



CAREMARK

# Clinical Update

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## Pulmonary Arterial Hypertension

### Background

**P**ulmonary arterial hypertension (PAH) is a disease in which there is continuous high blood pressure in the lungs. The disease causes the pulmonary artery and the small blood vessels in the lungs to constrict or squeeze, which narrows the openings of these blood vessels. As a result, blood pressure rises in the arteries of the lungs. The increased blood pressure in the pulmonary artery can cause the heart to pump harder to deliver blood throughout the body. Over time, the heart may become larger than normal and may lose its ability to pump enough blood to all parts of the body.

**Pulmonary artery** = the blood vessel that carries blood between the heart and lungs

**Hypertension** = high blood pressure

PAH can be inherited, occur for unknown reasons or be related to other conditions, such as chronic heart or lung disease or blood clots in the pulmonary artery. As many as 1,000 new cases of PAH due to unknown reasons are diagnosed each year in the United States. PAH due to other causes is more common. Some people may have a higher chance of developing PAH if they use medicines to lessen their appetite or certain illegal drugs for a long time. PAH may also develop in people who have human immunodeficiency virus (HIV) infection, liver disease or connective tissue disease, such as scleroderma or lupus erythematosus. PAH occurs in all age ranges and racial and ethnic groups.

The first symptom of PAH may be tiredness or weakness. Many people may simply think they are “out of shape.” As the disease gets worse, the pumping action of the heart grows weaker, and people have less energy. People with PAH may also have trouble breathing, swelling in the legs and ankles, bluish lips and skin, and chest pain.

### Treatment Options

There are many different treatment options for people with PAH. These options include medicines, oxygen and lung transplantation. The medicines described below may be used more often in people who have PAH caused by unknown reasons.

### Medicines Used in Pulmonary Arterial Hypertension

#### FDA-approved Medicines to Treat PAH

*Phosphodiesterase Type-5 Inhibitor*  
Revatio™ (sildenafil)<sup>§</sup>

*Prostanoids*  
Flolan® (epoprostenol)<sup>§</sup>  
Remodulin® (treprostinil)<sup>§</sup>  
Ventavis® (iloprost)<sup>§</sup>

*Endothelin Antagonists*  
Tracleer® (bosentan)<sup>†§</sup>

#### Supplemental Medicines

*Anticoagulants*  
warfarin<sup>‡</sup>

*Calcium Channel Blockers*  
nifedipine<sup>‡</sup>  
diltiazem<sup>‡</sup>

**Norvasc® (amlodipine)\***

*Cardiac Glycoside*  
digoxin<sup>‡</sup>

*Diuretics*  
furosemide<sup>‡</sup>

\* **Bolded** medicines are currently on the Caremark Performance Drug List and Caremark Primary/Preferred Drug List.

† These products appear on the printed Caremark Primary/Preferred Drug List.

‡ While generic products do not appear on the printed Caremark Primary/Preferred Drug List, it is stated that generics should be considered the first line of prescribing.

§ This medicine is approved by the FDA for pulmonary arterial hypertension.

### Anticoagulants

These medicines decrease the clotting ability of the blood. This helps blood to flow more freely and may prevent harmful clots from forming in the blood vessels. Side effects include unusual bruising or bleeding, fever and chills.

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### **Calcium Channel Blockers**

Medicines in this group help to relax blood vessels and increase the amount of blood and oxygen going to the heart. They make it easier for the heart to pump blood throughout the body. Side effects include coughing, wheezing, trouble breathing and swelling of the ankles, feet or lower legs.

### **Cardiac Glycosides**

This type of medicine helps to improve the strength of the heart. It also helps the heart pump better. Side effects include anxiety, confusion, loss of appetite and nausea or vomiting.

### **Diuretics**

These medicines are also called “water pills.” They help decrease the amount of fluid in blood vessels, which makes it easier for the heart to pump blood. Side effects include headache and dizziness or lightheadedness, especially when getting up from a sitting or lying position. A person may also sunburn more easily while on this type of medicine.

### **Phosphodiesterase Type-5 Inhibitor**

This medicine causes the arteries in the lungs to widen and lessens the blood pressure in the lungs. Side effects include headache, nasal congestion, blurred vision and sensitivity to light. This medicine is also marketed as Viagra® for the treatment of male erectile dysfunction, or impotence.

### **Prostanoids**

Medicines in this group relax blood vessels and increase the supply of blood to the lungs. This makes it easier for the heart to pump blood to the body. These medicines have also been shown to prevent blood clots from forming. Side effects include flushing, headache and nausea. Ventavis® is the only inhaled form of medicine in this group.

### **Endothelin Antagonists**

This type of medicine widens the blood vessels and lessens the blood pressure in the lungs. Side effects include headache, swelling of the ankles and legs, low blood pressure, tiredness and upset stomach.

### **Other**

Oxygen therapy may be necessary if the level of oxygen in the blood is low and if breathing becomes difficult. Oxygen is usually given through nasal prongs or a mask. This may be necessary around the clock as the disease worsens.

Surgery to replace one or both diseased lungs with healthy lungs from a human donor may be necessary for patients who have not responded to medical therapy. Transplant patients may have to take medicines for the rest of their lives to reduce the chances for rejection of the new lung(s).

### **What's New?**

Thelin (sitaxsentan) is pending approval by the U.S. Food and Drug Administration (FDA) for the treatment of PAH. It is an endothelin antagonist similar to Tracleer. Thelin is an oral agent that may be taken once a day. It is expected to receive approval and launch in second quarter of 2006.

### **Caremark Clinical Initiatives**

Caremark offers various clinical programs to help plan participants and their physicians manage pulmonary arterial hypertension appropriately, safely and cost-effectively.

For details regarding available clinical programs, please contact your Caremark account representative.

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