



# ESSENTIALS OF DEMENTIA – THE ELDERLY TRAVELLER

Based on a presentation by



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## Introduction

As an ever increasing number of destinations open up and invest in tourism, the international travel industry is expanding rapidly. It is estimated that the number of people travelling the world increased from approximately 25 million in 1950 to 1.186 million in 2015; by 2030 the number is expected to exceed 1.8 billion.<sup>1</sup> Approximately one-fifth of these travellers are elderly.

Travel for holidays, recreation and other forms of leisure accounts for just over half of international arrivals (53%), whereas just over a quarter (27%) of travellers report travelling for other purposes, including to visit friends and relatives. Only one out of every six travellers does so for business purposes. The majority of travellers travel by air (54%) or road (39%), with a small minority electing to travel by rail (2%) or water (5%).<sup>1</sup>

## KEY MESSAGES

- Elderly people represent about 20% of the travelling population and have high levels of pre-travel morbidity
- In flight, the most common problems are syncope or presyncope, respiratory symptoms and nausea/vomiting
- Physical consequences result from low aircraft cabin pressure, aggravation of prior cardiorespiratory conditions, infection and dehydration, leading to either deep vein thrombosis or pulmonary embolism
- Dementia, in flight disorientation, anxiety and aggression can make travel stressful for an elderly person
- Prevention of these mental/psychiatric-associated events entails reducing the stress of travel with thorough preparation, including comfort prior to and during the journey, adequate medication, including in the event of any unforeseen travel disruption, pre-medication as indicated and a reference health summary of pre-existing conditions and doctor details to be carried by the traveller.

## Medical emergencies and deaths while travelling

Considering that approximately 2.75 billion passengers fly on commercial airlines annually, in-flight medical emergencies are relatively uncommon. In a review of in-flight medical emergency calls from five American domestic and international airlines to a physician-directed medical communications centre over a two-year period between 2008 and 2010, there were 11 920 emergencies, equating to approximately one per 604 flights or 16 per one

million passengers.<sup>2</sup> The most common problems were syncope or presyncope (37%), respiratory symptoms (12%) and nausea or vomiting (9.5%). Aircraft diversion was required in only 7% of episodes. The mean age of passengers with in-flight emergencies was 48 years ( $\pm 21$ ; range 14 days to 100 years).

A second study retrospectively reviewed consecutive emergencies occurring during a six-month period on a single major

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international airline. The majority (65%) were the result of a pre-existing medical condition, 28% were new conditions and 7% were caused by traumatic injury (e.g. scalding by hot drink or injury due to falling luggage).<sup>3</sup> In the case of exacerbations of pre-existing conditions, 21% were respiratory in nature, 14% were cardiovascular and 10% related to abdominal problems. Half of the respiratory cases were asthma attacks and one-third were due to forgotten medication. The predominant new conditions were syncope (91%), mostly occurring when getting up after prolonged sitting, and abdominal pain (6%).<sup>3,4</sup>

Death on board an aircraft was extremely rare, occurring in only 0.3% of emergencies. The mean age of passengers who died was 59 ( $\pm 21$ ) years and cause of death was predominantly cardiac arrest (86%), with the remainder being related to syncope or presyncope.<sup>2</sup>

A report from the Centers for Disease

Control (CDC), which identified 213 international travel-related deaths during a three-year period between 2005 and 2008, reported that most occurred during sea travel (62%), predominantly among cruise ship passengers.<sup>5</sup> The remainder occurred on airline flights. Deaths were categorised as cardiovascular (70%), due to infectious disease (12%), cancer (6%), unintentional injury (4%), intentional injury (1%) and other (7%). Of the 145 cardiovascular deaths with reported ages, 62% were in people older than 65 years. Pneumonia was the most common infectious aetiology and 73% of respiratory deaths were associated with at least one pre-existing chronic medical condition. The higher incidence of death during sea travel is not entirely surprising considering that, compared to air travel, the longer duration of a voyage allows more time for a death to occur. It has been reported that some ill people choose to embark on a cruise with the intention of dying at sea.<sup>5</sup>

## The elderly travel with high levels of morbidity

Elderly people in general have high levels of morbidity, including cardiovascular disease, cancer, chronic diseases of the lower respiratory tract, cerebrovascular disease, diabetes mellitus, anaemia and dementia. In a 2008 Australian National Health survey, almost all individuals older than 65 years reported at least one long-term health condition and more than 80% reported three or more, including hypertension, diabetes and cardiac problems.<sup>6</sup>

However, chronic ill health is not a deterrent to travel. In an Australian

study of travellers aged >50 years, 68% had at least one chronic disease, with hypertension being the most prevalent. Approximately 62% were taking regular medications, of whom only half were carrying enough to last for the duration of their trip. Less than 10% had a health summary from their usual general practitioner, less than 20% carried a list of their medications and 39% were inadequately vaccinated.<sup>7</sup> Nevertheless, the majority of elderly travellers cope well with travel.

## Challenges associated with in-flight cabin pressure

Most commercial aircraft cruise at an altitude of 32 000-45 000 feet (10 000-14 000m), requiring the cabin to be isolated and pressurised. Cabin pressure is maintained at at least 74kPa, equivalent to an altitude of approximately 8000 feet (2450m), although it is often claimed that in practice it is normally maintained at around 1850m.<sup>3,8</sup> This is a relatively low pressure in comparison to standard atmosphere at sea level (101kPa) and because the fractional oxygen content of

the air in the cabin is the same as that at sea level, the partial pressure of oxygen at cruising altitude is approximately 25-30% lower than normal. A portion of the air inside the cabin (40-50%) is partly recirculated and cleaned with high-efficiency particulate air (HEPA) filters, whereas fresh air from the outside makes up the remainder. Inside the cabin, the humidity is maintained at 6-8% and the temperature at 19-23°C.<sup>3</sup>

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## Health risks associated with travelling

### 1. Low aircraft cabin pressure

Because of the reduced cabin pressure, gas expansion occurs in the closed gas- and air-containing compartments in the human body, such as the facial sinuses and the middle ear, and also in nonphysiological collections of gas that may occur following abdominal, intracranial or ophthalmic surgery and in pneumothorax. Since 1l of gas at sea level will expand to approximately 1.4l at 2450m, expansion occurring during air travel can be clinically relevant if the gas is trapped in a confined space.<sup>3,6</sup>

### 2. Cardiorespiratory conditions

The lower partial pressure of oxygen in the aircraft cabin is associated with a fall in blood oxygen saturation to 92-95%, which may be associated with compensatory hyperventilation and tachycardia.<sup>3,6</sup>

Symptomatic hypoxia often occurs in people with moderate to severe chronic obstructive pulmonary disease (COPD) and around 25% of COPD patients develop hypoxia-related symptoms in flight. It is likely that these patients will require in-flight oxygen, and oxygen will always be required by those who develop

In-flight changes in pressure can cause gastric discomfort, nausea or vomiting, and travellers should be advised to avoid carbonated drinks and gas-producing foods. Pressure in the sinuses and middle ear may be relieved by yawning and swallowing. Decongestants can be taken shortly before flying, with repeat administration as necessary during the flight. Sufficient time should be allowed after surgery before considering air travel, as changes in cabin pressure may cause wound dehiscence or retinal detachment.

respiratory failure.<sup>6,9</sup> In medically compromised individuals, hypoxaemia may be associated with headaches, dizziness or syncope, and may induce ischaemia, overt myocardial infarction or stroke, as well as impaired cognition and confusion.

In cases of syncope or presyncope, laying the patient on the floor with feet elevated and administering oxygen where necessary often provides rapid relief. If possible, blood glucose should also be checked with a finger-stick device to exclude hypoglycaemia.<sup>10</sup>

### 3. Infection

Because of immune senescence, elderly people are at increased risk of infection with viral respiratory pathogens during

air travel, particularly from infected fellow passengers seated within two rows of where they are sitting.

### 4. Dehydration and deep vein thrombosis

Dehydration may occur due to hyperventilation and inadequate fluid intake. Prolonged sitting and immobility in the lower ambient air pressure causes hydrostatic oedema with swelling, stiffness and discomfort of the lower legs and increased risk of deep vein thrombosis (DVT) and pulmonary embolism (PE).<sup>3</sup>

Although the risk of DVT during flight remains low (approximately 3.2 per 1000

person-years), it is approximately three times that of a healthy person who is not flying, and risk increases with increasing travel duration and repetitive flights. DVT affects approximately 1.65 and 4.8 passengers per million in flights longer than eight and 12 hours, respectively.<sup>11</sup> Factors that increase the risk of DVT are listed in Table 1.

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**Table 1. Risk factors for DVT and PE while travelling<sup>11</sup>**

|  |
|--|
| • Prolonged sitting or immobility  |
| • Family or personal history of DVT  |
| • Older age  |
| • Obesity (body mass index >30kg/m <sup>2</sup> )  |
| • Surgery (especially to the lower limb; e.g. hip or knee replacement, repair of hip fracture) |
| • Risk factors for atherosclerosis: smoking, hypertension, hyperlipidaemia, diabetes           |
| • Trauma   |
| • Stroke   |
| • Acute medical illness (including congestive heart failure, COPD, pneumonia)                  |
| • Inherited hypercoagulable states   |
| • Antiphospholipid syndrome  |
| • Cancer   |
| • Nephrotic syndrome   |
| • Use of hormone therapy or oral contraceptive pill  |
| • Central venous catheter or pacemaker   |

Usually clots are small and asymptomatic. Larger clots, however, cause oedematous swelling of the leg, warmth, tenderness, erythema, and tenderness or pain. Symptoms of DVT or PE usually occur within the first two weeks after travel, but may occur within hours or even up to two months after a long flight.

Advice for avoiding DVT while travelling includes exercising the legs by flexing and extending the ankles and frequently contracting the calf muscles while seated; refraining from placing baggage on the floor in front of the feet so that it restricts leg movement; on flights lasting longer than four hours, if conditions permit it, getting up and walking for five minutes every hour; drinking sufficient water to maintain hydration; avoidance of over-eating, alcohol and beverages containing caffeine; and wearing loose clothing. Graduated compression stockings may be considered for people travelling on longer flights. In patients at very high risk, low-molecular-weight heparin or a factor Xa inhibitor might be considered. Aspirin is not effective for prevention of venous thromboembolism.<sup>11</sup>

## 5. Dementia, in-flight disorientation, anxiety and aggression

Considering that, regardless of the reason for admission, approximately 30% of elderly patients admitted to hospital will suffer brief episodes of confusion or delirium, it is understandable that the combined physiological and psychological effects of air travel, in combination with pre-existent comorbidities and disruption of regular routines and activities, may increase the likelihood of confusion or delirium in elderly travellers, especially among those with pre-existing dementia. An elderly person who is confused during the night at home is likely also to develop confusion during an aircraft flight. Anxiety and emotions are exaggerated in patients with dementia and confusion may result in unusual, violent and potentially dangerous behaviour. Potential stressors include waiting in queues, security checks, delayed departures, cramped cabins and alcohol consumption.<sup>10</sup> Loud announcements, often in multiple languages, boisterous young children and crying babies may provoke underlying irritability. In those travelling by aeroplane, wrong turns

on exiting the toilets are common, leading to disorientation, inability to find one's seat and anxiety.

Anxious elderly passengers should be treated with empathy and appropriate reminding about where they are and where they are going. They will require assistance with decisions and directions. People with dementia should never travel unaccompanied.

Before leaving, elderly travellers should be encouraged to consult their usual doctor to optimise medical care, ensure that they are carrying sufficient medication for the duration of the trip and obtain documentation describing their pre-existing medical conditions and medications. If necessary, additional medication can be prescribed for use in case of emergency to aid sleep and for anxiety and psychosis. Appropriate options may include zolpidem, lorazepam and orodispersible risperidone or olanzapine wafers. All usual and emergency medications should be carried on board in hand luggage and caregivers should be familiar with how to

administer them (preparation and dose) and potential side effects. Additional recommendations for elderly travellers are listed in Table 2.

**Table 2. Recommendations for elderly travellers and their caregivers<sup>12,13</sup>**

|  |
|--|
| <ul style="list-style-type: none"> <li>• Prepare for the trip well in advance (at least six weeks before departure).</li> </ul>  |
| <ul style="list-style-type: none"> <li>• Necessary immunisations should be administered well before the departure date.</li> </ul>   |
| <ul style="list-style-type: none"> <li>• Ensure adequate health insurance, hospitalisation and repatriation cover.</li> </ul>  |
| <ul style="list-style-type: none"> <li>• Information and documents that should be carried on the person or in hand luggage include a travel and accommodation itinerary; personal details (with a photograph of the person with dementia); physician details and health summary (medical history, current medical conditions and medications); medical certificate for metal devices/pacemaker for clearance through security points. All forms should be stamped for authenticity.</li> </ul> |
| <ul style="list-style-type: none"> <li>• Notify the airline ahead of time. Most airlines provide preferential treatment for elderly passengers and may allow early boarding. Airport employees and airline staff should be notified of the traveller with dementia. A travel agent can assist with these arrangements.</li> </ul>  |
| <ul style="list-style-type: none"> <li>• A wheelchair may be requested, which facilitates caregiver support in terms of directions and commuting at the airport.</li> </ul>  |
| <ul style="list-style-type: none"> <li>• As far as possible, travel during the daytime.</li> </ul>   |
| <ul style="list-style-type: none"> <li>• Leave home earlier than usual, allowing plenty of time for formalities at the airport.</li> </ul>   |
| <ul style="list-style-type: none"> <li>• Avoid tight schedules between connecting flights.</li> </ul>  |
| <ul style="list-style-type: none"> <li>• To avoid urinary incontinence and getting lost on board, elderly people may be preferentially seated on the aisle near to the toilets.</li> </ul>   |
| <ul style="list-style-type: none"> <li>• All medications should be carried on board in hand luggage.</li> </ul>  |
| <ul style="list-style-type: none"> <li>• Contact lenses should be removed and replaced with glasses to avoid discomfort due to lower humidity inside the cabin.</li> </ul>   |
| <ul style="list-style-type: none"> <li>• Clothing should be layered to allow for cool or warm cabin temperatures.</li> </ul>   |
| <ul style="list-style-type: none"> <li>• Hearing aids should be turned down or switched off to avoid damage due to aircraft noise, especially during take-off.</li> </ul>  |
| <ul style="list-style-type: none"> <li>• Avoid alcohol, carbonated drinks and gas-producing foods.</li> </ul>  |
| <ul style="list-style-type: none"> <li>• Ensure adequate (but not excessive) fluid consumption.</li> </ul>   |
| <ul style="list-style-type: none"> <li>• Carry-on luggage should include snacks and sweets, especially if hypoglycaemia is likely to be a problem.</li> </ul>  |
| <ul style="list-style-type: none"> <li>• Senna glycosides may be considered for travel-induced constipation.</li> </ul>  |

## Cognitive enhancers for patients with dementia

In Alzheimer's disease (AD), cognitive deterioration is believed to occur secondary to progressive loss of cholinergic neurones and reduced levels of acetylcholine (ACh) in the brain. Therefore, current pharmacological alternatives for cognitive enhancement in elderly patients with mild-to-moderate dementia include the acetylcholinesterase (AChE) inhibitors (donepezil, rivastigmine and galantamine), which inhibit degradation of ACh in the synapse and enhance cholinergic neurotransmission. The three medications differ in their specificities for AChE; donepezil is a selective inhibitor where rivastigmine also inhibits butyrylcholinesterase.

In addition to activity against AChE, galantamine also modulates the activity of nicotinic ACh receptors.

Neuronal injury or death is believed to occur when there is excessive exposure to the neurotransmitter glutamate or overstimulation of N-methyl-D-aspartate (NMDA) glutamate receptors. Memantine is a fourth treatment option and was developed with the aim of enhancing cognitive performance or slowing dementia. It is an NMDA receptor antagonist that selectively blocks excessive NMDA receptor activity without disrupting normal activity, which is essential for physiological neuronal function.<sup>14</sup>

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In carefully selected patients with AD, these drugs have been shown to have modest, but clinically significant effects on cognitive function and functional decline. Although the AchE inhibitors are recommended for mild-to-moderate cognitive dysfunction, continued benefit may be evident during more severe stages of the illness.<sup>14</sup> In a study of 295

community-dwelling patients who had been treated with donepezil for at least three months and who had moderate to severe AD, continuation of treatment was associated with clinically relevant benefits in terms of cognition and function that were sustained for the 52 weeks duration of the study.<sup>15</sup> Memantine monotherapy was associated with similar benefits.

## Conclusions

Increasing world travel means that the number of elderly travellers is also increasing and will probably continue to do so in the future. Although most cope with travel without incident, a high prevalence of comorbidities predisposes the elderly to specific health risks during travel. Furthermore, widespread use of daily medication and polypharmacy, especially in combination with other prophylactic (e.g. malaria prophylaxis) and emergency medications, increases risk of medication-related side effects, drug interactions and sequelae of forgotten and

missed doses that need to be anticipated and planned for. Dementia is a particular concern in the elderly traveller, where unusual and even frightening behaviours can cause danger not only to the traveller, but also to fellow passengers and travel staff. However, timeous and meticulous planning, optimising health and medication regimens before travel, anticipating and making contingency plans for possible travel-related events, and enlisting appropriate assistance during travel can help to make the travelling experience safer and more enjoyable for all.

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