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Traveler Information

CARDIOVASCULAR DISEASE AND AIR TRAVEL**INTRODUCTION**

Those who have heart disease or have undergone a cardiac procedure should discuss whether they should fly with their doctor. Some of the risk factors that might affect that decision include an unstable heart condition, long flights, flying to a high-altitude destination, and personal risk for blood clots.

PRE-FLIGHT PLANNING

- Discuss with a doctor fitness to fly, any activity limitations, and the possible need for in-flight oxygen.
- Obtain names of physicians and medical facilities at the destination, in case complications arise.
- Verify medical insurance coverage while traveling; discuss the possible need for evacuation insurance.
- Carry enough of regular medications to last the duration of the trip. Drugs should be in the original containers and carried in hand luggage.
 - If taking an antimalarial, check with a physician to be sure that it will not interfere with heart medications.
 - Carry a letter on physician's letterhead stationery (signed and dated) that states the underlying medical condition and the need for carrying medications.
 - Bring copies of any prescriptions using generic drug names; a recent electrocardiogram; and, if appropriate, a pacemaker card with an ECG.
 - Remember to take medication at the usual times during travel.
- Wear a Medical Alert wrist band while traveling.
- Those with an implantable defibrillator or pacemaker should check with their cardiologist to determine whether portable airport security magnets can interfere with its function. One may need to carry a letter from a physician warning of this potential problem. (*See below, "Pacemakers, implantable cardioverter defibrillators, and biventricular devices."*)
- Contact the airline well in advance for in-flight oxygen needs. Most airlines supply oxygen face masks but they are not very comfortable. Bring supplies, such as masks, nasal prongs, extra connectors, and scissors, as back-up.
 - Blood oxygen levels decrease as altitude increases. While most commercial aircraft cabins are pressurized sufficiently for healthy young adults, travelers with heart problems, especially if the condition is unstable, may experience hypoxia, or low oxygen levels, during flight.
- Contact the airline in advance for airport assistance.
- Allow plenty of time for check-in and security clearance. Pre- and post-flight activities can cause stress due to security measures, delays, and unaccustomed exercise while checking in, boarding, and disembarking.

STABLE CARDIAC CONDITIONS

In general, travelers with stable heart conditions are not likely to experience ill effects from lower levels of oxygen during flight, unless another critical risk factor is present.

- Travelers with mild shortness of breath or angina should avoid unusual physical exertion at the airport.
- Travelers who are comfortable only at rest and can walk only short distances should obtain assistance at the airport and request in-flight oxygen.
- Anemia that is considered to be a risk to the cardiac condition should be corrected before flying.
- Those with a history of ischemic heart disease (including coronary artery bypass graft or percutaneous coronary intervention), should not fly with low hemoglobin levels.

Ischemic heart disease means the heart muscle is not getting enough blood and oxygen, and it may progress to a point where the heart muscle is permanently damaged.

PCI (previously called angioplasty, percutaneous transluminal coronary, or balloon angioplasty) is a procedure in which narrowed or blocked arteries are widened through use of a tiny balloon. The balloon, which is attached to a thin plastic tube going through the artery to the obstructed site, is inflated and deflated, pushing the plaque against the wall of the artery to create a wider channel for the blood to flow through.

TRAVELERS WITH UNSTABLE CARDIAC CONDITIONS

Travelers with unstable cardiac conditions generally should delay flying until the condition has stabilized. In some cases, flying with a medical attendant may be possible. This includes heart attack, angina, cardiac catheterization, heart surgery, implanted pacemaker or other device, and other heart conditions or procedures. Stabilization time can range from a few days to several weeks, depending on age, history of previous heart problems, recovery time, other high risk conditions that might be present, plans for further interventions or testing, and complications that may have arisen. Even if a doctor advises readiness to fly, some travelers may need to allow extra time at both ends of the journey and ask for assistance at the airport.

FLYING WITH A PACEMAKER OR OTHER IMPLANTED DEVICE

Pacemakers and implantable cardioverter defibrillators (ICD) are susceptible to electromagnetic interference (EMI); however, modern devices have bipolar leads that reduce the risk of EMI.

- At the airport, metal detectors cause EMI at a very low frequency. Significant EMI is highly unlikely if the passenger walks briskly through the screening area. The metal casing of the implanted device may trigger the alarm. Hand-held metal detectors cause EMI at a higher frequency and may be held closer to the pacemaker or ICD for a longer period of time. ICD shock has occasionally been triggered.
- In the aircraft, the risk to pacemakers and ICDs from EMI is negligible, but cosmic radiation may, rarely, reset an ICD. Those with pacemakers or ICDs and traveling by commercial aircraft:
 - Verify with the doctor that the underlying heart condition does not pose a risk for flying.
 - Advise security staff at the metal detector gate of the implanted device and be guided by them.
 - If requested to walk through the gate, do so at a normal pace and then move away from the gate.
 - If a search with a hand-held device is required, request a pat-down search instead.
 - If on a long-haul flight, have the device settings checked and reset if necessary after travel.
- Pacemaker or ICD rate settings may increase as a result of high levels of vibration when traveling by helicopter, but will return to normal once the engine has been switched off or by external magnet application.

AIRLINE TRAVEL AND PORTABLE OXYGEN

Portable oxygen converters (POCs) are devices that work by filtering nitrogen from the air and delivering concentrated oxygen to the user. Because the devices do not carry compressed oxygen, they are not considered hazardous to flight safety. However, plan ahead if carrying a POC when flying.

Travelers need a doctor's order to carry oxygen. The Federal Aviation Administration (FAA) requires that any person traveling with oxygen submit a letter from their physician stating their need, so be sure to mention this when discussing travel plans with a physician.

- Most air carriers require the statement to be written on doctor's letterhead, however some may require an airline-specific form. Check with the airline to find out which is required. If flying on a code share flight, be sure to know the procedures for both the ticketing airline and the air carrier actually operating the flight.
- The physician's statement must include the following information:
 - Ability to see, hear, and respond to the warning signals on the POC, which are typically flashing lights and audible alarms
 - Oxygen requirements—is medical oxygen required during the entire flight, or only under certain conditions?
 - The maximum oxygen flow rate required while the aircraft is in flight

Some airlines may not allow passengers to carry on FAA-approved devices and require, instead, that passengers use the airline's on-board oxygen. Others may allow passengers to use their own oxygen on the runway but require that they switch to the plane's oxygen once on board. There are, however, no regulations *requiring* that airlines provide medical oxygen during flights. Be sure to check with the airline well in advance of the flight to see what their rules are and to make necessary arrangements.

- Notify the air carrier of the POC when booking the flight. While FAA regulations do not require informing the air carrier in

advance, nearly all airlines ask for notification at least 48 hours before the flight.

- FAA regulations also require that passengers using POCs not sit in exit rows, and their POCs must not block another passenger's access to seats or to the airplane's aisles. Travelers must be able to see the alarm lights on the POC when it is stowed. Ideally, keep the POC under the seat.
- If taking an international flight, one may need to comply with 2 sets of regulations (e.g., U.S. and Canadian rules). Contact the airline to understand all the procedures; ask if they supply oxygen and/or whether they accept POCs.

If bringing a POC, make sure it is on the FAA's approved list. As of December 2010, the FAA approved the following POCs for in-flight use:

- AirSep FreeStyle
- AirSep LifeStyle
- Delphi Central Air
- Devilbiss iGo
- Inogen One
- Inogen One G2
- International Biophysics LifeChoice
- Invacare XPO2
- Invacare SOLO 2
- Phillips Respironics EverGo
- SeQual Eclipse
- Oxlife Independence

Renting Portable Oxygen Concentrators

Several companies rent FAA-approved portable oxygen concentrators. If one's POC is not on the FAA-approved list, one may wish to bring it along for use at the destination and rent a POC to use in-flight. Two companies that rent FAA-approved portable oxygen concentrators in the U.S. are OxygenToGo (<http://oxygenwego.com>) and Advanced Aeromedical (<http://aeromedic.com>).

Powering a Portable Oxygen Concentrator

Air carriers are not required to allow travelers to plug the POC into the airplane's electrical system. Plan ahead and bring enough batteries to power the POC for the entire "flight time" which includes gate time, taxi time, security check-in, takeoff, in-air time, landing, transfer times, and possible delays. Almost all U.S. air carriers require travelers to bring enough batteries to power a POC for 150% of the entire "flight time."

When packing extra batteries in carry-on luggage ensure that the terminals on the batteries are taped or otherwise protected from coming in contact with other items in the bag. (Some batteries have recessed terminals, which do not need to be taped.) Travelers will not be allowed to bring batteries if they are not packed properly. The POC and extra batteries are considered medical devices. While they will need to be screened by TSA personnel, they will not count against the carry-on baggage allowance.

RISK OF VENOUS THROMBOSIS AND THROMBOEMBOLISM (VTE)

Also see the article *Traveler's Thrombosis*.

Cabin-related risk factors for blood clots include long flight duration (over 4 hours), frequent long-haul flights in close succession, and immobility during flight.

Personal risk factors include age greater than 50 years, body shape and size (very tall, very short, or obese), pregnancy and the first 6 weeks after childbirth, previous history of VTE, recent surgery, cancer, use of oral contraceptives, and thrombophilia (e.g., factor V Leiden mutation).

- Those with no previous history of VTE, no recent surgery, and no personal risk factors: Stay as mobile as possible, flex and extend the lower limbs, stay well hydrated, and avoid hypnotic drugs, alcohol, and coffee.
- Those who are over 50 years of age, have had a previous DVT or VTE, surgery within the last 4-8 weeks, have known thrombophilia, are taking oral contraceptives, are pregnant, obese (BMI greater than 30), very tall, or very short: Follow the tips above *and* wear compression stockings.
- Those who have had surgery within the last 4 weeks, a previous DVT or VTE, or other personal risk factors, follow all the tips above. In addition, a doctor might administer low molecular weight heparin on the morning of the flight and the following day (unless taking warfarin, which should be continued). Aspirin is not recommended.
- Those with a plaster cast might be at risk for DVT; replace the cast with a split cast before flying.