CLINICAL AVIATION MEDICINE

POST TRAUMATIC EPILEPSY IN A TRANSPORT PILOT — A CASE REPORT

By Sqn. S K Dham *: Wg. Cdr. K R Banerjee ** GP. Capt. KS Rao ***

Introduction

EPILEPSY is an important late sequelae of head injury of special aeromedical significance in the flyer since sudden incapacitation due to inflight seizures seriously compromise flight safety. As it may develop only after months or years following head trauma, often when the patient has otherwise shown an uneventful recovery, medical evaluation for certification to resume flying poses difficulties.

A case of epilepsy developing 14 months after head injury in a transport pilot who had otherwise recovered with no apparent residual neurological dysfunction, forms the basis of this report.

Case History and Findings

GK, a 30 year old Flying Pilot, was in good health until 15 May 70 when he sustained a severe head injury following a motor cycle accident. He was unconscious for about 24 hours and disorientated and confused for about two weeks after injury. He had mild antegrade amnesia, bleeding from both nostrils and the right ear. He did not have any fits during the acute episode and detailed clinical evaluation at no stage revealed any evidence of localising or lateralising neurological signs. X-ray skull revealed linear fracture of occipital bone with the fracture line extending into the parietal bone. The officer had an uneventful recovery. EEG done in August 70 during convalescence was within normal limits. From December 70 onwards, the officer was under periodic review and medical surveillance at the Institute of Aviation Medicine. Evaluation in December 70, apart from mild borderline EEG abnormality, did not show any residual neurological or psychiatric deficits. The EEG abnormality consisted of appearance of occasional, transient, slow waves in the theta range of moderate voltage in the bipolar run during hyperventilation. In the unipolar run theta waves of 4 to 7 cps and delta waves of 3 to 3½ cps of 80 to 200 microvolts were seen (Fig 1).

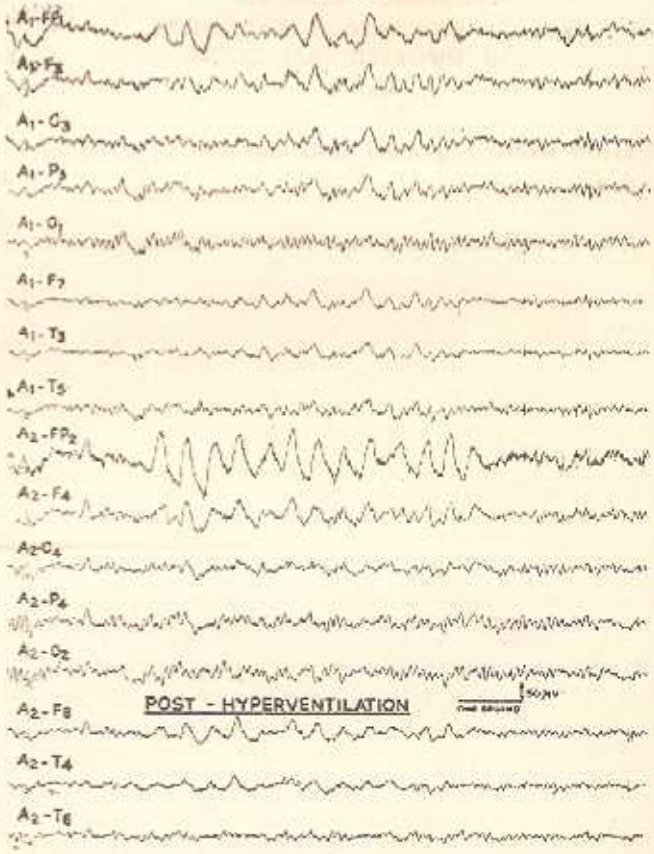

Fig. 1

* Specialist in Medicine, Institute of Aviation Medicine, IAF, Bangalore.
** Specialist in Neuropsychiatry, Institute of Aviation Medicine, IAF, Bangalore.
*** Officer Commanding, IAM, IAF, Bangalore.

The officer's response to 'G' tolerance and heat stress were within normal limits. Review in June 71 revealed normalisation of EEG abnormality. Taking into consideration the officer's strong motivation to flying and his flying experience together with absence of any clinical or electroencephalographic abnormalities a recommendation to restricted flying as a co-pilot was made.

with Brietal Sodium (Fig. 2) was found to be within normal limits. Carotid angiography done in October 72 was normal. Pneumoencephalography, however, revealed evidence of excessive air pooling in the right frontal region suggestive of cortical atrophy and resting EEG record showed a low voltage (6 to 7 cps) theta waves of 20—30 microvolts in the frontal region.

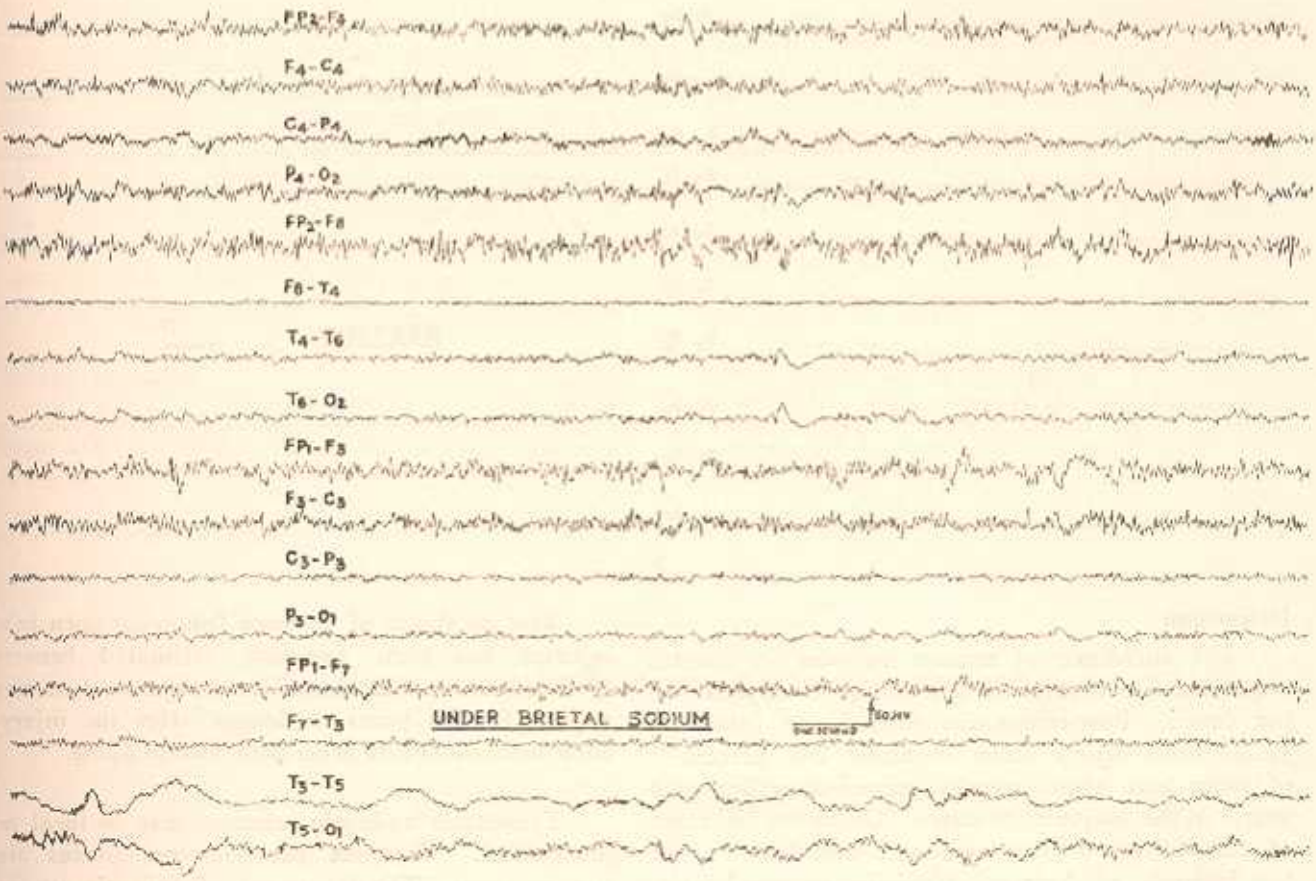

Fig. 2

On 7 July 71 after consuming beer, the officer had severe headache followed by a mild cry and tonic and clonic fits. He was unconscious for about 2 to 3 minutes. He had another similar episode on the same day. Neurological examination revealed a doubtful weakness of the grip of the right hand. EEG at that stage, even after provocation

The officer has remained asymptomatic and has not had any recurrence of fits for over 2½ years. He is not on any anti-convulsant drugs. The EEG done in January 74 shows localisation of abnormality in that it reveals focal spike activity in the left temporal zone during drowsiness in the transverse run (A1–T3) of the record (Fig. 3).

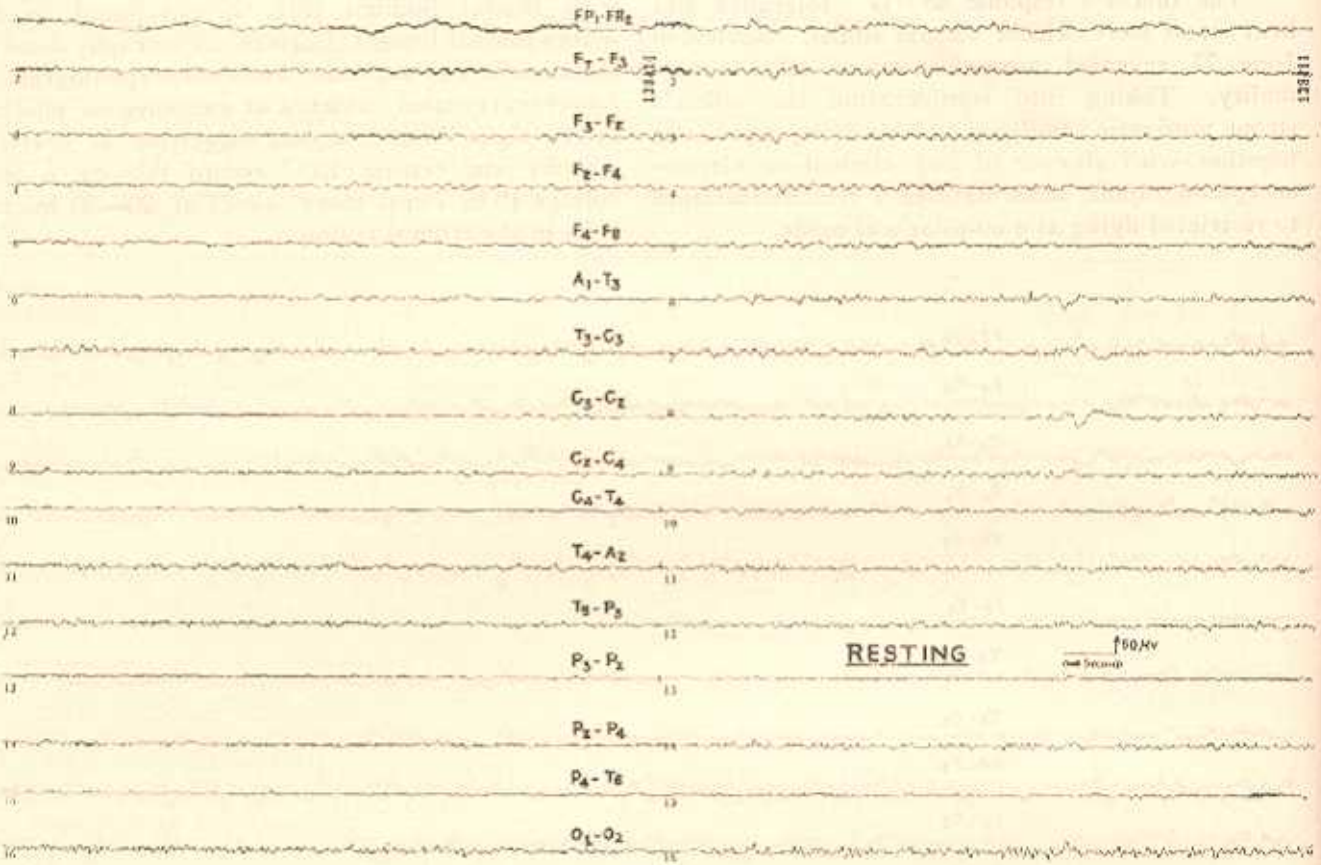

Fig. 3

Discussion

The incidence of seizure disorder in general population involving all age groups is approx 0.5 per cent[1]. Post-traumatic convulsions following closed head injury occur in about 2-5 percent[2,3] of cases and these usually manifest within two years[4] in the majority of cases. Of about 150 cases of closed head injury evaluated and followed at the Institute of Aviation Medicine approx 1.5 per cent developed post-traumatic fits. Epilepsy may occur as a complication after a severe injury. The risk is usually related to the severity of the injury as indicated by the degree of loss of consciousness, duration of PTA, presence of focal neurological deficit, appearance of fits immediately after injury, depressed fracture skull[5] and the proximity of the wound to the central sulcus as in the posterior frontal or parietal wounds.[6] The risk of late epilepsy is upto 25% in cases complicated by intracranial haematoma[7].

The incidence of seizures following open head injuries has been variously estimated between 40–50%[8] and unlike closed head injuries these may appear for 10 years or longer after the injury. Such cases obviously are a poor risk to flying.

Traumatic epileptic seizures may be focal or generalised. Complex psychomotor attacks are also common. The frequency of epileptic attacks is generally low and decreases progressively with time. Serial electroencephalography and pneumoencephalography are valuable in evaluating the extent of head trauma and the risk to late epilepsy. Almost 50%[3] of cases show a generalised EEG abnormality in the acute stage. In about 40% of cases these initial abnormalities may disappear in the period between trauma and the onset of attacks, thus inducing a sense of false security. In fact this reversion to normalcy is of no real prognostic value. Whereas a

normal EEG does not exclude post-traumatic epilepsy, persistence of localised spikes and waves or focal delta activity precedes, in most cases, clinical epileptic manifestations. Pneumoencephalography may reveal significant ventricular dilatation in patients showing evidence of cerebral disturbance after head trauma [9,10]. According to Walker, 87% of post-traumatic epileptics show an abnormal pneumoencephalogram.[11]

It follows therefore that if the nature of injury is severe, i.e., loss of consciousness exceeding 2 hours, post-traumatic amnesia, disorientation or impairment of judgment or intellect exceeding 48 hrs, complete evaluation including serial EEGs and PEG should be carried out even in the absence of any overt neurological abnormality and the pilot be observed in a ground category for at least 2 years.[12] This would reasonably minimise the risk of possible inflight seizure and ensure flight safety.

Acknowledgement

We thank the Neurological Centres at CHSC Pune and AH, Delhi Cantt, for making available to us the case sheets/neuroradiological investigations and EEG records. We thank Miss K Prabha and Cpl Velu for their valuable assistance.

REFERENCES:

1. LENNOX, W.G. — Epilepsy and related disorders Vol. I. Little Brown & Co., Boston, 1960.
2. JENNETT, B.: Scott Med J 1973, 18, 8.
3. COURJON, J.A. — The Late Effects of head injury. Edited by Earl Walker, Caveness, Critchly — 1969.
4. MILLER, H and STREN G.: The long term prognosis of severe head injury. Lancet, i, 225, 1965.
5. JENNETT, W.B.: Predicting epilepsy after blunt head injury, Brit Med. J, I, 1215, 1965.
6. RUSSEL, W. R.: The anatomy of traumatic epilepsy. Brain 70, 225, 1947.
7. EVANS, J.H.: Post-traumatic epilepsy. Neurology. 12:665, 1962.
8. CAVENESS, W.F.: Onset and Cessation of Fits following cranio cerebral trauma. J. Neurosurg. 20:570, 1963.
9. PIAZZESI, W and CAMPANELLA G.: Encephalography appearances in skull injuries. Acta Radiol, 1963.
10. LINDGREN E.: Encephalography in Cerebral Atrophy Acta Rad 35:277, 1951.
11. WALKER, A.E.: Post-traumatic epilepsy Springfield, Illinois, Charles C. Thomas, 1949.
12. United States. Department of the Air Force Medical Examination and Medical Standards — AFM-160-1 6 April, 1971 — Page 4-15.