Case Report

In-flight Myocardial Infarction in a single seat fighter aircraft : A case report

Surg Cdr LJ Pinto*, Wg Cdr N Taneja+

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Relative incapacitation in pilots flying single seater fighter aircraft can lead to disastrous results and therefore pilots are regularly screened to prevent such events from occurring. Moreover, investigation of an accident due to pilot incapacitation in these aircraft can often be inconclusive due to the paucity of material available for examination due to high speed impacts leading to fragmentation. Therefore the diagnosis of in flight incapacitation is rare in fighter aircraft. The case described below is one of the few where a fighter pilot suffered from incapacitation and survived.

Case details

In Jan 2003, a 43 year old experienced pilot took off for a combat sortie in a fighter aircraft at 1500 h. The pilot was apparently fine before and during the initial half of the sortie, but during a combat maneuver of 3-4 G, he developed nausea, sour eructation and neck pain. He initially attributed this to late nights and irregular meals. However, the symptoms got worse and he developed severe headache and blurring of vision on and off. He broke off the combat, asked for a rejoin, selected level mode, and switched oxygen to 100%. The blurring of vision and profuse sweating was impeding his view of the runway but with a lot of concentration and difficulty landed the aircraft. The landing was reported as unsteady and unsafe by another pilot who was waiting to line up at the end of the runway.

After the landing roll, the pilot opened the canopy of his aircraft and immediately felt better. Thereafter he taxied the aircraft to the pen but was unable to exit the aircraft by himself. He was lifted out with the help of his ground crew and he lay down on the ground at the side of the aircraft. The pain in the head and neck continued and he now developed a vice like pain around his chest. He was taken to the cardiology center of a civil hospital close by where he was diagnosed as a case of Acute Inferior Wall Myocardial Infarction. He was admitted to the civil hospital and administered streptokinase and other supportive medication. Two days later he was shifted to a military hospital where CART showed occlusion of 70% LAD and 99% RCA. PTCA was done and both arteries were stented. A repeat CART in Sep 03 revealed stenosis distal to the stent in RCA while LAD was patent. Another stent was put into the RCA. During review in Feb 04, TMT was negative and Echo showed basal wall hypokinesia with 50% LVEF. CART done in Aug 04 showed LAD 20 to 30% stenosis distal to the stented segment, mild pinching of the

*Professor Aerospace Medicine & Head
Dept. of Human Engineering & Human Factors
Institute of Aerospace Medicine, IAF, Bangalore.

+Associate Professor Aerospace Medicine
Institute of Aerospace Medicine, IAF, Bangalore.

RCA, and no regional wall motion abnormalities. He is presently being observed in nonflying status.

The pilot had significant coronary risk factors at the time of the cardiac event. He was a smoker consuming 10 cigarettes a day for the past 10 years and had a positive family history of coronary artery disease. He had undergone his annual medical exam including Double Master Test (DMT) in Aug 02.

Discussion

This case is being reported as it is the first confirmed incident of a Myocardial Infarction (MI) occurring during flight in a single seat fighter aircraft in the Indian Air Force. A 40 year old pilot of an F-5 aircraft of the USAF survived after complaining of chest pain during aerobatics and was later diagnosed as acute MI. Another documented case was a 43 year old pilot of an F-4 aircraft reported not feeling well in flight but who landed the aircraft with difficulty. At the end of the landing roll he lost consciousness and expired shortly thereafter. MI in single seat fighters has been suspected in the loss of three aircraft, where the diagnosis was made on circumstances of the case and post-mortem findings of occluded coronary arteries [1]. However, in-flight MI has been reported on a number of occasions in multi-crew members of military as well as commercial aircraft [1, 2].

The issue of in-flight incapacitation in commercial aircrew has been addressed by ICAO and this has led to a dramatic reduction in aircraft incidents since then. In Indian commercial aviation, an incident of MI occurred in the cockpit crew of an airliner enroute from Cochin to Mumbai in Sep 98 [3]. Another case was reported in Nov 04, wherein an Indonesian pilot collapsed at the controls of a 737 airliner minutes after take off from Pontianak, an island off Borneo. The co-pilot took over the controls and landed the aircraft back at the airport. Unfortunately, the pilot died in hospital a short time later [4]. In 216 general aviation accidents in the US from 1990 to 1998, which were attributable to pilot incapacitation or impairment, 26 (12%) had cardiovascular causes as a reason for the impairment [5].

In the present case it is indeed fortunate that the pilot landed the aircraft safely and thus the diagnosis could be confirmed. Had the aircraft crashed and/or the pilot not survived the incident, accident investigators would be at a great disadvantage as there was no call made to the ATC informing them of the emergency. Thus the possibility of in-flight impairment should be considered when investigating accidents where there is no apparent cause of the accident. Circumstantial evidence along with attention to the state of the coronary arteries at postmortem would be needed to clinch the diagnosis.

Another aspect that arises from the cases so far reported is the association of the onset of MI with aerobatics or combat maneuvers involving +Gz forces. The F-5 pilot flew a demanding mission including aerobatic maneuvers for an air show. The discomfort during sustained high Gz was severe but he was eventually able to land the aircraft. In the case being reported, the pilot was flying a combat sortie with a 3-4 G load.

The pilot in this case did not give the ATC any idea about the emergency or the difficulties that he was experiencing, he simply called off the combat and asked for a rejoin and landed the aircraft. The pilot was so involved in landing the aircraft, that he didn't even hear the conversation between ATC and the other aircrew on ground commenting on his unsafe

approach. This assumes significance as the pilot's physical discomfort and workload in keeping the runway in focus was so high, that even a call to abandon the landing or even the aircraft, would have possibly been ignored.

Conclusion

The above case is unique in that it occurred in a military aircrew during flight in a single seat fighter aircraft, the pilot survived and the diagnosis was confirmed. For accident investigators, this case also highlights the possibility of pilot incapacitation, both absolute and relative, as a cause of unresolved aircraft accidents. In the squadrons, the medical officer needs to emphasize the importance of health education and inculcate lifestyle modification where cardiac risk factors are present.

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