Mechanical Ventilator

A mechanical ventilator is a machine that makes it easier for patients to breathe until they are able to breathe completely on their own. Sometimes the machine is called just a ventilator, respirator or breathing machine. Usually, a patient is connected to the ventilator through a tube (called an endotracheal tube) that is placed in the windpipe. Sometimes, patients can use a machine that assists breathing through a mask or mouthpiece but this may not work with severe respiratory problems. Despite their life-saving benefits, mechanical ventilators carry many risks. Therefore, the goal is to help patients recover as quickly as possible to get them off the ventilator at the earliest possible time.

Common reasons for its use and benefits:

- To deliver oxygen
- To eliminate carbon dioxide
- To ease the work of breathing

The main job of our lungs is to get oxygen into the body and to get rid of carbon dioxide. When a patient's lungs are no longer able to do this job completely, we use a ventilator to help. Most commonly, patients are put on a mechanical ventilator when they are in respiratory failure. Respiratory failure is the situation when the patient has a low level of oxygen in the blood, even while getting oxygen therapy and/or when the level of carbon dioxide rises too much in the blood. Some patients need help from a ventilator even though they still have nearly normal levels of oxygen and carbon dioxide in the bloodstream. This can be true when breathing is very uncomfortable. Sometimes patients are placed on a ventilator because of other serious injuries that require treatment, which may interfere with breathing temporarily.

In most cases, mechanical ventilators are used for patients who cannot breathe by themselves. The only other choice would be to allow the patient to die, while using medicines to maintain comfort (see sections on Code Status and Withdrawal of Life-Sustaining Treatments). Mechanical ventilators do not actually fix diseases, but rather keep the patient alive while the hospital staff finds out why the patient has difficulty breathing and treats the disease that is causing the difficulty.

Risks:

Some of the risks of mechanical ventilation include:

- Infections - The endotracheal tube in the windpipe makes it easier for bacteria to get into the lungs. As a result, the lungs develop an infection, which is called pneumonia. The risk of pneumonia is about 1% for each day spent on the ventilator. Pneumonia can often be treated with antibiotics. Sometimes the pneumonia can be severe or difficult to treat because of resistant bacteria (see General Information).
- Collapsed Lung - This is called a pneumothorax. The mechanical ventilator pushes air into the lungs. It is possible for a part of the lung to get over-expanded which can injure it. Air sacs may leak air into the chest cavity and cause the lung to collapse. If this air leak happens, doctors can place a tube in the chest between the ribs to drain out the air leaking from the lung. The tube

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allows the lung to re-expand and seal the leak (see related Information Sheet on Chest Tube Thoracostomy). Rarely, collapse of the lung can cause death.

- Lung damage - When the lungs are diseased and not functioning well, they are at greater risk of injury. The pressure to put air into the lungs with a ventilator can be hard on the lungs.

- Side Effects of Medications - Patients may be given medications, called sedatives, to make them more comfortable while the ventilator pushes air in and out of the lungs. These medications make patients sleepy and help them forget unpleasant experiences. The medications can build up in the body and the patient may remain in a deep sleep for hours to days, even after the medicine is stopped. Although the doctors and nurses try hard to get just the right amount of medication for a patient, it is not easy to get it perfectly right.

- Maintenance of Life - In some very sick patients, trying to keep the patient alive means that dying actually takes longer. Sometimes the lungs fail because the body is dying, and using the ventilator in place of the lungs only serves to put off what is inevitable - death. In this way, the ventilator may increase the length of time that patients are uncomfortable in their final days. Sometimes, doctors can give a good idea how likely use of mechanical ventilation will lead to a successful recovery. Very often, however, doctors can only give a rough idea of the likelihood that a patient will survive and go home after mechanical ventilation. A decision about continuing mechanical ventilation or not may come up if a patient is not showing any recovery or is continuing to get worse (see sections on Code Status and Withdrawal of Life-Sustaining Treatments).