important role for determining adequate treatment strategies which include conservative treatment, embolisation therapy or surgery.

With a critical stenosis level of 70% as determined by the NASCET study to be the threshold for treatment of patients with thrombendarterectomy, improved spatial resolution for accurate stenosis grading of carotid arteries appears mandatory. Similarly, high spatial resolution imaging for improved characterisation of vascular wall invasion can play an important role to determine resectability of neck tumours. Craniocervical contrast-enhanced MRA can be used to evaluate patients following treatment for vascular disease, for example to assess re-stenosis after endovascular treatment following stent placement or for follow-up of patients with vessel dissection in order to detect possible progression of stenosis or occlusion which may mandate invasive therapy such as surgery or stenting to prevent ischemic cerebral complications.

Applications in the pulmonary circulation include evaluation of pulmonary embolism, pulmonary hypertension, and congenital heart disease. Pulmonary venous MRA plays an increasing role for accurate planning and follow up of radiofrequency ablation therapy in patients with cardiac arrhythmia.

For the abdominal vasculature, clinical applications include the assessment of atherosclerotic arterial disease, aneurysms, and dissections, as well as the preoperative assessment of tumour extent. In addition, MR venography is a rapidly growing application in chest, abdomen, pelvis and lower extremity which benefits from high spatial resolution and the potential reduction of contrast volumes.

Indications for renal MRA include the diagnosis of atherosclerotic renal artery stenosis, fibromuscular disease (FMD), renal aneurysms, dissections, as well as the evaluation of patients pre- and post renal transplantation. In combination with functional imaging techniques such as ultrasound, nuclear medicine imaging, phase-contrast MRA or perfusion MRI, the accurate characterisation and quantification of the severity of stenotic renal artery disease plays an important role for planning revascularisation strategies. High-resolution MRA at 3T may help to limit the over-estimation of the degree of stenotic disease and may therefore avoid unnecessary renal revascularisation procedures which may further increase the risk of patients with borderline renal function.

FMD represents the second most common cause of renal artery disease. It tends to affect younger patients. Patients benefit from early diagnosis since there is a good respond to balloon angioplasty. FMD usually affects the mid and distal artery segments. These segments may be missed on conventional MRA at 1.5T due to limited spatial resolution. It is expected that CEMRA at 3T increases sensitivity and specificity for the early detection of FMD.

Similarly to single station MRA, multistation peripheral or whole-body imaging can be performed at 3T yielding high spatial-resolution data sets with isotropic submillimeter voxel size. With the combination of parallel imaging, an appropriate contrast-injection protocol, and flexible table movement, venous contamination can be minimised or avoided. The procedure is feasible and holds promise for screening applications.

In summary, a wide spectrum of vascular diseases may benefit from imaging at 3T. Our experience suggests that CEMRA at 3T is robust and besides providing spectacular images holds promise to improve patient care by improved diagnostic accuracy which may positively affect therapeutic strategies.

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Atrial and ventricular contraction is differentially regulated

Beta-3-adrenergic receptor activation increases human atrial tissue contractility and stimulates the L-type Ca2+ current

France – The contraction of the atria and ventricles is differentially regulated, according to a study by **Rodolphe Fischmeister** and colleagues, at INSERM UMR-S 769 in Châtenay-Malabry. The contraction phase of the heart beat is controlled by several pathways, including one initiated by stimulation of cell surface proteins known as beta-adrenergic receptors. At the molecular level, the flow of Ca2+ through protein channels known as L-type Ca2+ channels has a central role in the regulation of the contraction of the heart by beta-adrenergic receptors.

Previous data have indicated that stimulation of beta-3-adrenergic receptor (beta-3-AR) decreases the contractility of tissue from human ventricles and decreases the activity of ventricle L-type Ca2+ channels in various animal models. In contrast, Dr Fischmeister and team have found that beta-3-AR stimulation increases the activity of L-type Ca2+ channels in heart cells isolated from human atria and increases the contractility of the atrial tissue.

The finding that beta-3-AR stimulation has opposing effects on human atrial and ventricular tissue could lead to the development of therapies that target beta-adrenergic receptors to treat CVDs.

Details: www.inserm.fr