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10.4 MR screening for iron overload in non-transfusion dependent haemoglobin H disease

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Objectives: To evaluate the clinical utility of magnetic resonance (MR) imaging in screening for iron overload (FeO) in non-transfusion dependent (NTD) patients with Haemoglobin H disease (HbH).

Methods: Thirty-six patients [21 F. mean age ±SD (43.4±14.5yrs)] with non-transfusion dependent HbH disease were studied. Four patients were splenectomised. Respiratory gated axial abdominal scans were obtained with spin echo (SE) T1 (TR/TE 300-700/9ms) and gradient echo (GRE) T2* (TR/TE 500-800/15 ms. flip 20°) sequences. The ratio of signal intensities (SIR) of the liver (L)7 spleen (S) and pancreas (P) to paraspinal muscles were calculated for T1 and T2* images. SIR was indicative of FeO. For statistical analysis, SIR was log-transformed. Intercorrelations between T1 and T2* scans. serum ferritin and age were determined. A p value of <0.05 was statistically significant.

Results: T2* SIR was more sensitive in detecting FeO than SE T1 SIR. There were 33 livers, 13 spleens and 6 pancreas with FeO on T2 data compared with 11 livers, 4 spleens and 2 pancreas on SE T1 data. The mean T2* SIR was statistically significantly lower than T1 SIR, differences in the liver being most significant. A positive correlation existed between serum ferritin and age [r=0.59. p=0.0001]. Serum ferritin [mean 2305 µg/L (range 220-8900)] was negatively correlated with both T1 and T2 SIR of the liver [r=-0.44. p=0.007; r=-0.38. p=0.02] and spleen [r=-0.48. p=0.006; r=-0.63. p=0.0001]. and with T1 SIR of the heart [r=0.35. p=0.04]. These correlations remained significant even after adjustment for age.

Conclusions: This first MR evaluation on Chinese with NTD HbH disease has shown a high prevalence of hepatic iron overload (89%) with a lower incidence in the spleen (41%) and pancreas (17%). Quantitative and qualitative MR imaging provide a more accurate assessment of iron status than serum ferritin. We therefore propose that MR surveillance should be performed routinely for the early detection of iron overload in these patients.

10.3 Late radiation injury in patients treated for nasopharyngeal carcinoma—features on magnetic resonance imaging and magnetic resonance spectroscopy

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Purpose of study: Evaluation of morphologic and metabolic features of late radiation injury of the temporal lobes in patients treated with radiation therapy for nasopharyngeal carcinoma (NPC).

Methods: 31 patients with MRI/CT documented radiation injury to the temporal lobes in the past were studied. All patients had known NPC with radiation therapy 2-10 years before. Morphologic evaluation was obtained from magnetic resonance imaging (MRI) using T2-weighted sequence, gradient-recalled echo sequence, and gadolinium-enhanced T1 -weighted sequence. Metabolite study was performed by using proton magnetic resonance spectroscopy (^{1}H MRS). Both MRI and MRS were performed on a 1.5T MR scanner with the standard head coil.

Results: On MRI, lesions were detected in 57 of the 68 temporal lobes.

White matter lesions were found in all 57 temporal lobe lesion and consisted of combinations of necrosis, oedema. demyelination, gliosis and cysts. Grey matter lesions were detected in 30 involved temporal lobes. Blood breakdown products were detected in 30 temporal lobes. Contrast-enhanced foci were present in 51 temporal lobes. On ^{1}H MRS, low N-acetyl aspartate was found and a decreasing level with greater degree of necrosis was noted. Lactate was detected in 9 temporal lobe lesions, all showing mass effect.

Conclusion: Late radiation injury of the temporal lobes in NPC had a more complex morphology than was previously described. Blood brain barrier breakdown was a usual feature. Grey matter lesions and blood breakdown products were frequently present. N-acetyl aspartate was typically low, matching the finding of necrosis with loss of neuronal tissue. The presence of lactate, indicative of the activation of the glycolytic pathway, suggested a pathogenetic association of ischaemia and mass effect in late radiation injury.