

## **British Travel Health Association Conference 2010, Edinburgh Travellers at risk - Advising the Cardiac and Diabetic Traveller**

*"Knowledge of the world can only be acquired in the world and not in a closet".*

Lord Chesterfield

Environmental factors ensure that global travellers experience higher morbidity and mortality rates than if they had stayed at home. Pre-existing conditions such as cardiovascular disease, chronic obstructive pulmonary disease and diabetes mellitus also play a prominent role in morbidity and mortality statistics for travellers, particularly among older age groups.

### **Causes of death in travellers while abroad:<sup>1</sup>**

<i>Cause</i>	<i>%</i>
Cardiovascular Disease	49
Medical, non- cancerous conditions	13.7
Trauma	22
Cancer	5.9
Other conditions	5.5
Suicide/Homicide	2.9
Infectious disease	1

### **CARDIAC EVENTS**

Cardiovascular events cause about 50% of deaths during air travel and are the second most frequent reason for evacuation. Several factors increase the risk of a cardiac event en route and at the overseas destination. Physiological and psychological pressures on travellers have increased in the last decade due to incremental changes in security and additional terror-ist threat at airports, rail termini and ferry ports. Air and land traffic congestion and new environmental and climatic factors create delay, hassle and uncertainty which can push vulnerable individuals from physiological stability into systems failure. Inability to meet cardiac demands and respiratory and metabolic distress may become life threatening, at a time when immediacy of available emergency care may not equate with that of the home environment. The inadequacies of travel health insurance can also be exposed at this time of medical need. Insurers can only provide the best medical evacuation resources available in the local milieu. Optimal care cannot be provided in transit locations such as an aircraft and in many tourist vacation destinations around the world.

### **Travel to departure point**

Anxieties and stresses about leaving home, reaching the airport, transport and new location develop, as departure day nears and heighten as the traveller leaves home. Time constraints and deadlines bring adrenaline rush and psychological arousal.

Unaccustomed physical demands such as hauling luggage, long walkways and the hassle of transfers from station to air or sea port, add to in-transit stressors. A fit healthy older individual may cope with these challenges, but the burden may push those with a pre-existing medical condition into respiratory or cardiac failure, or precipitate myocardial and

cerebrovascular ischaemia and infarction. The risk increases with prolongation of travel due to transport delay- a common feature of modern travel.

### **Air travel**

This transport mode can bring arterial oxygen desaturation with change in cabin pressurisation, along with forced immobility and potential dehydration. These effects can induce:

- Chest pain and angina
- Dyspnoea and pulmonary oedema
- Cardiac arrhythmia
- Venous

### **The Air Traveller with Heart Disease**

The older traveller with existing cardiac ischaemia, angina and heart rhythm irregularities may find their symptoms exacerbated in the cabin environment.

Those with pacemakers and cardioconverters may experience problems with security scanners.<sup>2</sup>

Travellers with heart disease should:

- Plan the journey by land and air as carefully as they choose their vacation hotel or ship cabin
- Purchase comprehensive travel insurance
- Acquire pneumococcal immunisation and annual influenza immunisation
- Choose antimalarial and anti-emetic drugs, with due regard to contraindications and drug interactions
- Consider use of executive airport transfer lounges to diminish airport stress
- Consider travel in an upper class cabin for a less stressful flying experience.

### ***Advice for traveller preparing for a long flight***

Advise airline in advance of travel via the Passenger Medical Clearance Unit. Complete Medical Information Form [MEDIF] and Travellers' Medical Card [FREMEC for frequent travellers] for stable, non-progressive, chronic conditions. The airline will require the potential traveller to be able to walk 100 metres on the flat, at a normal pace without severe breathlessness.<sup>3</sup>

Notify airline in advance of need for: Porter, electric buggy, wheelchair and airport oxygen: Not all airlines supply oxygen at take-off & land-ing. Supplemental oxygen must be booked in advance (portable cylinder, fixed rate of 2-4 L/min by Hudson mask/nasal cannula).

Oxygen concentrators are available (concentrate oxygen in ambient air by removing nitrogen) British Airways & United airlines charge £50-£100, other lines the price of another seat (£55 to £550). Virgin airline currently makes no charge: economy & premium economy class. For upper class passengers there may be no facility for oxygen for take-off & landing, as the oxygen cylinder cannot be stowed safely.<sup>4</sup>

### ***On the flight***

- Support stockings should be worn - applied before leaving home.
- Warfarin can be continued as normal.
- Diuretic medication should be taken as usual, or where there is prolonged morning travel they can be taken at the airport

- Drug medication must be carried in hand luggage in adequate amount
- Exercise limbs. Walk about the aircraft if possible Adequate non-alcoholic non-carbonated fluids should be taken in flight.

### **Contra-indications to flying and Duration of Restriction<sup>1,5</sup>**

- Uncomplicated myocardial infarction -7 days -if complicated MI => 4 to 6 weeks
- Severe or non-stabilised heart failure
- Unstable angina
- CABG (coronary artery bypass graft) procedure, Open heart surgery => 10-14 days
- Angioplasty, Stent => 3 -5 days Uncontrolled cardiac arrhythmias
- Uncontrolled Hypertension
- Severe symptomatic valvular heart disease
- Implantable cardioverter defibrillator (ICD): Prohibition on flying when ICD has delivered a shock, until condition considered stable<sup>1</sup>
- Pacemaker or ICD insertion: flying acceptable after 2 days. If pneumothorax at insertion: flight possible after 2 wks<sup>1</sup>
- Post ablation intervention : flight acceptable after 2 days but there is increased risk risk of VTE.<sup>1</sup>

### **Other Contra-indications to flying<sup>1</sup>**

- Acute Deep Vein Thrombosis -no flying until patient is stabilised on anticoagulants
- Cerebrovascular accident - if uncomplicated, individual may fly within 3 days (clearance is needed if travelling within 10 days)
- Brain surgery - 10 days no flying after event
- Generalised seizure - 24 hours delay before flight after occurrence
- Subarachnoid haemorrhage - 10 days delay before flight Departure Security clearance.

### ***Predeparture Security Clearance***

- Stent or mechanical valve in place. The passenger can safely walk through security machines, as these will not trigger an alarm.
- Pacemaker/ICD: metal casings may trigger alarm. The hand-held metal detector should be requested and the operator advised not to place it directly over the pacemaker, or repeatedly sweep over device.

### ***The Traveller with Heart Disease who becomes ill while abroad***

Consideration should be given to stopping pre-scribed diuretics and ACE inhibitors and seeking specialist advice if there is severe vomiting, diarrhoea, dehydration, hypotension, oliguria, 3kg weight loss. Increased intake of salt in a patient with heart failure may lead to pulmonary or peripheral oedema.

### **Air Travellers and peripheral vascular disease**

Air travel brings increased risk in elderly people from venous thromboembolism (VTE)-Risk increases<sup>1</sup> when flight > 4 hours with risk peaking at > 8 hours flight duration<sup>6</sup>

#### ***Factors increasing risk for VTE:***

- immobilisation (found in 75% of cases, with higher risk in non-aisle seating)
- dehydration, due to haemoconcentration and hyperviscosity of blood
- hypobaric hypoxia
- recent surgery

- obesity
- malignancy
- thrombophilia
- past VTE

### ***VTE precautions***

- Support stockings (but not if existing peripheral arterial disease (PAD)) Below knee hosiery should be fitted to the individual. 'Activa', 'Flight', 'Mediven' brands are available and should be applied with the leg elevated or at least horizontal, prior to home departure.
- Aspirin 75-300 mg not advised, as side effects may outweigh the benefits of use. Aspirin has been shown to be efficacious in arterial blood research.

### ***Passengers at high risk of VTE<sup>1</sup>***

Passengers with thrombophilia, recurrent DVT, poly-cythaemia, Factor V Leiden, antithrombin deficiency, malignancy, POP on lower limbs, gross obesity, surgery lasting >30 min in the previous 4 weeks are at higher risk A recommended precaution is the prescription of LWMH e.g. dalteparin (Fragmin®) 2,500 -5,000u SC before outward and return flights.<sup>2,6</sup> Passengers on Warfarin medication may need alteration in routine administration with long flights and transmeridian travel.

### ***Case Example***

If a traveller on warfarin is flying directly to Tokyo from London (11<sup>1</sup>/<sub>2</sub> hour flight, 8 hour time difference). The first regular dose of warfarin on that day needs to be changed at destination as the traveller will be flying a shorter day (east).<sup>4</sup> The individual will be exposed to changes in diet bringing change in gut flora and possible vitamin K balance. The traveller is advised to get INR done this length of time. on the third week, if staying abroad INR changes are likely with possible increase in alcohol input which can increase the INR. With change in the environment atmospheric pressure-at altitude > 2,400 m, (7,900 feet) there is a 2.7-fold increased risk for INR values to fall below target (effect of hypoxia on coagulation and drug metabolism).<sup>7</sup>

In a crossing of more than 6 time zones from the UK e.g. (travel from Britain to mid-USA or East India). The first regular dose of warfarin for the day needs adjustment.

### ***In travel:***

- WEST => increase dose by ¼ as the traveller is facing a longer day
- EAST => decrease dose by about 1/3

The INR should be repeated after 2 weeks of stay at the destination.

### ***Other problems for the traveller with heart disease***

- Photosensitivity from various drugs such as thiazides, doxycycline, amiodarone
- Anxiety generated by stressors inseparable from global travel, may merit use of a beta-blocker if not contraindicated.
- Paroxysmal supraventricular tachycardia, precipitated by physiological or psychological stress. This can be terminated with vagal stimulation, Valsalva manoeuvre, carotid sinus massage, by plunging the face into ice cold water or taking large sips of ice cold water. If recurrent, it is the responsibility of the travel clinic to exclude drug interactions from medication such as beta-blocker plus verapamil.

## **THE DIABETIC TRAVELLER**

The diabetic traveller faces several problems in world travel relating to diet and medication. Cultural changes in eating and diet habit at the destination may require change in caloric intake and adjustment in medication. The crossing of time zones and restricted meal content and times may upset the metabolic balance. Adverse temperatures and the risk of hypothermia can result in morbidity in the diabetic and failure to protect insulin and maintain adequate personal stores of other diabetic drugs can be hazardous. Prescribed drugs to combat the condition may not be available at the destination or not be equivalent in dose and efficacy. It is vital that diabetic potential global travellers prepare for the journey well in advance and seek advice from family doctor, consultant physician and travel clinic staff before embarking on international trips to developing and remote countries. Neither diabetics nor their medical advisers should regard diabetes as a contraindication to travel, but many problems may arise for diabetics during travel, including loss of diabetic control, travel-related infections, management of diabetic emergencies and practical problems of carrying and storing insulin, other supplies and equipment.

### ***Pre-travel arrangements<sup>18,9</sup>***

*The travel health professional should consider with the traveller -*

- All recommended vaccinations. These may give a temporary rise of blood sugar
- Malaria chemoprophylaxis and insect repellents
- such as DEET 50%
- Travel insurance (full declaration of clinical status required) - Diabetes UK can help if insurance cover is difficult to obtain
- European Health Insurance Card - needs periodic renewal
- MedicAlert® identification bracelet.
- Adequate and correct medication, glucose testing equipment, glucose tablets, syringes/needles, needle disposal container.
- Glucagon to be administered by travelling companion/stewardess) GlucoGel (previously known as Hypostopgel), with written professional declaration of medical need for needles, syringes, pens, vials, monitoring devices NHS 'Repeat Prescription' form can be accepted as a medical declaration of the need for these items

### ***The Diabetic Potential Traveller should remember:***

- Insulin needs to be kept from freezing and protected from sunlight. For long travel and use in hot/cold regions: use of a wide-necked vacuum flask (rinse with cold water or ice daily) or insulated storage bag. Special insulin wallets can be used with no need for refrigeration and should be carried in hand luggage when travelling by air.
- Carry on the person, testing strips, glucometers (In very hot/cold climate strips may over/under read.)

### ***During travel:***

- Anticipate delays, the freezing of insulin supplies in hold and lost luggage - need to carry emergency snacks - insulin/food and travel sickness medication.
- All medication, testing equipment, lancets - capped - and glucometer should be carried in hand luggage
- Exercise limbs, walk about train and aircraft to mobilise limb/calf muscles
- Stockings for leg support should be applied to limbs before home departure.
- Comfortable shoes or slippers should be worn on aeroplane, train or long distance coach

- Avoid alcohol in transit
- Tight glycaemic control during air travel is not necessary, but avoid hypoglycaemia

### ***The Diabetic Traveller on insulin***

For travel up to 8 hours it is best to stay on the time it would be at home (no watch change of time) for meals and injections. North to south travel often requires no medication change. In travel over 8 hours, with crossing of many time zones, the insulin dose should be adjusted by 2-4 % by time zone crossing.

A type 1 Diabetic patient, on insulin, is travelling to California (13 hour flight, 8 hour difference, 9 time zones). The total dose of insulin needs to change by 2-4% per time zone crossed.

- Travel up to 8 hours-stay on 'home time' for meals and injections
- North - South travel=> no change
- Travel over 8 hours (> 6 time zones)-adjust dose of insulin by 2-4% per time zone crossed.<sup>5</sup>

### ***East North - South West travel Insulin (more than once daily) dose***

Monitor blood glucose frequently in flight and accept a relative hyperglycaemia. In westbound travel (longer day) increase time between injections twice, by 2 hours each time. Increase insulin dose by 2-4% each time zone shift. In east bound travel (shorter day), shorten time between injections. Decrease daily dose of insulin 2-4% for each hour of time zone shift.<sup>6</sup>

### ***Westbound travel (longer day)***

If on a single daily dose, take usual dose on day of departure. On twice daily dose regimen, take usual dose on day of departure then 18 hours after am. Dose, but if blood glucose is greater than 13 mmol/l. take 2/3 of usual am. dose followed by snack or meal, then usual morning dose at destination.

### ***Eastbound travel (shorter day)***

For single or twice daily dose, take usual dose on day of departure. In morning at destination take 2/3 usual dose, 10 hours after am dose, If blood glucose is greater than 13mmol/l, take 1/3 of remaining dose followed by a snack or meal. If on twice daily regimen, add this 1/3 to pm dose. On second day take usual regimen.

### ***Insulin & Airport Security***

- Carry a prescription that matches the patient name & insulin in the box & label
- GlucoGel & Glucagon-carry a prescription with matching name
- Ask for hand-inspection of the insulin but insulin can safely pass through X-rays. However insulin stability may be affected by remaining in the path of X-rays longer than normal, or if it is repeatedly exposed to X-rays
- Carry insulin glucagen and glucogel only in checked baggage. Baggage stored in cargo subject to powerful X-rays and severe changes in pressure and temperature.

### ***The Diabetic Traveller on oral hypoglycaemics***

- Stay on 'home time' for meals and medication
- Adjust on arrival. Sulphonylurea dosages -may need to be altered to avoid hypoglycaemia
- Carry glucose tablets

### ***At destination***

- Some countries only have insulin U-40 or U-80 strengths therefore take an adequate supply
- Adjust dose of insulin if undertaking -increased activity, overeating or less active than normal
- Hot climates lead to increased absorption of insulin bringing risk of relative hypoglycaemia (dose may need to be reduced).
- Travel to areas of high altitude: can cause insulin to expand and contract causing air pockets within the cartridge or pen. When in very high cold conditions, keep insulin inside a pocket as close to the chest as possible.
- Practice a few "air shots" to ensure absence of air bubbles before injecting. Alternatively, revert to using a syringe and needle -it is usually possible to draw insulin out of a cartridge
- Avoid walking barefooted on beach or at poolside to avoid laceration and infection
- If traveller's diarrhoea occurs, do not stop insulin or tablets, monitor glucose frequently, adjust insulin dose accordingly. Hydrate and correct caloric input with carbohydrate-containing salt/sugar solution (1 level 8 level teaspoonfuls sugar in 1 litre of safe water).

### **References**

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- 9 The Diabetic Traveller Adapted from Benson E, Metz R. Management of diabetes during intercontinental travel. *Bull Mason Clinic* 1984-85;38:145-151 *Practice Nursing* 13(6): 259 - 262 (Jun 2002).

### **Patient Information leaflet**

#### **Tips for diabetic traveller**

- Plan ahead and consider the proposed trip activities and destination.
- Visit GP or diabetic advisor early to organise immunisations supplies and equipment - Acquire a letter from GP confirming diabetic status, and need for needles, or ensure original surgery repeat prescription is carried.
- Get a prescription for medication for longer than the trip schedule.
- Acquire diabetic identity bracelet and list of medications for emergency situations. Take copies of prescriptions & pharmacy contact information.
- Carry pharmacist contact information and copies of prescriptions which will expedite replacement or ordering of medications and supplies while abroad but be aware that exact replacements of drugs and equipment may not be available.

- Insurance should be organised on booking recording diabetes as a pre-existing condition. (Diabetes UK - can assist with appropriate policy)
- Acquire and check validity of EHIC travelling within Europe.
- Travelling by air "diabetic meals" may not be most appropriate. Check carbohydrate intake regularly and, if required, top-up with snacks en route.
- Keep insulin on person at all times or carried in hand luggage, out of direct sunlight or freezing conditions - such as an aeroplane hold! If insulin comes in U-100 check the conversion rate in countries where it comes in U-40 or U-80 Travel to tropical regions of the world will require the keeping of insulin in a cold pack, or in a cool place.
- Heat will affect the rate at which insulin is absorbed. In a high heat environment, insulin is absorbed quicker. It is important to monitor blood levels in hot weather and adjust diet/insulin dose as required.
- In a cold climate insulin is absorbed slower. Monitor blood sugar levels in extreme conditions and never allow insulin to freeze.

### **Adjust insulin times on reaching destination**

When travelling WEST lengthen the gap between insulin doses or add extra food with an extra dose until adjusted. When travelling EAST shorten the gap and reduce dosages. Check blood sugar regularly when crossing time zones, to determine need to adjust dosages. Perfect control might not be possible initially and accept a degree of hyperglycaemia

### **At Destination**

- Anticipate Traveller's diarrhoea. Careful attention should be given to food and water ingestion. It is important to monitor blood sugar levels carefully if vomiting and diarrhoea occur. sick. Maintain a good level of carbohydrate content in diet. Seek medical advice if the problem continues beyond a few days. DiabeticTravel.co.uk specialises in Travel Insurance for Diabetics.
- Airport security or immigration may request medication information. Traveling with an insulin pump can be difficult if you are unfamiliar with how to adjust them as you change timezones. Check with your doctor before traveling to determine the proper routine. In hand luggage, have a spare blood test machine, spare sensors, spare insulin and spare insulin pens.
- Take spare medication and equipment. Travelling by car, coach or train, assume travel will extend over one additional day. If travelling by air, assume three additional days. Carry a readily accessible medical history in case of hospitalisation. Include name and contact information of the home physician and family emergency contact numbers. Include medical ID cards current prescriptions.
- Carry an extra set of batteries for the glucose meter (or insulin pump if a portable unit is used and requires them).
- The glucagon emergency kit should include written, concise and easily understood instructions for its utilisation if not traveling with someone who knows how to administer it. Advise and train close travelling companions on how to administer it and tell airline staff you carry glucagon and where it is carried. Set a travel alarm to ring 4 hourly as a reminder to continue regular eating habits when abroad and keep it by the pre packaged emergency snack.

Kassianos G FRCGP, FBTHA., FFTM RCPS Glas. Mcintosh I FBTHA., FBSMDH., FFTMRCPS Glas.

Further Reading - How to Prepare a Diabetes Travel Pack I eHow.co.uk

[http://www.ehow.co.uk/how\\_6521103\\_prepare-diabetes-travel-pack.html#ixzz0vqcZIkEj](http://www.ehow.co.uk/how_6521103_prepare-diabetes-travel-pack.html#ixzz0vqcZIkEj)

**INFORMATION SOURCES**

Diabetes U.K. (formerly The British Diabetic Association).