

The risk of venous thromboembolism from air travel

The evidence is only circumstantial

There has recently been increased publicity on the risk of venous thromboembolism after long haul aeroplane flights.¹ This was generated by the death of a 27 year old woman from a pulmonary embolism immediately after she disembarked from a flight from Australia to London.² So far there is only circumstantial,¹ but no epidemiological, evidence connecting air travel with venous thrombosis.

Homans first reported venous thrombosis related to air travel in a 54 year old doctor who developed a deep vein thrombosis after a 14 hour flight.³ This condition was first termed economy class syndrome by Symington and Stack.⁴ Venous stasis, caused by prolonged sitting in the "coach" position in a cramped aeroplane, was considered to be the main causal factor. Similar conditions to air travel, such as sitting for many hours in air raid shelters in London during the Blitz, were associated with a sixfold rise in sudden death from pulmonary embolism.⁵ A history of prolonged travel by train or car has also been reported to be associated with venous thromboembolism.⁶

Compression of the popliteal vein on the edge of the seat could be a major contributing factor to venous stasis. Haemoconcentration, as a result of decreased fluid intake and insensitive water loss in the dry atmosphere of an aeroplane cabin, has also been implicated.⁷ The diuretic effect of alcohol may exacerbate the situation.

In a recent case control study of 788 patients Kraaijenhagen et al concluded that there was no increased risk of venous thrombosis among travellers.⁸ However only 17 gave a history of air travel. The results should be balanced by the findings of Ferrari et al,⁹ who showed in another case-control study that a history of recent travel was found almost four times more often in patients with deep vein thrombosis than in controls. Interestingly the authors found that deep vein thrombosis after travel seemed to involve no particular risk factors and was more often idiopathic. In another study the coroner for the area including Heathrow airport in London reported 61 deaths in arriving passengers over three years. Eleven were due to pulmonary embolism. In the same period venous thromboembolism was attributable to only one of 28 deaths in those waiting to embark.⁹

Landgraf et al investigated the complex clinical and biochemical changes in 12 healthy volunteers during four simulated 12 hours flights.¹⁰ Plasma viscosity, packed cell volume, albumin concentrations, fluid balance, and lower leg swelling were measured. No dehydration was shown, but there was retention of an average of 1150 ml of fluid, which correlated with the increase of body weight of about 1 kg. This quantity of fluid roughly corresponded to the simultaneous swelling of the lower legs. The increase in lower leg volume was significant but not pathological. A weakness of this study was that it took no account of changes in cabin-related factors such as decreased air pressure, hypoxia, and low humidity.¹¹

These factors distinguish air travel from other types of travel. The decreased air pressure and relative

hypoxia in the cabin reduces fibrinolytic activity and may lead to release of vein wall relaxin factors that enhance venous stasis.¹² In this hypobaric environment markers of activated coagulation may increase by two-fold to eightfold.¹³

Further studies are required to prospectively identify the incidence of this condition and those at risk. However, current evidence indicates that any association between symptomatic deep vein thrombosis and air flights is weak and its incidence much less than the impression given by the recent publicity. The ideal prospective study should screen many passengers before and after prolonged air flights. Most airlines take the view that thromboembolism usually develops after the flight when the passenger has left the aeroplane and therefore has nothing to do with them. As a rule no advice has been given to the passengers, though at least one airline has now started giving advice.¹⁴

Preventive measures should include general advice to all passengers to stand up occasionally, drink plenty of water, and perform leg stretching exercises. Those with risk factors for deep vein thrombosis, such as a history of deep vein thrombosis, hormone treatment, presence of malignancy, recent leg surgery, or any major surgery, should discuss additional protective measures with their doctors. These will usually include graded compression stockings, aspirin, or low molecular weight heparin. Similar advice should be provided to travellers by bus or train who spend many hours in quiet sitting. However, until prospective studies conclusively show an association between deep vein thrombosis and prolonged travelling there will be no strict scientific basis for this advice.

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