Deep vein thrombosis and air travel

The death of a 28-year-old woman in October 2000 following a long-haul flight has led to sustained media interest in travel-related thromboembolic disease. In November 2000, the House of Lords Scientific and Technical Committee considered issues relating to the airline cabin environment. The evidence presented to this Committee consisted of many anecdotal case reports, a number of retrospective reviews of patients presenting with thromboembolic disease and oral evidence from many groups claiming an interest in flight-related medical problems. The Committee made a number of specific recommendations which can be summarized as the need for further research and passenger information.

HISTORICAL REVIEW

A summary of the literature before 2000 showed the first reported case of a flight-related deep vein thrombosis by Homans in 1954. Homans reported two colleagues who developed deep vein thrombosis following relatively short-haul flights. In 1988 surgeons working at hospitals near airports noted a high incidence of pulmonary embolism following travel. Their hospital was located close to Heathrow and they reported 13 deaths per annum from pulmonary embolism (J Belstead, personal communication, 1997). The term 'economy class syndrome' was subsequently coined by Sahiar and Mohler (1994).

CURRENT SITUATION

It is now recognized that deep vein thrombosis can affect all passengers, not only those passengers travelling economy class but business and first class passengers, including passengers who travel by coach, train or sit for long periods of time in their cars. Although there appears to be an association between flying and the development of deep vein thrombosis, there is still no scientific evidence that conclusively links deep vein thrombosis with flying (Kraaijenhagen et al, 2000). Immobility may be the only common factor.

There were no prospective clinical studies carried out before 2000 looking at either the true incidence of deep vein thrombosis or studies looking at whether there are specific flight-related factors that might increase this risk. Attempts to carry out prospective studies during the early 1990s were often thwarted by lack of funds (JH Scurr, K Burnand, P Kesteven, personal communication, 2001).

The first prospective study (Scurr et al, 2001) showed a surprisingly high incidence of asymptomatic deep vein thrombosis. With only 231 passengers included in this study, the results have to be interpreted with care. It is probable that using modern ultrasound techniques the diagnosis of deep vein thrombosis, particularly small asymptomatic clots in the calf, are much more common than was originally thought.

This study still does not address how many passengers will go on to develop a serious blood clot or how many will progress to suffer a pulmonary embolism. As the study only looked at airline passengers, it gives no real indication as to whether airline passengers are at greater risk than passengers travelling by other means of long-distance transport. Seven per cent of the passengers in the study by Scurr et al had a thrombophilia and what is becoming increasingly clear is that thrombophilia combined with a past history of previous thromboembolic disease or other risk factors is probably as important as flying itself in the development of thromboembolic disease.

WHERE TO NEXT?

The issues which remain that need to be addressed are first, what is the true incidence of deep vein thrombosis following all methods of long-distance travel and how many of these are likely to give rise to long-term sequelae, i.e. post-thrombotic limb or acute pulmonary embolism. Other specific flight-related factors such as a reduced cabin oxygenation and reduced cabin pressure, which might predispose the development of blood clots, needs further study. To date, chamber studies by Bendz et al (2000) suggest that reducing oxygen concentration may increase the risk of thrombosis. The third factor which remains is that if there is an increased risk of deep vein thrombosis, can this be reduced by prophylaxis with elastic compression stockings, subcutaneous heparin or exercise devices?

PASSENGER ADVICE

With the current media hype, some advice to passengers is essential. The problem must be kept in perspective and although passengers have died following long-haul flights, the number remains small. The true incidence, however, could be larger than is known given that many passengers travelling will develop a deep vein thrombosis and pulmonary embolism days or weeks after travelling when the true diagnosis is either not made or not associated with travel.

Studies on hospitalized patients show that there are risk factors which will increase the risk of deep vein thrombosis and the whole question of fitness to fly needs to be addressed formally (THRIFT Consensus Group, 1992). There are no regulations concerning who can or cannot fly. Clearly those passengers with increased risk factors should be assisted by the use of compression stockings and/or subcutaneous heparin.

FUTURE STUDIES

What is urgently needed are proper large prospective control studies performed by the international community and backed by the World Health Organization and other world bodies. Funding for these studies has proved difficult. The WRIGHT Project (World

Health Organisation Research into Global Hazards of Travel) currently has three proposed studies. One is a large epidemiological study to look at the true incidence of travel-related deep vein thrombosis and pulmonary embolism. The second part of the study is a chamber study designed to answer specifically whether reduced oxygen concentration and reduced pressure predispose to blood clotting. Third, a large study looking at passengers prospectively before and after travel will be undertaken to assess the incidence of deep vein thrombosis and to assess the efficacy of prophylactic measures including elastic compression stockings, exercise devices and in high-risk groups of passengers the effect of subcutaneous heparin.

Until the results of these studies are known it is not possible to say if there is a conclusive link between air travel and deep vein thrombosis, although there does appear to be an association. Until this risk is established and there is scientific evidence on matters of prophylaxis, passengers should be given commonsense advice similar to the advice given to patients coming into hospital to undergo surgery. Those passengers who are at increased risk of developing a deep vein thrombosis should be identified and given appropriate advice.

Overall a greater awareness of fitness to fly, not only with regard to deep vein thrombosis but to many other medical issues should be promoted. This promotion should form part of general health education and not left specifically to the airlines. While the airlines have made great contributions to increasing passenger awareness, and often in many cases sensible advice, the airlines' contact with the passenger is often too late, i.e. at check-in, to alter the course of events. **HM**

KEY POINTS

- Although there appears to be an association between deep vein thrombosis and air travel, there is still no conclusive evidence for this link.
- Economy class syndrome is a misnomer – all travellers can be affected by deep vein thrombosis.
- Fitness to fly needs to be addressed formally.
- Deep vein thrombosis prophylaxis, such as compression stockings and/or subcutaneous heparin, should be considered in high-risk passenger groups.

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