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Recurrent Venous Thrombosis in a Flight Attendant

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***Abstract*- Deep vein thrombosis (DVT) is a common pathology with an estimated incidence of 1.2 per million inhabitants in France, but this figure is probably underestimated. In the aviation environment, many factors can influence the physiopathology and cause VTE. This condition threatens flight safety due to the risk of embolism and poses a problem for the assessment of fitness, its treatment, and its functional consequences.**
Using a case of recurrent VTE in a flight attendant, we will review the pathophysiology of VTE, and the relationship between VTE and its treatment in the aviation environment. We will also review international aeromedical regulatory guidelines and aeromedical certification in the case of VTE.

Index Terms- flight safety, aeromedical fitness, aircrew member.

I. INTRODUCTION:

Deep Venus thromboembolism (DVT) is a common pathology with an estimated incidence of 1.2 per million inhabitants in France, but this figure is probably underestimated (1).

Its incidence increases exponentially with age (especially after 50 years). It typically results form a combination of factors known as Virchows triad; venous stasis, endothelial injury and hypercoagulability. These predisposing factors lead to development of thrombus from activation of the clotting cascade(2).

Distal thrombosis accounts for over 50% of DVTs, and is usually asymptomatic. The risk of embolic migration determines prognosis. Approximately 90% of pulmonary embolisms arise from DVTs of the lower limbs(1).

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In the aviation environment, many factors can influence the physiopathology and cause VTE. This condition threatens flight safety with the associated risk of embolism, and poses a problem for aptitude determination with its treatment and its functional sequelaeThrough this case report the pathophysiology of VTE is review, the relationship between VTE and its treatment in the aviation environment. It also reviews the international aeromedical regulatory guidelines and aeromedical certification in case of VTE.

II. CASE REPORT:

A 28-year-old female flight attendant with 800 total flight hours and a history of an appendectomy 3 years ago.

She presented a thrombosis of the left peroneal veins two weeks after immobilization for ankle sprain.

She was an active chronic smoker (5 packs/year).

She was treated with 1 month of anticoagulant therapy and was declared unfit for work during this time. 7 months later, she presented a left sural thrombosis 1 day after a long-haul flight of 8 hours.

There was no active cancer, anti-phospholipid syndrome, anti-thrombin, protein C or S deficiency. No Other risk factors for recurrence.

She was on anticoagulant treatment for 3 months. And after recovery, she was declared fit for only short-haul flights. She was advised to stop smoking and to wear compression stockings during the flight.

III. DISCUSSION:

Venous thrombosis is the occurrence of a thrombus (clot) in one of the veins of the vascular network. It is the most frequent manifestation of venous thromboembolism (VTE), while pulmonary embolism (PE) is rarer but more serious(1).

Venus thromboembolism typically results form a combination of factors known as Virchows triad; venous stasis, endothelial injury and hypercoagulability. These predisposing factors lead to development of thrombus from activation of the clotting cascade (2). Known risk factors are: Older age, Obesity, Previous history/Family history of VTE, Antiphospholipid syndrome/Thrombophilia, Active

cancer, recent immobilisation/travel/surgery. In our case the first episode of VTE was induced by recent immobilization following an ankle sprain and smoking.

Since Gruickshank's description of the economy-class syndrome, the relationship between air travel and venous thrombosis remains debated (3). Studies show an association between venous thromboembolism and long-haul air travel (>8 h), with risk up to four-fold, depending on study methods (4).

Risk increased with increasing flight duration more than 8 h, number of flights during the first 2 weeks after a flight and when other traditional risk factors for venous thromboembolism were present. Several aspects of the aviation environment are thought to contribute to the development of venous thromboembolism such as immobility during any type of air travel (economic and non-economic), dehydration - Reduced fluid intake and reduced cabin humidity lead to hemoconcentration, which increases blood viscosity and reduces blood flow (5) , hypobaric hypoxia can cause endothelial injury and activate the coagulation pathway (6).

This increased risk of developing VTE with air travel indicates special precautions mainly in high-risk individuals (e.g., history of previous VTE, recent major surgery, malignancy, stroke)(7). With the use of drug (aspirin or anticoagulant like injectable low weight molecular heparin or an oral alternative, prior to a long flight) and non-drug prophylactic interventions like support stockings and Hydration.

In aviator, the occurrence of VTE in flight threatens flight safety because it can cause sudden incapacitation due to sudden death or syncope in the event of a pulmonary embolism, or subtle incapacitation due to distraction from symptoms such as dyspnea, chest pain, hemoptysis, leg pain, and dizziness.

In our case, the second episode of VTE was favored by the history of VTE 7 months ago; smoking and perhaps aviation environment (one day after a long-haul flight).

Anticoagulant treatment is a medical issue because of the high risk of bleeding, Moroccan standards do not allow flying while on anticoagulant treatment.

Internationally, ICAO Annex 1 Chapter 6 states: "An applicant for any class of medical assessment shall be free from any effect or side effect of any prescribed or non-prescribed therapeutic, diagnostic or preventive medication taken"(8).

IV. CONCLUSION

The relationship between air travel and venous thrombosis remains debated, but it’s seems that the increased risk of developing VTE with air travel indicates special precautions mainly in high-risk individuals.

The emergence of new anti-coagulant therapy: Non-vitamin K oral anticoagulants (NOACs) with low bleeding risk should prompt discussion or updating of eligibility standards and norms.

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