

Travel medicine: Part 2—Special situations

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Abstract

Travel should be educational, fun, and safe if the appropriate care is rendered by counseling physicians and travelers take an active role in their health. In the second paper of the 2-part special articles, we provide a practical summary of up-to-date travel medicine about special situations for primary care physicians. We focus on in-flight emergencies, pregnancy, and specific precautions for injury and infectious disease as special situations. Physicians are frequently called upon to examine patients with in-flight emergencies, and thus, they should have knowledge and skills for effectively caring patients. Common health problems over the flights include syncope, chest pain, dyspnea, and gastrointestinal symptoms. Cautious and prudent behaviors should be recommended for travelers to prevent injury and infectious disease. Follow-up after the return home optimizes a positive outcome.

KEYWORDS

emergency kit, food and water precautions, in-flight emergency, malaria chemoprophylaxis, pregnancy during travel

1 | IN-FLIGHT EMERGENCIES

An In-Flight Emergencies (IFE) is an event that began during flight. There are about 3 billion passengers traveling on commercial airlines annually.¹ Despite this large number, there is one significant IFE per 10-40 000 passengers 200 IFMEs worldwide daily and approximately 0.35 deaths per million inbound passengers annually.¹ Because there is no uniform reporting system, both figures are probably underreported. More die for medical reasons than in crashes. About 67% IFMEs are from preexisting medical conditions which increase with age and the growing geriatric population.² The etiology is typically an exacerbation of a current problem, new medical problem, or trauma (Table 1).

Common problems encountered in flying are low cabin humidity, relative hypoxia, noise, vibration, turbulence, "strange" foods, cutbacks in meals and liquid offerings, a smaller and more cramped environment, flight delays and cancellations, and circadian desynchronization (Jet Lag).^{2,3} At 39 000 feet, the cabin on a long haul is pressurized to 5-8000 feet=560 torr (at Sea Level: pressure=760 torr). This means that the oxygen saturation of 99% drops to 85%-90%.⁴ These conditions

often worsen underlying medical problems such as chronic obstructive pulmonary disease and heart failure.

The Captain of the airplane is in charge of the plane and flight plan, while the physician is in charge of all medical or surgical problems and their treatment. The airplane is not a flying emergency room or airborne ambulance. Usually, only basic first aid is available with limited medication availability. It is essential to establish communication and cooperate with the medical response center and airport medical staff. It is advisable to keep a written record of the patient encounter and to perform only treatments or procedures you are qualified to administer.⁵

Flight attendants are trained in basic first aid, medical oxygen use and usually cardiopulmonary resuscitation (CPR), automated electrical defibrillator (AED), and the use of epinephrine intramuscular injector.⁶ They are also taught to recognize common symptoms of distress and may know how to receive medical advice via telemedicine. The AED is required on board any passenger aircraft with a maximum payload capacity >7500 lb (approximately 30 passenger aircraft) since 2004.⁷ It is stored in the passenger cabin, and at least one crew member is trained in its use. An electrocardiogram screen is not required.

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TABLE 1 Common problems of in-flight emergencies

| |
|------------------------------|
| Syncope-54% |
| Chest Pain, Dyspnea-24% |
| Gastrointestinal symptoms-9% |
| Allergic Reactions |
| Anxiety |
| Diabetic symptoms |

TABLE 2 Basic emergency kit

| |
|---|
| Ammonia inhalants (10) |
| Bandage compresses, 4 inch (8) |
| Triangular bandage, compress, 40 inch (5) |
| Arm splint, noninflatable (1) |
| Leg splint, noninflatable (1) |
| Roller bandage, 4 inch (4) |
| Adhesive tape, 1-inch standard roll (2) |
| Bandage scissors (1) |

A standard (Table 2) and advanced (Table 3) emergency kit may be available.⁷ The advanced kit is used one in 1900 flights or one use per 150 000 air travelers. It is required on aircraft with at least one flight attendant or aircraft with 50 or more seats, and it is available to physicians or professionals acting on behalf of physicians. Most frequently used drugs are anti-emetics, anti-diarrheals, and analgesics.⁷ Table 4 shows items that are not available in the advanced kit.

The need for diversion is rare and requires good medical judgment and clear communication with the flight crew.⁸ Inappropriate diversions include a stable patient with chest pain relieved by nitroglycerin, minor lacerations and abrasions, seizure in known epileptic and an asthma attack relieved by a metered dose inhaler. Appropriate diversions are major bleeding, major injury, impending birth, uncontrollable mental status, cardiac failure or chest pain, cerebrovascular accident, new seizure, food poisoning, and uncontrollable pain.

2 | PREGNANT WOMEN ABOARD AND ABROAD

It is more likely that somebody will die on an airplane flight from a known medical problem than give birth—26 times as likely. A study of 10 189 medical emergencies aboard European flights between 2002 and 2007 by German researchers found only two births but 52 deaths.³

Travel during pregnancy is generally acceptable if certain guidelines are understood. In the absence of obstetric or medical complications, pregnant women can observe the same general precautions for air travel as the general population and can fly safely up to 36 weeks of gestation. The safest time is during the second trimester (18-24 weeks). After the 28th week, a doctor's/midwife's letter confirming the expected date of delivery should better be carried by the patient. For single pregnancies, flying is usually permitted to the end of 36th week.⁹ A multiple gestation patient is usually allowed to fly permitted to end of the 32nd week.⁹

TABLE 3 Advanced emergency kit

| |
|---|
| Stethoscope (1) |
| Sphygmomanometer (1) |
| Sharps container |
| Directions for use of medications |
| Oropharyngeal airways (3 sizes) |
| Self-inflating manual resuscitation device (1) |
| CPR resuscitation masks (3 sizes) |
| Protective nonpermeable gloves (1 box) |
| IV NS 500 mL (1) |
| Tubing with Y connectors (2) |
| Alcohol sponges (2) |
| Adhesive tape, 1-inch standard roll (1) |
| Trauma shears (1 pair) |
| Tourniquet (1) |
| Needles (2 each of 18, 20, 22 gauge) |
| Syringes (2 each of 1 mL, 5 mL, 10 mL) |
| Nonlatex gloves (2 pair) |
| Medications |
| Analgesic, nonnarcotic tabs, 325 mg (4) |
| Antihistamine tabs, 25 mg (4) |
| Antihistamine injectable, 50 mg (2) |
| ASA, 325 mg tabs (4) |
| Atropine, 1 mg, 10 mL (2) |
| Dextrose 50%, 50 mL ample, injectable (1) |
| Epinephrine 1:1000, 1 mL injectable (2) |
| Epinephrine 1:10 000, 10 mL injectable (2) |
| Lidocaine 20 mg/mL, 5 mL injectable (2) |
| Nitroglycerine tabs, 0.4 mg (10) |
| Extras: epinephrine intramuscular injector, glucagon, naloxone, loperamide, antacid, nasal decongest spray, bacitracin ointment |

The travel should be comfortable without long air or road transportation. The destination should have good health services available. Adequate insurance coverage should be purchased. Regions of high malaria endemicity should be avoided, and at-risk pregnancies (eg, placental abnormalities, history of preterm labor) should avoid travel.¹⁰ For any vaccination or medication, the risks and benefits should be carefully weighed, as pregnant women are more vulnerable and at higher risk of complications.¹⁰

In-craft environmental conditions, such as low cabin humidity and changes in cabin pressure, coupled with the physiologic changes of pregnancy, do result in maternal adaptations, which could have transient effects on the fetus. Pregnant air travelers with medical problems that may be exacerbated by a hypoxic environment, but who must travel by air, should be prescribed supplemental oxygen during air travel.⁹ Because pregnancy predisposes to a risk of superficial and deep venous thrombosis due to alterations in clotting factors and pressure of expanding uterus, in-flight calf exercises are important.¹¹

TABLE 4 Items not available in the advanced kit

| |
|--|
| Manual suction device |
| Large trauma dressing |
| Urinary catheters |
| Butterfly 21 gauge |
| Cord clamps |
| Bite stick |
| SAM (structural, aluminum, malleable) Splints |
| Intubation supplies |
| Obstetric supplies |
| Hemostats |
| Scalpel/blade |
| Suturing equipment/material |
| Steroids, diuretics, narcotics, sedatives, anticonvulsants, ACLS drugs |

TABLE 5 Standard chemoprophylaxis for malaria in pregnancy

| Drug | Half-life | Time to wait before conceiving |
|---------------------------|-----------|--------------------------------|
| Mefloquine | 14-21 d | 3 mo |
| Doxycycline, tetracycline | 12-24 h | 1 wk |
| Malarone/atovaquone | 2-3 d | 2 wk |
| Proguanil | 14-21 h | 1 wk |

If antibiotics are required during travel, the following are recommended: penicillins, aminoglycosides (excluding kanamycin, streptomycin), cephalosporins, macrolides, antifungals, metronidazole, and most antiparasitics.¹² The quinolones, griseofulvin, and tetracyclines are contraindicated.¹² Malaria increases the risk of maternal death, miscarriage, stillbirth, and low birthweight with associated risk of neonatal death.¹³

If travel to a malaria-endemic area cannot be avoided, DEET (diethyl toluamide) should be used as a 20% solution during the 2nd and 3rd trimester.¹⁴ It is well accepted and has no adverse effects (eg, low birthweight, prematurity, or congenital abnormality). DEET does cross the placenta (8% of cord samples) but blood levels are low. More information is needed with respect to usage during the first trimester. Mefloquine is the drug of choice for pregnancy and malaria.¹⁵ Table 5 lists the standard chemoprophylaxis for malaria in pregnancy.

If a pregnant traveler acquires malaria, a standby drug should be started and medical attention sought as soon as possible.¹⁵ The recommended agents are as follows: chloroquine (with or without proguanil) mefloquine (2nd and 3rd trimester), artemisinin, clindamycin, quinine, and sulfadoxine-pyrimethamine. If the malaria is severe (ie, falciparum), artesunate and artemether are the drugs of choice during the 2nd and 3rd trimester. Data are limited during the first trimester. However, neither quinine nor artemisinin derivatives should be withheld in any trimester if they are considered lifesaving.

3 | OTHER CONCERNS

3.1 | Motor vehicle accident

Motor vehicle accident, involving a pedestrian, rider or driver, is a common cause of trauma and death for travelers.¹⁶ Travel in developing countries by a vehicle should be done during the daytime whenever possible. Seatbelt restraint for all travelers and car seats for infants are essential. Hitch-hiking is not recommended, and walking, jogging, or running should be undertaken with heightened caution.

3.2 | Food and water precautions

Recommendations for food and water precautions include the use of bottled water, wise selection of foods (eg, well-cooked and hot foods; avoidance of salads, raw vegetables, unpasteurized dairy products, street vendors, and ice; removal of the skin of fruits). Precautions against common vectors (eg, mosquitoes, gnats, fleas, ticks) include covering exposed skin (ie, blousing), using insect repellent containing DEET 25%-50%, treating outer clothing with permethrin, using permethrin-impregnated bed nets and insect screens over open windows, seeking air-conditioned rooms, using aerosolized insecticide indoors, and pyrethroid coils outdoors and inspecting for ticks.¹⁷

3.3 | Sexually transmissible diseases and other infections

Precautions are also recommended against sexually transmissible diseases and blood-borne pathogens (eg, hepatitis, HIV). These include unprotected sexual activity, commercial sex workers, tattooing and body piercing, and the use of blood products and dental and surgical procedures in situations where sterility and quality control are questionable.¹³ Hepatitis E virus acquired during pregnancy has a particularly high case fatality rate (15%-30%). Transmission of the virus occurs through fecal-oral exposure.

3.4 | Fauna and flora

Fauna precautions include animal avoidance in general, particularly stray animals that have the potential for rabies (eg, raccoons, fox, mongoose, bat, skunk). If exposure should occur, medical care should be sought as soon as possible and postexposure immunoglobulin and immunization provided. In addition, specific caution should be taken with spiders, scorpions and snakes and maritime animals if diving or swimming (eg, jellyfish, stone fish, lion fish, and sting rays).¹⁸ Flora such as poison ivy, sumac, and oak should be easily recognized and avoided. If contact occurs, the area should be scrubbed with soap and water within 10 minutes of exposure.

3.5 | Situational awareness

Because there is always a risk of crime in the host country, situational awareness should be a maxim. Governmental and travel warnings should be checked before and during travel.¹⁹ Avoidance of certain locations (eg,

bus and terminals after hours) and scam awareness are advisable. The use of recreational drugs and alcohol is not recommended during travel.²⁰

CONFLICT OF INTEREST

The authors have stated explicitly that there are no conflicts of interest in connection with this article.

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