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## TRAVELLING SENIORS – CARDIOVASCULAR AND OTHER RISKS

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The number of seniors undertaking longer and more demanding journeys at an advanced age has been on the increase. Chronic illnesses together with the physical and mental demands of travelling make seniors vulnerable. Geriatricians and general practitioners should be able to assess the risks that could lead to the deterioration of the condition during travel and to co-operate with the travellers to minimise such risks. The article content information about main risks and its prevention, and a table of recommendations for the minimisation of travel-related risks.

Key words: Senior traveller, Economy class syndrome, risk, prevention

**Introduction.** The past years have witnessed a trend towards retaining the predilection for travelling in ever higher age categories also in our seniors. To many seniors travelling means fulfilment of their life plans that they had devised and fostered in the times when, for political as well as economic reasons, these were rather dreams than plans. Travelling to a certain destination and preparations for such travels may often be a matter of considerable emotional drive. A successfully undertaken journey then becomes a very positive stimulus for a very long time. The age itself is no contraindication for travelling; the presence of chronic diseases increases the risk of complications and the vulnerability of the senior, but a reasonably planned and well-prepared journey with adequate backup usually does not present any great risk [1]. There has even been published a study assessing 40 long travels (218 to 4 256 miles, 350 to 6 800 km), 15 patients of an average age of 66 years with an implanted left ventricular assist device (LVAD) with a minimum of more significant complications. It is thus for these reasons that we as doctors should be able to provide adequate advice to seniors if they are willing to accept it, and to minimise the risks if they are not willing to do so [1-6].

**Cardiovascular complications of travelling.** Travelling especially to remote destinations may mean, as early as in the preparatory stage, a significant though joyful mental stress which continues with varying intensity through all the duration of the journey, for example in the form of worries about the functioning of the household during the absence, or as a vicious circle of concerns about a possible worsening of the health state, hospitalisation while abroad, language barrier, and such like. Thus, the majority of older travellers find themselves, both prior to the journey and in the course of it, under the predominance of the sympathetic nervous system with its positively oriented effects on the myocardium, especially with its inotropic effect increasing systolic blood pressure; as a significant risk factor it takes part in the development of stroke, and there also appears a higher susceptibility to the development of arrhythmias.

When travelling by air, we have to take into account for older patients the **decrease of atmospheric pressure** inside the airplane cabin along with concurrent decrease of the fraction of inhaled oxygen – the pressure inside the cabin is maintained at a value corresponding to the altitude of 2 440 m above sea level. A study of British authors monitored a group of healthy passengers aged between 17 and 70 years during the flight; oxygen saturation was determined by means of an oximeter before the start, and after 3 and 7 hours of flight. A **decrease in saturation** by 3 to 4 % was demonstrated depending on the height of flight, decrease of cabin pressure, and decrease of the inhaled fraction of oxygen. The same study also contained monitoring of a group of athletes, and the influence on the condition of the cardiovascular system of a flight longer than 10 hours was so great that the study did not recommend the arrival in the place of the competition only on the day when the athlete is supposed to give maximum performance. From this conclusion there might be deduced a recommendation for senior travellers for the first day of their stay: besides the activities associated with finding accommodation, no other more important load should be applied.



**Thromboembolic complications of travelling.** A much feared complication of long flights is represented by **deep venous thrombosis** with the subsequent **pulmonary embolism**. The cause of this complication had for a long time been seen in the long (several hours) sitting on relatively narrow seats in the airplane – hence the original name: economy-class syndrome. However, the information published over the last years has brought important new aspects. The originally noted association with flight had emerged from the spectacular, though infrequent sudden deaths of passengers close after alighting from the plane. The international airport of Madrid-Barajas with almost 7 million passengers arriving yearly has recorded 16 such deaths in 6 years. However, today we already know that deep venous thrombosis and/or pulmonary embolism are clinically manifested with even a several days' delay following termination of the journey, that the economy class syndrome is related not only to flights but also to long-lasting bus travels, and that thromboembolic complications also include ischaemic strokes which threaten travellers with the foramen ovale patens. A combination of pulmonary embolism and **ischaemic stroke** has also been reported in these patients.

Apart from the already mentioned limitation of movement and decreased intake of fluids, risk factors of the development of thromboembolic complications also include drop of partial oxygen pressure inside the aircraft cabin, decrease of the humidity of the environment due to air conditioning causing increased blood viscosity and, in senior travellers, concurrent diseases such as obesity, thromboembolic complications having occurred in the past, diabetes mellitus, smoking, diseases of the cardiovascular system, renal diseases and, naturally, patients with diagnosed thrombophilic condition [10,11].

As preventative measures, medicaments have been discussed: administration of acetylsalicylic acid or low-molecular heparin. At present, **low-molecular heparin** has been considered as the more efficient in this respect. Of importance are also non-pharmacological measures: **enough fluids, support of circulation** in the lower extremities, and/or use of compression stockings. Sufficient intake of fluids may become a problem with the current safety regulations, where passengers are only allowed to take with them no more than one litre of fluids into the cabin, in the form of containers of a maximum of 100 ml each. In some airports, refreshment stands have already begun appearing also behind the safety checkpoints; thus, it is possible to purchase fluids there, unfortunately at the "airport" price. Some airlines have been serving fluids regularly during long flights.

Another significant preventative measure against the development of thromboembolic complications during long travels is represented by **blood circulation support**, which may be achieved by regular exercise: flexing both calf and thigh muscles, standing up and taking walks approximately every hour. Exercises in the form of repeated plantar flexion against a defined resistance effectively supported, in a plethysmographically controlled study, the **muscle pump**, thus acting preventatively against the development of deep venous thrombosis. Especially senior travellers with previous history of venous thrombosis or with diagnosed chronic venous insufficiency should use compression stockings for longer journeys. A study conducted on travellers – volunteers, pilots, and stewards – concerned with the effect of ankle bandaging at graduated pressures yielded both anticipated results: reduced swelling of ankles, smaller painfulness of the lower extremities, and, however, unexpected ones: improved ability of concentration, perception, and a higher-quality sleep after the flight.

The question remains of what travel we should consider as long in terms of the risk for the development of thromboembolic complications. In case of travellers without any severe predisposing factors, a long travel is supposed to take more than 5 hours; for travellers with a known risk it takes more than 2 hours.

**Complications of hypertension.** The reaction of **blood pressure** during travelling can only hardly be anticipated. On the one hand, during travelling to areas with a warmer climate we may expect a rise in both pulse rate and pulse volume; however, peripheral vasodilatation may be a counterbalance. In connection with the overall upset because of the travel itself, with fatigue and/or temporary disorders of sleep related to change of environment, there is rather likely to appear a tendency towards a rise of blood pressure values. Complications may appear in patients treated with higher doses of beta blockers without the



internal sympathomimetic activity, where the higher ambient temperature causes peripheral vasodilatation to which the organism should react by a compensatory increase of the pulse rate. However, due to an effective blockade of the sympathetic nervous system it is unable to do this, which may result in a syncopal condition. The optimal solution is self-measurement of blood pressure during the travel and preliminarily agreed changes of drug dosages in case of more marked changes in blood pressure values.

**Complications of ischaemic heart disease.** The most feared complication is the development of **myocardial infarction** in the course of the travel, particularly a travel outside the republic. The acute coronary syndrome is really the most frequent cause of death during a holiday stay or during some other travel abroad. A more detailed analysis of the acute coronary syndrome during travelling is provided by a study published in 2003. The risk factors for the development of a coronary accident included short-term planning of the travel, unusual destination, a lower level of education; coronary accidents also occurred more frequently in travellers living in partnership than in those living alone; more frequently when travelling by car compared to the other means of transport; more frequently when staying in a tent or a trailer/caravan compared to staying in a hotel. From the viewpoint of time, acute complications kept appearing most often during the first two days of travel [17].

**Arrhythmias in senior travellers.** During travelling there may appear at once several factors predisposing to the development of **arrhythmia**. Staying in a hot climate, with the universally known yet always neglected decreased feeling of thirst can lead to a thickening of the internal environment with subsequent ionic dysequilibrium, further worsened by, e.g., development of diarrhoea with/without vomiting, leading to losses of potassium. An opposing trend may occur in disorders of continence, when a traveller treated for a long time with diuretics reduces the dosage for fear of limited accessibility of toilets, and thus causes a drop of mineral concentration due to dilution. A change in the composition of diet and eating regimen may result in a change of the biological availability of long-term used antiarrhythmics. The tendency to the development of arrhythmias may further be potentiated by the already above-mentioned predominance of the sympathetic nervous system.

**Failure of circulation.** Deterioration of the state of cardiopulmonary compensation and **manifestation of circulation failure** is usually provoked by a combination of several factors: the above-mentioned reduction of diuretics dosage, increased physical load, stay in hot climate, increased blood pressure, and manifestation of intercurrent infection.

**Diarrhoeal diseases.** Travelling seniors have a 6.5fold higher probability of falling ill with a diarrhoea than during the stay in domestic environment. When travelling, the most frequent are **diarrhoeas of infectious origin** with faeces-to-mouth transfer, as well as alimentary infections whose global increase has been repeatedly reported. Diarrhoeas typical of certain destinations (the Balkans, Egypt, and Maghrib countries) are usually a very substantial intrusion on the general health condition of a travelling senior. Vomiting and diarrhoeas connected with febricities may very quickly lead to dehydration, ionic dysequilibrium, provocation of arrhythmias, cardiac decompensation, and other serious complications. Persistent diarrhoeas are also the most frequent cause of seeing the general practitioner after coming back home from travels. Older patients are more susceptible to diarrhoeas with the progressing involution of the immune system, variously intensive atrophy of the mucous membrane of the gastrointestinal tract and the associated disorder of the mucous membrane barrier and, last but not least, due to often only a suboptimal compliance with the observation of preventative recommendations. Consistent instruction prior to onset of the journey had a significant influence on reducing the number of attacks of diarrhoeal diseases during travels and on decreasing the number of visits to the general practitioner after coming back home.

**Problems connected with vaccination of seniors before travelling to exotic countries.** With the increasing numbers of seniors travelling to remote and exotic destinations, a discussion appears on the topic of benefits and risks of vaccination of seniors. One stream of opinions says that age is no contraindication of vaccination and sees the main profit of vaccination in preventing infectious diseases, in which the severity of their course increases with age. The same author brings our attention to the fact that the generation of



active seniors who are even at present capable of undertaking longer travels was for the last time vaccinated in the period of World War II, and thus their antibody titres will apparently be insufficient. On the other hand, it has been repeatedly empirically proved that in a considerable percentage of seniors significant titres can be identified of IgG antibodies against agents of diseases of whose sufferance the senior or their next of kin have no awareness at all. Thus, when deciding on the choice of the vaccine, we will most probably not do without serological examination. Generally recommended vaccinations for travelling include those against viral hepatitides, typhus, yellow fever, tetanus, influenza, pneumonia, and antimalarial prophylaxis. The more rigid patterns further recommend vaccination against diphtheria, rubella, measles, parotitis, chickenpox and, depending upon the envisaged area of stay, also against encephalitis and/or rabies. The significance of pre-travel vaccination undoubtedly also consists in an overall assessment of a senior's vaccination status, oftentimes after a long period, and thus in a possible remedy of previous omissions.

**Death on travel.** Death in the course of a travel is a much feared matter for senior travellers. A study made by Canadian consulates analysed the numbers and causes of deaths of their citizens abroad in the years 1996 through 2004. Over the period monitored there were 2 410 deaths: 32 % of them were women, 68 % were men; the mean age of the women was 61.7 years, that of the men was 60.4 years. Considering the causes of deaths there were 1 762 (73 %) natural deaths, 450 as the result of accidents, 96 suicides, and 106 murders. The mean age of the naturally deceased was 66 years, of those deceased in accidents 45 years, by suicide 41, and through murder 43 years. Unfortunately, the results of this study do not provide a detailed analysis of the causes of natural deaths; nevertheless, the significantly higher mean age of naturally deceased persons justifies concerns, and, in the overall preparations of seniors for the travel, the possibility of death has naturally to be respected by efforts at minimising the risks, but e.g. also in the form of consistently checking if the voyage insurance effected includes repatriation.

#### SUMMARISING PRACTICAL RECOMMENDATIONS

DRAFT MEASURES FOR MINIMISING RISKS OF TRAVELLING IN HIGHER AGE  
[27,28,29,30,31,32,23,22]

##### **Pre-travel considerations**

destination planned;  
length of stay planned;  
season of the year, climate (Czech Rep. versus target destination);  
type of accommodation (hotel, resort, camping, city area, rural area);  
further activities planned (open air, primeval forest, wandering)

##### **Pre-travel preparations**

- 1) general health fitness examination with regard to the travel planned; picking out risks including chronic focal infections;
- 2) adaptation of the therapy panel to the given destination;
- 3) vaccination (tetanus, pneumonia, influenza, hepatitides, typhus, yellow fever);
- 4) consider further vaccinations depending upon the intended place of stay (rubella, measles, cholera, polio, meningococcus);
- 5) chemoprophylaxis – drug interactions (antimalarials);
- 6) medical reports in English;
- 7) current ECG record;
- 8) list of drugs in generic names;
- 9) picking out institutions at one's place of stay for the treatment of diabetics, haemodialysed patients, asthmatics;
- 10) individually tailored first-aid kit, supply of medicaments for the whole journey;
- 11) insect repellents;
- 12) appropriate type of insurance

##### **Specific travel instructions**

- instruction on fluid balance, importance of ion drinks;
- instruction on protection from overheating;
- instruction on prevention against thromboembolic disease;





- instruction on skin care;
- dietary recommendations regarding the local character of food;
- instruction on the necessity of balancing out physical strain with rest;
- recommendation for the prevention of faeces-to-mouth infections;
- recommendation for prompt control of vomiting (ice-cold Coca-Cola in teaspoonfuls), diarrhoeas (at present empirically optimal is nifuroxazide – Ercefuryl, and/or ciprofloxacin);
- recommendation for patients with cardiovascular affection – individually.

**Case study 1.** A 74-year-old woman, treated for ischaemic heart disease with atrial fibrillation, put on warfarin, further treated for hypertension, hyperlipoproteinaemia, and bilateral coxarthrosis. Took part with her family in a one-week hotel-based coach tour to Croatia. Had a diarrhoea from day 3 of her stay, which took on a black to reddish hue. Was examined on day 6 by a local lady doctor whom she could only hardly understand; was prescribed loperamide, a very brief finding written by hand with conclusion: “susp. anaemia” and a recommendation to seek a doctor upon returning home. Undertook together with the other clients the travel home from Croatia on the same night, all the time with red diarrhoeal stools, and the emergency ambulance was called already on bus arrival, as the patient repeatedly collapsed. On admission to hospital the patient was sweaty, paleness of the skin could not be assessed as the patient belongs to a rather swarthier type and got a marked tan within a short time; however, her conjunctivae and lips were practically white, blood pressure on admission was 70/40, the ECG record showed an atrial tachyarrhythmia of 150/min with depressions of up to 4 mm diffusely, haemoglobin concentration of 34 g/l, urea 15.8 mmol/l, creatinine 195  $\mu$ mol/l, INR value > 6, the patient was anuric.

The patient's state was evaluated as a haemorrhagic shock after a massive blood loss, probably caused by an infectious gastroenteritis whose consequences had however been potentiated by a dysmicrobia leading to decreased formation of vitamin K and by a subsequent relative overdosage of warfarin. The introduced therapy with crystalloids, plasma volume expanders, erythrocytic mass, and fresh frozen plasma led to renewal of diuresis within 4 hours and to a gradual adjustment of the state. However, the ECG record made after 24 hours showed inversion of T waves in V2-4 leads with CKMB and troponin positivity; during the subsequent days the ECG picture and laboratory parameters were gradually restored: the state was evaluated as a non-Q focal lesion of the myocardium, NSTEMI; aetiologically we considered an effect of myocardial ischaemia produced by severe anaemia together with a haemorrhagic shock. Rehabilitation proceeded according to the standard; the patient was discharged into domestic care on day 10. Additionally, the woman also confessed the fact that she had felt more pain in her hip joints during the diarrhoeas and so had taken several tablets of ibuprofen.

**Case study 2.** A 73-year-old man, treated for hypertension, state after thrombosis of right carotid artery, hepatopathy, operated on for cholecystolithiasis 2 years ago: underwent laparoscopic cholecystectomy. Within 15 months after surgery, the patient noticed a darker urine and immediately afterwards his neighbourhood noticed an increasing icterus: an asymptomatic obstructive jaundice was diagnosed, differential diagnostic examinations were done, a tumour of the biliary tract was excluded, and a postoperative stenosis was detected in the area of the junction of the right and left hepatic duct and of the proximal part of the common hepatic duct. ERCP was carried out with introduction of a drain into the right common hepatic duct: it was left in situ for 3 months; immediately after introduction a drop of the serum bilirubin levels and adjustment of the state were observed. After 3 months the drain was extracted; laboratory and clinical findings were without pathology. After 5 months since drain extraction icterus appeared again, accompanied by rise of temperature, dramatic deterioration of the state with hypotension, weakness, dizziness, impaired vision, feverishness. The patient was hospitalised with the following diagnosis: susp. cholangitis with restenosis of the biliary duct. ATB therapy was introduced, intravascular volume was refilled, ERCP with new introduction of a drain into the right hepatic duct. A haemoculture was withdrawn which demonstrated the presence of *E. coli* sensitive to the introduced ATB therapy with ciprofloxacin. The symptoms of both jaundice and the infection subsided within several days and the patient was discharged into domestic care. However, this time it was decided that after 3 months the drain would only be exchanged, not extracted.



Over a period of 2 months the patient was in quite a satisfactory condition and began to be interested in the possibility of realising a holiday tour to the sea that he had been planning already since the last spring: he had envisaged a hotel-based coach tour to Croatia. The patient himself was convinced that he could make the tour. In order to minimise the risk, the patient was equipped with ciprinol, instructed what to do in case of recurrent temperatures and jaundice, as well as with a report in English containing all the patient's diagnoses and medication administered in generic names. The patient's daughter was ready to drive her father back to the Czech Republic within 12 to 18 hours for hospitalisation in case of complications. However, the whole stay passed without difficulties, the drain was exchanged within a month as planned and, after another 4 months, it was extracted definitively. Further, the patient was checked up regularly for laboratory parameters, his clinical state was quite satisfactory. Sonography of the biliary tract done after one year showed practically normal conditions in the region of the two hepatic ducts and the common hepatic duct.

Such, the number of seniors undertaking longer and more demanding journeys at an advanced age has been on the increase. Chronic illnesses together with the physical and mental demands of travelling make seniors vulnerable. Geriatricians and general practitioners should be able to assess the risks that could lead to the deterioration of the condition during travel and to co-operate with the travellers to minimise such risks. The article content information about main risks and its prevention. and a table of recommendations for the minimisation of travel-related risks.

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## ПОЖИЛЫЕ, СОВРЕШАЮЩИЕ ПУТЕШЕСТВИЯ – КАРДИОВАСКУЛЯРНЫЙ И ДРУГИЕ РИСКИ

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Большое количество пожилых пациентов, находясь на пенсии, путешествуют. Хронические заболевания, связанные с физическими и ментальными изменениями, могут сделать путешествия пожилых людей осложненными. Гериатры и врачи общей лечебной сети должны распознавать, прогнозировать эти риски и кооперироваться со службами сопровождения во время путешествий для снижения этого риска. Статья содержит информацию об основных рисках и возможностях их профилактики для минимизации этого риска.

Ключевые слова: пожилые, путешествия, синдром экономического класса, риск, профилактика.