

Symposium Paper
AEROMEDICAL ASSESSMENT OF FLYING PERSONNEL

Medical Problems

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Introduction

TYPES of diseases and injuries in aircrew do not differ from those of the general population except for a few diseases precipitated while functioning in the different environment of flight. However, significance of various diseases and the after effects of injuries are different for aircrew. While management of such disease or injury does not differ from other service personnel, the disposal and categorisation needs special knowledge of Aviation Medicine. Purpose of this paper is to highlight some of the medical problems in aeromedical evaluation of aircrew encountered at Air Force Central Medical Establishment.

Material and Methods

525 IAF aircrew were evaluated at CME from January to June 1979. Out of them, 218 had medical disabilities as shown in Table I.

TABLE I
Types of medical disabilities

Disability	No.
ECG abnormality	61
IHD	24
Arrhythmias	16
Hypertension	10
Diabetes Mellitus	31
GTT abnormality	11
Obesity	27
Respiratory diseases	10
Peptic ulcers	4
Miscellaneous	24
Total	218

In every case full flying history and clinical history are taken. Complete physical examination, routine blood counts and urine analysis are done. Routine work-up of an ECG abnormality case is given in Table II.

TABLE II
Work-up for ECG abnormality

History and physical examination
ECG resting and DMT
Metabolic parameters
X-ray chest
Perusal of old ECG held in Central Library
Fasting and Propranolol ECG
Stress testing on treadmill or bicycle ergometer

IHD cases, in addition, had hypoxic stress test at IAM. For cases of hypertension, IVP was also done on the first occasion. Control of diabetes mellitus was assessed by Standard and Cortisone primed GTT.

Results and Discussion

Of the 61 cases of ECG abnormality, 57 had been asymptomatic at the time of detection. Out of them, 3 cases had been recommended permanent grounding as even at the end of two years of observation, possibility of IHD could not be ruled out. Temporary grounding was recommended for 30 cases. 12 had been returned to flying category, without any restriction. Out of 24 IHD cases 14 were in permanent ground category as shown in Table III.

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TABLE III
Permanent Grounding for IHD

Myocardial infarction	...	11
Septal fibrosis	...	1
Coronary Insufficiency	...	2
Total	...	14

Although aircrew who have suffered from transmural infarction are permanently grounded, this decision is delayed for 6-12 months to see the degree of stabilisation and to avoid additional psychological trauma in immediate post-infarction period. Type of arrhythmias seen were supraventricular and ventricular ectopics and parasystoles. Five cases of WPW syndrome, one of first degree heart block and five cases of bundle branch block were also seen. One case of complete RBBB had developed in an aircrew who had partial block at the time of initial selection. A case of first degree block and one case of WPW syndrome with paroxysmal atrial tachycardia were permanently grounded. None of the 16 cases were declared fit for fighter flying.

During this period 27 cases of diabetes mellitus and 11 cases of GTT abnormality were seen. Five cases of diabetes mellitus had been grounded permanently. Criteria for grounding cases of diabetes mellitus are :—

- (i) Requiring Insulin or Hypoglycaemic drugs continuously or intermittently.
- (ii) Frequent breakdown in control.
- (iii) Presence of complications.
- (iv) Unreliability of individual to admit real method of control.

Total of 27 cases of obesity were assessed. 14 cases were in temporary ground category. One was permanently grounded because of diabetes mellitus. Conditions associated in obesity were:—

Diabetes mellitus	...	7
GTT abnormality	...	4
ECG abnormality	...	4
Supraventricular Ectopics	...	1

There were 10 cases of respiratory disease. The three cases of pulmonary tuberculosis had been returned to flying. Two out of five cases of bronchial

asthma were permanently grounded. Two cases of ankylosing spondylitis grounded for primary disease also had respiratory insufficiency. Four cases of peptic ulcer were referred for evaluation. One of them had erosive gastritis due to analgesics, one had gastric ulcer and the remaining two were cases of chronic duodenal ulcers.

Problems of Aeromedical Evaluation

A physician has to prognosticate on disabilities like ischaemic heart disease and diabetes mellitus which are progressive and chronic illnesses beset with sudden and unpredictable deterioration. Cardiovascular and metabolic processes, for example, are dynamic with many variables and their response in the environment of flight is difficult to assess with certainty. Primary concern of the physician, in other words, is the prevention of sudden in-flight incapacitation.

Some of the conditions posing problems in aeromedical evaluation are discussed below.

Cardiovascular Group: This group includes ECG abnormality, IHD, arrhythmias and hypertension. The 'ECG abnormality' is only a working diagnosis. First problem is to decide which is an abnormal ECG as there are many normal variants. The same changes in different individuals and in different conditions may have different interpretations. Second problem is to explain why an asymptomatic aircrew requires such prolonged grounding and repeated reviews for deciding on his disability. It is apparently to see that the abnormality is not progressive, to correct any coronary risk factor and to confirm repeatedly a good cardiovascular function. It is difficult to decide in a given case how long he should be observed, how many times he should be screened for metabolic abnormality and how many times he should have stress testing. If some of the selected aircrew in this group are subjected to cardiac catheterisation and angiographic studies as is the practice in USAF, the time of observation can be cut down. The third problem is the arbitrary period of two years to decide on the final fitness for aircrew duties. An aircrew who has been asymptomatic all along and has been following all instructions given by the specialists, if grounded in the end, has reasons to feel frustrated. Lastly, for cases like IHD and arrhythmias, drugs are prescribed at special evaluation centres for periods of 3 to 6 months at a time. Their ineffectiveness is detected only at

the time of the next review. Is it necessary to give drugs for six months before deciding upon a change in the therapy or is there any way of reducing this period?

Diabetes Mellitus and GTT abnormality: Diagnosis of GTT abnormality is again not clearly defined, but this has been a useful working basis. The problem in diabetes mellitus is that while there is universal agreement that diabetics requiring drug therapy should not be permitted flying, there is not much information on the degree of dieting that is permissible for safe performance of flying duties. Another problem is that quite a few aircrew seem to achieve grade one control while temporarily grounded, but the control breaks down on resuming flying because of stress and irregular meals. Problem is more acute in transport crew though more dangerous in fighter pilots. Permanent grounding seems to be the only solution.

Obesity: Enough has been said to the aircrew about obesity and majority have realised the preventive health value of correcting it. But an often asked question is why should Air Force aircrew be grounded for obesity alone, especially when this is not so for civil aircrew. Civil aircrew disposals should be commercially viable, whereas no great inconvenience is felt by temporarily grounding military aircrew in peace time. Correction of obesity is a preventive health programme adopted by the Air Force and similar responsibility is not there with civil aircrew. Temporary grounding helps in undertaking proper dieting and exercise. This may be relaxed on individual merits.

There have been two problems connected with this disability. A group of obese people overdo diet-

ing and exercise to the detriment of health and family harmony. Just before the medicals, they may adopt such unscientific methods as dehydrating themselves with diuretics, and present with signs of asthenia. The opposite group is one where there is total failure to reduce the body weight. The medical reviews are more frustrating to the medical evaluator rather than to the individual reviewed. The final disposal should be an administrative problem.

Drugs: Any drug therapy given on a continuing basis ordinarily contraindicates the performance of aircrew duties. For aircrew other than pilots some relaxation has been given for drugs like thyroxine preparations. Similarly diuretics in low dosages have been permitted for cases of hypertension. Problem for the medical evaluator is to know which aircrew is taking the drug on the quiet. While clinical findings sometimes give rise to doubt, there is no way of proving it chemically at present. Facility to estimate blood levels of commonly used long term medications like anti-diabetics, anti-hypertensives, anti-inflammatory and anti-convulsant drugs should prove useful for centres like AFCME.

Conclusion

Cardio-respiratory problems in aircrew form an important share of our work load. A good cardio-pulmonary laboratory is the pressing need of the medical evaluator. Secondly, in some individuals flying ability and experience can compensate for his disability. A proper feedback by the flight executives and unit medical officers is often not forthcoming and this should be corrected. Lastly while stabilization of the disability as assessed on the ground may not have much relevance in flight environment, attention must be given to more inflight research and provision of inflight monitoring equipment.