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PERIVASCULAR FAT (peri-aortic fat) PROJECT

1) **Funded via the FHS contract (N01-HC-25195)**

2) **Machine used to read these:**

   All subjects underwent computed tomography (CT) scanning in a supine position using an eight-slice MDCT (LightSpeed Ultra, General Electric, Milwaukee, WI, USA).   We measured perivascular adipose tissue volume around the abdominal and thoracic aorta using a dedicated offline workstation (Aquarius 3D Workstation, TeraRecon Inc., San Mateo, CA, USA).

3) **Protocol:**

   Because the CT attenuation in absolute hounsfield units (HU) corresponds to tissue properties, we applied an automatic threshold based algorithm to identify pixels containing adipose tissue and to determine the volume of adipose tissue using a HU range from -195 to -45 HU.

   Measurements of Abdominal Periaortic adipose tissue (AAT): In order to separate periaortic from retroperitoneal adipose tissue and to standardize our measurements, we defined our region of interest (ROI) in each slice as a circle that had a diameter which was 10 mm larger than the anterior-posterior aortic diameter. This predefined ROI was centered over the aorta. This standardization enabled the capture of a cylinder of periaortic adipose tissue. The volume of periaortic adipose tissue was measured over 16 contiguous slices, covering 40 mm above the aortic bifurcation. The first slice above the aortic bifurcation was defined as the slice where the difference between transversal and anterior-posterior diameter were less then 1mm. We excluded subjects in whom the difference between transverse and anterior-posterior diameter remained > 5mm within the volume of interest because the oval shape of the aorta precluded a standardized measurement of the periaortic adipose tissue cylinder. In addition, we excluded all subjects in whom <40 mm of the aorta above the bifurcation was captured on CT. To account for the linear relationship between the aortic diameter and the area of the abdominal periaortic adipose tissue cylinder, all abdominal periaortic adipose tissue measurements were adjusted for aortic diameter (anterior-posterior diameter, first slice above the bifurcation).

   Thoracic periaortic adipose tissue (TAT) protocol : In contrast to the abdominal aorta, thoracic periaortic adipose tissue can be clearly separated from other anatomical structures. Thus, the ROI included all of the adipose tissue surrounding the thoracic aorta. The volume of interest (VOI) was extended 67.5 mm below the level of the

pulmonary artery bifurcation, which was the highest common denominator for all subjects. If necessary, manual adjustments were made throughout the analyzed imaging volume. Subjects with hiatal hernia and intra-thoracic stomach were excluded from the analysis.