Bronchopulmonary Dysplasia (BPD)

Babies who are born prematurely or who experience breathing problems shortly after birth are at risk for bronchopulmonary dysplasia (BPD). It usually occurs during the first four weeks after birth. This is sometimes called chronic lung disease.

BPD involves abnormal development of lung tissue. Inflammation and scarring in the lungs develops. It most frequently develops in premature babies who are born with underdeveloped lungs.
"Broncho" refers to the bronchial tubes through which the oxygen we breathe travels into the lungs.
"Pulmonary" refers to the lungs' tiny air sacs (*alveoli*). This is where oxygen and carbon dioxide are exchanged.
"Dysplasia" means abnormal growth in the tiny air sacs. These changes make breathing difficult and cause problems breathing.

Most infants fully recover from BPD and have few long-term health problems. BPD can be a serious condition requiring intensive medical care. The number of BPD cases has gone down in recent years.

CAUSES

- A child is not born with BPD.
- It most often develops in premature babies who are born with underdeveloped lungs.
- Risk factors include:
  - Prematurity.
  - Respiratory infection.
  - Congenital heart disease.
  - Other severe illness in the newborn requiring treatment with oxygen or ventilators.

SYMPTOMS

The early signs of this illness are:

- Rapid, difficult breathing.
- Bluish skin and mucous membranes.

DIAGNOSIS

- BPD is often diagnosed if an infant still needs oxygen and shows signs of breathing problems after 28 days of age (or past 36 weeks post-conceptional age).
- Chest x-rays and tests of blood gases help your caregiver know what is wrong.
- Important factors in diagnosing BPD are:
  - Prematurity.
  - Infection.
  - Mechanical ventilator dependence.
  - Oxygen exposure.

TREATMENT

- No available medical treatment can cure BPD. Treatment supports the breathing and oxygen needs of infants with BPD. This helps them to grow and thrive. Babies first diagnosed with BPD receive a lot of supportive care in the hospital to help with breathing and comfort. This is usually in a newborn intensive care unit (NICU), until they are able to breathe well enough on their own without the support of a mechanical ventilator. Some babies may also receive jet ventilation. This is continuous low-pressure ventilation. It is used to lessen the lung damage from ventilation that contributes to BPD.
- Breathing help is usually needed. This is done with a ventilator. The ventilator is a mechanical device which keeps the lungs blown up and able to receive extra oxygen. The infant will gradually be taken off (*weaned*) from the ventilator. Oxygen may continue to be given by a mask or nasal tube for several weeks to months.
- Infants with BPD may be fed by tubes inserted into the stomach. Extra calories are needed due to the effort of breathing. Fluids may be restricted. The infant may be given *diuretics*. They are medications that remove water from the body to keep the lungs from filling with fluid.

- Other medications sometimes used include:
  - Corticosteroids. These medications decrease inflammation in the lungs.
  - Bronchodilators. These will decrease over-activity of the airways.
  - Surfactants. These will lower the surface tension of the lung.

- Most babies with BPD survive. In severe cases, the baby may die.
- Some infants may require oxygen therapy for many months. The time spent in the NICU for infants with BPD can range from several weeks to a few months. The average length of in-hospital care for babies with BPD is 120 days.
- Even after a baby leaves the hospital, he/she may require continued medication, breathing treatments, or oxygen at home. Most children are taken off extra oxygen by the end of their first year. A few with serious cases may need a ventilator for several years or even their entire lives (this is rare).
- Improvement for any baby with BPD is usually steady. Some infants are slow to improve. Lungs continue to grow for 5-7 years. There can be small abnormal lung functions, even at school age.
- The majority of children do well. Many babies diagnosed with BPD will recover close to normal lung function over time. Infants with BPD grow new healthy lung tissue that may eventually take over much of the work of breathing for diseased lung tissue.

COMPLICATIONS

- Babies who have experienced BPD are at a greater risk for developing new respiratory infections requiring hospitalization. Influenza, RSV (*respiratory syncytial virus*), and pneumonia are all more common. Many of the changes in the small airways (*bronchioles*) in babies with this illness are permanent.
- When they get an infection, they tend to get sicker than most children do.
- Another respiratory complication of BPD includes excess fluid buildup in the lungs. This is known as pulmonary edema. It makes it more difficult for air to travel through the airways.
- Some children with a history of BPD may also develop complications of the *circulatory* (blood moving) system.
- Infants with BPD often grow more slowly than other babies. They have difficulty gaining weight. They tend to lose weight when they are sick. Premature infants with severe BPD also have a higher incidence of cerebral palsy.
- Overall, the risk of serious, permanent complications from BPD is small.

PREVENTION

Early weaning from respiratory support, if possible, and the early use of surfactant may help prevent this condition.

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