Message from the President

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Congestive heart failure is one of the most frequent causes for hospital admission world-wide and not uncommonly seen as a complication of patients undergoing surgical procedures and receiving anesthesia. Sleep-disordered breathing is also noted to often accompany CHF with reportedly around 2/3 of CHF patients having an even split between either predominantly central or obstructive sleep apnea (OSA) conditions. Patients with central sleep apnea (CSA) were thought to benefit from CPAP therapy and a randomized controlled trial (RCT) known as CANPAP emerged hoping to prove benefit in reducing mortality or time to transplantation in patients with symptomatic CHF and reduced ejection fractions (EF) near 30%.\(^1\) Although patients had improved mean oxygen saturation and a reduction in their central apnea index (CAI) from near 40/hr to around 20/hr, CPAP did not show the expected beneficial outcome difference. Many felt that the residual CAI on CPAP was still too high and merely affirmed the sub-optimal choice of CPAP for these CHF patients.

Adaptive servo-ventilation was an alternative mode of PAP therapy thought to be more appropriate for patients with CSA as the flow delivery is more responsive on a breath to breath basis to the periodicity seen most notably in the CSA periodic breathing termed Cheyne - Stokes Respiration (CSR). This monotonous crescendo-decrescendo pattern would be expected to have better support from a device that is just as robust in its ability to reduce airflow delivery during the hyperpneic phase as it is during an apneic or hypopneic phase when airflow delivery should be increased. This is the basic design of the present day ASV devices that use different algorithms to accomplish the same net result depending on the specific manufacturer.

It was only a matter of time to expect that industry would design and proceed with another RCT hoping to prove the superiority of ASV therapy in symptomatic CHF patients with reduced EF with a primary goal of reducing mortality, hence

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Greetings from the newsletter editor’s office! Fall has passed and along with the change in colors that fill our hearts with joy, it is also time to welcome our dear friend, Dr. Peter C. Gay, as President of SASM for the next term. Congratulations Peter! This coming year promises to bring the best of SASM to the fore, through the imminent publication of the consensus guidelines for management of OSA patients and a continuation of the consolidation of research efforts across some of the larger groups currently involved in groundbreaking clinical research in perioperative sleep disordered breathing.

As Dr. Anthony Doufas takes over the role of Research Chair, we anticipate that this level of collaboration and openness will develop into seminal studies that will serve the society and larger population well. Anthony, welcome and congratulations! The 2015 SASM meeting that just concluded in San Diego put the best clinical and research talent on full display. The program chairs are to be commended for a fantastic job well done!

This year, several research abstracts were presented at the meeting. Three clinical and three pre-clinical abstracts were awarded prizes. Dr. Pu Liao et al from the University of Toronto were selected for the first place award for their study on postoperative oxygen therapy in patients with OSA. They report that postoperative oxygen therapy improved oxygen saturation, decreased central apnea index and hypopnea index without increasing the duration of the apnea events. Anne Stayhr-Rye et al described the relationship between high-inspired oxygen fractions intraoperatively and the occurrence of major postoperative respiratory complications using a retrospective database analysis approach. Median intra-operative FiO2 was associated with increased risk of major respiratory complications in a dose-dependent fashion. The findings are provocative and suggest the need to evaluate inspired oxygen concentration as an independent risk factor in future studies. Eric Deflandre et al report the improved accuracy of their newly developed morphological score for OSA when compared to three previously published OSA prediction scores. Shinichi Nakamura et al have been selected for first place award in pre-clinical science. Their abstract describes how dexmedetomidine retains respiratory carotid reflex and induces balanced inhibition in hypoglossal and phrenic nerve activity in rabbits. Pedro Gambus et al report the age-related variability of EEG alpha activity in response to propofol and remifentanil sedation. Finally Rohan Gopinath et al from the University of Michigan report the novel use of heart-rate variability to phenotype patients who develop early postoperative respiratory complications. These studies adequately capture the rich content of research being performed across the various members of the SASM.

The near future holds terrific promise for large strides in our Society’s activities, as research from our esteemed membership is poised for major discovery and innovation. Stay tuned!
the resultant SERVE-HF clinical trial sponsored by ResMed. After reaching the goal of 1325 patients with half receiving ASV treatment and optimal treatment of CHF vs controls with optimal CHF management alone, the results were ready to be analyzed in late Spring of this year. An astonishing result was revealed in a blast announcement to patients and caregivers that not only did the ASV not provide the expected benefit but it appeared to cause harm with an actual increase in cardiovascular mortality. For the chosen CHF inclusion criteria study population in the trial, this amounted to a 25% increased annual risk of cardiovascular death (primarily sudden death and not generally while on treatment) with 10% mortality in the ASV group compared to 7.5% in the control group. There was of course, some speculation that the data was wrong or confounded in some way by other unknown and unbalanced conditions in the ASV group but no explanation was immediately apparent and the sponsor felt obligated to reveal the data and recommend that similar clinical patients now being treated with ASV be contacted with the intent of discontinuing therapy. Another RCT being conducted in CHF patients by Respironics was temporarily halted and the data reviewed for a similar signal but none was found and the trial was resumed. These patients had a much higher proportion of complex sleep apnea rather than largely CSA as in the ResMed trial but a subsequent blast e-mail from Respironics also resulted in the urging that patients meeting criteria for the ResMed trial be contacted and consider discontinuing ASV therapy with the Respironics device as well. Other possible explanations of these findings include imbalances in randomization, hemodynamic effects of positive pressure, potential benefits of CSA, or pro-arrhythmogenic effects through metabolic/electrolyte abnormalities. The results of the SERVE-HF trial and an accompanying editorial were just published and no new definitive explanation for this surprising and unfavorable discovery was presented.

Current recommendations vary but the general feeling is that the CHF patients with CSR/CSA and significantly reduced EF proven by recent echocardiogram should not be started on ASV. If need be, patients should undergo repeat polysomnography and be assessed for whatever component of OSA might be present and if the patients have Complex sleep apnea (predominant CSA emerging only as a consequence of CPAP exposure with baseline predominant OSA) either ASV or CPAP could be considered. If predominantly CSA and they have not previously failed CPAP therapy, then the ASV should not be offered for now and CPAP therapy may be explored. The only other option is to consider oxygen therapy but this may be limited by present reimbursement restrictions.

Hospitalized CHF patients should have all attention placed on optimizing the CHF condition and ASV would not be considered during an episode of acute CHF with reduced EF. Sleep specialists might be consulted for assessment of the patient after discharge with the plan of following the recommendations above. The landscape will continue to evolve as a better understanding of the optimal treatment of CHF patients becomes clearer with future research.

References


7 Martin R. Cowie, M.D., Holger Woehrle, M.D., Karl Wegscheider, Ph.D., Christiane Angermann, M.D., Marie-Pia d’Ortho, M.D., Ph.D., Erland Erdmann, M.D., Patrick Levy, M.D., Ph.D., Anita K. Simonds, M.D., Virend K. Somers, M.D., Ph.D., Faiez Zannad, M.D., Ph.D., and Helmut Teschner, M.D. Adaptive Servo-Ventilation for Central Sleep Apnea in Systolic Heart Failure. September 1, 2015, at NEJM.org. DOI: 10.1056/NEJMoia1506459
A year ago I attended my first SASM meeting in New Orleans and was smiling as I sauntered down the Vieux Carré streets… it wasn’t the jazz music on every corner or the sugar rush from the deep fried, warm beignets with an avalanche of icing sugar on top but rather the impressive SASM meeting I had just attended.

Many factors went into the enjoyment of my inaugural SASM meeting experience not excluding the excellent cocktails at the Hotel Monteleone where it was hosted. More important elements of course were the high quality of talks, a vibrant society with a big vision, and a friendly, intimate energy emanating from society members. As well as meeting new faces and making new contacts, the level of mentorship was inspiring. My first encounter with the enterprising and then SASM President, Frances Chung, or rather the SASM energy warp core was to say the least invigorating. After discussing my interest in sleep disordered breathing (SDB) in the obstetric population, I found myself, with Frances’s unerring support, carrying the aSASM baton to develop the obstetric special interest group. Standing at the group helm, I am cognizant that the SASM obstetric special interest group could not, would not have flourished without the motivation and proactive enthusiasm of all members who share a common interest in researching and educating other medical providers about SDB in the obstetric population. Our group hails from different medical professions i.e. anesthesiology, sleep medicine, pulmonology, critical care and obstetrics and gynecology as well as different countries US, UK, and Canada. The rich heterogeneity of the group is its strength, our mission is to educate and above all collaborate. Collaboration and discussion are highly encouraged among group members and among the group as a whole at our hourly, bimonthly teleconference. My vision for the group was to develop a nurturing and supportive environment with recognition of intellectual property and minimization of artistic differences, a goal that has been reached. For our group to succeed and provide evidence-based care to the growing number of OSA obstetric patients it really does take an inter-professional, forward looking, international village.

Symptomology and associated co-morbidities of pregnant women with suspected OSA cannot be underestimated. O’Brien et al (3) not only showed that habitual maternal snoring, a marker for SDB, is a risk factor for adverse delivery outcomes including cesarean delivery and small for gestational age but also showed that pregnant women with hypertension and who snored are at high risk for unrecognized OSA (4). Another powerhouse in the group, Bourjeilly, and her colleagues have researched many aspects of SDB in pregnancy that range from...
epidemiological associations and outcomes between SDB and pregnancy, showing us that symptoms of SDB in pregnancy are indeed common and associated with a higher likelihood of hypertensive disorders, gestational diabetes and unplanned Cesarean delivery (5); to investigation of underlying mechanisms behind these associations (6) i.e. that circulating placenta-secreted glycoproteins and markers of angiogenesis are in altered in pregnant women with OSA.

A recent group newcomer further adds to the growing evidence that OSA in pregnancy cannot be ignored. Lewis et al (7) reviewed over 55 million pregnancy related inpatient discharges from 1998 to 2009. OSA was shown for the first time to be associated with not only severe maternal morbidity and cardiovascular morbidity but also in-hospital death. Earlier work also indicated that pregnancies complicated by OSA are at increased risk for preeclampsia, medical complications and pre-term birth (8).

Above is only a taste of the current academic achievements being attained by very accomplished individuals within our group. The breadth of talent and prodigious efforts being made to research different aspects of SDB in pregnancy while also juggling clinical and other commitments are staggering. However there is still more work to do, more questions that needs to be answered and more leads to follow and if you share our interest and vision, more people to recruit.

So one year later... the group continues to grow, educate and collaborate. We have been upgraded from a special interest group to a sub-committee and excitedly we have been given an opportunity to present a session on SDB in the obstetric population at the next SASM meeting which is going to be held in the great city of Chicago... no mean feat for a group that was conceived under the influence of jazz music and a warm beignet... with an avalanche of icing sugar on top. Laissez les bons temps roulez and bring on the deep-dish pizza!

References

The Society of Anesthesia and Sleep Medicine’s 5th annual meeting was held in sunny San Diego on October 22-23, 2015. The theme of this year’s meeting was “Practical Magic: optimizing resources for best outcomes”. True to the theme, the scientific program featured a mix of practical and timely topics pertinent to clinical problems common to anesthesiologists; sleep medicine specialists and other health care professionals and scientists caring for patients with sleep disordered breathing.

The program began on October 22, 2015 with informative presentations on ‘Sleep issues in hospitalized patients’. This session, which was moderated by Peter Gay, MD, emphasized the impact of sleep disturbances on outcomes of hospitalized patients in various settings including critical care, medical, and surgical wards. In keeping with this year’s theme, the ‘Rapid Fire Technology’ session provided an update of current therapy and monitoring modalities for optimal management of patients with sleep disordered breathing.

The second day of the meeting began with several Keynote speakers including Mervyn Maze, MB, ChB, who presented ‘Why focus on Sleep Hygiene in the perioperative and Critical care settings?’ The effect of sleep disruption on cognitive function and immune function were discussed. The second Keynote speaker, Clete Kushida, MD, PhD, presented ‘Sleep evaluation in newly discovered OSA in & after hospital’. His experience at Stanford University with out-of-center sleep tests was discussed. Several special topics relating to sleep disordered breathing and postoperative outcomes were presented including the SASM Consensus Statement on preoperative screening for obstructive sleep apnea. The methodology and design involved in the development of this much needed consensus statement were outlined by Frances Chung, MBBS and Satya Krishna Ramachandran, MD.

In addition to the outstanding scientific program, many interesting research abstracts were presented. The Research Abstract Awards were presented to the top 3 Pre-Clinical Research Awards, and the top 3 Clinical Research Awards. The best Pre-Clinical Research Award was awarded to Shinichi Nakamura, MD for his abstract “Different from other sedatives, dexmedetomidine retains respiratory carotid reflex and induces balanced inhibition in hypoglossal and phrenic nerve activity in rabbits”. The first place award for the best Clinical Research Award went to Pu Liao, MD for his abstract “Postoperative oxygen therapy for patients with obstructive sleep apnea”. The 2015 Annual Meeting Research Grant Winner was Mandeep Singh, MD, MSc for his project: “The contribution of rostral shift of fluid to postoperative worsening of obstructive sleep apnea severity in surgical patients – A prospective cohort study.”

The development and recent establishment of an Obstructive Sleep Apnea Death and Near Miss Registry this year, was presented by Norman Bolden, MD and Karen Posner, PhD. This important initiative represents a partnership between SASM and the Anesthesia Quality Institute. This registry is now open and accepting case reports. Attendees were encouraged to submit reports.

The next SASM annual meeting will be held in Chicago, Illinois on October 20-21, 2016.
Approximately 1 in 8 children undergo tonsillectomy under anesthesia in the United States alone. The most common indication for tonsillectomy used to be infection approximately 30 years ago, presently, 80% of the tonsillectomy is done for obstructive sleep apnea (OSA). OSA represents an extreme spectrum in the continuum of pediatric sleep disordered breathing. This continuum ranges from normal airway, primary snoring, upper airway resistance, obstructive hypopnea, and OSA with increasing upper airway resistance. The prevalence of pediatric OSA is 2%-4% and peaks at the age of 3-6 years, which correlates with adenotonsillar hypertrophy. Pediatric OSA is a growing epidemic and it is more debilitating than adult OSA. Pediatric OSA is associated with neurobehavioral consequences, development of learning disabilities, and higher risk of post-anesthetic deaths than adult OSA.

The first mention of tonsillectomy was in Hindu Medicine about 1000 years B.C. Tonsillectomy is the third most common pediatric surgery performed after ear tubes and circumcision. The guidelines for the management of tonsillectomy patients are described elsewhere. In spite of being one of the oldest and one of the commonest pediatric surgeries performed, postoperative adverse events following tonsillectomy can be devastating. These complications may be related to the severity of underlying OSA. The post tonsillectomy morbidity and mortality are largely preventable if they are detected early in the perioperative period.

The common surgical postoperative complications after tonsillectomy are related to bleeding. The common anesthesia related complications after tonsillectomy are respiratory events, postoperative nausea and vomiting, postoperative pain, opioid toxicity, and dehydration. Tonsillectomy has one of the highest rates of postoperative nausea and vomiting among all pediatric surgeries. Post-tonsillectomy pain is a significant problem and may interfere with drinking and/or eating after surgery, and this in turn can lead to dehydration. In February 2013, the U.S. FDA passed a black box warning for the use of codeine in children after tonsillectomy because of multiple deaths. Codeine undergoes metabolism through cytochrome 2D6 isoenzyme, and a subgroup of patients who are ultra metabolizers convert codeine to the active metabolite morphine rapidly precipitating respiratory depression and death.

Fatal respiratory events following tonsillectomy in children are twice that of adults, and are more common in younger children and in those with comorbid conditions. In a malpractice claim analysis, 242 cases were reviewed from 1984 to 2002.
to 2012. All these surgeries were done in the U.S. There were 98 fatal injury claims and 144 non-fatal injury claims (Table 1). In this analysis, bleeding was the most common malpractice claim and problems related to airway management were the most common anesthesia related claim (Table 2). Although malpractice claims against surgeons were more than anesthesiologists, the dollar amount awarded to families was higher for anesthesia and opioid related claims than for surgical claims (Table 3). OSA was the most common comorbidity in these patients.7

Intraoperatively, the use of intravenous acetaminophen was found to be cost effective in tonsillectomies if the probability of rescue analgesic requirement in post anesthesia care unit is more than 35%.28 However, the cost of intravenous acetaminophen has increased since the publication of this study. Dexamethasone is a standard of care and is recommended by the American Academy of Otolaryngology.18 Routine antibiotics are not indicated. The post tonsillectomy complications, pain management issues, anesthetic management, and future directions are well described.7,19,29

In summary, pediatric tonsillectomy patients are high-risk population who frequently have underlying comorbidities like OSA, craniofacial anomalies, and obesity. A team-based approach with locally developed algorithms will enable safe care of these patients.  

### Table 1: Categories of fatal and non-fatal injury claims

<table>
<thead>
<tr>
<th></th>
<th>Fatal injury claims n (%)</th>
<th>Non-fatal injury claims n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery related</td>
<td>39 (39.8%)</td>
<td>101 (70.1%)</td>
</tr>
<tr>
<td>Anesthesia related</td>
<td>36 (36.7%)</td>
<td>32 (22.2%)</td>
</tr>
<tr>
<td>Opioid related</td>
<td>16 (16.3%)</td>
<td>6 (4.2%)</td>
</tr>
<tr>
<td>Uncategorized</td>
<td>17 (17.4%)</td>
<td>9 (6.3%)</td>
</tr>
</tbody>
</table>

Some claims had overlapping causes between the different categories.


### Table 2: Complications that were associated with malpractice claims

<table>
<thead>
<tr>
<th>Main variable</th>
<th>Factors</th>
<th>Fatal injury claims (n = 98) n (%)</th>
<th>Non-fatal injury claims (n = 144) n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding</td>
<td></td>
<td>23 (23.5)</td>
<td>18 (12.5)</td>
</tr>
<tr>
<td>Burn injury*</td>
<td></td>
<td>0</td>
<td>19 (13.2)</td>
</tr>
<tr>
<td>Surgical</td>
<td>Infection</td>
<td>0</td>
<td>3 (2.1)</td>
</tr>
<tr>
<td>Medication</td>
<td></td>
<td>7 (7.1)</td>
<td>3 (2.1)</td>
</tr>
<tr>
<td>Soft tissue injury</td>
<td></td>
<td>0</td>
<td>30 (20.8)</td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td>10 (10.2)</td>
<td>13 (9.0)</td>
</tr>
<tr>
<td>Airway or oral fire/burns</td>
<td></td>
<td>0</td>
<td>7 (4.9)</td>
</tr>
<tr>
<td>Adult respiratory distress syndrome</td>
<td></td>
<td>1 (1)</td>
<td>0</td>
</tr>
<tr>
<td>Arrhythmias</td>
<td></td>
<td>0</td>
<td>1 (0.7)</td>
</tr>
<tr>
<td>Aspiration</td>
<td></td>
<td>4 (4)</td>
<td>2 (1.4)</td>
</tr>
<tr>
<td>Below standard of care</td>
<td></td>
<td>1 (1)</td>
<td>0</td>
</tr>
<tr>
<td>Bronchospasm</td>
<td></td>
<td>1 (1)</td>
<td>1 (0.7)</td>
</tr>
<tr>
<td>Anesthesia Cardiorespiratory failure/arrest</td>
<td></td>
<td>1 (1)</td>
<td>1 (0.7)</td>
</tr>
<tr>
<td>Difficult airway</td>
<td></td>
<td>5 (5.1)</td>
<td>5 (3.5)</td>
</tr>
<tr>
<td>Fluid overload</td>
<td></td>
<td>1 (1)</td>
<td>0</td>
</tr>
<tr>
<td>Hypoxic brain damage**</td>
<td></td>
<td>---</td>
<td>2 (1.3)</td>
</tr>
<tr>
<td>Inadequate anesthesia</td>
<td></td>
<td>0</td>
<td>1 (0.7)</td>
</tr>
<tr>
<td>No consent</td>
<td></td>
<td>1 (1)</td>
<td>0</td>
</tr>
<tr>
<td>Malignant hyperthermia (Halothane)</td>
<td></td>
<td>0</td>
<td>1 (0.7)</td>
</tr>
<tr>
<td>Non opioid medications</td>
<td></td>
<td>4 (4)</td>
<td>4 (2.1)</td>
</tr>
<tr>
<td>Negligent intraoperative monitoring</td>
<td></td>
<td>1 (1)</td>
<td>4 (2.1)</td>
</tr>
<tr>
<td>Pulmonary edema</td>
<td></td>
<td>3 (3.1)</td>
<td>0</td>
</tr>
<tr>
<td>Seizures</td>
<td></td>
<td>1 (1)</td>
<td>0</td>
</tr>
<tr>
<td>Sepsis</td>
<td></td>
<td>1 (1)</td>
<td>0</td>
</tr>
<tr>
<td>Soft tissue/bone/teeth injury</td>
<td></td>
<td>0</td>
<td>4 (2.1)</td>
</tr>
<tr>
<td>Opioids</td>
<td></td>
<td>17 (17.4)</td>
<td>9 (6.3)</td>
</tr>
</tbody>
</table>

- The total burn injuries include 26 cases of which 7 were burns related to airway fire and 19 were burns related to cautery use.
- **Hypoxic brain injury is not included among fatal injury claims as this was thought to be the common pathway for all deaths.

Table 3: Inflated adjusted monetary awards for deaths and injuries

<table>
<thead>
<tr>
<th>Main variable</th>
<th>Fatal injury claims</th>
<th>Non-fatal injury claims</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anesthesia Related</td>
<td>10</td>
<td>341,236 (600,240 – 2,143,715)</td>
</tr>
<tr>
<td>Opioid related</td>
<td>6</td>
<td>1,625,892 (969,932 – 2,142,475)</td>
</tr>
<tr>
<td>Surgical related</td>
<td>7</td>
<td>121,241 (600,240 – 2,331,002)</td>
</tr>
<tr>
<td>Uncategorized</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>1,193,570 (669,942 – 2,143,715)</td>
</tr>
</tbody>
</table>

Data is Median (Inter quartile range). Dollar amounts are rounded off to nearest whole numbers. Not all claims mentioned in table 1 resulted in monetary awards.


References

1 Brouillette, R. T. The New England journal of medicine 2013, 368, 2428.
4 Lerman, J. Paediatric anaesthesia 2009, 19 Suppl 1, 100.
7 Subramanyam, R.; Chidambaram, V.; Ding, L.; Myer, C. M., 3rd; Sadhasivam, S. Paediatric anaesthesia 2014, 24, 412.
15 Mahmoud, M.; Gunter, J.; Sadhasivam, S. Pediatric radiology 2009, 39, 1034.
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28 Kuehn, B. M. JAMA 2013, 309, 1100.
These are exciting times for SASM. While we are a new and growing organization, we feel our collaborative efforts will give rise to unlimited opportunities. You have the ability to make an impact from the very start. Please consider joining SASM today!

The mission of SASM is to advance standards of care for clinical challenges shared by Anesthesiology and Sleep Medicine, including perioperative management of sleep disordered breathing, as well as to promote interdisciplinary communication, education and research in matters common to anesthesia and sleep.

Benefits of SASM Membership include:

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- Full Voting Rights in Electing SASM Board of Directors and SASM Officers
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- Enhances Your Network of Regional, National and International Colleagues
- Learn of Collaborative Research Projects
- Educational Material Posted on SASM Website for Members
- Access to a “Discussion Forum” to Evaluate and Discuss the Latest Research, Education and Clinical Practices pertaining to OSA and Patients with Other Sleep-Disordered Breathing
- Get Advice and Counsel from Other Members Regarding Various Practice Paradigms

The easiest and quickest route to join as a member of SASM is to visit our website, www.SASMhq.org, and pay by credit card by clicking on the Membership Information tab. You can also mail check payment to our office at the address provided below.

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The additional donation beyond general membership will be used to promote scholarly activity in the area of anesthesia and sleep medicine and promote patient care programs in areas common to anesthesia and sleep medicine. Gold Patrons will be recognized on our website for their extraordinary support of SASM efforts and will be invited to special events highlighting the programs made possible with their donations, including a keynote speaker dinner at the Annual Meeting.

SASM

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