



THE MANAGEMENT OF ARDS VIA VENTILATORY SUPPORT AND MEDICATION

by Respiratory Care Student - Brandon Censon

Acute Respiratory Distress Syndrome is a severe injury to the lungs with high morbidity and mortality rates affecting more than 30 percent of the patients with this condition. One cause of ARDS is sepsis, where a bacterium manifests your bloodstream, which in turn causes multi-organ failure. Other causes include aspiration, infectious pneumonia, severe trauma, drug overdose, drug reaction, near drowning, smoke inhalation, pancreatitis and pulmonary contusion amongst many other causes.

There are many complications associated with ARDS as well, including complications directly derived and other complications that may be allied by the support needed to treat the condition. Some of those complications include barotraumas, volutrauma, delirium, multiple bacterial infections, central nervous system dysfunction, irreversible pulmonary fibrosis, and severe blood clotting.

ARDS primarily affects the lungs by causing the lungs to become stiff or non-compliant. This causes alveoli to collapse so that gas exchange is severely compromised. ARDS is typically supported by mechanical ventilation; therefore the patient becomes bed bound which in turn can cause the patient's blood to become stagnate. This can cause clots, causing either a deep vein thrombus (DVT) or pulmonary emboli (PE). ARDS has a great effect on the cardiovascular system as well. As mentioned, pulmonary emboli can form from the patient being inactive. This, coupled with the capillaries leaking into the pulmonary system; can increase the pressures of the heart and lung, such as the pulmonary artery pressure, pulmonary capillary wedge pressure and the central venous pressure, measurements of which all are obtained via a Swan Ganz catheter.

The diagnosis of ARDS is quite complex and requires many tools and laboratory tests to ensure that the patient is being treated for all of the underlying affairs. Some of the diagnostic tools used are: Complete Blood Count (CBC) which is used to assess white blood cell count as well as red blood cell count, necessary as the first-line method for detecting infection as well as assessing hemoglobin and albumin levels. Multiple Chest X-ray's are necessary as well, to follow the patient's progression/regression with ARDS.

With mechanical ventilation being almost always necessary to treat severe ARDS, there is, of course, an increased chance of experiencing barotrauma that leads to pneumothorax. Thus, pressures and volumes delivered to the lungs have to be monitored closely. An Echocardiogram is also a noteworthy test for patients with ARDS. The echocardiogram will show problems that can

occur when excessive fluid builds up within and/or around the heart and lungs as a result of ARDS. The echocardiogram is essential for the diagnosis of whether the heart is working properly and distributing blood through the body.

Another diagnostic tool used with ARDS is the bronchoscope. The bronchoscope allows one to have an in-depth, direct look at the condition of the lungs from the inside. Bronchoscopy may also facilitate the diagnosis of lung infections by allowing practitioners to obtain sputum samples from the lower lobes. The scope also allows inspection of the lung parenchyma for scarring and or exudates. Arterial blood gases are also pertinent in the treatment and diagnosis of ARDS; ABG's show the Acid-Base balance of the patient as well as their oxygenation status.

There is no defined way to treat ARDS. The practitioner can only support the patient and treat any infections or cardiac issues that are embroiled. Our major support comes in the form of mechanical ventilation. The most common mode of ventilation used with the ARDS patient is pressure controlled ventilation. This mode controls the amount of pressure the lungs are being exposed to. Other ventilator settings should be set appropriately to support the patient's state of affairs.

Permissive hypercapnia ventilation (PHV) is another strategy used with ARDS. This is a consequence of lower tidal volumes. PHV has many advantages includ-

ing the ability to increase the patient's cardiac output, heart rate, oxygen delivery, and pulmonary artery pressure. PHV, however, should only be used short term, due to the long term negative physiologic effects of the body.

Medication plays a crucial role in treating ARDS. Bronchodilators administered by aerosol or intravenously delivered medications such as corticosteroids are key. Cardiac drugs are used with the treatment of the symptoms that are being displayed as well, and can vary from vasopressors to drugs that manage fluid balance. Antibiotics are, of course, used to treat any infections that may be present. Furthermore, you want to make the patient as comfortable as possible via the use of sedation and paralytics. This in turn often decreases the patient's pulmonary pressures, allowing you to ventilate them more effectively.

Overall, ARDS is a complex condition that is not easily managed or supported. It takes a team of trained professionals, with respiratory therapists being important members of that team, to treat the patient.

Brandon Censon is an RC Student at Florida Community College of Jacksonville in Jacksonville, FL. His paper on The Management of ARDS was chosen from 9 papers submitted to Focus for this issue. Mr. Censon will receive a \$100 gift certificate and a gratis registration to the 2009 Focus Conference. His school's RC Program will also receive a \$100 donation. Students are encouraged to submit their papers for the May/June issue by Apr 15th. Papers should be 900 - 1250 words and should be submitted as MS Word files to Craig Baker at BakerCT78@yahoo.com.