Spiral computed tomography (CT) angiography (CTA) is a newly developed minimally invasive vascular imaging modality. Several papers have already described that CTA is a promising screening modality for renal artery stenosis [1–2], pulmonary thromboembolism [3] and pulmonary arteriovenous malformations [4]. The value of CTA in carotid artery stenosis has also been evaluated [5–9]. However, there are many other potential fields of clinical application which are currently being investigated.

During the past year, we performed a total of 300 procedures of CTA in 250 patients with diverse vascular diseases including aortic diseases, abnormalities of aortic branches, potential renal donors, postoperative evaluation of aortic surgery or bypass graft, pulmonary thromboembolism, pulmonary arteriovenous malformations, pulmonary sequestration, various venous abnormalities, and pancreas islet cell tumor.

The spiral CT examinations were carried out with Somatom Plus S (Siemens, Erlangen, Germany) scanners with a maximum continuous scanning time of 40 s. The examinations always began with a localizer scan (unenhanced standard CT, 5 mm X-ray beam collimation and 5 mm interslice gap) to screen the nature of the lesion and to determine the range of scan. The length of the lesion to be imaged determines the scanning parameters. As a basic principle, we fixed the nominal slice thickness (X-ray beam collimation) at 3 mm and adjusted the scan volume with a table speed and scanning time. It is generally recommended that the preliminary timing scan be performed with injection of a test dose (10–30 ml) of the contrast material in order to estimate the optimal scan delay time. However, we did not routinely employ it because the optimal scan delay time could be determined empirically according to the age of the patient and the site of the lesion. Only elderly patients or those with cardiac dysfunction were evaluated with timing scan. During the spiral scanning, between 100 and 150 ml of nonionic contrast medium (iopromide, 370 mg iodine per ml) was injected with an automatic power injector. For the evaluation of the thoracic vasculature, we routinely injected contrast material into the peripheral veins of the lower leg or foot. Scans were reconstructed at 2-mm intervals. Multiplanar reformation (MPR), shaded surface display (SSD), and maximum intensity projection (MIP) images were made with commercially available standard scanner software. In some cases, color-encoded three-dimensional (3D) surface reconstruction is more informative.

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was accomplished on an independent workstation (Allegro; ISG Technologies, Toronto, Ontario).

**Aortic diseases**

The major vessels of the thorax and abdomen are the best candidates for CTA because of their large luminal diameter. CTA can display the gross morphologic anatomy of the vascular structures, which is useful for surgical planning and is the greatest advantage of CTA to other imaging modalities in the evaluation of aortic diseases. In addition to the 3D display capability of CTA, a thin X-ray beam collimation of 3 mm and maximum vascular enhancement within a single breath-hold period enable accurate delineation of major aortic branches. CTA permits precise measurement of maximum dimension of aortic aneurysms, and demonstrates the extent of aortic aneurysms or dissections in relation to major aortic branches, their 3D morphology, extraluminal pathologies and the relationship to adjacent organs. Furthermore, CTA is the most sensitive technique for detecting and evaluating calcified lesions. Even the hemodynamically unstable patient of impending or acute aneurysm rupture or acute aortic dissection can be examined by CTA because of its short scan time. CTA provides not only the angiographic images reflecting the luminal changes of the aorta or its branches, but also thin high quality axial images that enable the evaluation of mural changes of the aorta. Therefore, mural changes of the aorta caused by atherosclerosis or Takayasu arteritis can be assessed. The diagnosis of aortic dissections, whether the false lumen is thrombosed or not, is no longer a diagnostic problem of CTA. When compared with the conventional CT, CTA provides an overall picture of aortic dissections and much more accurate evaluation of major aortic branch involvement. The site of the entry tear can be visualized in a large proportion of the patients. However, the aortic regurgitation cannot be imaged directly, only the indirect sign of the dilatation of aortic annulus and left ventricle. Highly movable dissection flap and motion artifact at the ascending aorta can obscure or mimic a dissection flap in a few images of a patient. CTA is a promising noninvasive modality for postoperative evaluation of aortic surgery.

**Evaluation of Major Aortic Branches**

We successfully applied CTA in the evaluation of the stenosis, obstruction or aneurysm of the major aortic branches. Renal artery stenosis and the celiac axis compression by the median arcuate ligament of the diaphragm are well demonstrated by CTA. According to Rubin et al. [2], CTA was 92% sensitive and 83% specific for the detection of high grade stenosis (≥70% stenosis) of the renal artery. CTA not only consistently depicts all main and accessory renal arteries [1–2], but also provides information about renal veins and renal parenchyma. Therefore, in the evaluation of potential renal donors and renal artery stenosis, CTA can be a promising noninvasive alternative to conventional angiography. Cumming and Morrow [5] compared CT angiography with conventional angio-