

Deep Vein Thrombosis Associated with Airplane Travel during Pregnancy: (Article Review)

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ABSTRACT

Background: Air travel during pregnancy is increased in the last decades, this occur due to globalization and because of more engagement of pregnant women in multiple occupational, social or recreational activities around the world. for most healthy pregnant ladies it is safe to travel during pregnancy before 36th week of gestation, but this is not the case in presence of maternal risk factors because the risk of thrombosis will escalate due to the physiological hypercoagulability of pregnancy and environmental conditions of aircraft like decreased atmospheric pressure, low oxygen saturation, and limited motility; these all contribute to increase incidence of thrombosis in susceptible pregnant women. For healthy pregnant women, preventive strategies include good hydration, avoid wearing tight clothes and encouragement of motility in aircraft; adding low molecular weight heparin is advised in high-risk patients.

Keywords: Deep Vein Thrombosis, Air Travel, Pregnancy.

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INTRODUCTION

Deep Vein Thrombosis (DVT) is the presence of coagulated blood in deep venous system. It usually occur in the legs and it predispose the patient to many adverse effect like pulmonary embolism and post thrombotic syndrome (1).the risk of DVT is already increased four folds in pregnant ladies as a result of prothrombotic changes and increment in the level of clotting factors that occur normally during pregnancy (2).

With the increasing availability of commercial air flights, more pregnant ladies travel for different purposes. the risk is specially increased in long flights because the prolonged restricted movement in aircraft seats affect venous circulation of the legs together with low oxygenation, decreased humidity and hemoconcentration all will contribute to an increased likelihood of thrombosis(3)

The incidence of air travel induced thrombosis is low in healthy pregnant ladies but it increased in the presence of predisposing

factors like advanced maternal age,twin pregnancy, and obesity.

So it is very important to clarify the relationship between air travel and thrombosis.

This review will explain the relation between DVT and air travel, clarify the epidemiology, summarize the pathophysiological mechanism and risk factors ,explain the preventive strategies and current recommendations regarding thrombosis associated with air travel in pregnant ladies

Epidemiology

There is no large observational data demonstrate the exact incidence of deep vein thrombosis in flying pregnant ladies because of difficulties in following and registering each flying pregnant women.so determining the accurate incidence is difficult.

Refaei, M. et al establish that the risk of thromboembolism post flight is very low about 0.05 % (4).

Panel Suzanne C. Cannegieter^a et al also state that the risk is very low about 0.03/1000(5)

While Bahy Vethanayagam et al state that the risk of venous thromboembolism associated with air flying is (< 1%) .in low risk pregnant women or in the postpartum period.(6).

Kourlaba G, Relakis et al show that the absolute risk of VTE in the pregnant traveler is 0.6/1000(7).

Physiology and pathophysiology

Blood stasis in venous circulation, endothelial injury, and increased coagulability, termed as Virchow's triad, are these contributor elevate the possibility of thromboembolism during pregnancy(8). The cabine environment characterized by low air pressure, dry air, low oxygen saturation, in addition to inhibition of the fibrinolytic pathway and decreased secretion of endothelium-derived relaxing factors.(9) all associated with increase tendency for thrombosis.

Combination of both escalate the risk of thrombosis specially in predisposed women with multiple patient related risk factors.

Patient related risk factors

- Previous DVT .it is regarded as leading risk factor(10)
- Inherited or acquired thrombophilia: Blood-clotting disorders (e.g., Factor V Leiden) or conditions like Antiphospholipid Syndrome (APS). (10)
- Family history of first or second degree relative. (6)
- maternal age: more than 35 years (10)
- Obesity: patient with a body mass index (BMI) of 30 kg/m² or more.(11)
- Immobility: traveling more than four hours.(12)

.Smoking: it causes vascular endothelial damage with subsequent enhancement of clot formation. (13)

- Underlying chronic conditions: Having chronic medical issues like renal disease, diabetes, or inflammatory bowel disease (14,15)
- Multiple gestations: Carrying twins, triplets, or more puts extra pressure on pelvic veins. (16)
- Assisted reproduction: Fertility treatments using hormones may increase clot risk. (17)
- Hyperemesis & Dehydration: Severe morning sickness or dehydration can make blood thicker and more prone to clotting.(18).
- preeclampsia. It is an important risk factor of thrombosis due to haemoconcentration that occur as part of pathological changes of pre eclampsia (19).

Aircraft related risk factors

The exact trigger within the cabine still controversial, Chandra et al suggest that main risk factor is limited motility in aircraft which leads to pooling of blood in the veins of legs (20), while Bendz et al suggest that the main contributor to thrombosis is the decrease in oxygen and pressure in the cabine, because both leads to activation of clotting system(21)

Clinical manifestations

The clinical findings are not unique to the disease; it may mimic the clinical features of pregnancy in third trimester, it mostly occur in the left side because the left iliac vein is compressed by right iliac artery, with further pressure from the enlarging uterus(22).

patient may present with:
leg swelling, warmth and redness, and calf muscle pain.

Contraindications for air travel in pregnancy

The safest period for travel in pregnancy is the second trimester from 13_28 week, after that the risk of maternal and fetal adverse outcome is increased ,any serious medical or obstetric complication during pregnancy is regarded as a contraindication for air travel like placenta previa,pre eclampsia,pre term ruptured membrane,threatened pre term labour (23),

Preventive strategies

• *Low-Risk patient :*

1. increased mobility is advised like walking in the aisle of aircraft and moving the legs when seated
- 2.wearing loose clothes and avoid tight one.
- 3.good hydration to eliminate the possibility of haemoconcentration. (24)
- 4.Compression Stockings: it can be used in case of travelling for long flights, more than 4 hours (25).
- 5..Pharmacological Prophylaxis: it is not recommended for low risk pregnancies.(26)

• *High risk patient:*

In addition to all of the above prophylactic measures ,low molecular weight heparine can be considered if there is additional risk factors like obesity or previous thrombotic attack.(26)

Guidelines and recommendations:

- Regarding the RCOG ,it recommends that singleton pregnant ladies with uncomplicated pregnancy can travel safely till 37th week of gestation,while women with twin pregnancy up to 32th week of gestation.(26)
- While the American college recommend that singleton pregnant women travel safely up to 36 week in domestic flights and 35_36 in international flights.and up to 32 week in multiple pregnancy.(27) .
- International air transport association advice travel to be limited to 36 week in singleton and 32 week in twin pregnancy.(28)

Medical organization	Singleton pregnancy	Multiple pregnancy
RCOG	37 Week	32 week
ACOG	36 week(domestic) 35_36(international)	32 week
IATA	36 week	32 week

Gaps in current literatures

1. limited studies about travelling in pregnancy, especially for short travels for few hours.
2. Most studies are observational one, no large prospective studies about this subject.
3. Lack of adequate studies about cabin circumstances on pregnant women volunteers.
4. No accurate follow-up for post-flight effects in the long term to track delayed cases of thromboembolism.

CONCLUSIONS

Pregnancy and extended air flying both leads to increase risk of deep vein thrombosis, although the overall risk is slightly increased in low risk pregnant women,high risk lady may need more evaluation with adequate preventive measures. Low risk women usually can tolerate air travel by increasing mobility,increase intake of water and other fluids,wearing compression stocking. while high risk patient may require pharmacological thromboprophylaxis with proper anticoagulant. Further studies are required to

determine the specific incidence, describe the exact pathophysiology and improve preventive strategies for pregnant ladies undertaking airplane flying.

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