

UNCONSCIOUSNESS IN FLIGHT

(A Case Report)

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Introduction

With the advent of high altitude and high speed flying, the incidence of impairment or loss of consciousness during flight appears to have increased. Recently 17 such episodes have been reported. The factors thought to be operative in these cases were:—

- (a) Previous or concomittant 'G'.
- (b) Hypoglycaemia occurring a few hours after a light carbohydrate meal. ✓
- (c) Hyperventilation of anxiety or anger.

It has been stressed in these reports that all these factors contribute to diminished cerebral activity and can cause unconsciousness which has been called 'PHYSIOLOGIC UNCONSCIOUSNESS' by the authors. The incidence of such cases in the Indian Air Force, is not known. From the available evidence it appears that such cases are not very rare, although they are not reported for one reason or another. Further the possibility exists of such episodes playing a role in unexplained accidents.

A case is reported below of loss of useful consciousness resulting in an accident.

Case Report

On the morning of 4 Dec. '56, two junior pilots, were briefed for a practice high level close Vic formation sortie at 25,000 feet in Vampires Mk. 52. The formation was led by the Flight Commander who was an experienced pilot. The aircraft were airborne at 0845 hrs and immediately began to climb at a rate of ascent of about 2,000 ft./min. Reaching 20,000 feet the leader instructed his Nos. 2 and 3 to check oxygen and to turn the oxygen flow to 'high'. The aircraft pressurization system was not put into operation. At about 22,000 feet the leader observed that No. 3 was not keeping steady and his aircraft was porpoising. At this time the leader ordered a turn to the port and observing that the No. 3 was finding it difficult to maintain position, called him and asked him whether all was well and to check his oxygen again. There was no reply. Soon after No. 3 was seen passing slowly into a 45° dive. The height was 23,000 feet.

The leader followed No. 3 in the dive and informed the Control Tower that No. 3 was diving probably due to oxygen trouble. When about to hit compressibility the leader eased out and in doing so he lost sight of his No. 3. A little later he saw him coming out of the dive and then flying straight and level at about 5,000 feet with his under-carriage out. The under-carriage was broken and was seen dangling in an awkward attitude. By this time No.3 was apparently normal again, and when asked what had happened, replied "I can't say". After receiving necessary instructions from the leader and the flying control the pilot

approached the airfield. On attempting to land he over-shot once. After touch down the aircraft rolled for 500 - 700 yards, the starboard wheel slowly went in and the aircraft swung to starboard hitting a small $2\frac{1}{2}$ feet high bund. Soon after the aircraft came to rest, the pilot jumped out of the aircraft. On medical examination immediately after the accident nothing particular was noted except for a moderate degree of nervousness and apprehension. He could not recollect what had happened between the time he had put his aircraft in a turn to port at 22,000 feet and the time he had observed his aircraft in a steep dive hitting Mach. As he had found it difficult to pull his aircraft out of the dive he had lowered his under-carriage to reduce the speed. When coming out of the dive he had blacked out and had almost lost control of the aircraft. However, contact with the leader was made and the leader brought him on to the airfield. He was feeling fit to control the aircraft though somewhat nervous when landing. When the aircraft came to rest he threw his helmet, parachute and oxygen equipment in the cockpit and came out in excitement. When the equipment was brought to him in the flight office he noted that his oxygen tube was off the oxygen mask. He could not say when it could have come out. On enquiry he confirmed that he had checked his oxygen at 20,000 feet.

Results of Investigations.

The investigations which commenced 24 hours after the accident revealed the following facts:—

- (a) There was nothing to note in the previous or family history. He denied a history of fits, syncope or head injury.
- (b) A complete and a thorough clinical examination revealed nothing abnormal except a Grade I mitral systolic murmur which was considered "functional" or physiological.
- (c) Immediately before loss of consciousness supervened the pilot had been aware of his unsteady flying (which he attributed to lack of experience) and had experienced haziness and dimness of vision (which he attributed to the sun's rays coming into his eyes.) There were no other symptoms he could remember.
- (d) The total period for which there was loss of effective control was roughly 20 seconds or less.
- (e) There were no residual symptoms on regaining full mental faculties.
- (f) The pilot had only once before flown a high level formation sortie and his flying on that occasion was rather unsteady probably because of inexperience.
- (g) The pilot had breakfast of a glass of milk and two slices of bread two hours before take off and had no dinner the previous night. He also stated that he missed his dinner quite frequently just "to keep light".
- (h) The oxygen system was fully serviceable, with emergency switch seal broken. The oxygen had been turned to emergency in the air under instruction of the

leader. The pilot was using a large size 'G' mask which was ill fitting and leaking over the nose bridge. He was never given oxygen indoctrination in a Decompression Chamber. The pilot was wearing his oxygen tube beneath his harness straps and he said he almost always did this. The tube connection with the mask was loose and the tube could easily be pulled out of its housing. The pilot was checked out with his helmet and oxygen mask on, in the seat of a Vampire, wearing the oxygen tube under the harness straps; it was slightly compressed on tightening the straps but it was badly pulled on turning his head from side to side.

- (i) Radiography of chest revealed no abnormality.
- (j) Two glucose tolerance tests were carried out and showed a moderate degree of reactive hypoglycaemia.
- (k) E. E. G. records taken on two occasions before and half-an-hour after breakfast did not reveal any abnormalities.
- (l) Carotid sinus tests did not show any undue sensitivity.
- (m) Tests of useful consciousness were carried out in the Decompression Chamber at simulated altitudes of 23,000 feet. These were performed at varying intervals after carbohydrate meals, blood being withdrawn at the same time for glucose estimation. In all these tests the useful consciousness time was about 15 minutes. There was no evidence of excessive hyperventilation at altitude with or without oxygen.
- (n) The pilot was not found to be unduly susceptible to hypocapnia.

Discussion.

The loss of consciousness at an altitude of 23,000 feet followed by quick recovery on loss of height is strongly suggestive of hypoxia in this case. Leaking and ill-fitting masks can produce symptoms at this altitude, but this is not likely to cause unconsciousness after a short period at such an altitude. There is every possibility that the oxygen failure may have been due to disconnection, particularly under the effect of slight 'G', between the oxygen mask and the corrugated rubber tubing. Contrary to instructions in force, the tube had not been properly secured to the mask.

Although 23,000 feet is the critical altitude at which severe symptoms of hypoxia appear the time of useful consciousness in an average individual at this altitude is much longer than the period spent by the pilot. This brings in the possibility of other factors contributing to loss of consciousness e.g. 'G' forces, apprehension, hypoglycaemia etc. The latter was particularly of interest in view of his fall in blood sugar to a level as low as 55 mgm. 2 to 2½ hours after a carbohydrate meal. The question arose as to what extent, if any, the effects of low blood sugar had influenced the onset and degree of hypoxia at that altitude. In addition the possibility of partial or complete deprivation of oxygen at this altitude producing symptoms in an otherwise asymptomatic state of relative hypoglycaemia had to

be explored. In the Decompression Chamber tests, an ascent to 23,000 feet at the rate of 2,000 feet per minute without oxygen or sudden deprivation of oxygen at this altitude did not reduce the useful consciousness time when the tests were synchronized with the time of maximum fall of blood sugar.

In view of the above it is probable that associated effects of apprehension or concomittant 'G' had altered the onset of severe symptoms of hypoxia.

Acknowledgement.

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References.

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