

The Sensor

Ventilators and Ventilation

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Ventilators and Ventilation

The Covid pandemic forced ventilator management into mainstream media. Do we have enough ventilators?

Sugammadex: A Game-Changer for Reversing Neuromuscular Blockade

Sugammadex is a relatively new medication used in anesthesiology, particularly in reversing neuromuscular blockade induced by neuromuscular blocking agents

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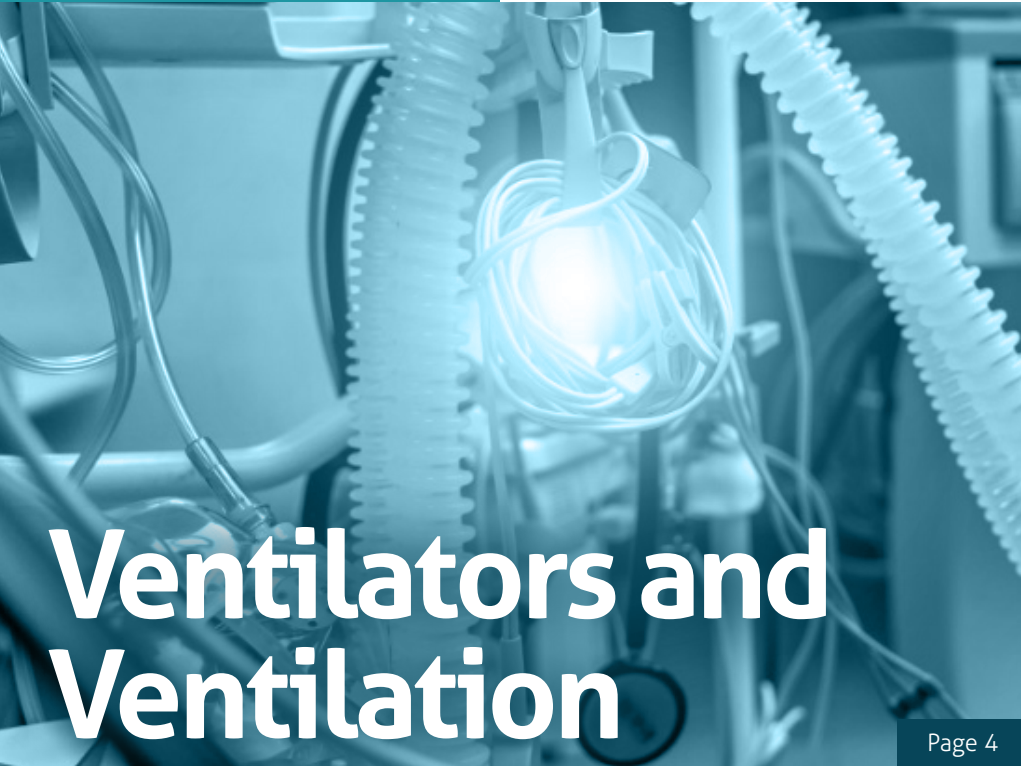
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Perspective

PRESIDENT'S LETTER



Dear ASATT Members,

I hope this letter finds you in good health and spirits. As the President of the American Society of Anesthesia Technologists and Technicians (ASATT), I am pleased to update you on our profession's latest events and happenings.

Firstly, I am thrilled to announce that our organization will host the ASATT National Education Conference *Re:Evolution* from October 19-21, 2023, in Pasadena, California. The conference will provide anesthesia technologists and technicians from across a platform to network, learn and share their experiences with colleagues nationwide. We sincerely look forward to seeing you in sunny Southern California. Similar to last year, we will have multiple tracks so you can have the freedom to decide which CEU opportunities fit you best. Stay on the lookout for more information regarding this exciting event.

Secondly, I want to share some exciting news about our organization's latest initiative. As you know, the Practical Experience Pathway went live on February 1, 2023. The outreach from you all has been enormous. We are excited to see how this pathway improves our profession by providing credentialing access to experienced uncertified technicians nationwide. We are currently in talks with organizations seeking to start practical experience pathway curriculums to offer professional development training as another alternative to finding relevant training that best fits your needs.

Additionally, the Board of Directors approved and assembled a task force to begin work on the initial revisions of the ASATT Scope of Practice. The task force, with representation from across the country, will be working to perform minor edits and modifications to the current Scope of Practice, for example, adding the recent approval by the Board of Directors to allow American Red Cross BLS, ALS, and PALS as an alternative to the American Heart Associations certifications. This Taskforce will also be finalizing the development of a Professional Practice Survey, which will go out in Q3 of this year. The purpose is to collect data on anesthesia technology practices nationwide and perform a large-scale review of the Scope of Practice in 2024.

As we close out Anesthesia tech Month with our annual celebration of Anesthesia tech week, I would like to take this opportunity to recognize and celebrate the critical role that anesthesia technologists and technicians play in the anesthesia care team. Your clinical expertise and attention to detail are vital to ensuring patient safety and smooth operations in the perioperative environment. I am humbled to represent you as President of this organization, and I count it as a daily blessing every time I hear and can share a story about how you all enhance the healthcare system with our industry partners.

Bryan Fulton, M.Ed., Cer.A.T.T.

ASATT President 

From the Executive Director

EXECUTIVE DIRECTOR & COORDINATOR REPORTS



Happy Spring to All!

ASATT has experienced many changes in 2023. I have returned as the ASATT Executive Director. For those of you who don't know me, my name is Mike McManus, and I was the Executive Director for ASATT between 2008 and 2018. On January 1, 2023, ASATT changed management

companies, and we began working together again. I think that you will notice some welcome changes in the coming months. We are in the process of building a new website and database that promises to be more user-friendly. All of us at ASATT headquarters are extremely member focused and try to answer every call that comes into our office. We have heard from members who have called how happy they are to speak with someone.

All of us at Headquarters have spent the first 3 months of this year learning more about all the changes that have taken place at ASATT, and they all seem to be very positive. There are several events already planned for 2023, of special interest is that our Annual Conference will take place between October 19- 21, 2023 at the Hilton in Pasadena, California. We are in the midst of finalizing plans for this event and will have more information available shortly. On January 31, 2023, ASATT launched a new program, the Practical Experience Pathway, which will help those who are not certified but have considerable experience working as an Anesthesia Technician, qualify for the National Technologists Exam.

I'd also like to introduce you to Annie Rapach-Lagowski, who will be working with me and whom you will have the pleasure of speaking with when you call our office. Annie has vast experience and is quickly learning how ASATT works. She will be our lead during webinars in the near future, as well as your association specialist. Be sure to call either Annie or I with any questions that you may have.

We are looking forward to working with you!

Mike McManus

ASATT Executive Director 



Hello ASATT!

I am very excited to join you as part of a great management team. I have several years of relevant experience, and in the past three months I have enjoyed applying that experience to ASATT, as well as learning new things about what makes ASATT unique. I have

enjoyed the chance to connect with all those who I have spoken with over the phone or via email and look forward to getting to know many more of you in the coming months. Please always feel welcome to reach out with any questions you may have.

Annie Rapach-Lagowski

ASATT Coordinator 

Ventilators and Ventilation



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The Covid pandemic forced ventilator management into mainstream media. Do we have enough ventilators? What can we make into a ventilator? Those in medicine that had no knowledge or interest in ventilator management became experts. Truthfully, all physicians should have a level of expertise in the basic mechanics of a ventilator and modes of ventilation. So, let's see if we can achieve that.

POSITIVE PRESSURE VENTILATION

All mechanical ventilation is "positive pressure ventilation." as opposed to how we naturally breathe which is through the generation of a negative inspiratory force. Instead of generating negative intrathoracic pressure, we raise intrathoracic pressure which will affect the normal cardiopulmonary physiology. Preload will be reduced therefore there will be a reduction in left ventricular volume and cardiac output. We can expect minimal effects with a

healthy patient, but few healthy patients are mechanically ventilated in an intensive care unit.

REBREATHING VS NON-REBREATHING

We should understand the difference between a non-rebreathing and rebreathing system. Simply, if the ventilator allows for rebreathing of expired gas, it is a rebreathing system; and if it does not, it is not. The classic ICU ventilator is non-rebreathing therefore the fresh gas flow must be equal to but usually is two to three times higher than the patient's minute ventilation. The classic anesthesia machine is a rebreathing system to allow for maintenance of humidity and warmth and a reduction in anesthetic waste. Therefore, CO₂ is removed from the exhaled gas utilizing CO₂ absorbers which contain chemicals that remove the CO₂ via a set of chemical reactions. Therefore, the majority (semi-closed system) or all (closed system) of the exhaled gas can be reused as inspired gas. Commonly, fresh gas flow during an anesthetic is as low as one liter/minute with a minute ventilation of seven liters/minute or more in an adult.

ICU VENTILATORS

ICU ventilators start with a power supply which is usually electricity powering a compressor or compressed gas. Next, you need an oxygen and air source usually from wall outlets delivering the gases to the room from large tanks or concentrators at around 50 PSI with regulators

within the ventilator allowing for further reduction of the PSI leading to the safe administration of the gases to the patient. The concentrations of the air and oxygen can be manipulated to provide the percentage of inspired oxygen desired. Flow control valves are present to manipulate the direction in which the gases travel. Many valves allow for the variation of the orifice size to further control flow. Lastly, there is the control system that will determine the mode of ventilation, fresh gas flow, preset parameters such as tidal volume and/or pressure generated, and so on.

DEFINITIONS

The **Tidal Volume** is the volume of gas delivered per breath. The **Respiratory Rate** is the number of breaths per minute. The **Minute Ventilation** is the tidal volume times the respiratory rate in liters/minute. The **FiO₂** is the concentration of oxygen in the inspired gas as a percentage such as 50% FiO₂ or an FiO₂ of 0.5. The **I:E ratio** is the time during one breathing cycle spent in inspiration (I) and expiration (E). The common I:E ratio during mechanical ventilation is 1:2, and 1:3 to 1:4 with COPD or other diseases leading to potential alveolar collapse or air trapping. A **breathing cycle**, as stated above, is the time taken for one breath, and the duration of inspiration and expiration will be determined by the I:E ratio. There are four phases to the cycle: inspiratory flow, inspiratory pause, expiratory flow, and expiratory pause. **PEEP** stands for positive end expiratory pressure applied to stent airways open or avoid end-expiratory airway collapse allowing for maximal oxygenation. Commonly **PEEP** is set at a minimum of 5 cmH₂O during mechanical ventilation to as high as 20 cmH₂O for patients that are hypoxemic. **CPAP** is continuous positive airway pressure utilized with spontaneously ventilating patients to also help with oxygenation and to maintain airway patency. The **Peak Inspiratory Pressure** is the highest pressure obtained during inspiration and the **Plateau Pressure** is the pressure at the end of inspiration during the inspiratory pause phase. Both are important in determining lung compliance and the risk of barotrauma with goals being under 35 cmH₂O for the peak inspiratory pressure and under 30 cmH₂O for the plateau pressure when using standard ventilation strategies. Lastly,

Simply, if the ventilator allows for rebreathing of expired gas, it is a rebreathing system; and if it does not, it is not.

Compliance equals the change in volume over the change in pressure.

INVERSE I:E RATIO

Inverse I:E ratio is an uncommonly used method where the inspiratory time is set longer than the expiratory time. It is usually a rescue maneuver to improve oxygenation when all else has failed. The idea is to increase or maintain mean airway pressure but not further raise peak inspiratory pressure. For example, if PEEP is 5 and peak inspiratory pressure is set at 20 with an I:E ratio of 1:2, the mean airway pressure is $5 \times 2/3 + 20 \times 1/3 = 10$. Now if we reduce the peak inspiratory pressure to 15 and change the I:E ratio to 2:1, the mean ventilatory pressure is $15 \times 2/3 + 5 \times 1/3 = 11.5$. So, we increased mean airway pressure to improve oxygenation but reduced peak inspiratory pressure so as not to cause barotrauma. Inverse I:E ratio is not tolerated well by patients therefore heavy sedation is usually required.

VENTILATION MODE

The modes of ventilation are how the ventilator assists the patient in the act of breathing; what is controlled, what is variable, and preset limits to both the controlled and variable components. The two basic modes are Volume Control and Pressure Control.

Volume control is a mode of ventilation where the tidal volume is preset (or controlled) as well as the respiratory rate and FiO₂. Therefore, the minute ventilation would be constant. The variable will then be the peak inspiratory pressure. PaCO₂ can be reasonably constant but if lung compliance changes, high peak airway pressures can occur with the potential for barotrauma. If PaCO₂ is of the highest importance, this would be the preferred mode of ventilation.

Pressure control is a mode of ventilation where the inspiratory pressure is preset (or controlled) as well as the respiratory rate and FiO₂. If lung compliance remains unchanged, the minute ventilation would be constant. However, if compliance changes, the tidal volume will proportionally change up or down leading to variations in

the minute ventilation as well as the PaCO₂. If the concern is barotrauma, especially in children, this would be the preferred mode of ventilation.

Pressure Support ventilation is a form of pressure control ventilation, however there is no preset respiratory rate. Peak inspiratory pressure, FiO₂ and PEEP are preset. The patient's own inspiratory effort will trigger the ventilator to deliver a breath to a preset peak inspiratory pressure. This mode of ventilation was developed to reduce the work of breathing in a patient taking spontaneous breaths. Many times, a backup mandatory rate can be set up in case the patient would become apneic.

Assist/Control (A/C) ventilation is a form of volume control ventilation with a preset tidal volume, respiratory rate, FiO₂ and PEEP. However, if the patient tries to take a spontaneous breath, the ventilator will identify this and deliver a full preset tidal volume. This is the most used initial mode of ventilation to allow maximal rest of likely weakened respiratory muscles. The downside of this mode of ventilation is that if the patient is tachypneic for any reason such as due to anxiety or pain, the patient will likely hyperventilate and develop a reduced PaCO₂ and respiratory alkalosis.

SIMV (Synchronized Intermittent Mandatory Ventilation) is a form of volume control ventilation where we still have a preset tidal volume, respiratory rate, FiO₂ and PEEP; as well as the ability to take spontaneous breaths. However, with the spontaneous breaths, the ventilator will not deliver a full tidal volume, therefore, the tidal volume generated with the spontaneous breath is based on the patient's respiratory effort. Pressure support can be added to the spontaneous breaths if desired by the clinician. The preset mandatory breaths will be delivered around the spontaneous breaths. This mode of ventilation along with pressure support alone are commonly used for weaning from the ventilator.

To be clear on our understanding of A/C and SIMV, if the preset portions are the same, and the patient is paralyzed

and/or taking no spontaneous breaths, the two ventilation modes would be indistinguishable from one another. The difference is with the spontaneous breaths.

There are many other advanced modes of ventilation utilizing one or a combination of volume and pressure control. Computer algorithms can change modes and parameters from breath to breath, or "find" the optimal tidal volume and peak and plateau pressures. A couple examples of many are described below.

Pressure Regulated Volume Control (PRVC) is an example of a dual mode (both pressure and volume are controlled in some way) of ventilation where it utilizes feedback from the patient to adjust pressure and volume. You set the respiratory rate, FiO₂, peep and "target" volume desired. The ventilator performs a test breath to determine the lung compliance (tidal volume over peak airway pressure). The ventilator will then deliver a "pressure control" breath at that setting then adjust the pressure settings slowly until the target volume is achieved. It will continue to adjust when and if compliance changes. Basically, the computer is doing the changes instead of the operator.

High Frequency Oscillatory Ventilation is an "extreme" form of ventilation for lack of a better word used when adequate oxygenation cannot be achieved with more standard modes. More commonly used in infants and children, it delivers very low tidal volume breaths (as low as one or two milliliters) at a very rapid rate. Both inspiration and expiration could be active processes by "sucking" the volume out during the expiratory phase. The respiratory rate is

measured in hertz which is 60 cycles/minute and commonly 10-15 hertz or more are used. Rates well over 1000 may be needed. The mean airway pressure remains relatively constant, but lower than usually required with standard methods to maintain oxygenation. The low tidal volume and mean airway pressures, in theory, reduce the risk of lung trauma as described below, but ventilation occurs due to the high minute ventilation.

The modes of ventilation are how the ventilator assists the patient in the act of breathing; what is controlled, what is variable, and preset limits to both the controlled and variable components.

LUNG PROTECTIVE VENTILATION

When mechanically ventilating a patient, a commonly used clinical strategy is “Lung Protective Ventilation”. It is designed to reduce barotrauma or volume trauma, therefore, reducing the risk of ARDS or acute lung injury or to reduce mortality in patients with ARDS. The lung protective strategy employs low tidal volumes and high respiratory rates to achieve the desired PaCO₂. PEEP is used to avoid atelectasis and hypoxemia. Commonly, the initial settings are a tidal volume of 6 ml/kg based on ideal body weight, a respiratory rate of 12-14 breaths/minute, an FiO₂ of 100%, and a peep starting at 5 cmH₂O. If PaCO₂ is high, the respiratory rate is increased, and the peep is increased if the patient is hypoxemic. The tidal volume may be lowered even further if the peak inspiratory pressure is felt to be too high.

NON-INVASIVE POSITIVE PRESSURE VENTILATION: BIPAP (BILEVEL POSITIVE AIRWAY PRESSURE) AND CPAP

These techniques do not use an endotracheal tube. Instead, a tight fitting mask is utilized. CPAP provides constant airway pressure throughout the breathing or respiratory cycle improving oxygenation. Usually, the pressure setting starts at about 5 cmH₂O but can go to 20 cmH₂O or more. Since this is non-invasive or without an endotracheal tube, the higher the pressure, the more likely you will insufflate the stomach leading to vomiting and possible aspiration. BiPAP is commonly used for patients that have hypercapnic respiratory failure or a combination of hypercapnia and hypoxia. There are two positive airway pressures: inspiratory positive airway pressure (IPAP) and expiratory positive airway pressure (EPAP). When the machine senses an inspiration, it provides the IPAP which is commonly 5 cmH₂O to 20 or 30 cmH₂O. The EPAP is like CPAP which will help support the airway during expiration. It can be set at zero if the patient does not have hypoxemia. It cannot be set as high as the IPAP though since the difference in pressures provides the tidal volume. The bigger the difference in pressures, the larger the tidal volume the patient will receive and the better the CO₂ clearance.


MONITORING DURING MECHANICAL VENTILATION

Arterial blood gases (ABGs) are the gold standard for monitoring the effectiveness of positive pressure ventilation. The ABG provides the level of oxygenation as well as ventilation since arterial PaO₂, PaCO₂, oxygen saturation, and pH are provided. Pulse oximetry and ETCO₂ (end tidal CO₂) can be used as surrogates however the ETCO₂ should be occasionally “calibrated” with an ABG since changes in the amount of pathologic dead space (ventilated but not perfused areas) will create a larger difference between the two parameters. Patient comfort and level of consciousness are also important parameters to follow especially when attempting to wean from the ventilator.

EXTUBATION CRITERIA

There are many extubation criteria, but here are a few commonly utilized. One is the **Rapid Shallow Breathing Index (RSBI)** which is the tidal volume generated over respiratory rate when spontaneously breathing on a T-piece or with CPAP at 5 cmH₂O or less or pressure support of 5 cmH₂O (TV/freq). The lower the RSBI, the better. Less than 60 is ideal. The level of secretions generated should be relatively minimal because clearing secretions can be a big problem after extubation. The patients should be hemodynamically stable, and any arrhythmias should be controlled. The patients should be able to follow commands. Mental status is vital for airway protection. Lastly, the underlying reason that they needed mechanical ventilation should be improved or resolved. Negative inspiratory force of greater than -20 cmH₂O, and an arterial oxygen saturation that is above 90% and stable with an FiO₂ below 50% are also commonly used.

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Education

CONTINUING EDUCATION UPDATE



Hey ASATT,

Just wanted to take a minute to introduce myself as your Continuing Education Director. You may remember me as the Region 4 Director which is now in the ever-capable hands of Samantha Groshek. The continuing Education Committee is excited to be working on a few

things that will hopefully help with your obtaining of CE's as well as your recertification. Excited to see the Practical Experience Pathway posted. Great opportunity for people to

get their certification. Feel free to reach out if you have any questions or interests in that program. We have quarterly webinars set so look at the upcoming events on the ASATT website for dates. New sensor articles and quizzes will be out with this Spring Sensor. Writing an article for the Sensor is also a good way to get some CE's. We can never have too many articles. Don't wait for the last minute to get your CEs completed for your re-certification. Looking forward to be working with all of you to keep this organization growing in the right direction!

Mike Kosanke

Continuing Education Director 

Sugammadex: a game-changer for reversing neuromuscular blockade



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Sugammadex is a relatively new medication used in anesthesiology, particularly in reversing neuromuscular blockade induced by neuromuscular blocking agents (Thilen et al., 2023). Neuromuscular blocking agents (NMBAs) are drugs that inhibit muscle contraction and are used to facilitate intubation and decrease patient movement during surgical procedures. Although effective in facilitating surgery, NMBAs also paralyze the diaphragm and other respiratory muscles, increasing the risk of respiratory complications postoperatively (Beltran et al., 2022). Sugammadex was developed as a novel, selective, and reversible antagonist for NMBAs to help overcome these challenges.

Sugammadex was developed to address some limitations of traditional reversal agents such as neostigmine, including

delayed onset, unpredictable response, and muscarinic side effects (Chen et al., 2022). Sugammadex was approved by the United States Food and Drug Administration (FDA) in December 2015 to reverse NMB in adult patients. Since then, it has been approved for use in pediatric patients aged two years and older (Thilen et al., 2023).

Sugammadex selectively targets and encapsulates NMBA, specifically rocuronium and vecuronium, with high affinity and rapid action (Irani et al., 2022). This encapsulation is facilitated by a cyclodextrin molecule within sugammadex's structure, which creates a cavity that can trap the NMBA molecule. Once the NMBA molecule is encapsulated, it can no longer bind to the receptors at the neuromuscular junction, which leads to the restoration of neuromuscular function. Sugammadex is administered intravenously, usually at the end of a surgical procedure, with the dose determined based on the level of neuromuscular blockade and the desired speed of reversal (Duranteau et al., 2021).

Interestingly, the structure of sugammadex shares similarities with the titular air freshener, Febreze®. Both sugammadex and Febreze® contain cyclodextrin components which help to encapsulate specific molecules. However, whereas sugammadex encapsulates NMBA molecules, Febreze® captures odor molecules by trapping them within the cyclodextrin cavity. This suggests that cyclodextrins may have various applications beyond the field of anesthesia, and this area of research could lead to the development of new treatments for various diseases and conditions (Beltran et al., 2022; Chen et al., 2022; Irani et al., 2022).

Sugammadex is contraindicated in patients with known hypersensitivity or allergy to sugammadex or any of its components (Thilen et al., 2023). Sugammadex is not recommended in patients with renal impairment, as the kidneys primarily eliminate it. In patients with severe renal dysfunction (creatinine clearance less than 30 mL/min), sugammadex may not effectively reverse NMB (Thilen et al., 2023).

Compared to neostigmine, using sugammadex for NMB

reversal is associated with a lower incidence of muscarinic side effects (Beltran et al., 2022; Li et al., 2021; Ruetzler et al., 2022; Suleiman et al., 2022). Neostigmine administration can solicit unwanted muscarinic side effects which are mediated by the activation of muscarinic receptors in various organs and tissues. These side effects include bradycardia, hypotension, bronchospasm, salivation, lacrimation, sweating, defecation, and urinary incontinence (Carvalho et al., 2020; Lee & Jung, 2020; Thilen et al., 2023). Glycopyrrolate (or, less frequently, atropine) is co-administered with neostigmine to minimize these muscarinic side effects. Therefore, the choice of reversal agent should be based on the individual patient's characteristics and the clinical situation (Blobner et al., 2022; Duranteau et al., 2021; Hirsch et al., 2022).

Sugammadex is generally well-tolerated, with few reported adverse effects. The most common side effects include nausea, vomiting, and headache. These side effects are usually mild and self-limiting, resolving within a few hours. However, more severe side effects have been reported, including anaphylaxis, bronchospasm, hypotension, and bradycardia (Goodman et al., 2022; Teng et al., 2021; Trivedi

et al., 2021). Anaphylaxis is a rare but potentially life-threatening reaction that can occur within minutes of administration. Therefore, the dosing of sugammadex should be carefully considered in patients with preoperative risk factors for sugammadex-induced anaphylaxis (Kotake et al., 2022). Furthermore, bronchospasm can develop in patients with a history of asthma or chronic obstructive pulmonary disease (COPD), and hypotension

and bradycardia can occur in patients with pre-existing cardiovascular disease (Teng et al., 2021; Trivedi et al., 2021).

A prospective observational study conducted by Devoy, Hunter, and Smith (2022) raised concerns about using sugammadex with concurrent oral contraceptive use. The study found that sugammadex administration decreased the levels of estrogen and progesterone hormones in women who take hormonal contraception. The authors suggest that this could lead to contraceptive failure and

Sugammadex selectively targets and encapsulates NMBA, specifically rocuronium and vecuronium, with high affinity and rapid action.

(Irani et al., 2022)

unintended pregnancy; thus, caution should be exercised when administering sugammadex to women of reproductive age who use or could be using hormonal contraception. Additionally, Hirsch, Chia, and Jahr (2022) recommend that healthcare providers discuss sugammadex administration's potential risks and benefits with their patients, especially women of childbearing age who use oral contraceptives, to facilitate informed decision-making. Limited research is available on the safety and efficacy of sugammadex use during pregnancy. However, a case series study of pregnant women who received sugammadex during surgery reported favorable maternal and fetal outcomes (Singh et al., 2021).

In recent years, qualitative neuromonitoring (QNM) has gained attention as a complementary technique for monitoring NMB during anesthesia, especially in patients with neuromuscular disease or those undergoing surgery with a high risk of postoperative respiratory complications (Naguib et al., 2017). Postoperative complications resulting from residual paralysis include muscle weakness, pulmonary complications, and increased healthcare utilization (Dubois et al., 2023; Li et al., 2021; Suleiman et al., 2022). These complications may be influenced by choice of neuromuscular blockade reversal agents, such as sugammadex or neostigmine, and their administration practices (Bash et al., 2021; Beltran et al., 2022; Ruetzler et al., 2022).

QNM measures the transmission of nerve impulses at the neuromuscular junction and objectively measures the degree of muscle relaxation. QNM is used to ensure that the level of muscle relaxation is appropriate for the surgical procedure and can be measured through various methods, such as electromyography, acceleromyography, or kinemyography. These techniques use sensors and electrodes to measure muscle activity, response, and contraction. QNM allows for precise titration of NMBAs and their reversal agents, which can prevent postoperative residual paralysis and associated complications (Blobner et al., 2022). The use of QNM is beneficial in various clinical settings, including outpatient surgery, pediatric surgery, and colorectal surgery (Bash et al., 2021; Beltran et al., 2022; Chen et al., 2022).

Postoperative complications resulting from residual paralysis include muscle weakness, pulmonary complications, and increased healthcare utilization.

(Dubois et al., 2023; Li et al., 2021; Suleiman et al., 2022)

According to the 2023 American Society of Anesthesiologists Practice Guidelines for Monitoring and Antagonism of Neuromuscular Blockade, sugammadex dosing is based on the patient's weight, depth of NMB and dose of NMB used (Thilen et al., 2023). For adults, the recommended dose of sugammadex is 2 mg/kg for moderate NMB (train-of-four [TOF] ratio 0.1-0.4) and 4 mg/kg for deep NMB (TOF ratio < 0.1) induced by rocuronium or vecuronium (Dubois et al., 2023). A randomized placebo-controlled trial by Duranteau et al. (2021) found that earlier and lower dose administration of sugammadex was safe and effective in reversing moderate NMB.

According to Lentz et al. (2021), sugammadex can be used in a difficult airway situation by rapidly reversing NMB, which can help to restore airway patency, potentially avoiding the need for more invasive interventions. In such situations, a bolus dose of sugammadex 16 mg/kg can be administered to reverse NMB immediately (Lentz et al., 2021). Many institutions have included and stocked sugammadex in their difficult

airway emergency carts for this reason.

The relative cost of sugammadex is significantly higher than that of neostigmine (Beltran et al., 2022). A systematic review and meta-analysis of studies on the use of sugammadex in colorectal surgery found that the cost of sugammadex was significantly higher than that of neostigmine and that the increased cost may limit its use in some settings (Chen et al., 2022). However, other studies have suggested that using sugammadex may be cost-effective in certain situations, such as when it reduces the incidence of postoperative pulmonary complications (Li et al., 2021). It is essential to weigh the clinical benefits of sugammadex against its financial impact, taking into account patient-specific factors and institutional resources, to optimize patient outcomes and healthcare expenditure. Further research is needed to determine its cost-effectiveness across different clinical settings.

In conclusion, sugammadex represents a valuable addition to anesthesiology, and its unique properties hold promise for future research in other areas of medicine. However, careful

consideration of dosing, contraindications, and potential side effects is necessary for safe and effective administration. The use of QNM can further optimize the administration of sugammadex. While the cost of sugammadex remains a consideration, its benefits in certain situations may outweigh the increased expense. As anesthesia continues to evolve, sugammadex administration should be guided by individual patient characteristics and clinical circumstances to ensure optimal outcomes.

The author declares that she has no competing interests, financial or otherwise, and that no commercial or industrial affiliations influenced the preparation or presentation of this manuscript.

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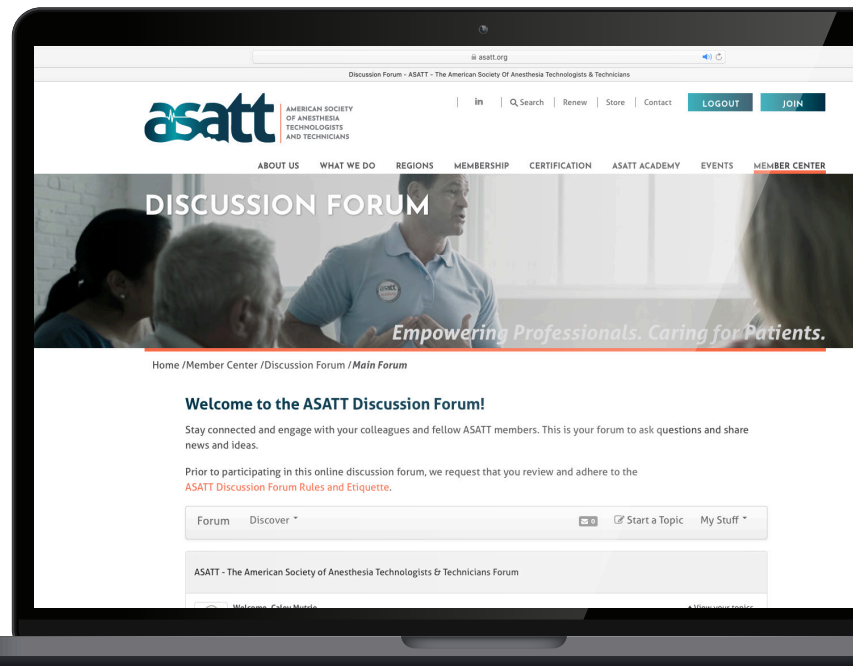
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Share. Inquire. Learn.

ASATT's online Discussion Forum is available for members to connect and share!

ASATT has an online Discussion Forum that members can support each other through the sharing of vital resources, knowledge and experiences, and to seek answers to questions and concerns.

Join the Conversation!



Notes

REGIONAL UPDATE

REGION 1




Happy Spring, the flowers will be blooming soon, even though we still have snow in the forecast. I keep thinking it is only a couple weeks away from new life in all the greenery. I hope you all take some time to enjoy the amazingly fresh smells of spring in the air. Happy Anesthesia Tech Week!!

We all deserve a pat on the back if not more than that. It is our week to shine bright, we are the stars of the OR's or whatever setting you work in. It is right around the corner so put on your biggest smiles and be brightest star in your work setting. For those of you that do celebrate, please send any pictures that are taken to me or even just a shout out to whomever else helps you celebrate.

ASATT has a lot of great things to report. First is the Q1 Webinar that will be happening on Saturday March 27th, Region 6 Director (Otoniel Castillo) are going to be the hosts. I have two speakers lined up, the first one is John Mcnemar, CRNA, DNAP his lecture is going to be on NORA, the second one is Jennifer G. Keller, MD, her lecture is going to be on "Ten things I wished I known (about Anesthesia and the practice of the Anesthesia Techs)." Region 6 is providing 2 Speakers who are Otoniel Castillo and Sara Paraspolo. I hope as many of you can attend will do so, it is an inexpensive way to earn some CEU's. You will have the opportunity to earn up to 4 CEU's. Hope to see you on the roster for the meeting.

Watch for the registration for the national meeting for this year. We will be having so much fun. Cannot wait to see you all. Stay safe and healthy, wear your masks by setting an example of what is best for all of us.

Respectfully Submitted and Happy Spring,
Jonnalee Geddis, Cer.A.T. 

REGION 2



Hello members,
I hope this finds everyone safe and healthy, with spring well on its way I'm ready for warmer weather! I'm ready to start planning some family vacations and I hope you can also get some family time in with making wonderful memories with your family and friends.

Be on the lookout for our **Quarterly Webinar Conferences!** We will be having 4 webinar Conferences with the first one being March 25, 2023 with region 1 & 6 then the second one will be June 24th with region 2 & 4 the third one will be September 9th and the last one will be December 16th. Watch the ASATT website for more details coming shortly. Remember you can earn up to 4 CE's for attending.

If you have any questions or concerns please feel free to reach out to me at region2director@asattoffice.onmicrosoft.com.

Don't forget about **Anesthesia tech** week it will run from **March 26 through April 1, 2023**. Please send me your stories and pictures so I can get them posted or you can go to our Instagram page and post them and also get update's/information about what's going on in the ASATT. The Instagram page is at: www.instagram.com/ASATT_OFFICIAL.

Remember being a member has many benefits and discounts. You can get access to the sensor, ASATT updates and discounts to Educational, Regional conferences and many more valuable benefits. So make sure you check out membership page at ASATT to see the different tiers that are offered we even have a student membership.

Don't forget to check the quarterly sensor publication, remember you can earn CE's from the quizzes. It's one of many perks for being a ASATT member.

REGION 2 *continued*

Remember to visit our ASATT website it has very useful information and updates about our zoom meetings and articles on healthcare news. It also has a discussion panel where you can ask questions and share your ideas.

This year up for re-election for regional directors will be 1,3 and 5, let's think about getting more involved as a member. One of the biggest things I always hear when talking to members is how you can be more involved well voting is a great way to get started, Other great ways you can be more involved is join a committees and help better our profession.

Save the Date: Our National Conference will now be held in **Pasadena!!**

It will be held in mid October, more updates will post shortly on the ASATT website. I hope you can join us and I look forward to seeing everyone in person.

Please everyone stay **Safe** and **Healthy!**

Karen Patrick, Cer.A.T. 

REGION 3




Region 3 is working on hosting a conference in Georgia date: TBA. I am thinking around August.

I have made some progress with establishing a Georgia Society of Anesthesia Technologist. Please let me know if you are in Georgia and want to be join or interested in learning more.

Bryan and I are working with a community college in Atlanta metro area to get a program for Anesthesia Technology. I am so excited to help bring this to Atlanta. I will keep you all updated once we hit a few milestones.

Region 3 needs your help. I know some you received my introductory email about awareness, however I wanted to make sure I reached everyone. So, To bring awareness about ASATT, I am asking that each member email me their leaders contact information. This will allow me contact each leader to educate them about our society, scope of practice, etc. Also let me know your ideas. Please email me at region3director@asattoffice.mircosoft.com. I look forward to hearing from you.

Respectfully yours,

Phillip Hood, Jr., Cer.A.T. 



Hi All,

I'm new to the ASATT Board of Directors as Director of Region 4 this year and I'm excited to learn as I go and connect with all of you working in the profession not only in our region but across the country.

I want to open myself to emails from any of you with questions, comments, or concerns. My hope is to support members and the profession while growing recognition of our certification from health systems and other anesthesia professional organizing bodies.

To introduce myself, my husband and I have three children. We love to be outdoors! Being from central Wisconsin, I'm quite ready for spring and summer and am really looking forward to gardening, fishing, and camping! I'm currently working on getting my private pilot license... you know... in all my free time.

I am going to bullet point some important events-

- First, the big one! The ASATT National Education Conference *Re:Evolution* from October 19-21, 2023, in Pasadena, California. This is a great opportunity for networking and gaining CEUs. There will be flexible tracks and customizable educational experiences so you can get the most out of the conference. Stay tuned for more information and registration for this event.

- March 25th will be the first quarter webinar hosted by directors of Region 1 and Region 6. These webinars are a convenient, fun, and inexpensive way to gain continuing ed. Check it out. Registration is open.
- June 24th- webinar hosted by region 2 and 4 directors. That's me! Participation is required. Just kidding, but I'd love to see you there.
- December 16th- webinar hosted by region 7 director

If you haven't heard yet, the Practical Experience Pathway went live on February 1, 2023. I will link the guidelines here.

https://www.asatt.org/images/23_ASATT_Pathways_Brochure.pdf

If you are hoping to gain certification but are unable to attend a program, with the appropriate work history and education requirements, this is the pathway for you.

Currently, the board is looking for certified members to volunteer as part of a task force to potentially revise our Scope of Practice. This topic is very important to me as one of the things I hear most often is regarding the differences in practice from facility to facility. I'm hoping this will help garner clear guidelines and respect for our knowledge and clinical skill set.

Happy Anesthesia Tech Month!

Sincerely,


Samantha Groshek, Cer. A.T.T. 



Hello from region 5, Hope everyone is getting ready for more virtual meetings this year. So far we have them planned on March 25, June 24, and December 16. Also on top of that ASATT is getting together to setup another meeting, details are still to come for location

and when. Keep checking back. That was a fun meeting last year at The Kalahari Resort in Round Rock, very good presentations, and absolutely amazing place to hang out

for the day. The national meeting this year is in Pasadena, California from October 17th through the 21st. Start getting that vacation time ready and we will send out more information about this conference soon as well. REMEMBER tech week is March 26th to April 1st. Before anyone tells you how good y'all are let me be the first to say thank you for everything you do for this profession and keeping the standards high. I always tell my techs do the best they can and show people what we can do together will always help more people recognize how needed and useful we are.

Jason Menchey, Cer.A.T. 

REGION 6



Hello ASATT Region 6 members,
I hope you have staying warm and dry. Weather wise, it has been an interesting winter in the western part of the country. Nonetheless, I bid you all warm tidings.

We are ramping up the conferences for this year with our first webinar on Saturday, March 25th. Please register at your earliest convenience. We plan to have some interesting and informative lectures on that day.

Also, HAPPY ANESTHESIA TECH WEEK/DAY!!!! Let your manager know that your professional society celebrates the week of March 27-31. The day of course is the last Friday of every March, this year it fall on March 31st. There have some question from individuals about the new Practical Experience Pathway. Please refer to the link on the [ASATT web page](#)

There is plenty information on the new Pathway there. However, if you have more questions do not hesitate to call headquarter for more information.

“Success is no accident. It is hard work, perseverance, learning, studying, sacrifice and most of all, love of what you are doing or learning to do.”

~ Pele ~

(one of the best Soccer players of all time)

“The level of our success is limited only by our imagination and no act of kindness, however small, is ever wasted.”

~ Aesop ~

(an ancient Greek fabulist and storyteller)

I look forward to seeing many of you on March 25th.

Be well.

Otoniel Castillo, BA, Cer.A.T. 

REGION 7



Howzit Everyone!!!

Spring is in the air...It's my favorite season of the year because it's the beginning of Major League Baseball, baseball season. I spent so much of my life around baseball, having played or coached for over 50

years. One of the points that I tried to instill in the players that I coached, "give back to a community when you're older". Coach the youth in a community of your choice and both of my sons are now coaching baseball, one in Seattle and the other in Los Angeles. That makes me a proud Daddy...

Unfortunately, many of you are still experiencing severe winter weather. Please try keep yourselves safe, warm, and dry. The weather has been really different, that's for sure. We just visited southern California and we have visited many times and experienced cold weather, but the rain was unbelievable. We were there for 10 days and it rained on six of them. I wish better weather for everyone from here on out.

“Where you go, no matter the weather, Always bring your own sunshine.”

~Anthony J. D'Angelo ~

The 2023 ASATT Annual Educational Meeting will be held on October 19th -21st, at the Pasadena Hilton in Pasadena, CA. This will be the second time that the meeting will be held at this venue. It's a great place to have the meeting that's walking distance to many places to dine and establishments to have cold drinks at the end of the day. Please start making plans to attend the meeting. It will be ASATT's second live meeting post pandemic. President Bryan Fulton is working hard to coordinate a great meeting for continuing education. Because of family priorities I could not attend the Annual Meeting in Fort Worth, Texas last year. So, I'm really looking for seeing old friends/peers that I haven't seen since the meeting in Orlando. But, I'm also looking forward to meeting new peers and making new friends. As I have said before education is a critical aspect of everyone providing patient care. It's the reason we can improve our patient care skills. Last, I look forward to sitting with and communicating with our board of directors instead of on our computer skills and iPads.

Region 7 Report continued on next page

“Teamwork – The combined action and effort of a group to achieve a common goal in an effective and efficient way.”

~ Unknown ~

2023 is the election year for the Region 7 Director. If you or anyone you know is interested in becoming the Regional Director please visit the website for further information of email me with you questions and concerns. Before you nominate someone, please contact the person to verify that he or she is interested in being nominated for the position. But, the first qualification of this person MUST be a member of ASATT in good standing.

We’re still looking at the possibility of coordinating a live meeting in Region 7. Please email or contact me if you would be willing to support a live meeting in the region.

This is repeated message because we may have a competing society. ASATT is the society that will help our profession grow and move forward into the future. I know ASATT’s plan WILL NOT make everyone happy, but you must look at the overall direction that our profession is headed. Many of you have not been around as long as I have... I remember the


days before we even had the National Certification and we had nothing. This has been a long hard journey to get to where we are now, there are no short cuts. Things haven’t always been smooth sailing and we are still headed through rough seas ahead. There is no easy way to get to where we want to go. There will be some extremely hard decisions to be made and they are making these decisions with careful consideration to improve our profession. There’s only a small percentage of our peers that have been in this profession >30 years like I have. As I have said before... We are laying the foundation for future generations of Anesthesia Technicians & Technologist and we MUST continue to grow and build this .

“The strength of the team is each member. The strength of each member is the team.”

~ Phil Jackson ~

PLEASE BE SAFE AND PROTECT YOURSELVES, and TAKE CARE...

Aloha,

Delbert Macanas, Sr., Cer.A.T.T. 

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Edwards

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