

## Neuropsychiatric Problems

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### Introduction

AEROMEDICAL assessment of flying personnel with neuropsychiatric disabilities poses varying degrees of difficulty at times. While reviewing the medical histories of 1000 airline pilots employed in U. K. from 1954-65, psychological problems have been reported as a major cause of wastage. In another series medical wastage of Civil and Military aircrew in Great Britain for the period 1963-68, was reported and cardiovascular disease, flying accidents and psychiatric illness were noted to be chief causes. RAAF, USAF, and Navy experience is also similar<sup>1</sup>.

CNS diseases are about one third as frequent as CVS ones when flight safety is used as the point of comparison<sup>2</sup>. Sudden incapacitation leading to flight safety hazard can also occur on certain neuropsychiatric illnesses, e.g. lapse of consciousness, seizure attacks, strokes, migraine, fugue and amnesia. The neuro-psychiatric problems faced by us at AF CME are hereby presented.

### Material and Methods

The case records of 136 neuro-psychiatric cases among aircrew, available at AF CME pertaining to the period Jul 1971-Jun 1979 were studied and analysed in retrospect. Cases reported after hospitalisation and/or sick leave and were grouped as Pilots, Navigators and "others" for this study. The "others" comprised of Flt. Engrs., Flt. Gunners and Flt. Signallers.

### Results

Among 136 subjects, pilots contributed the maximum number followed by navigators and compo-

site group in that order (Table I). Neurological diseases were almost twice in incidence as compared to psychiatric illnesses and were maximum among pilots. Types of neurological illnesses comprised head injuries (49 cases), seizures (18 cases), cervical spondylosis (15 cases), lapse of consciousness (3 cases), asymptomatic EEG abnormalities (3 cases), tumours (2 cases) and subarachnoid haemorrhage (1 case).

TABLE I  
*Incidence of neurological and psychological illnesses in various categories*

Category	Neurological illness	Psychological illness	Total
Pilots	74 (81.32%)	27 (60.0%)	101 (74.27%)
Navigators	13 (14.29%)	12 (26.67%)	25 (18.38%)
Others	4 (4.39%)	6 (13.33%)	10 (7.35%)
Total	91	45	136

Maximum incidence of psychiatric illness was seen among the pilots followed by navigators and the composite group (Table I). Psychiatric disorders included 18 cases of neurosis, 12 of alcoholism, 6 of psychosis, 3 of transient situational disturbances, 3 of psychiatric investigations and 1 each of personality disorder, confusional disorder and loss of confidence. Precipitating factors pertaining to Services were maladjustment in the unit, lack of amenity, flying fatigue due to continuous boredom/alert/flying, aircraft accidents, fall in motivation, low morale and attractive and safer career elsewhere. Other associated diseases

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with psychiatric illness were diabetes mellitus and hepatomegaly in 4 cases each; IHD, obesity, head injury, fracture bone and cortical atrophy in 2 cases each; and delirium tremens, hypertension, renal glycosuria and ECG abnormality in 1 case each.

Disposal of these subjects to various flying status is given in Table II.

TABLE II  
*Disposal of subjects (n = 136) upto Jun '79*

Flying Status	Psychiatric	Neurological	Total
Grounded	19(42.23%)	33(36.23%)	52(38.23%)
Invalided or Released	2(4.44%)	3(3.32%)	5(3.68%)
Returned to Flying	24(53.33%)	55(60.45%)	79(58.09%)
Total	45	91	136

#### Discussion

The most meticulous preemployment examination may not always preclude the occurrence of a disease at a later date. Our aircrew have a stiff preemployment medical examination, yet they are prone to neuropsychiatric and other illness. However, no personality is immune to decompensation under the severe stresses while some seemingly vulnerable personalities have withstood surprisingly severe stress<sup>7</sup>.

In the present series the higher incidence of neuropsychiatric illness among pilots could be due to the large number of pilot population being exposed to flying or other stresses. However, further statistical and other comparative studies are needed before a categorical statement can be made.

#### Neurological Disorders

The main problems in neurological disorders are head injury, seizures, cervical spondylosis and lapse of consciousness because of their high incidence rate. Seizures and lapse of consciousness, by causing sudden incapacitation may lead to fatal accident. Only one case had subarachnoid haemorrhage, and two cases of brain tumour are of no statistical significance.

Relevant aspects of head injury, seizures and lapse of consciousness are discussed below:

#### Head Injury and Post Traumatic Epilepsy

Since the introduction of crash helmet, incidence of severe head injury cases have come down. Mild and severe head injury cases pose no problem in disposal. Moderately severe cases pose the real problem because of possibility of post traumatic epilepsy and its resultant sudden incapacitation. This is the single most serious effect in a closed head injury case from the standpoint of returning an aircrew to flying status although its overall incidence is low (2%)<sup>2,7</sup>.

Our problem is whether a pilot recovering from head injury be returned to flying with safety? If so, when can he resume full control of the aircraft?

In one series of 356 cases of cranio cerebral trauma, 30% of total number of patients had developed epileptic fits by 10th year. 50% of those patients who were to develop epilepsy did so within six months. At the two year point 80% of the epileptics reveal themselves by overt fits<sup>7</sup>.

Walker reviewed the fifteen year clinical course of 759 patients with head injuries from World War II. He highlighted the risk of post traumatic epilepsy in open head wounds as against closed head injuries without neurologic deficit. Cases with open cerebral wounds develop epilepsy more often as a group and continue to do so for a much longer period of time following the head injury i.e. upto 10, 15 or even 20 years<sup>9</sup>.

We can not follow up head injury cases for 20 years in service for administrative reasons. For all practical purposes, the maximum incidence of post traumatic epilepsy occurs between 2-4 years in head injury cases. We, therefore, follow most of the cases for 2-4 years depending on the nature of their head injury. Normally they get partial/full flying after a year or two depending on whether they are fighter/transport/helicopter pilots. In 3rd and 4th year, they come only for EEG review if otherwise clinically fit.

*Anti-convulsant Drugs:* Those who are put on these drugs have to be kept grounded for the duration. The drugs are gradually withdrawn after prophylactic or curative treatment. The danger of indiscriminate usage/sudden withdrawal is well known. Later on, an observation period without

drugs is necessary before restoration of flying status. We have yet no means of finding out whether the aircrew is continuing to take anti-convulsant drugs or not. This might pose a flight safety hazard. Laboratory facilities for estimation of anticonvulsant in serum is for consideration.

*Cranioplasty:* Although cranioplasty, when performed within 3-6 months from the injury, seems to have no influence on the development of relief of seizures, the original indication for performing such a procedure places the subject in a severe head injury category, thus disqualifying him from flying (small burr holes are an exception). However, all may not agree with this harsh view point. Further follow up of such cases is needed before we take a fresh decision in the interest of flight safety.

*Lapse of Consciousness:* Unconsciousness other than epilepsy can occur due to a variety of causes. In such cases, when there is no eye witness or the history is vague, problems are obvious. A solitary or two seizures at prolonged intervals may also pose problem. To make matters worse, the description and history are often vague. Clinical finding or investigations may also not be helpful at times. The disposal depends on correct etiological diagnosis.

*Post-Traumatic Syndrome:* These cases resume flying in a phased manner after relief of symptoms with treatment. Partial flying can be permitted with periodic psychotherapeutics if no drug treatment is needed.

*Asymptomatic EEG Abnormality:* Those with persistent specific EEG abnormalities are grounded as they are prone to seizures/lapse of consciousness especially under stressful flying situation. We had only three such cases. Statistically they do not pose a problem. However, one had to bear in mind that all such cases do not throw seizure attacks. Also 20% of normal individuals have abnormal EEGs. It is also known that nonspecific slow waves are seen in the inter-seizure period.

Basal EEG at entry has been rightly introduced for the aircrew. EEG is also done during their selection for conversion to high performance flying. These are pointers in the right direction as the study of serial EEGs are more important in diagnosis, follow up and prognosis than that of a single EEG. There are many such references in literature regarding EEG in aviation<sup>1,2</sup>.

### *Psychiatric Disorders*

Among psychiatric illnesses, neurosis constitutes the largest group, closely followed by alcoholism and psychosis in that order. Psychiatric cases usually have predisposing and precipitating factors which might be missed creating diagnostic problems about the nature of illness, e.g. endogenous or exogenous.

Minton's study showed that anxiety reaction was the diagnosis in 30% of all psychiatric disorders in a 2 year period for his aircrew population. He opines that with latest advances in treatment and outlook it should finally be possible to approach 90% successful return rate<sup>3</sup>. Our experience is more or less similar.

*Neurosis:* The neurotic group in our series consists of anxiety reaction, depressive reaction and paranoid reaction cases. Anxiety reaction constitutes the largest number of cases.

The aircrew are kept off flying as long as they are under drug treatment. A devoted flyer is also prone to anxiety or depression if suspended from flying. The problem is therefore how long to continue the drug treatment as curative and maintenance therapy. Periodical psychotherapy alone is, however, consistent with flying status — partial or full. Other problems are that of the possibility of relapse and deterioration of a neurotic case into psychotic category. Several factors e.g. environmental, psychological and clinical findings, have to be taken into account to make a reasonably correct forecast. It is also known that neurosis at times is a mask of psychosis.

Depression cases also pose problem. The first is the nature of depression e.g. endogenous or exogenous, psychotic, neurotic, or reactive. The second is the possibility of suicide. There are instances of fatal accidents which in reality were covert suicides<sup>4</sup>.

Transient situational disturbance is a category by itself. It consists of component parts of both neurosis and psychosis requiring prolonged observation.

### *Alcoholism*

Alcoholism affects by causing intoxication, hypoglycaemia, neurosis, psychosis and delirium tremens. Alcoholic depression and suicides are often interlinked. Incidence of alcoholism is high as such cases are

referred very late. Therefore, alcohol and flight safety do not go together<sup>6</sup>.

### Psychosis

Cases of endogenous psychosis are initially grounded. Those transient in nature and having first episode without a family history, may be allowed to fly in a phased manner while all others are permanently grounded.

The solitary personality disorder case was grounded as should be done in such cases. Loss of confidence in flying was dealt with administratively after negative clinical finding. This is usually due to low morale.

Confusional disorder if transient, could be infective, toxic or metabolic. Their disposal depends on etiology. The only problem arises if it is due to drug addiction and has to be tackled accordingly.

In psychiatric illness as in other illness, early detection may lead to early return to flying in most of the cases. The cooperation of COs, MOs and relatives is vital for this. Early and mild cases are best treated in the unit flying environment. Psychiatrists should be posted to all major flying stations.

### Recommendations

Based on our experience the following suggestions are made :

- (a) Provision of modernised facilities in major boarding centres and Command Hospitals for ;
  - (i) CAT SCAN
  - (ii) Chemical analytical laboratories and
  - (iii) FM magnetic tape recordings with computerisation of EEG.
- (b) Review and updating of existing preentry psychological tests by Directorate of Psychological Research.
- (c) Posting of Psychiatrists to major flying stations.
- (d) Close constructive cooperation by all concerned e.g. MOs, COs, Specialists, relatives and aircrew themselves.

### Conclusion

The incidence of neuropsychiatric illness among our aircrew is not alarming. The problems faced by us during aeromedical assessment of flying personnel e.g. diagnostic, therapeutic, prognostic and rehabilitative are common to other air forces also. Our disposal also compares favourably with them, although facilities in our major boarding centres are much less than in advanced countries. The recommendations made are necessary for early and effective diagnosis and will help a comparatively quicker return to flying in a larger number of cases.

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