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Dictated: 07.06.2007
Date: 12.12.2007

Dear Dr Woodward

John Grahame Hoyte - DOB: 17/10/55
Harefield House, High Street, Fenny Compton, SOUTHAM. Warwickshire CV47 2YG

Mr Hoyte was referred to me by his previous general practitioner Dr Marshall but I understand that he has changed his registration to your practice and hence this report is addressed to you. The history might be well known to you but I would summarise it below for the sake of my records.

Occupational history

Mr Hoyte worked from 1973 till 1976 as North sea gas measurement laboratory technician. In 1977 and until 1980 he worked as a Civilian Flying instructor. From 1981 to 1987 he was aerial crop spraying pilot and during this period he was flying PA25 type of aircraft which uses fresh air through vents in the roof. In 1987 he became a Freight / maritime pollution patrol pilot flying DC3 & Cessna twins and he was in this job for two years until 1989. These planes were very old.

In 1989 and for the following 10 years he was a pilot for TNT flying the BAe 146 planes with average flying of 300 hours per year. From 1998 until 2005 he was a pilot with Flybe flying BAe 146 planes with average flying of 600 hours per year.

He tells me that during the period of almost 17 years as a pilot flying the BAe 146 he had repeated exposure to “fumes”, mostly noticed on the ground from the APU. He was unaware of “fumes” during BAe 146 flying and had no idea of the extent of the “fume problem”. He stated that “it affected other people” but was repeatedly told it was “normal’ and they have just accepted it. He stated that these “fume” incidents were present on numerous occasions estimating to be at least 50% of flights on the

BAe 146. He would notice them for example in almost every “early sector” flight. He described the “fume” as “not normal”, “just aware of it like heated fumes” and usually appears on take off and would stay for 20 minutes or so afterwards. On “bad occasions it would appear like blue mist”.

The Clinical Problem

Mr Hoyte indicated that he used to develop manifestations on most if not all occasions of “fume” incidents. In contrast, he would not develop such symptoms on times when no such incidents occurred. These symptoms would develop usually within minutes and they used to stay with him initially for most of the flight time and then progressively increased to all flight time and then for hours after leaving the flight and later on they would stay until he goes to bed to clear in the morning. The extent and severity of the symptoms also increased gradually with the passage of time.

The symptoms included visual blurring and visual disturbances (lights seem to jump up and down), sweating disturbances, dizziness and light headedness, fuzzy head and mild drowsiness, not concentrating properly “not with it”, feeling tired, clumsiness, weakness feeling, tremor, experiencing “internal head pressure” and feeling funny. As time went by he would also have difficulty in finding words and formulating sentences, disturbance of balance and difficulty with tasks and multi-tasks performance.

He noticed that when he was away from flying we would feel better. In 1998 he started day time flying and noticed a slight improvement initially then he started to have the symptoms built up again. For example, In 2004 he elected not to fly a BAe 146 three times. The first time due to fatigue on his wife’s birthday (when a social event had been booked weeks in advance) and the second time as a Training Captain in the co pilots seat, when he didn’t think he was fit enough to operate an old BAe 146 “with a bad fume background odour” to the Austrian Alps in bad weather. His airline and CAA criticised this decision. He had four months away from flying during which period he felt relatively better and then started again in February 2005 as a part time non training pilot. In June 2005 he again elected not to operate a flight after a BAe 146 “fume event” and he lost his medical and licence as a result of all the previous failures to fly. This was attributed to ‘chronic stress’. He had “very little detailed understanding at the time of the fume issue with the BAe 146”.

The symptoms of tiredness, fatiguability, loss of energy, muscle twitching, unusual sweating, reduced libido and mood instability all persisted with him. He feels exhaustion after moderate exercise or simple gardening. He knows what to expect so he can pace his activities accordingly. He drifts off to sleep very easily even in really exciting absorbing TV programmes / films. He needs to record them to make sure he doesn’t miss anything. He suffers from mood swings such as irritability and anger. He is getting much better at controlling this, but can still get very angry at losing his job and apparently, ‘failing’ his family.

After he stopped flying some of the symptoms started to improve gradually and by the middle of 2006 some of them have disappeared all together.

He was one of the 27 pilots tested by UCL in March / April 2006 and knew in May 2006 the exact reason for his previous ill health.

His medical problems have caused very difficult family relationships, mostly with his wife, mother and sister and most of his friends who all comment on “how well I look”.

Previous Medical History: He used to be very fit prior to the onset of his medical problems and enjoyed very good health.

Family history: His parents are in their 80’s. His Mother is incredibly fit and active. His Father is less so, but still in quite good health. His father was also involved with aerial crop spraying (not flying) in the 1960’s and agricultural chemicals in Sri Lanka the 40’s, 50’s and in the UK in the 60’s. His parents were divorced in ‘70’s.

Social history: He drinks alcohol only on social occasions. Alcohol used to have a very bad effect on him during his airline flying but his tolerance is back to normal now. He does not smoke cigarettes and has never taken social drugs before.

Previous investigations: He had ECG examination which was normal. Glucose tolerance test was normal. He was investigated for under active thyroid investigated as his Mother has this condition but this was found to be normal.

Medications: He has been prescribed anti-depressant medication (Citalopram and Prozac on separate occasions) but he did not take them. Apparently the CAA psychiatrist agreed later that “it was not appropriate”. He takes the odd paracetamol, but very rarely, maybe 5 a year, in total.

Neurological Examination: This showed a slight disturbance of tandem walk where he had difficulty with heel-toe walking or walking on his heels. Romberg sign was negative. Reflexes were present and equal on both sides and plantar responses were flexor. Sensory system examination showed no abnormalities and motor examination was unremarkable. There was no evidence of cerebellar dysfunction and cranial nerve examination showed no abnormality. The rest of the neurological examination was unremarkable.

Investigations We proceeded with some investigations as follows:

Electromyography and Nerve Conduction Studies
This showed the following in summary:

1. Motor Conduction Studies of the right common peroneal and right median nerves showed normal distal motor latency, compound muscle action potential and motor conduction velocity.

2. Sensory Nerve Action Potential Studies of the right median, ulnar and sural nerves were normal.

3. F-Wave Studies of the right common peroneal and median nerves showed results which were within normal limits.

4. Needle EMG Studies of muscles of the right upper and lower limbs at distal, proximal or intermediate levels showed no abnormalities. There was no evidence of neuropathic or myopathic changes.

In summary, these neurophysiological studies were essentially within normal limits with no evidence of any dysfunction of peripheral neuro-muscular system.

Single Fibre Electromyography

This was done on the right extensor digitorum communis muscle using the appropriate filter settings. There was no evidence of abnormal jitter or impulse blocking. These jitter studies, therefore, showed no evidence of any significant abnormality of neuromuscular junctional transmission.

Thermal Threshold QST

These were performed on the right lower limb using the technique of Jamal et al 1985 (Triple-T, Medelac, Vickers International Limited). The values were as follows:

	HT	CT
Right Foot	1.25	0.50

These showed results which were within normal limits for both modalities.

Vibration Perception Threshold (QST)

This was measured using the Somedic Vibrameter. Measurements (in micrometers) were performed on the right side in micrometres with the following results:

First metatarsal 0.80
Medial Malleolus 0.70
Tib Tuberosity 0.60
Index metacarpal 0.50
lateral epicondyle 0.60

These are normal results.

Evoked Potentials

Brainstem Auditory Evoked Potentials (BAEP) studies, Visual Evoked Potentials (VEP) studies and Somato Sensory Evoked Potential (SEP) tests were performed on the upper limbs through stimulation of the median nerve on either side following standard procedures. All the respective waveforms were reproduced and clearly recorded with normal absolute and differential latencies and amplitudes with no significant differences between the sides. These studies, therefore, were normal and showed no evidence of any involvement of the respective pathways of their neuronal generators in the central nervous system.

Electroencephalography (EEG):

A prolonged EEG examination was performed and this recording showed normal findings with no detectable epileptiform discharges nor focal abnormalities.

Mini mental state examination

This was performed using standard Folstein et al (1975) bedside procedure. It scored 44/45 points.

Neuropsychometric Battery Assessment:

These were performed by Dr Sarah Mackenzie-Ross, consultant clinical neuropsychologist at University College Hospital in London to asses the presence of cognitive dysfunction, to characterise them and to identify its profile. These tests were reported to show no evidence of global intellectual dysfunction but the tests showed some patchy dysfunction for example in difficulty in processing information, visual scanning and psychomotor speed and executive function (verbal and visual reasoning, semantic fluency, trails B, Stoop). Dr Mackenzie-Ross indicated that while the pattern is similar to those seen in other pilots who reported exposure to contaminated air, she was not concerned about the findings. These tests were performed almost two years after Mr Hoyte's last exposure.

Neuronal Autoantibodies:

Mr Hoyte had his serum tested at Duke University in North Carolina by Professor MB Abou-Donia, who is an international authority in pathological assessment of neurotoxicity, for Neuronal and Glial Autoantibodies. These tests were reported by Professor Abou-Donia to show increased autoantibodies against nervous system proteins and “in the absence of other neurological diseases, it is concluded that this profile is consistent with chemical-induced nervous system injury”.

OPINION

There seems to be some good description of many attacks of acute incidents developing while in the plane's cockpit and then initially being relieved from them immediately on leaving the plane and later on being relieved from them after hours. This time association of their onset following the description of the "fumes" and their disappearance once he is away from the plane is very striking. Furthermore, the description that he would not develop these symptoms if no "fume" incident occurred inside the aircraft is equally striking. Therefore, from the history provided there seems to be a very clear association of the occurrence of symptoms to the described "fume" incidents. The nature and content of the symptoms described seem to be compatible with exposure to a factor causing irritation of the conjunctiva and the mucus membrane while the rest of the symptoms are compatible with cholinergic attacks. It is therefore reasonable to assume from the face value of the history provided that the acute symptoms were time-locked with the "fume" incidents and that such fumes probably had in them irritant components and toxic components causing those acute manifestations. Mr Hoyte's description seems to be very similar to those obtained from other pilots/crew members describing similar events. He describes that at least early on the effects were temporary and would disappear initially immediately after leaving the aircraft, and later on with the passage of time, hours after leaving the aircraft.

Mr Hoyte then developed some chronic manifestations which he clearly describes and these are mainly in the form of some mental and cognitive effects as well as tiredness, and autonomic symptoms. He has also developed increased intolerance to alcohol. A series of objective neuropsychmetric testing battery done by Dr Sarah MacKenzie-Ross have shown clear evidence of patchy cognitive dysfunction. He also demonstrated clear abnormalities on laboratory neuronal autoantibodies testing which were commented by professor Abou-Donia as being suggestive of chemical injury to the nervous system.

I saw Mr Hoyte exactly 2 years after his last flight in a BAe 146 (which was on 30 June 2005) and he has had a lot of improvement during this period of time as indeed is expected given that he was not exposed. He tells me that his speech, word finding, cognitive function were back to where they were in 1989 before he started flying the aircraft.

Mr Hoyte describes clear set of autonomic symptoms and it would have been interesting and useful to have a full set of objective autonomic battery of tests to see whether he has toxic autonomic neuropathy and if so whether the pattern is compatible with a toxic type. However, this is now mostly academic since he is improving and I understand if Mr Hoyte is reluctant to undergo any more tests.

On the whole the present evidence available seem to point to the direction that Mr Hoyte's problem might well have been or indeed probably linked to his repeated

exposure to the "toxic fumes". I am glad he is improving well and I think he has been very sensible and wise in attempting to avoid further exposure.

Yours sincerely

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