
GERIATRIC THERAPEUTICS

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The Older Traveller

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ABSTRACT

The overseas traveller requires accurate, detailed information regarding malaria prophylaxis, traveller's diarrhoea and immunisation requirements. Much of the general travel advice and preventative measures to avoid traveller's diarrhoea and mosquito bites are applicable to all age groups. However, the impact of physiological changes with age and existing comorbidities must be considered when advising older travellers. No change in dose of antimalarial prophylaxis is recommended in older people although there may be a moderate increase in adverse effects when given with other medications. The elderly may be considered for prophylactic antibiotics against traveller's diarrhoea. Impending travel provides an opportunity to check immunisation status in older people and administer the required vaccinations.

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INTRODUCTION

With the current advances in medicine and improved living conditions the average life expectancy of an Australian has increased and there is a large proportion of the population (currently 11.2%) over the age of 65. Many of these people are in good health and choose to spend their time travelling overseas. The travel destinations themselves are becoming increasingly exotic and adventurous. However, the elderly need special travel advice because of the increased incidence of co-existing medical problems, multiple medications and physiological changes which occur with ageing.

GENERAL ADVICE

It is important to advise the impending traveller to start their immunisation preparations early since these take time to complete and to become optimally effective. Older people do not need more time than other adults to complete vaccinations—schedules and doses are the same as in younger adults. The elderly traveller

should have a medical check-up to ensure they are well enough to travel and that the medical management of any chronic condition is optimised. This is particularly important if travel to locations remote from good medical care or demanding physical activities are planned. The elderly traveller should be provided with a doctor's letter detailing any medical problems and current treatment including generic names, dosages and non-prescription medications. It may be useful to carry a copy of recent blood tests and an ECG if relevant.

Patients should have sufficient supplies of their medications and carry them in their hand luggage. It may also be useful to have spare medication in check-on luggage.

Every traveller should be encouraged to take out travel health insurance including provision for emergency medical assistance. Premiums for older travellers may be more expensive because of chronic illnesses but insurance is still strongly recommended.

Long distance air travel poses an increased risk of deep venous thrombosis and pulmonary embolism because of reduced mobility, cramped conditions and dehydration. Elderly travellers should be encouraged to request an aisle seat to facilitate frequent mobilisation. They should also be taught isometric foot and leg exercises and advised to increase fluid intake to avoid dehydration.

Travellers with diabetes need to be educated on how to adjust their medical therapy when exposed to unfamiliar foods, irregular schedules, unaccustomed exercise and changes in time zones. The most practical approach for those using short acting insulin alone or in combination, is to use short acting insulin alone, adjusted according to pre-prandial blood glucose levels during flight. Diabetic travellers should carry sufficient insulin and syringes for the duration of their trip, a diabetic alert card, quick acting carbohydrate, blood glucose testing equipment and a glucagon ampoule.

PHYSIOLOGICAL CHANGES IN THE ELDERLY RELEVANT TO TRAVEL

There are changes in the respiratory system with age which affect the elderly traveller. Respiratory function declines with less total surface area for gas exchange.

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Work of breathing is increased due to reduced compliance of the chest wall and respiratory muscles. The ventilatory response to hypoxia and hypercapnia is reduced, as is arterial oxygen tension.¹ Reduced pulmonary reserve may combine with underlying cardiopulmonary disease to cause hypoxia and respiratory decompensation at high altitudes or simply in aircraft. Commercial aircraft are generally pressured to around 2000 metre altitude equivalent. At these altitudes oxygen tension falls to about 70 mm Hg resulting in a reduction in arterial oxygen saturation of between 3-8%. In a healthy person this is of no consequence but in an elderly person, especially with cardiorespiratory distress, it may be important. Such patients may require supplemental in-flight oxygen.

Travellers with moderate to severe chronic obstructive airways disease should be further evaluated. Pulmonary function tests, arterial blood gases at rest or simulated high altitude lung function tests using hypoxic gas mixtures with partial pressures of oxygen equal to that in an aircraft cabin should be conducted to decide if supplemental oxygen is indicated. From a practical point of view, dyspnoea at rest is generally a contraindication to flying. Patients unable to walk 50 metres or climb 15 stairs without significant symptoms should be assessed by a respiratory physician.

Renal function also declines with age. Glomerular number is reduced as is the glomerular filtration rate. Ageing kidneys are less able to respond to extremes of salt and water homeostasis. This makes the elderly more vulnerable to dehydration and acute renal failure associated with acute gastroenteritis.

MALARIA

Approximately 1.5 per 1000 Australian travellers develop malaria.² Around 20-30% of these are caused by potentially lethal *Plasmodium falciparum* infections. These figures are higher with travel to particular countries. In terms of travel advice the doctor needs to make an individual assessment taking into account the destination, duration of stay, planned activities, type of accommodation, ability to minimise mosquito exposure, drug resistance patterns, the patient's coexisting medical problems and possible variations to the itinerary.

Preventing severe disease and death due to malaria involves a three-pronged approach. The first aspect is avoiding bites from *Anopheles* mosquitoes, which transmit malaria. All travellers should be advised to wear protective clothing such as long sleeves and long pants at night, avoid outdoor activities between dusk and dawn, sleep in well screened accommodation or under a permethrin-impregnated bed net and apply an effective insect repellent such as one containing N,N diethylmetatoluamide (DEET) to bare skin.

The second aspect is chemoprophylaxis, the aim of which is to minimise the chance of severe life-threatening disease, not prevention of all infections. Therefore, it is principally directed against *P. falciparum*. The agents commonly used are chloroquine, with or with-

out proguanil, mefloquine and doxycycline. The choice of agent is determined by the pattern of drug resistance at the chosen destination, compliance issues and the patient's other medical problems. Antimalarial drug doses used in the elderly are the same as those recommended for younger adults.

Thirdly, because no measures to prevent malaria are completely effective, prompt diagnosis and treatment of febrile illness whilst in or after having been in a malarious area are essential. The elderly are at increased risk of severe and complicated malaria. They are more likely to die from malaria than younger travellers.³ Risk of contracting malaria however is related to exposure, not to age. The risk of severe disease increases with duration of symptoms, particularly after four days or more. Travellers should be advised to seek medical care, including blood smear examination within 48 hours of onset of a febrile illness, or earlier if the illness is severe or worsening. For those at high risk in remote areas, emergency self-treatment is warranted. This can be supplemented by the use of new rapid immunochromatographic diagnostic tests which can be done within minutes on a fingerprick blood sample.

Chloroquine

Chloroquine is effective against the blood stage of *P. vivax*, *P. ovale* and *P. malariae* but is less effective against *P. falciparum* because of widespread resistance.² It is not contraindicated in the elderly. Minor side effects such as gastrointestinal upset and headaches are common. Retinal damage is known to occur with prolonged high dose treatment regimens in conditions such as rheumatoid arthritis, but has not been shown to occur at the low doses given for antimalarial prophylaxis.

The recommended dose is two tablets (310 mg base) weekly. The tablets should be taken on the same day each week for one week before travel, for the duration of exposure and four weeks after leaving endemic areas. It is the treatment of choice for travel to chloroquine-sensitive areas although these are becoming less common.

Mefloquine

Mefloquine is effective in chemoprophylaxis against *P. vivax* and chloroquine-resistant *P. falciparum*. Common side effects include gastrointestinal upset, dizziness, confusion and headache. It has been estimated that 25-40% of travellers experience side effects with mefloquine, although these are usually mild and self limited.⁴ Approximately 1-6% of users may discontinue use because of these side effects. However, this is not significantly different to other antimalarials.⁵ Adverse effects do not appear more commonly in the elderly.

Comedication may increase the risk of side effects with mefloquine or chloroquine but any such effect is modest and may be more related to underlying disease (relative risks of 1.5 overall and 2.1 for severe adverse effects).⁶

Serious side effects include neuropsychiatric disturbances including, very rarely, convulsions and psychosis (at a rate similar to that observed in chloroquine users). Mefloquine is not recommended for those with a history of any neurological disorder, including seizures,⁷ or psychiatric illness.

Mefloquine has also been associated with sinus bradycardia and a prolonged QT interval. Therefore it is not recommended for patients with cardiac conduction disturbances. It is also contraindicated in patients with severe renal failure or severe impairment of liver function since no experience has been gained in these conditions.

The recommended dose is one tablet (250 mg) on the same day each week for one week before travel to endemic areas, plus for the duration of exposure and four weeks after.

Doxycycline

In comparative trials in Irian Jaya and Africa, doxycycline had equivalent efficacy to mefloquine.^{8,9} It should be regarded as an alternative to mefloquine in chloroquine-resistant areas. In multidrug-resistant malarious areas (Burma, Northern Thailand, Western Cambodia) doxycycline is the drug of choice.

Common side effects include gastrointestinal upset, photosensitivity and *Candida* infections. It is prescribed as 100 mg daily for two days prior, for the duration of exposure and for four weeks after leaving the area. Compliance may be reduced because of the need for daily administration, although elderly travellers taking other daily medications may find it easier to remember a daily tablet for malaria prophylaxis.

There are no specific concerns in the elderly although they should be advised like all travellers to take antimalarial medication with ample liquid at night with or after food and to wear sunscreen and minimise sun exposure. Elderly patients on oral anticoagulants may require reduction of their dose since tetracyclines have been shown to suppress prothrombin activity. Such patients are best stabilised on doxycycline prior to departure.

Other Options

If neither mefloquine or doxycycline can be used for travel to a chloroquine-resistant area, the combination of chloroquine and proguanil is the most commonly used alternative. However, it must be appreciated that this combination is significantly less effective than mefloquine or doxycycline.² Comparative studies in Sub-Saharan Africa have demonstrated that this combination provides only about 50-65% protective efficacy.¹⁰ The World Health Organisation still recommends this combination for travellers to low risk areas with limited or moderate chloroquine-resistant *P. falciparum* such as the Philippines, Indian subcontinent and parts of Indonesia.¹¹

For all antimalarial drugs, and particularly for long-term travellers at high risk of malaria, a trial of the

chosen drug for a period before departure (three to four weeks for mefloquine, at least one week for doxycycline) is a very useful way to ensure the drug is tolerated, or to identify side effects and implement an alternative approach.

New Drugs for the Prevention of Malaria

Primaquine is currently under trial for the prevention of malaria. It has been used for many years to prevent relapses of *P. vivax* and *P. ovale* infections and to reduce the transmission of *P. falciparum* in endemic areas. A recent study in Indonesian men with partial immunity demonstrated protective efficacy of 85-95% when primaquine was taken for 11 to 50 weeks.¹² In this study primaquine was tolerated as well or better than other antimalarials.

Primaquine is contraindicated in individuals with glucose 6-phosphate dehydrogenase deficiency because it may cause haemolytic anaemia. Further studies are required to assess efficacy in the non-immune traveller and the elderly.

The combination of atovaquone and proguanil (Malarone) became available in Australia in 1998, and in our view has become the drug of choice for emergency self treatment of possible malaria. Initial studies suggest high efficacy in prophylactic use, but it cannot yet be recommended for this purpose.

TRAVELLER'S DIARRHOEA

Traveller's diarrhoea is common, affecting 20-50% of travellers to developing countries.¹³ It is associated with increased complications in the elderly with coexisting medical problems such as diabetes, renal impairment, vascular disease or congestive cardiac failure. In particular the elderly are susceptible to electrolyte disturbances and acute renal failure.

Because the incidence of traveller's diarrhoea is so high and preventive measures difficult to implement rigorously and consistently, education of travellers should focus both on prevention and treatment of the diarrhoea if and when it occurs.

The diarrhoea itself is usually self-limiting, lasting approximately 48 hours. The most important advice for the elderly is to maintain adequate fluid intake. This may include commercially available oral rehydration solutions or dilute juice. Flavoured mineral water in combination with salted crackers provides a readily available means of rehydration.

Antimotility drugs such as loperamide may be carried by the traveller but should be avoided if the patient is febrile (temperature 38°C or more), has bloody diarrhoea or if the diarrhoea lasts more than 48 hours. This drug acts on the intestinal musculature to reduce peristalsis and has some effect on increasing intestinal fluid absorption. It should be explained to the patient that these drugs do not treat the underlying infection, but merely reduce the number of bowel actions. The recommended dose is two capsules (2 mg each) to a maximum of eight capsules per day. Loperamide is quite safe if

used appropriately and is preferred to diphenoxylate which has increased potential for anticholinergic side effects such as dizziness, dry mouth, blurred vision and opiate-related side effects of nausea and drowsiness.

The other medication that should be carried for traveller's diarrhoea is a three-day course of norfloxacin (400 mg 12-hourly). Dosage adjustment is not required in elderly people unless glomerular filtration rate is less than 30 mL/minute, in which case the dose should be halved.¹⁴ Patients are advised to take norfloxacin if the diarrhoea is severe (3-5 or more stools within 24 hours), fails to settle after 48 hours or if it is bloody or associated with a fever. For non-dysenteric diarrhoea, a high single dose of a quinolone (e.g. 750 mg ciprofloxacin or 800 mg norfloxacin) results in rapid improvement in most cases.^{15,16} However, if there is no dramatic response within 12-24 hours, or diarrhoea is dysenteric, a 3-day course should be used. There is no evidence to suggest any differences between quinolone agents for treatment of traveller's diarrhoea. If the diarrhoea lasts greater than 3-5 days and is not responding to norfloxacin it is commonly caused by *Giardia* and a single dose of 2 g tinidazole would be appropriate empiric therapy.

Because of the frequency of traveller's diarrhoea many people have examined the effectiveness of prophylactic antibiotics. Numerous studies have demonstrated that daily administration of an appropriate antibiotic can prevent 80-90% of the disease.¹³ However, in 1985 a consensus conference on traveller's diarrhoea did not recommend the use of chemoprophylaxis.¹⁷ The reasons for this decision were concerns about allergic reactions, potential side effects, infections induced by antimicrobial therapy (such as *Candida* vaginitis and antibiotic-associated colitis) and increasing frequency of multiple drug-resistant organisms.

In 1993 Dupont and Ericsson analysed the advantages and disadvantages of chemoprophylaxis.¹³ They concluded that it is reasonable to consider it in particular groups of travellers such as those with underlying illnesses which make them more susceptible to the complications of an acute diarrhoeal illness. This would include those with inflammatory bowel disease, diabetes, cardiac disease, renal impairment, vascular disease or the immunocompromised. An example of a suitable regimen is norfloxacin 400 mg daily for the duration of exposure, but for no more than three weeks.

An alternative is to commence antibiotics with the first symptoms of diarrhoea. This can reduce the overall duration of illness, if caused by a susceptible bacterial organism, from an average three days to one day or less. Patients on diuretics need to be advised to reduce their dose if they develop significant diarrhoea, become dehydrated or are exposed to extreme temperatures.

IMMUNISATION

The aim of immunisation is to protect the elderly traveller against the infections they are most likely to encounter due to their planned travel and the illnesses to which they are most prone. Travel can be used as an

opportunity to check routine immunisation status.

Routine vaccinations should include diphtheria-tetanus and polio (boosters every 10 years), influenza (annual) and pneumococcal (every 5 years). Influenza vaccine is recommended for patients over the age of 65 and those with chronic cardiac, respiratory or metabolic conditions. Influenza can be fatal in the elderly. Greater than 90% of deaths caused by influenza occur in those aged over 65. Influenza vaccine is recommended annually as the vaccine formulation is reviewed to counter changes in strains due to antigenic shifts. It has been shown to reduce the likelihood of hospitalisation related to influenza by 30-70% in elderly patients.¹⁸

Similar indications exist for pneumococcal vaccine. Travellers most at risk are those over the age of 65 or with chronic illness. Because mortality is higher in the elderly this should be considered routine in the older traveller.

Polio has reduced substantially in incidence since the introduction of widespread vaccination programs. Many elderly travellers may have missed out on such programs. There is an extremely small risk of the oral vaccination causing paralytic polio in both immunocompromised and non-immunocompromised individuals (1 in 2.5 million doses overall).¹⁹ This risk is slightly higher in adults so it is recommended by some authorities (e.g. US Centers for Disease Control and Prevention) that previously unimmunised adults receive a full series of the enhanced injectable polio vaccine if travelling to high risk areas. This option can be discussed with elderly travellers but the increased risk of oral vaccine paralytic disease is extremely low and oral polio vaccine use is acceptable and recommended by Australian authorities. If the patient has been previously vaccinated against polio a single booster of either the injectable or oral vaccine can be given.

Other recommended vaccines include hepatitis A, hepatitis B and typhoid. Hepatitis A is the most common vaccine-preventable disease in travellers.²⁰ Older persons are at significantly increased risk of severe disease due to hepatitis A. In Australia, over 50% of those over 50 years of age are immune to hepatitis A, usually as a result of childhood infections not associated with jaundice.² Thus, it is reasonable, if time allows, to perform a blood test to determine susceptibility prior to hepatitis A immunisation. If this is impractical, there is no harm in giving vaccine to an individual who is already immune. The two options for protection include immunoglobulin which confers around 85% protection for approximately 5 months or, preferably, the hepatitis A vaccine (primary vaccination plus booster at 6-12 months) which confers virtually 100% protection, probably for well over 20 years. Seroconversion is rapid with approximately 90% of adults seropositive two weeks after a dose of the hepatitis A vaccination.² In many cases, the booster will need to be given after return from overseas travel. The vaccine alone provides effective protection and there is no need to combine it with immunoglobulin.²¹

Hepatitis B vaccine is recommended for elderly travellers who are likely to be involved in high risk activities or who are spending long periods in endemic areas. As the seroprotection rate following a course of hepatitis B vaccine declines over the age of 40 years, elderly people at high risk of hepatitis B should have antibody levels checked one to three months after the third vaccine dose.

Typhoid vaccine is recommended for travellers to endemic countries especially for stays longer than two to three weeks. Patients particularly prone to infection are those likely to encounter poor sanitation and those with reduced gastric acidity, due to H₂-antagonists, proton pump inhibitors, atrophic gastritis or previous gastrectomy. The oral typhoid vaccine should not be given to the immunocompromised, nor given with antibiotics.

Other vaccinations to consider include Japanese encephalitis, meningococcal and rabies. None of these are contraindicated in the elderly; however, the physician needs to weigh up the relative risk of acquiring these infectious diseases. The elderly are at highest risk of developing symptomatic infection with Japanese encephalitis and immunisation is therefore recommended for travellers to endemic areas for greater than six months in an urban setting or for travel greater than one month in a high risk rural setting. Meningococcal vaccine is recommended for travellers to high risk areas for periods of greater than two weeks.

Certain vaccinations, such as yellow fever, are required prior to entry into some countries. Again, these are not contraindicated in the elderly.

CONCLUSION

The approach to an older traveller is both detailed and complex. As a group there is an over-representation of chronic medical conditions which should be optimally treated and stabilised prior to travel. An important part of the pretravel consultation should involve detailed advice regarding appropriate vaccinations, malarial prophylaxis and traveller's diarrhoea. If this is done thoroughly and in good time one can expect the elderly to be able to travel safely to more common as well as increasingly exotic destinations.

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