Respiratory distress treatment pdf

The objectives of mechanical ventilation in ARDS are to maintain oxygenation while avoiding oxygen toxicity and complications of mechanical ventilation. Generally, this includes maintaining oxygen saturation in the 85-90% range, with the aim of reducing the fraction of inspired oxygen (FiO_2) to less than 65% within the first 24-48 hours. Achieving this goal almost always requires the use of moderate to high levels of positive final exhaled pressure (PEEP). Experimental studies have shown that mechanical ventilation can promote a type of acute lung damage called lung damage associated with the ventilator. A protective ventilation strategy that uses low tidal volumes and limited plateau pressures improves survival compared to conventional tidal volumes and pressures. In an ARDS study, patients with ALI and ARDS were randomized to mechanical ventilation at either a tidal volume of 12 mL/kg of predicted body weight and an inhaled pressure of 50 cm of water or less or at a tidal volume of 6 mL/kg and a crawling pressure of 30 cm of water or less; the study was discontinued early after an interim analysis of 861 patients showed that individuals in the low tidal volume group had a significantly lower mortality rate (31% vs. 39.8%). [35] While previous studies using low tidal tumours have allowed patients to be hypersmoking (tolerant hypersmoking) and oxoids to achieve the protective ventilation targets of low tidal volume and low pressure of respiratory airways, the ARDS network study has allowed increases in respiratory rate and bicarbonate to correct acidosis. This may explain the positive result in this study compared to previous studies that had not shown benefit. Thus, mechanical ventilation with a tidal volume of 6 mL/kg of projected body weight is recommended, adjusting the tidal volume to as low as 4 mL/kg if necessary to limit the pressure of the crawling plateau to water of 30 cm or less. Increase the fan rate and administer bicarbonate as needed to maintain pH at an almost normal level (7.3). In the ARDS network study, patients ventilated with lower tidal tumors required higher LEVELS of PEEP (9.4 vs. 8.6 cm of water) to maintain oxygen saturation at 85% or more. Some authors have speculated that higher levels of peep may also have helped improve survival rates. However, a subsequent trial of the ARDS network higher versus lower PEEP levels in patients with ARDS showed no benefit from higher PEEP levels in terms of either survival or duration of mechanical ventilation. [36] The lack of effectiveness of higher LEVELS of PEEP may have with the fact that the recommended PEEP levels in the ARDS network study were based on oxygenation, and were not individualised on the basis of lung engineering. ARDS is a heterogeneous process and patients may have different patterns of lung injury and different chest wall mechanics. Measurement of esophageal pressures with esophageal balloon catheter allows allows of the intersymonal pressure. The basis of the fan strategy in these pressures, as PEEP is titrated, can allow the determination of the levels of best PEEP to improve oxygenation and minimize voluntarim and atelectasia. [37] Using the protective ventilation strategy of lower tidal volumes, limited plateau pressure, and higher PEEP improves survival in ARDS. Amato et al, [38] through a retrospective review of more than 3500 ARDS patients reported in nine previous studies, found that the most important ventilation variable in determining survival is delta P (plateau pressure minus PEEP). Delta P is a reflection of lung compliance and is reliable for predicting survival in patients with ARDS who do not breathe spontaneously. In these patients, lower delta P levels improved survival. Higher PEEP levels and lower tidal tumours did not improve survival unless they were associated with lower delta P levels. Patients with severe ARDS may also benefit from early use of neuromuscular exclusion factors. In a group of patients with severe ARDS (PaO2/FiO2< 120) diagnosed within 48 hours, paralysis with cisatracurium for the next 48 hours was shown to improve mortality of 90 days, compared to placebo (31.6% for cisatracurium versus 40.7% for placebo). increasing days without a ventilator; and reduced barotrauma. There was no increased incidence of prolonged muscle weakness in the paralyzed group. [39] However, a more recent study in 2019 in patients with a PaO2/FiO2 ratio of less than 150 mm Hg for less than 48 hours showed no improvement in mortality, days without a ventilator or barotrauma rates. [40] Neuromuscular exclusion factors should be used selectively. These factors may be beneficial in patients with very severe ARDS, those who have breathing synchronization problems with the ventilator, and patients with poor lung compliance. The management of doctors should not use paralytic in all cases. rather, you should only use them in those where the length of ventilation is expected to exceed a few hours. Patients should not remain ventilated for longer than necessary to have their paralytic effects. The duration of the paralysis will depend on the condition. [39] A study by Jaber et al examined diaphragmatic weakness during mechanical ventilation along with the relationship between mechanical ventilation duration and diaphragmatic injury or atrophy. [41] The study determined that longer periods of mechanical ventilation were associated with significantly greater injury fiber, increased ubiquitinated proteins, higher expression of the nuclear agent p65-kB, higher levels of calcium-activated proteins, and decreased transverse area of muscle fibers in the diaphragm. The conclusion was that weakness, injury and atrophy can occur quickly in the diaphragms of patients with mechanical ventilation and are significantly correlated with the duration of fan support. Go to Barothuma Barotruma Mechanical ventilation for complete information on this topic. ARDS is characterized by severe hypoxemia. When oxygenation cannot be maintained despite high inspired oxygen concentrations, the use of CPAP or PEEP usually promotes improved oxygenation, allowing FiO2 to taper. With PEEP, positive pressure is maintained throughout the expiration, but when the patient inhales spontaneously, the airway pressure decreases below zero to cause airflow. With CPAP, a low strength demand valve is used to allow continuous maintenance of positive pressure. Positive pressure ventilation increases intrathoracular pressure and thus can reduce heart production and blood pressure. Because the average airway pressure is greater with CPAP than PEEP, CPAP may have a more profound effect on blood pressure. In general, patients tolerate CPAP well, and CPAP is commonly used rather than PEEP. The use of appropriate CPAP levels is considered to improve the effect on ARDS. By keeping the cells in an enlarged state throughout the respiratory cycle, CPAP can reduce the shear forces that promote fan-related lung damage. The best method for finding the optimal CPAP level in ARDS patients is controversial. Some favor using just enough CPAP to allow the reduction of FiO2 below 65%. Another approach, favoured by amato et al, is the so-called open lung approach, in which the appropriate level is determined by the construction of a static pressure volume curve. [42] This is an S-shaped curve, and the optimal PEEP level is just above the lowest inflection point. Using this approach, the average PEEP level required is 15 cm of water. However, as noted above, a study of the ARDS network for higher versus lower LEVELS of PEEP in patients with ARDS did not find higher levels of PEEP interests. [36] In this study, the PEEP level was determined by how much inspired oxygen was required to achieve a target oxygen saturation of 88-95% or a partial target pressure of oxygen (PO2) of 55-80 mm. Peep level was on average 8 in the lower PEEP group and 13 in the highest PEEP group. There was no difference during mechanical ventilation or survival until discharge from the hospital. A 2010 review by Briel et al found that treatment with higher PEEP showed no advantage over treatment with lower levels in patients with ALI or ARDS. However, among patients with ARDS, higher levels were associated with improved survival. [43] A study of Bellani et al found that in ali patients treated with relatively high PEEP, the metabolic activity of gas-related areas was associated with plateau pressure and regional tidal volume from the volume of the final exhaled pulmonary gas. no correlation was found between cyclic uptake/derecruitment and increased metabolic activity. [44] If high pressure of the herpable airways is required to provide even low tidal volumes, pressure-controlled ventilation (PCV) may be initiated. In this mechanical ventilation mode, the doctor adjusts the pressure pressure level CPAP (delta P) and inspiration time (I-time) or inspiration/exhalation ratio (I:E). PCV can also lead to improved oxygenation in some patients who do not do well for tumor-controlled ventilation (VCV). If oxygenation is a problem, longer I-times, so that inspiration is greater than expiration (inverse ventilation ratio I:E) can be beneficial; proportions of up to 7:1 have been used. PCV, using lower peak pressures, can also be beneficial in patients with bronchofthalal fistula, facilitating the closure of the fistula. The evidence suggests that PCV can be beneficial in ARDS, even without the specific circumstances occurring. In a multicenter controlled trial comparing VCV with PCV in patients with ARDS, Esteban found that PCV led to fewer organ system failures and lower mortality rates than VCV, despite the use of the same tidal tumors and peak-inspired pressures. [45] A larger test is required before a clear recommendation is made. High frequency ventilation (jet or oscillating) is a ventilation mode that uses low tidal volumes (approximately 1-2 mL/kg) and high respiratory rates (3-15 breaths per second). Since cell dilation is known in one of the mechanisms for promoting respirator-related lung injury, high-frequency ventilation is expected to be beneficial to ARDS. The results of clinical trials comparing this approach with conventional ventilation in adults have generally demonstrated a timely improvement in oxygenation, but no improvement in survival. The largest randomized controlled trial involved 548 adults with moderate to severe ARDS who were randomized to conventional ventilation or high-frequency oscillating ventilation (HFOV). This study was terminated early for damage due to a mortality rate in the hospital of 47% in patients receiving HFOV and 35% in the conventional arm. [46] Therefore, HFOV is not recommended as a treatment strategy for ARDS. Partial liquid ventilation has also been tested on ARDS. A randomized controlled trial comparing it to conventional mechanical ventilation determined that partial liquid ventilation led to increased morbidity (pneumothorax, hypotension, and hypoxaemic episodes), and a tendency toward higher mortality. [47] Airway pressure release ventilation (ADRV) is another ventilation mode that uses a long duration (high T) of a high positive airway pressure (P high) followed by a short duration (low T) at a low pressure (P low). Time spent at a P high compared to P low is a reverse ratio to normal breathing patterns. for example, a patient can pass 5.2 seconds at P high and 0.8 seconds at P low. The theory is that time in P high significantly increases and maintains cellular intake, thus improving oxygenation. ADRV may improve oxygenation, but there have been no randomized controlled trials demonstrating improved survival with ARDS. Doctors should be careful with APRV in patients with lung disease, due to the relatively short exhalation time and possible hyperinflation and barotrauma. Approximately 60-75% of patients with ARDS have significantly improved oxygenation when converted from the supine to the prone position. Improving oxygenation is rapid and often significant enough to allow reductions in FiO2 or CPAP levels. The prone position is safe, with proper precautions to secure all pipes and lines, and does not require special equipment. Improved oxygenation may continue after the patient returns to the supine position and may occur in repeated trials in patients who did not initially respond. Possible mechanisms for improvement are the uptake of dependent lung zones, increased functional residual capacity (FROC), improved diaphragmatic excursion, increased cardiac production and improved ventilation-blood matching. Despite improved oxygenation with the prone position, early randomized controlled trials of prone position in ARDS did not prove improved survival. In an Italian study, the survival rate for ICU discharge and the survival rate at 6 months remained unchanged compared to patients treated in the supine position, despite a significant improvement in oxygenation. [48] This study was criticized because patients were kept in the prone position for an average of only 7 hours per day. In addition, a subsequent French study, in which patients were prone for at least 8 hours a day, does not substantiate a benefit from the prone position in terms of 28 or 90-day mortality, the duration of mechanical ventilation or the development of respirator-related pneumonia (VAP). [49] However, a subsequent randomized controlled trial in which patients with severe ARDS were put in the prone position early and for at least 16 hours daily showed a significant mortality benefit. [50] In this study, patients with severe ARDS (PaO2/FiO2 < 150) were randomized to a prone position after 12-24 hours of stabilisation. The 28-day mortality rate was 16% in the prone group and 32.8% in the supine group. The patients were manually converted. A specialized bed was not necessary. Required.