Chemical Shift Imaging in Diagnosis of Adrenal Adenoma

CASE - 1

A 65 yrs old male patient and a known case of carcinoma of prostate with finding of a small adrenal mass on CT scan. MRI is done to rule out metastasis of adrenal. On in-phase and out phase imaging (Figs. 1,2) showing a significant loss of signals within the mass on out of phase imaging suggestive of lipid rich adrenal adenoma. The signal intensity drops below signals of spleen.

CASE-2

A 38 yrs old male patient had early onset hypertension. Routine CT scan showed a small mass lesion in the right adrenal gland. MRI was performed to rule out adrenal pheochromocytoma. Chemical shift imaging (breath hold T1W GRE in phase and out of phase-Figs. 3,4) showing significant signal loss from the right adrenal mass on out of phase images

DISCUSSION

Adrenal adenomas are the most common incidentally detected benign masses of the adrenal gland and are called "incidentalomas". The number and size of these tumors increases with age, obesity and diabetes. Distinguishing adrenal adenoma from non adenomatous masses (like adrenal metastasis and pheochromocytoma) is very important in many clinical circumstances.

The incidence of adrenal adenoma in general population is 2-8% and the adrenal gland is one of the most common organ for metastasis. In the oncologic patient it is important to identify the nature of the adrenal tumor if detected. The Adenomas of adrenal contain abundant amount of intracytoplasmic lipids (cholesterol, fatty acids and neutral fat) in clear and compact cells. The chemical shift imaging is a technique to identify these intracytoplasmic lipid and is most sensitive and specific MR imaging technique in characterization of adrenal adenoma. On out phase imaging there is loss of signals from this intracytoplasmic lipids and helps in characterizing the adenoma.

Some of the adrenal adenomas do not contain abundant intracytoplasmic lipids and are called as lipid poor adenomas. These lesions are indeterminate and are troublesome in oncologic patients because they cannot be differentiated from metastasis. Thses lesions can be characterized on their wash out characters on contrast enhanced MRI. Alternatively PET scanning can accurately characterize lipid poor adenomas from metastasis. The other tumors like adrenal cortical carcinomas, metastasis from hepatocellular carcinomas and clear cell carcinomas of kidney, pheochromocytomas may contain very small amount of intracytoplasmic lipids. The pheochromocytoma shows characteristic high signals on T2W images and do not show the characteristic pattern of signal changes on chemical shift imaging. The pheochromocytomas are usually more than 3 cm in size where as adenomas are smaller in size.

The chemical shift imaging is emerging as one of the most sensitive and specific investigation for differentiating adenoma from non adenoma of the adrenal gland.

REFERENCES