bun’ and dorsolateral putaminal hyperintense signs detected on MRI are recognised features of MSA. Previous studies have found MRI of lower than 3 T to have low sensitivity and specificity in detecting these signs. The aim of this study is to revisit the ‘hot cross bun’ and dorsolateral putaminal hyperintense signs in 3 T for distinguishing MSA and PD.

MATERIALS & METHODS

We performed MRI brain (T1-weighted, T2-weighted and gradient echo) at 3.0 Tesla on 64 patients (24 PD, 14 MSA and 26 age-matched healthy controls). Parameter measured on the gradient echo was susceptibility artifact indicating iron deposition in the substantia nigra, putamen and pons. T2-weighted images were used to detect the presence of ‘hot cross bun’ and dorsolateral putaminal hyperintense signs. The results were compared between the three groups.

RESULTS

The ‘hot cross bun’ sign was not present in PD and normal subjects. This sign had a low sensitivity of 35.7 % and high specificity of 100 % (PPV = 1, NPV = 0.85) in MSA. The dorsolateral putaminal hyperintense sign was detected in two normal subjects and MSA with sensitivity of 57.1 % and specificity of 96 % (PPV = 0.8, NPV = 0.89) % for MSA. Susceptibility artifact was only significantly higher in the putamen in MSA compared to PD (64.3 % vs 30.8 %, p = 0.042).

CONCLUSION

The ‘hot cross bun’ and the dorsolateral putaminal hyperintense signs had high specificity for MSA and can be an imaging feature in distinguishing MSA and PD.

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DTI IMAGING AND TBSS OF WHITE MATTER CHANGES IN NORMAL PRESSURE HYDROCEPHALUS COMPARED WITH ALZHEIMER DISEASE PATIENTS

Jiri Vrana1, Daniel Horinek2, Irena Bulcsakowska1, Milan Mohapat2, Pavel Rejcht1, Tomáš Belsan1

1Radiology Department, Military University Hospital, Prague, Czech Republic, 2Neurosurgery Department, Military University Hospital, Prague, Czech Republic

PURPOSE

Normal pressure hydrocephalus (NPH) is an idiopathic treatable cause of cognitive derangement in the elderly. Reliable noninvasive markers of the disease are still in need. Major hypothesis for gait and cognitive impairment in NPH is the affection of periventricular white matter.

METHODS

In this study 17 patients were investigated for confirmed NPH (confirmed by lumbar infusion/drainage tests). All patients were finally treated by shunting. The patients underwent MRI examination including T2W, T1W and DTI sequence of the whole brain in axial sections (EPI, TR/TE=12,000/89.4 ms, 30 slices 2.4 mm thick, 128x128 matrix, FOV 24x24 cm2; 30 noncollinear gradient directions, b value 1000 s/mm², 5 b0 images). 17 age matched Alzheimer disease patients with marked brain atrophy and ventricular dilation, without clinical signs of NPH were examined with the same technique. Tract based spatial statistics (TBSS) as implemented in the FSL software package was used to evaluate the group differences in fractional anisotropy (FA) and mean diffusivity (MD).

RESULTS

FA was significantly higher in the NPH group in posterior limb of capsula interna. Reduced FA was found across corpus callosum and in optic radiation. MD was not changed in these regions.

CONCLUSION

The DTI measurements reveal specific white matter structural impairment in patients with normal pressure hydrocephalus. The method shows promising as a possible non invasive diagnostic marker.

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THEME: HOT TOPICS

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MRI-GUIDED DEEP BRAIN STIMULATION OF THE SUBTHALAMIC NUCLEUS: CORRELATION OF POSTOPERATIVE 1.5 T MRI WITH POSTMORTEM 9.4 T MRI AND HISTOPATHOLOGY

Othman Al Helali, Luke Massey, David Thomas, Marwan Hariz, Thomas Foltynie, Janice Hoton, Tarek Yousry, Ludvic Zrinzo

University College London, London, UK

Deep brain stimulation (DBS) of the subthalamic nucleus (STN) is an established procedure for patients with advanced idiopathic Parkinson’s disease (PD). Anatomical location of active stimulation contacts is most accurately determined with postoperative stereotactic MRI. Post-mortem examination of the brain provides additional details. This report uses 9.4 T MRI and histopathology to document electrode location in a single patient who had received bilateral MRI-guided STN DBS. A 67-year-old patient with idiopathic PD underwent surgery for DBS of the STN using a MRI-guided targeting and macro-electrode stimulation. Postoperatively, the patient experienced transient agitation and increased dyskinesia lasting for a few hours. Postoperative MRI documented lead location within the subthalamic nuclei...