

Seizure precipitated during long haul flight

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Abstract

We report three diagnosed cases of epilepsy under medication that were on long haul flight from Kathmandu to different destinations in USA with different clinical outcomes during flight. The first case had brief seizure like episode during flight and was given oral benzodiazepine. The second case was put on prophylactic oral benzodiazepine to induce sleep and reduce seizure threshold and had an uneventful flight. The third case developed generalized tonic clonic seizure and was managed accordingly.

Key words: Epilepsy, long haul flight, seizure.

Introduction

Here we have presented a series of cases diagnosed as epilepsy that were on long haul flight from Nepal to different places in USA at different period from May 28, 2008 to April 12, 2009. As medical escorts to Bhutanese refugee resettling in USA, we had to take care of medical cases during flight. This included detail review of medical records, pre-embarkation health checkup and administration of regular drugs. We would intervene if any medical problem occurred during flight or travel period to ensure safe passage of the medical cases to final destination.

All medical cases were rigorously screened prior to departure; thorough health checkup and investigations were done and they were put on medication and stabilized before they were cleared for flight.

Medical cases were flown in the evening from Kathmandu to New York via Abu Dhabi. From New York they were flown to different destination within USA sometimes with connection flights in between. They traveled with family members and other fellows. On international flights they flew on wide bodied jet planes at an average altitude of 35 000 to 43 000 feet. On domestic flights they flew on small bodied jet planes at similar or lower altitudes.

Long haul flight involves crossing of different international

time zones. On a typical commercial flight air is compressed in the aircraft to obtain a cabin pressure equivalent to that found at 5000 to 8000 feet.¹ Breathing air at 8000 feet is equivalent to breathing 17.1% oxygen at sea level. The alveolar oxygen tension falls from 103mm Hg at sea level to 70 mmHg. The PaO₂ likely falls from 75-100 mmHg at sea level to 53-64 mmHg and SpO₂ falls to 85-91%. This reduction in arterial oxygen pressure represents only small decrease in oxygen carrying capacity in blood. The humidity of air is kept low (15-21%).²

Case 1

A 24 years male was diagnosed with Generalized Tonic Clonic Seizure (GTCS) for last 13 months. He had multiple episodes of seizure which mostly precipitated during night with the last episode being 45 days back. He had seizure precipitated during his sister's wedding when he was awake for the whole night. In another episode which also occurred during night, he had persistent seizure and was rushed to the hospital. He consumed tobacco but no other recreational drugs. He had not suffered from any major illness. CT scan head was normal; EEG had abnormal background activity suggestive of postictal dysrhythmia. His weight was 50 kgs and height 173 cms. He was being treated by a neurologist and was maintained on oral Phenytoin 300 mg once daily.

On May 28, 2008 he had flight from Kathmandu to New

York via Abu Dhabi. From New York he had to fly to Phoenix via Dallas. So total travel time to reach final destination from Kathmandu was 36 hours including 24 hrs flight hours and remaining transit and waiting time. He was well during initial period of flight. He took regular medication and food but he did not sleep well in the plane. On 34th hour when on domestic flight from Dallas to Phoenix he developed jittery movements of hands and body for a brief period. He did not have up rolling of eyes, frothing or tongue bite. He was confused approximately for one minute. Oral diazepam was given after which he slept well and did not have any problem.

Case 2

A 51 years male was treated for seizure disorder for last 18 years. Apart from this, he did not have any other medical or surgical illness. He tried to stop medication on several occasions but seizure precipitated on discontinuation. He said tiredness, anxiety and sleeplessness often precipitated his seizure attacks. He had last episode two months back. His weight was 69 kgs and height 176 cms. He was maintained on oral Phenobarbitone 150 mg per day.

On 26th Jan 2009 he flew from Kathmandu to New York via Abu Dhabi and then to Atlanta. Total flight time was 36 hrs with 20.5 flight hours and remaining transit and waiting hours. He took his regular medication during flight, and he had adequate food and water. He could not sleep onboard so diazepam 5mg oral was given and repeated after 10 hours. He slept well after medication and did not have any other problems during travel.

Case 3

A 29 years female with generalized tonic clonic seizure for last 5 years was under regular medication of Phenobarbitone 30 mg twice daily. Her weight was 49 kgs and height 152 cms. According to the family members, during episodes of seizures she would have stiffness of body, up rolling of the eyes but no tongue bite, frothing from mouth or stool and urine incontinence. They usually did not leave her alone and the episodes never occurred at night. She did not have any known precipitating factors that provoked seizure. She had a two year old daughter.

On 1st April she flew from Kathmandu to New York via Abu Dhabi/Paris and then to Buffalo. Total flight time was 38 hours with 24 hours flight time. During flight she took her medicine at regular intervals. She took less food during the flight as she did not like the taste. She had to look after her young child who was a bit irritable, so she did not have good sleep.

After 16 hours flight, one hour before landing in Paris she fell down in the corridor while she was trying to go to toilet.

Her body was stiff lasted for about one minute; she had up rolling of eyes but no frothing, tongue bite or incontinence. She did not have any external injury or injury to head. After the episode she was confused for few minutes. Her vitals were stable and oxygen saturation was maintained. Oral diazepam 5 mg was given and she slept well. Remaining flight was uneventful.

Discussion

Air travel may play a role in exacerbating certain medical conditions causing in-flight medical emergency. There is an evidence of precipitation of deep vein thrombosis and pulmonary embolism especially in high risk patients such as pregnant women and those having such episodes in the past.^{3 4} Hypoxia may develop in patients with chronic obstructive pulmonary disease and in smokers.¹ Less severe health problems like jet lag, earache, sinus problem and abdominal upset occur more frequently.

A review article on in-flight medical incapacitation showed that leading causes of these episodes were myocardial infarctions, cardiac arrhythmias and epileptic seizures.⁵

The likelihood of developing seizure during flight in a patient with epilepsy has not been established. The probability of having an onboard seizure based on prevalence rate in general population is about 1%. Higher the seizure rates prior to flying, the greater the likelihood of an increase in seizure after air travel. Those with complete seizure control are less likely to experience seizures.⁶ Factors associated with increased incidence of seizures during and after flight have not been studied.

Potential source of physiological disruption during flight include cabin environment with relative hypoxia, low humidity, noise, vibration, turbulence and immobility. While healthy patients tolerate relative hypoxia of cabin environment very well and do not produce any symptoms, patients with cardiopulmonary disease may manifest symptoms of hypoxemia.⁷ Low humidity may cause nasal and oral mucosal dryness and dehydration.

There is intimate relation between sleep and epilepsy.⁸ Air travel may lower seizure threshold due to sleep disruption and sleep loss. Long haul flights that involve crossing of several time zones cause desynchronization of circadian rhythm, called jet lag. Travelers experience physical and mental effects like sleep disorder, difficulty with concentration, irritability, depression, fatigue, disorientation, loss of appetite and gastrointestinal upset.⁹

Passengers' postural mobility in most cabin settings is greatly restricted. Tiredness and monotony of the flight

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environment, excitement, emotion, different food, long waiting and transit time may also add up to the problem.

Adequate hydration, measures to reduce background noise and rest helps to make travel comfortable. Antiepileptic medication should be taken on time. Oral therapy with benzodiazepines may help to induce sleep and lower seizure threshold. Larger research is needed to identify factors that precipitate seizure and prophylactic use of benzodiazepine to prevent seizures during flight.

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