

EDITORIAL

Brain Imaging

This means the rapid non-invasive technique for revealing the different morphological changes occurring in a wide variety of brain disorders, this comprises computerized tomography (CT), positron tomography (PET), nuclear magnetic resonance (NMR), and computerized EEG (CEEG). Since the application of CT in 1973 to study the different morphological changes in the brain, many generations were introduced. However, certain limitations to its application were present. This led to the discovery of other different brain imaging techniques.

With the introduction of PET, a recent technique of investigating brain physiology was induced. By this technique various cerebral metabolic processes were measured and together with the cerebral blood flow provided a powerful tool for studying the pathophysiology of different neuropsychiatric disorders. PET provides the opportunity to assay the rates of biochemical processes in tissues in man. There have developed a variety of biochemical assay techniques for PET, these include : (a) methods for measurement of the local cerebral metabolic rate for glucose, (b) methods for measurement of local cerebral blood flow, (c) measurement of local cerebral metabolic rate for oxygen, local rate of protein synthesis; so actually PET is a non-invasive assessment of local physiological processes.

With the introduction of NMR the viewing of the brain image has markedly advanced as the most outstanding feature making it superior to the CT is the striking differentiation between grey and white matter, white matter is not only seen to the subcortical level but together with the CSF it defines the margins of the basal ganglia,

the thalamus, the insular cortex,... etc.. In the posterior fossa the brain stem and the cerebellum are clearly visualized. The physical processes underlying the NMR phenomena are entirely different from those related to X-rays, its different kinds of information are contained in NMR images, the electron density and the atomic number of tissue and their effects on X-ray attenuation are not relevant to the imaging technology of NMR. NMR is a clinical imaging modality but is clearly not radiological in nature, it has been said to really mean "no more radiology".

Computerized EEG represents another form of brain imaging. By using the quantum of the CEEG and evoked potentials we can map the various physiological functions of the brain and this can be of great relevance in clinical and research work, we can classify now according to the CEEG the anxiolytic drugs, the antidepressant drugs, neuroleptics and psychoactive substances according to standardized maps of the brain, also we can assess clinically the response of patients to various drugs. Some psychiatric disorders like schizophrenia have a form of standardized brain map under the CEEG, so computer analysed EEG may be used in a variety of ways by the physician, in addition to screening for organicity which should be performed routinely in every psychiatric patient. Two new areas of use have emerged in recent years :

1. Classifying psychotropic drugs and estimating their therapeutic window and potency.
2. Predicting the CNS response of a patient to an anxiolytic or psychotropic drug (biological predictability).

The superiority of NMR over CT is prominent in the following pathological entities : demyelinating diseases, determination of implant vessel status, Arnold Chiari malformation, syringomyelia and syringobulbia, detection of oedema of any type, all pathological entities involving the posterior fossa, traumatic lesions including subdural and

extradural collections, and lastly dementias and bipolar affective disorders. Although the studies performed with NMR on psychiatric disorders are limited yet, they are highly significant. Some studies showed T1 values elevated in frontal and temporal lobes in patients with bipolar affective disorders. The T1 level returns to normal after treatment, and from this we can conclude that NMR has a great potential for psychiatric disorders that it confirms the biological basis of psychiatric disorders, and we can use it in detecting biochemical alterations in absence of structural loss and it is expected to confirm or to disconfirm the cumulative evidence pointing to the relation between schizophrenic illness, ventricular dilatation and degree of cortical atrophy. The main disadvantage of NMR is its inability to show details in the bone structure, it has relatively longer scanning time, and there is difficulty in some brain tumours to demonstrate the break in the blood brain barrier and it is contraindicated in patients with pace-makers, and the cost of an NMR machine is about 1½ million dollars, also the over year expenses are higher. At the present time NMR may be complementary to CT. However, it is clear that with the technical improvement together with the potentiality of the NMR it can totally replace the CT.

PET represents a major advance not only in the study of pathological changes, but also in studying the physiology of the normal human brain. Its major advantage is the ability to study in vivo the various pathological processes. This appears clear from the results obtained in the PET studies in strokes, gliomas, neurotransmitters, efficiency of drug therapy, epilepsy, dementias and finally in some psychiatric disorders. The hypo-frontality shown by PET in schizophrenia can be due to the disease process itself or a reflection of some other associated processes. Future work is required to clarify the relationship between the energy metabolism, symptomatology and the aetiology of the disease process. Perhaps one day psychiatric classification will depend upon various metabolic patterns instead of various symptoms and confirming the psychiatric diagnosis can be done by comparing an NMR, a PET or a CEEG image. The major problem in applying

PET technology to human behaviour lies in the fact that you are dealing with a greater variance than what might be reflected in any single biochemical alteration. Thus, in our opinion those who rapidly try to apply theories for psychiatric disorders with PET were carried away by the enthusiasm of this fascinating machine. Also the radioactive material used in PET has an average half-life of 30 minutes, thus a nuclear reactor must be near the research centre harbouring the PET, a situation difficult to fulfill in many countries.

Indications of CT scanning can be summarized in the following groups of clinical presentations : patient presenting with stroke syndrome, cerebral infarction, intra-cerebral hemorrhage, also those subjected to cerebro-cranial trauma, progressive neurological deficits suggesting an intracranial neoplastic lesion, metastatic lesions, intracranial infection, patients with progressive mental deterioration, e.g. senile dementia may show cortical atrophy and ventricular dilatation, while in cases of dementia of normal pressure hydrocephalus marked ventricular enlargement with absence of signs of cortical atrophy, also Huntington chorea, cortical and striatal atrophy with diminished bicaudate index, in multi-infarct dementia the infarcts areas appear as zones of decreased density with dilatation of the ventricles which are shifted to the side of the infarct, also CT can be used in the evaluation of the treatment modalities, surgery, radiotherapy, chemotherapy. It is claimed that schizophrenic patients with dilated ventricles or cortical atrophy do not follow the dopamine hyperactivity hypothesis, subsequently the response to neuroleptics will be minimal so, CT can help in predicting response to treatment and prognosis of schizophrenia. Further research with alcoholics, opium, and hashish addicts may show some correlation of ventricular size and intellectual impairment or social deterioration. Specific atrophy can be elicited as in Huntington's chorea, in other various presenile dementias and secondary dementias. We can summarize the indications of CT scan in psychiatry by the following :

- 1 - Confusion and dementia of unknown cause.

- 2 - First episode of psychosis of unknown aetiology.
- 3 - Movement disorders of unknown aetiology.
- 4 - Anorexia nervosa.
- 5 - Prolonged catatonia.
- 6 - First episode of major affective disorder or personality changes after the age of 50 years.
- 7 - Brain diseases with dementia, e.g. Alzheimer's disease, Pick's disease, multi-infarct dementia, abscess, Jacob-Cruetzfeldt's disease, lupus erythematosus, subdural haematoma.
- 8 - Brain disease with depression, e.g. subdural haematoma, granuloma, cerebral infarct, tumour, abscess, trauma, lupus erythematosus, Huntington's disease.
- 9 - Brain diseases with movement disorder, e.g. Huntington's disease, Wilson's disease, Co poisoning, Mn poisoning, tumour, granuloma.
- 10 - Brain diseases with personality changes or psychoses, e.g. abscess, lupus erythematosus, Huntington's disease, encephalitis, tumour, granuloma, trauma, Wilson's disease.

Ahmed OKASHA

EDITORIAL

**Biological Unfolding in Dream,
Psychosis and/or Creation :
A Unitary Hypothesis**

Dream phenomenon is but the physiologic rhythmic unfolding of partially assimilated information. In so doing dormant information is set free or stirred up to become more available to the current state (level) of wakeful consciousness. However, consciousness is but the active outcome of holistic interactions (and transactions) of ever reorganized/ing information. Consciousness is both a matrix and a content at a time. Dream could represent different stages of reorganizing information at a certain phase of consciousness transformations in different units of time. Recent recording devices would permit recording certain dream organization at various stages of waking up. (Various levels of consciousness). This is to be considered as a sort of creation which is, then, a daily phenomenon for everyone. This holds true whether the dream content is memorized, narrated, recorded, interpreted or not at all.

According to the basic concepts of biorhythmic activity of the human brain the same unfolding could occur during wakeful consciousness, or still more possible in a state of heightened consciousness. The result would be creation, which is further identified according to the time unit it occupies as well as the outcome. This would vary from a 'peak experience' or writing a poem (or allied) up to promotion of creative growth in developmental crisis.

Finally, if such unfolding is aborted, maldirected and/or misperceived, a psychosis sets in.