



PET/MRI Fusion in Epilepsy

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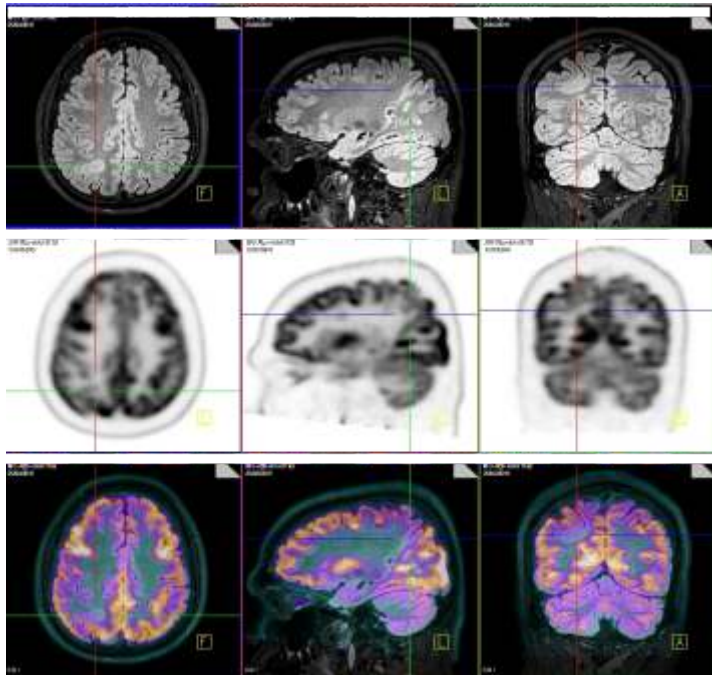


Fig.1: Top row shows MRI findings of right parietal balloon cell dysplasia

Middle row shows PET images with hypometabolism

PET MRI fusion images show hypometabolism corresponding to the area of abnormality. Hypometabolism seen surrounding the lesion represents the functional deficit zone.

In this case, PET was performed in view of some discharges from the left parietal lobe as well to rule out any other focus that could alter management. However this was ruled on MR PET fusion and patient underwent resection of the right parietal dysplasia.

PET/MRI Fusion In Epilepsy

PET is a well-established modality in the presurgical evaluation of patients with epilepsy. One of the weaknesses of PET is poor delineation of anatomic structures. Using the fusion technique, functional information from PET can be superimposed on precise MRI anatomic landmarks. This combined technique is useful and increases the sensitivity of detecting an epileptogenic focus.

Technology available allows fusion of PET and MR images, combining the high spatial resolution of MR imaging with the functional imaging capability of PET.

The DICOM images from both datasets are loaded on an advanced post processing workstation and then co-registered or fused. They have standard colour coding where red represents the highest metabolic activity while blue represents the lowest.

The functional deficit zone is defined as that cortex with abnormal function in the interictal period, which is due to morphologic or functional physiologic causes. The functional deficit zone has been shown to be more extensive than the focal epileptogenic zone and can be assessed by using FDG PET.



At a glance

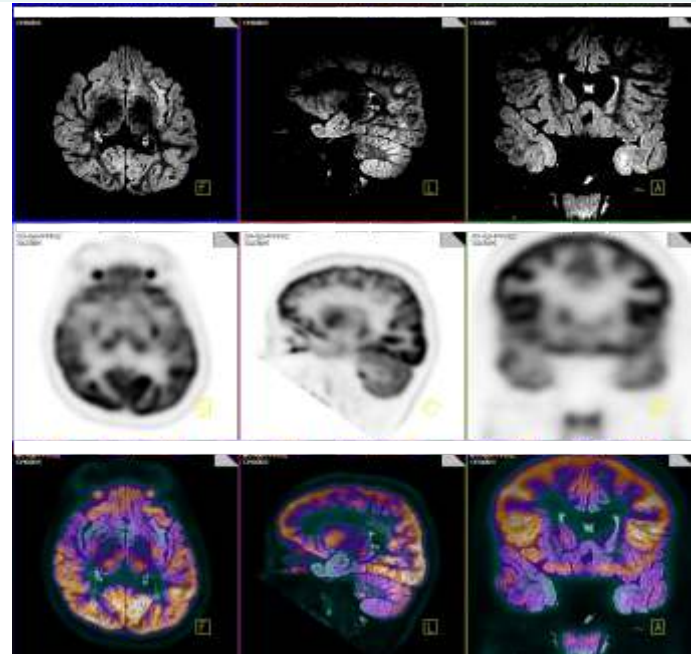
- MRI provides high resolution images of brain parenchyma and pathology in epilepsy
- PET provides functional information in patients with epilepsy
- Fusing the two images on an advanced post-processing computer allows accurate evaluation of the cause of epilepsy, which guides treatment, especially surgery.

Fig.2 : Young girl with widespread discharges from the right frontotemporal lobe. EEG also showed build up on the left.

MRI (top row) shows subtle focal cortical thickening in the right anteromesial temporal lobe suggestive of type 1FCD.

PET MRI co registered images show severe hypometabolism in both medial temporal lobes.

In view of these findings it was decided not to operate and continue with medical management.



FDG PET/MRI co-registration incorporated into multimodality presurgical evaluation can enhance the noninvasive detection of patients with type I cortical dysplasia and normal MRI scans.

It also allows a second look MRI in MR negative “non-lesional” patients, turning a meaningful percentage of patients into “subtle-lesional” thereby improving the chances of surgery and freedom from epilepsy.

PET/MRI coregistration adds value for patients with nonconcordant EEG and neuroimaging

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