

## **Persistent Pulmonary Hypertension of the Newborn (PPHN)**

**Persistent pulmonary hypertension of the newborn (PPHN)** is a dangerous condition which may cause a baby not to get enough oxygen after birth.

During pregnancy, a baby gets all of the oxygen he or she needs from the mother, through the placenta. The baby's blood mostly skips over its own lungs. The blood vessels going to the baby's lungs (pulmonary vessels) are closed.

When the baby is born and takes the first breath, the pulmonary vessels should open up and start flowing blood through the lungs. This allows the baby to get oxygen for the brain and the rest of the body.

With PPHN, the blood vessels to the baby's lungs do not open up fully. The closed blood vessels cause too much blood to skip the lungs. This means that the brain and the body may not get enough oxygen. There is too much pressure in the blood vessels to the lungs (pulmonary hypertension). The high pressure can hurt the baby's heart and lungs.

The cause of PPHN is not known. The risk is increased if the baby has:

- Meconium aspiration (breathes in his or her own bowel movements before birth)
- Lack of oxygen before or during birth
- Infection in the lungs or blood
- Abnormal development of the heart or lungs

### **Signs and symptoms**

The baby will have problems breathing and show signs of low oxygen at birth or in the first hours after birth.

- Fast breathing and fast heart rate
- Grunting or moaning when breathing
- Retractions (the skin between and under the ribs pulls in during fast and hard breathing)
- Blue color of the lips or around the mouth or blue hands and feet (cyanosis)
- Low blood oxygen levels, even after getting oxygen
- Low blood pressure

## Diagnosis

The doctor may do the following tests to diagnose PPHN.

- **Echocardiogram (ECG).** This test uses sound waves to make a picture of the heart and blood vessels. It will show how the blood flows through the body.
- **X-Rays.** A camera takes a picture of the lungs and can also see if the heart is too large.
- **Blood tests.** Changes in the number of blood cells and in the level of chemicals in the body. This helps to tell how well the infant can use oxygen or if there is an infection.
- **Pulse Oximeter.** This checks how much oxygen is in the baby's blood.

## Treatment

The goal of treatment is to increase oxygen levels in the blood, open the blood vessels in the lungs and maintain a normal blood pressure.

### Oxygen is given by:

- **Nasal cannula:** A small tube with prongs is placed in the nostrils.
- **CPAP** (Continuous Positive Air Pressure). This machine gently pushes air or oxygen into the lungs.
- **Ventilator.** This machine will breathe for your baby until the baby can breathe on his or her own. A breathing tube is put down the infant's windpipe. This is called *intubation* (in too BAY shun). The breathing tube is then hooked up to the ventilator. The ventilator is set to give the infant even and regular breaths.
- **High frequency oscillation ventilation.** This is a special type of ventilator. It can deliver rapid, short bursts of air through a breathing tube.

### Medicines:

- **Blood pressure medicine** to keep the blood pressure at the right level
- **Antibiotics** to treat or prevent infection
- **Sedation medicine** to help your baby rest and stay calm. When the baby is calm, the machines that give him oxygen can work better and he may need to use less.
- **Surfactant** to help the lungs work better. Surfactant allows the lungs to use oxygen and get rid of carbon dioxide. It is given to the baby through a breathing tube.

**If PPHN is severe and life-threatening:**

When other treatments fail, very severe PPHN may be treated with:

- Nitric oxide. This is a gas that helps expand the blood vessels in the lungs.
- Extracorporeal membrane oxygenation (ECMO). With ECMO, the baby's blood is pumped through an artificial lung. It puts oxygen directly into the blood (and takes out carbon dioxide) before pumping the blood back into the baby. See Helping Hand HH-II-90, *ECMO (Extra Corporeal Membrane Oxygenation)*. If ECMO is needed, your baby's doctor will discuss this procedure with you and answer your questions.