
BILATERAL FRONTAL LOBE CT SCAN ABNORMALITY FOLLOWING ECT IN AN ADOLESCENT

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A case is described of bilateral frontal lobe CT Scan abnormality associated with ECT in an adolescent. Possible causes and risk factors are discussed.

ECT is an important treatment method in psychiatry (Kaplan and Sadock, 1988). Consequently, it has been used extensively for the last fifty years. This extensive use has brought to light some adverse effects- both minor and major. Death following ECT, though rare, has been reported in literature (Barker and Barker, 1959; Arneson and Buller, 1961; Shukla and Mishra, 1985). Though Kiloh et al. (1988) mention cerebral oedema, subarachnoid haemorrhage and cerebral haemorrhage among the major adverse effect of ECT, well-documented reports hardly appear in print in India.

We report a case of bilateral frontal lobe infraction following ECT in an adolescent, as suggested by CT scan.

Case Report : K.M, a hindu male aged 15 years, was admitted in the Neurology deptt. of a teaching hospital on 28.4.89. On examination, patients was conscious but mute, with saliva dribbling from the mouth, weakness and rigidity of all limbs and bilateral, florid, pyramidal signs. The patient's brother reports that K.M was born normally at term; milestones of development were normal. He was well adjusted with his peers, intelligent and alert. There was no past history of major physical or mental illness or of addictions nor a family history of mental illness.

Four months earlier, the patient had suddenly developed abnormal behaviour characterized by unprovoked shouting, laughter, excessive talking restlessness and sleeplessness. He had been given some major tranquilizer by a local doctor. After two days of treatment with this drug, the patient developed extrapyramidal symptoms. At once the drug was withdrawn and K.M. was referred to a psychiatrist. As the patient responded poorly to drugs given for two months, ECT was administered twice a week. The initial response was encouraging, but after the third ECT the patient developed weakness of the right upper and lower limbs. The weakness was considered to be functional and two more ECT's were given at the same frequency. After the last ECT (on 6.4.89), the patient's muscular weakness worsened. No further information of relevance is available.

The patient became bed-ridden and was brought to the authors' hospital. On 17.5.89 (41 days after the last ECT), CT scan of brain was done. Re-evaluation of the scan at the present moment in time reveals the following : the scan is of poor visual quality. Movement artefacts are present. Notwithstanding this, irregular, non-enhancing, uniformly hypodense zones extending anterolaterally from the anterior horn of each lateral ventricle are visible. The central cortex

is spared. There is no visible mass, or a mass effect, or any other CT abnormality.

The patient improved satisfactorily with conservative treatment and was discharged from the hospital after six weeks. He is on follow-up treatment for the last two years and a half. At present, he is free from mental symptoms (with no psychoactive drugs). Mild right sided hemiparesis persists. Six months ago, he developed right sided myoclonic seizures; appropriate treatment has fairly controlled the condition.

DISCUSSION

In competent hands, ECT is safe form of treatment. Major complications occur mostly in those suffering from physical illnesses like arrhythmias, aspiration pneumonia or cerebrovascular accidents (Gelder et al., 1989). The history and evaluation of the case under report does not suggest that he had any kind of serious cardiac, cerebrovascular, respiratory or other disease. The patient, aged 15 years, was known to be physically healthy from his early childhood.

The voltage, duration and nature of electrical stimulus can hardly be considered as risk factors for brain damage of the nature evident in this patient, though passage of suprathreshold current may lead to prolonged convulsion which should be avoided because of adverse cognitive consequences (Kaplan and Sadock, 1988). ECT had, however, been given before he came under our care.

Although it is theoretically possible that the CT scan abnormality preceded the ECT

course, it is more likely that the abnormality is linked to the development of the bilateral pyramidal signs in the patient.

The hypodense Zones in conjunction with bilateral occurrence and situated anterolateral to the anterior horns of each internal ventricle suggest an infarct in the watershed territory of the anterior and middle cerebral arteries, occurring as a result of a systemic - not vascular - pathology such as hypotension.

The density characteristics of the lesions vis-a-vis the timing of the scan and the bilateral occurrence in the cerebral white matter both exclude the possibility of haemorrhagic infarcts due to transient, ECT-induced hypertension. The situation of the lesions is also uncharacteristic of anoxic brain damage occurring as a complication of ECT. Internal contusions, such as could have resulted from head injury consequent upon a fall from the ECT table, cannot be ruled out; the likelihood of this explanation is however remote because of the bilateral location of the lesions.

To consider each 'possible' interpretation in turn: a pre-existing ECT abnormality would imply a leucodystrophic process. Repeat CT scan over time could clarify the interpretation particularly if further white matter degeneration is seen. However, the 'stroke' in the patient coincidental with the ECT course would remain to be explained.

ECT does not induce hypotensive change. Therefore, a hypotensive explanation begs explanations for both occurrence of the hypotension and failure of compensatory mechanisms.

The unlikelihood of internal contusions has already been mentioned.

Though the first ECT is said to be commonly associated with major complications, subsequent ECT's are not innocuous. Shukla and Mishra (1989) report a case of death following the fifth ECT in a girl aged 15 years. In the present case (a boy aged 15 years)the damage was done after the third ECT. Each ECT has the potential of causing complication.

Comprehensive investigation of the case soon after the development of neurological symptoms could have yielded valuable information. Nevertheless, as the risk factors for major adverse effects may not be predictable in each

case, one must be cautious while deciding to administer ECT in children and adolescents.

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