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Review Article

Aeronautical constraints and air travel risks in aged people.

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Abstract: Due to the fragility of the elderly people's health status, air travel and aeronautical constraints constitute a real risk to the onset of pathology or the aggravation of an already failing state of health in the elderly subject, so, despite the trivialization of air transport, it must be remembered that it presents risks and even contraindications in aged people. Through this article, we will try to spread the main aeronautical constraints that may lead to contraindications to air travel in the elderly subject.

Keywords: Aeronautical constraints, Air travel, Elderly subject, Risks and contraindications.

INTRODUCTION

With the development of technology, modern airliners offer unrivaled comfort in the cabin, which does not prevent the persistence of certain aeronautical constraints that could constitute true contra-indications to theft, especially in aged people (Strumza, M.V. 1977). In order to help the future senior traveler and his medical doctor to take the necessary precautions before departure, it is necessary to recall the different aeronautical constraints with appropriate recommendations.

Main Aeronautical constraints and air travel risks entailing a contraindication to theft for the elderly:

Pressure variations:

Despite the pressurization of the aircraft, the technical constraints prevent maintaining a cabin altitude at the sea. We pass from a cabin altitude of 0 to 2400 m (pressure of 1 to 0.8 atm), then from 2 400 to 0 m (pressure of 0.8 to 1 atm). These pressure variations have an action on the gases of the organism (Mariotte's law: PV = constant). At 2,400 meters, the volume of gas increases 30 %.

The variations of gaseous volume at the descent may be the cause of barotraumatic accidents, such as otitis, sinusitis, barotraumatic aerodontalgia, in case of underlying ENT pathology such as rhinitis or sinusitis. The dilatation of the abdominal gas can also aggravate acolitis, diverticulitis, gastric ulcer, hernia. Some medical examinations requiring a gas injection (laparoscopy, arthroscopy, eye surgery) should prevent theft for a few days (Strumza, M.V. 1977).

Altitude hypoxia:

Aircraft pressurization provides air pressure at an altitude of 1800 to 2400 m (cabin altitude).

The so-called "physiologically indifferent" altitude zone, where the oxygenation capacity of the organism is sufficient, corresponds to altitudes between 0 and 1500 m. Above, in the 1,500 to 3,500 m area known as "complete compensation", the maintenance of oxygenation requires compensation by increasing the respiratory and cardiac frequencies. A passenger on a short-haul flight (not exceeding one hour) will remain a quarter to a half hour in this area, while on a medium or long-haul flight, he can stay there many hours. People with a lung condition (emphysema, respiratory failure), heart (heart failure, angina) or blood (anemia) that would not allow this compensation for hypoxia at altitude, run a real risk of discomfort by hypoxia on board. This will be appreciated by their doctor depending on the duration of the flight (Rayman, R.B. 1997).

Thermal constraints:

Temperature differences can be important between the place boarding and cabin of the plane. A passenger boarding in a tropical zone and slightly dressed risks a cooling in the air conditioned atmosphere of the plane. This cooling is accentuated by the absence of movement and the decrease physiological central temperature during the night. It is

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necessary remember to keep a jacket or sweater during the trip. Majority of airlines provide blankets (Rayman, R.B. 1997).

Jet lag:

It is at the origin of a desynchronization of the biological rhythms in particular of the sleep-wake rhythm, known internally under the name of Jet-lag. After a medial flight of at least 4 hours, everyone knows that takes a time of adaptation to find his sleep and his form. It takes about one day per time zone crossed to the west, and a day and a half to the east (Gisquet, A. 1994; Ariznavarreta, C. *et al.*, 2002). Synchronization of biological rhythms on the new schedule is facilitated by physical activity by exposing oneself to light natural. Light is the main synchronizer of rhythms and phototherapy with a screen or "light helmet" is sometimes used. Age influences the speed of adaptation; the little child adapts very quickly, while the elderly can put more time. He more often resorts to sleeping pills to find his sleep (not to be taken during the flight, see above). Melatonin, which has been so much talked about, is not miraculous. Its current pharmaceutical form does not make it possible to obtain kinetics that follow the curve of the natural secretion by the epiphysis. The effect obtained by the available form is mostly considered as that of a placebo. Its synthesis does not make it possible to obtain a pure molecule and allows about 5% of non-negligible impurities to persist. It is also forbidden in space European market and its purchase in the countries which market it is not recommended by sleep specialists. Research is however going on to get a melatonin agonist which would overcome these disadvantages. The time difference can aggravate a pre-existing pathology such as diabetes, psychiatric pathology (Matsumoto, K., & Goebert, D. 2001). It is also necessary to adjust the dosage and take care of the setting times certain treatments whose blood level must remain very precise: insulin, anticoagulant treatment, lithium.

Noise:

In certain ports of call, the proximity of reactors in operation may to be harmful for hearing, especially in subjects with hearing aids. Unplug the unit momentarily avoids the discomfort of a too amplified sound level (Rayman, R.B. 1997).

Stress on board:

It can be caused by the fear of the crash: it is necessary to remember accident statistics to explain that the plane is the means of transport the safer; or claustrophobia or agoraphobia: it's the fear of feeling locked up or the fear of not being able to move as one wants. In this case, provide mild anxiolytic treatment. For very anxious subjects, we can envisage internships of relaxation or psychological follow-up (Matsumoto, K., & Goebert, D. 2001).

Thromboembolic risk:

It can be avoided by simple measures. It's the fact of staying sitting for a long time, which compresses the veins of the lower limbs, immobilizes the activating muscles of the venous return, promotes dilation of the veins of the calf and edema of the ankles. This discomfort with venous return, associated with a possible hemoconcentration caused by the dry atmosphere of the cabin, increases the risk of occurrence of venous thrombosis. At the beginning of the flight, companies usually give advice to seated passengers to periodically raise their heels to contract the calves and thus accelerate the venous return. People with venous insufficiency will benefit from taking a sachet of aspirin at the beginning of the flight (in the absence contraindications) or put on compression stockings and wear loose clothes. Those with a history of phlebitis or disorders of coagulation should consult their doctor who will prescribe heparin-like anticoagulant therapy (Lovenox) for the duration of the flight. Taking a sleeping pill to sleep better during a night aboard is to be avoided because, by reducing the feelings of discomfort, it decreases the spontaneous mobility and increases the risk of thrombosis. The major complication is pulmonary embolism that can occur during the flight or especially in the days that follow (Schwarz, T. *et al.*, 2003; Paganin, F. *et al.*, 2003).

Travel sickness:

Motion sicknes is rare in the air. In predisposed subjects, antinaupathics may be proposed, but small doses. Among the most prescribed specialties are the scopolamine (Scopoderm), which is a parasympatholytic of atropinic type (with its risks prostatic, glaucomatous and confusional) and diphenhidramine (Nautamine), which is a antihistamine (with its risk of drowsiness) (Turner, M. *et al.*, 2000).

Distance from a care structure:

The lack of opportunity for emergency care during a period up to 12 hours on the longest flights must contraindicate flight to certain subjects with recent or unstable recent pathology in particular:
- cardiac cause: recent myocardial infarction, valvulopathy evolved, heart rhythm disorder, although many companies equipped their aircraft with a defibrillator - acute gastrointestinal disease: ulcer, recent intervention within 15 days of an operation (incompletehealing). As a general rule, a subject suffering from an unstable disease must not fly. However, in case of need, most of the patients can fly, either during a medical repatriation on a specially chartered and equipped plane or on certain companies with medical assistance (extended transport, oxygen, presence of a doctor). In any case, the flight aptitude of a weakened passenger must be appreciated by his doctor. If in doubt, he may contact a doctor of the airline (Possick, S. E., & Barry, M. 2004; Page, R. L. *et al.*, 2000).

Observance of medical treatments:

Some treatments may require follow-up that is not always possible to find on the spot (adjustment of a vitamin K treatment). It is desirable to carry a file written in English, mentioning the disease and its treatment. Main medicines have to be kept in cabin baggage so as not to risk being left without in case of a loss of baggage or delay in the conduct of the flight, and it is also preferable to take orders to justify drugs held at customs. Likewise, during the whole trip, it is desirable not to separate from medication (Rayman, R.B. 1997).

CONCLUSION

With the development of air transport, the attraction for exotic countries, longer life expectancy, more and more seniors become "globe-trotters". However, we must not trivialize the health problems of this population. This reminder of contraindications and possible complications to different flights will help the traveler and his doctor in the precautions to take and the choice of possible destinations without rash risk.

Competing Interests:

The authors declare that they have no competing interests.

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