

# Travel Related Deep Vein Thrombosis

## Introduction

Deep vein thrombosis (DVT) is a term used to describe the formation of a clot, or thrombus, in one of the deep veins, usually in the lower leg. DVT can occur as a result of periods of immobility, for example following surgery, but can also occur spontaneously in otherwise healthy persons.

DVT has been known to occur following long haul air travel and was dubbed 'economy class syndrome'; however this term is misleading as DVT has also been reported following car and train journeys. The preferred term is now travel related DVT or travellers' thrombosis. The evidence for an association between long haul travel and DVT remains under study.

## Risk for Travellers

The risk of DVT related to long periods of immobility has been known for many years. However, it is not known if air travel *per se* is a risk.

A recent history of travel was found in 24% (39/160) of patients who presented with venous thrombosis [1]. Of the 39 persons, 9 had undertaken air travel, 2 had travelled by train and 28 by car. A more recent study found the risk of DVT to be of a similar rate following air, car, bus and train journeys [2].

A further study concluded that the risk of DVT was increased during the two weeks following a long haul flight [3]. Other studies have found that the risk increases with the length of journey [4,5], and when other health risk factors are present [6,7]. Long-haul flights that typically last for 8 to 10 hours are considered highest risk.

Several factors have been identified from studies of surgical patients as increasing the risk of DVT [8, 9]. These include:

- History of DVT or pulmonary embolism
- Haematological disorders (e.g. thrombocythemia, antithrombin deficiency)
- Pregnancy and puerperium
- Malignancy
- Congestive cardiac failure or recent myocardial infarction
- Recent surgery
- Oestrogen therapy (e.g. oral contraceptive pill)
- Dehydration

The most severe complication of DVT is pulmonary embolism. This has been estimated to occur in approximately 1 to 2 cases per million flights longer than 5,000 km [10].

## Physiology

The physiology of DVT involves three related factors known as Virchow's triad. These factors are damage to the vessel wall, slowing down of the blood flow and increase in blood coagulability.

Long periods of immobility can slow the blood flow from the lower legs which can result in pooling and coagulation. A thrombus may then form which can occlude the blood vessel. Reduced blood flow can be further compounded by pressure on the popliteal vein in the back of the knee, such as that caused by an airline seat. One study has shown that flights longer than eight hours are associated with a hypercoagulable state in some travellers, particularly in those who were taking oral contraceptive pills and who had a genetic predisposition to venous thrombosis [11].

A serious complication of DVT is a pulmonary embolus caused by the thrombus dislodging and travelling to the lungs.

## Signs and Symptoms

Many cases of DVT cause no symptoms. However, some persons may develop pain in the calf accompanied by swelling and redness. The affected area is often warmer and there may also be oedema.

If the vein is completely occluded there may be cyanotic discoloration of the limb and severe oedema.

Pulmonary embolus is a serious complication and can be life threatening; sudden onset of dyspnoea is the most common clinical feature.

## Treatment

The main aim of therapy is to prevent pulmonary embolism, and anticoagulation treatment with heparin and warfarin is usually commenced. Warfarin therapy is usually continued for between 3-6 months, and patients are advised to wear a compression stocking on the affected limb for a period of time.

## Prevention

There are a number of measures that can be taken to reduce the risk of travel related DVT. All travellers intending to travel long haul should be aware of these.

- Avoid dehydration and excessive consumption of alcohol
- Do not wear constrictive clothing around the waist or lower extremities.
- Walk around the cabin as much as is practical at regular intervals during the flight
- Regularly flex and extend the ankles which will encourage blood flow from the lower legs
- Take regular deep breaths
- Avoid stowing hand luggage under the seat as it restricts movement

### Compression stockings

Travellers at an increased risk of DVT are advised to consider the use of compression stockings, which reduce the risk of DVT [12] and also reduce swelling associated with long haul flights [12-14]. It is vital that compression stockings are correctly measured and properly fit as ill fitting stockings could further increase the risk of DVT.

### Low molecular weight heparin (LMWH)

The value of LMWH in the prevention of DVT in high risk persons is well established. However, its use in the prevention of travel related DVT is less clear. Most medical practitioners recommend the use of LMWH for travellers at high risk of developing DVT, for example a history of previous DVT or pulmonary embolus [9,15]. A suitable regimen of heparin should be discussed with a haematologist, and the traveller or companion trained in its administration.

### Aspirin

There is good evidence that aspirin is useful in preventing arterial thrombosis, but it is not recommended for the prevention of venous thrombosis during travel. One study found that there was a reduction in the rate of DVT and pulmonary embolus in patients with hip fractures who were given aspirin.[16] However, when this data was applied to rates of traveller's thrombosis it was found that in order to prevent one case of DVT, 17,000 persons would have to be treated with aspirin [17]. Furthermore a Cochrane review noted that approximately one patient in 40 taking low dose aspirin would develop gastric irritation [18].

Due to insufficient evidence supporting the use of aspirin in travel related venous thrombosis, guidelines from the American College of Chest Physicians recommend against its use for DVT prevention associated with travel [9]. UK guidelines support this view and agree that aspirin should not be used for the prevention of DVT in travellers [15].

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## Links

British Medical Association Board of Science and Education. The impact of flying on passenger health: a guide for health professionals.

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