



AIR TRAVEL AND PREGNANCY

This is the second edition of this Opinion Paper, which was published in 2001 under the title Advice on Preventing Deep Vein Thrombosis for Pregnant Women Travelling by Air and was archived in February 2005.

1. Background

Obstetricians are commonly asked to advise on whether it is suitable for women to fly during pregnancy. Such advice is sought because of the physiological and environmental changes associated with commercial air travel and also because of the possibility of preterm labour or an obstetric emergency developing while in flight, particularly in those women who are approaching 37 weeks of gestation or who have risk factors for preterm labour.

The key change in environment associated with commercial air travel is the cabin altitude. Although cabins are pressurised, this will equate to a cabin altitude of between 4000 and 8000 feet at cruising altitude. Thus, the barometric pressure is significantly lower than at sea level and there will be a concomitant reduction in the partial pressure of oxygen, in turn resulting in a reduction in blood oxygen saturation by around 10%. Such a reduction does not pose a problem for healthy individuals and this remains so in pregnancy. Owing to the higher count of red blood cells in the fetal circulation and the favourable properties of fetal haemoglobin, there is considered to be little if any change in fetal oxygen pressures.¹ Humidity in aircraft cabins is kept at up to 15% so insensible fluid loss is increased. While this can potentially increase the possibility of dehydration, there is no evidence that this actually occurs. With regard to any adverse effects of air travel on pregnancy themselves, there are no data to suggest that commercial airline travel is associated with an adverse pregnancy outcome in terms of preterm labour, preterm rupture of the membranes or abruption. The increased cosmic radiation exposure associated with flying is not considered significant in terms of risk to the mother or fetus for occasional flights but flight crew are not usually allowed to fly while pregnant as their exposure would be substantially greater.

Although there is no direct risk of pregnancy complications, the cabin changes can be associated with increased risk of discomfort and medical complications in the mother. With increasing altitude and reduction in barometric pressure, gases expand. This most frequently leads to problems within the ear, particularly if there is nasal congestion, which is more common because of the vasodilatation of pregnancy. For some women, motion sickness will be a problem and this may accentuate morning sickness. The duration of the flight and sometimes cramped seating will lead to significant immobility and increased risk of lower extremity oedema and deep venous thrombosis (DVT), which when coupled with the physiological changes in the coagulation system in pregnancy may accentuate the risk, particularly if further risk factors are present, such as previous DVT or obesity.

The main concern restricting the airlines from accepting pregnant women as passengers relates to the risk of labour developing, which may disrupt or divert the flight and the lack of appropriate care providers and facilities to manage labour or any obstetric complication in flight. As the majority of pregnancies extend to at least 37 weeks of gestational age, many airlines do not allow women to fly after 36 completed weeks of gestation because of this risk. If there are significant risk factors for preterm labour, such as dichorionic multiple pregnancy, women should not fly after 33 completed weeks of gestation. This may be further reduced for monochorionic twin pregnancy. Many airlines will require a letter from a midwife or doctor confirming that there are no anticipated complications for flights taken after the 28th week of pregnancy and confirmation of the expected date of delivery.

Thus, although there is no specific risk to pregnancy associated with commercial air travel, it is important that the obstetrician is aware of conditions which may complicate the pregnancy and could lead to an increase in risk or problems. Medical complications which may occur during pregnancy and which would contraindicate commercial air travel include:

- severe anaemia with a haemoglobin less than 7.5 g/dl
- an unstable fracture, where significant leg swelling can occur in flight, particularly hazardous if a cast is in place
- recent haemorrhage
- otitis media and sinusitis
- serious respiratory disease, particularly with marked breathlessness
- recent sickling crisis
- recent gastrointestinal surgery where there have been gastrointestinal procedures carried out and where suture lines on the intestine could come under stress due to the reduction in pressure and gaseous expansion.

A particular concern is the risk of DVT. As noted earlier, pregnancy carries significant risk of venous thrombosis. Although the absolute risk is small, this risk is likely to be increased by air travel owing to immobility and sometimes cramped conditions. The true frequency of DVT during long-haul flights in pregnancy is unknown and difficult to determine, particularly as the condition may be asymptomatic. In non-pregnant populations, studies have estimated that around 4–5% of those at high risk will develop symptoms of DVT associated with such travel.² A systematic review concluded that there was some evidence to suggest that flights of 8 hours or more increased the risk of DVT in those with additional risk factors.³ A recent cohort study in non-pregnant individuals reported that the risk of new thrombosis associated with air travel is approximately two- to four-fold.^{4,5} To combat this risk, there is evidence that graduated elastic compression stockings worn during a flight will significantly reduce the risk of **asymptomatic** DVT.⁶ There are no data to indicate that symptomatic DVT, pulmonary embolism or death is avoided by the use of such stockings. Again, these data relate to the non-pregnant population, although may be reasonable to apply to pregnant women.

2. Practical considerations and advice

For women with an uncomplicated pregnancy and no medical or obstetric risk factors for complications that would contraindicate air travel, there is no indication to advise against commercial air travel. Travel insurance may be difficult to obtain in the latter stages of pregnancy.

When giving advice, consideration should be given not only to the woman's obstetric and medical condition and risk factors but also the reason for travel, the duration and the destination. Issues associated with destination include recommended immunisation and antimalarial medication. Even at advanced gestation, there is no significant risk associated with flying *per se* and indeed air travel may be of significant value in obstetric emergencies.⁷ However, in view of the difficulties associated with labour occurring in flight, it would appear to be prudent to avoid air travel from 37 weeks of gestation in an uncomplicated singleton pregnancy and beyond 34 weeks of gestation in an uncomplicated multiple dichorionic pregnancy.

For seat belt use, the woman should be advised to ensure that the strap is reasonably tightly fastened under her abdomen and across the top of her thighs.

With regard to minimising the risk of DVT, appropriate general advice would be to have an aisle seat to facilitate ease of movement, take regular walks around the cabin every 30 minutes or so on a medium or long-haul flight, maintain a good fluid intake and minimise caffeine and alcohol intake to avoid dehydration. It is critical to make a specific individualised risk assessment for thrombosis in pregnant women who are flying. For short-haul journeys no specific measures are likely to be required. For medium to long-haul flights lasting more than 4 hours, it is suggested that all pregnant women are advised to wear properly fitted graduated elastic compression stockings. Where the woman has additional risk factors for thrombosis such as a previous DVT, morbid obesity or medical problems such as nephrotic syndrome, specific pharmacological prophylaxis with low-molecular-weight heparin (LMWH) in the doses recommended for antenatal prophylaxis should be considered for the day of travel and several days thereafter, if the woman is not already on LMWH. In many such cases, the woman is liable to be on antenatal thromboprophylaxis with LMWH in any event and this should be continued. She may require a letter to confirm the gestation and also for security purposes if she is carrying a supply of LMWH injections. Evidence suggests that antiplatelet agents, such as low-dose aspirin, provide some protection against venous thromboembolism (VTE) in hospitalised women.⁸ However, aspirin alone is not recommended as VTE prophylaxis, primarily because more effective methods of prophylaxis are readily available and there is an association with potential haemorrhagic complications. Indeed, current recommendations advise **against** the use of aspirin alone as prophylaxis against VTE for any patient group.^{8,9} Thus, the woman at high risk of VTE should be treated with LMWH as described above.

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