphragmatic hiatus or first lumbar vertebra at the aorta should also be taken into account. A threshold of 150 HU is recommended, and a volume of 100-120 mL of non-ionic contrast should be administered at a flow rate of 3 to 5 mL/s for optimal enhancement. The recommended scan delay for the late arterial phase is 15-30 seconds post-bolus trigger, with the portal venous phase being 60-75 seconds post-injection, and the delayed phase being 2-5 minutes. The respiration phase should be inspiration, with a breath-hold to ensure optimal image quality.

The CT pancreatic protocol
The protocol involves patient positioning in the supine position with both arms elevated and the abdomen centered within the gantry. A tube voltage of ≤120 kVp is used with tube current suggested by the automatic exposure control. The scout is from the diaphragm to the iliac crest, and scan extent in the arterial/pancreatic phase is mid-diaphragm to the iliac crest, while the venous phase is above the diaphragm to the iliac crest. The scan direction is craniocaudal, and the field of view (FOV) is 350 mm with an adjustment in-plane resolution. The slice thickness should be ≤0.625 mm with an interval of ≤0.5 mm, and soft tissue and bone reconstruction algorithms are used. The optional use of oral neutral contrast agents is administered 20-30 minutes before the scan.

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Contrast injection considerations involve non-contrast (rarely indicated) and use of 70-120ml (1 mL/kg) of contrast volume with a 30-40mL saline chaser at 3-5 mL/s. The scan delay for the pancreatic phase is 15-20 sec after trigger or 35-40 sec after contrast injection, while the portal venous phase is 30 sec after the pancreatic phase or 65-70 sec after contrast injection. For neuroendocrine tumors, the arterial phase is minimal scan delay (or 20 seconds after contrast injection), while the portal venous phase is 40 seconds after the arterial phase or 60-70 seconds after contrast injection. Single acquisition with a monophasic injection (venous phase) with contrast volume of 70-120ml (1 mL/kg) and portal venous phase of 65-70 sec after contrast injection. The respiration phase includes a single breath-hold with inspiration, and multiplanar reconstructions using strictly axial, coronal, and sagittal images, aligned through the center of the vertebral bodies and the sternum with a slice thickness of ≤2,5 mm for soft tissues and ≤2 mm for bone with an overlap of 20-40%.

The four-phase technique

The four-phase technique used for computed tomography (CT) scans of the kidneys focuses on accurate patient positioning and contrast injection considerations. The first phase, a non-contrast scan, involves positioning the patient supine with their arms above their head and scanning from the diaphragm to the lesser trochanter. The second phase, the corticomedullary phase, uses bolus tracking to monitor a region of interest at the level of the diaphragmatic hiatus or first lumbar vertebra at the aorta, with a threshold of 150 HU and 100mL of non-ionic contrast injected at a flow rate of 3 to 5mL/s. The nephrogenic phase, which covers the entire renal system, scans from the mid-diaphragm to the lesser trochanter and has a scan delay of 100 seconds post-injection, while the excretory phase, with the same scan extent and direction, has a scan delay of 5-10 minutes post-injection. All phases require inspiration and breath-holding for optimal images