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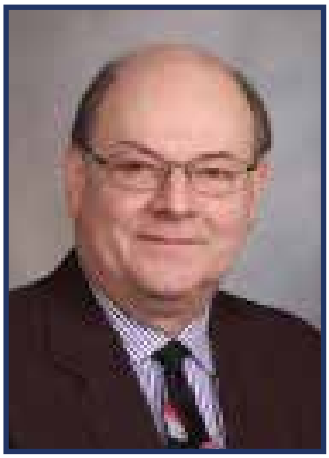
Message from the President



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Commentary and Meeting Highlights from the Incoming President of SASM

Central Sleep Apnea in Patients with Congestive Heart Failure:

Approach in the Outpatient and Hospitalized Patient

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.[1,2] 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%.[3] 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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Editor's File

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New Horizons

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 care-givers that described the findings noting that not only did the ASV not provide the expected benefit but it appeared to cause harm with an actual increase in cardiovascular mortality.[4] 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.[5] Other possible explanations of these findings include imbalances in randomization, hemodynamic effects of positive pressure, potential benefits of CSA,[6] 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.[7]

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

1 Ayas NT, Patil SP, Stanchina M, Malhotra A. Treatment of Central Sleep Apnea with Adaptive Servoventilation in Chronic Heart Failure. Am J Respir Crit Care Med. 2015 Jul 15; 192 (2):132-3. doi: 10.1164/rccm.201506-1131ED.

2 Malhotra A, Patil S, Sands S, Ayas N. Central sleep apnoea in congestive heart failure. Lancet Respir Med. 2015 Jul; 3(7):507-8. doi: 10.1016/S2213-2600(15)00235-0.

3 Bradley TD, Logan AG, Kimoff RJ, Series F, Morrison D, Ferguson K, Belenkie I, Pfeifer M, Fleetham J, Hanly P, et al.; CANPAP Investigators. Continuous positive airway pressure for central sleep apnea and heart failure. N Engl J Med 2005; 353:2025–2033.

4 ResMed. Healthcare providers SERVE-HF FAQs [accessed 2015 May 20]. Available from: http://www.resmed.com/content/dam/resmed/global/documents/serve-hf/Healthcare_providers_SERVE-HF_FAQs.pdf

5 Philips response to ResMed update on phase IV SERVE-HF study of adaptive servo-ventilation (ASV) therapy in central sleep apnea and chronic heart failure. 2015 May 15 [accessed 2015 Jun 2]. Available from: http://www.prnewswire.com/news-releases/philips-response-to-resmed-update-on-phase-iv-serve-hf-studyof-adaptive-servo-ventilation-asv-therapy-in-central-sleepapnea-and-chronic-heart-failure-300084444.html

6 Naughton MT. Cheyne-Stokes respiration: friend or foe? Thorax 2012; 67:357–360.

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 Teschler, M.D. Adaptive Servo-Ventilation for Central Sleep Apnea in Systolic Heart Failure. September 1, 2015, at NEJM.org. **DOI: 10.1056/NEJMoa1506459**

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What a Difference A Year Makes

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 a SASM 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.

Each group member is making positive contributions to the field of sleep disordered breathing in pregnancy. Contributions comprise assessment of current attitudes of obstetric anesthesiology providers towards obstructive sleep apnea (OSA) in pregnancy by Dominguez et al (1), a SASM poster presentation this year as well as assessment of the current status of anesthetic antenatal screening for SDB in pregnancy (2). This latter data presented by Lockhart at last year's SASM meeting showed that no current screening tool accurately detects OSA in pregnant women in the third trimester. Group efforts are underway to develop this "holy grail" sleep-screening tool in pregnancy. We've reached a consensus regarding questions deemed relevant to recognizing OSA in pregnancy and shall be implementing this at various institutional sites in the future.

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 power house in the group, Bourjeilly, and her colleagues have researched many aspects of SDB in pregnancy that range from

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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

1 Dominguez J, Lockhart E, Miscovic A, Bullough AS. Recognition of Obstructive Sleep Apnea in Pregnancy (ROSAP), P10. SASM October 2015

2 Lockhart EM, Ben Abdallah A, Tuuli MG, Leighton BL. Obstructive Sleep Apnea in Pregnancy: Assessment of Current Screening Tools. Obstet Gynecol. 2015 Jul;126(1):93-102.

3 O'Brien LM, Bullough AS, Owusu JT, Tremblay KA, Brincat CA, Chames MC, Kalbfleisch JD, Chervin RD. Snoring during pregnancy and delivery outcomes: a cohort study. Sleep. 2013 Nov 1;36(11):1625-32.

4 O'Brien LM, Bullough AS, Chames MC, Shelgikar AV, Armitage R, Guilleminault C, Sullivan CE, Johnson TR, Chervin RD. Hypertension, snoring, and obstructive sleep apnoea during pregnancy: a cohort study.

5 Bourjeily G, Curran P, Butterfield K, Maredia H, Carpenter M, Lambert-Messerlian G. Placenta-secreted circulating markers in pregnant women with obstructive sleep apnea. J Perinat Med. 2015 Jan;43(1):81-7.

6 Bourjeily G, Raker CA, Chalhoub M, Miller MA. Pregnancy and fetal outcomes of symptoms of sleep-disordered breathing. Eur Respir J. 2010 Oct;36(4):849-55.

7 Lewis JM, Mogos MF, Salemi JL, Redline S, Salihu HM. Obstructive sleep apnea and severe maternal-infant morbidity/mortality in the United States, 1998-2009. Sleep. 2014 May 1;37(5):843-9.

8 Louis JM, Auckley D, Sokol RJ, Mercer BM. Maternal and neonatal morbidities associated with obstructive sleep apnea complicating pregnancy. Am J Obstet Gynecol. 2010 Mar;202(3):261.e1-5.

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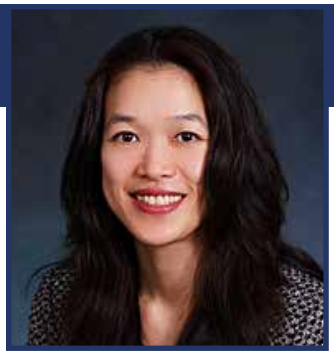
For more information on committees, please visit: www.sasmhq.org/current-committee-membership



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Summary of SASM 5th Annual Meeting

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 Welcome Reception and Dinner on the opening night of the meeting was a success. Jean-Francois Pittet, editor of Anesthesia & Analgesia discussed the recently formed partnership of SASM with Anesthesia & Analgesia, and the new vision of this journal. David Dawson, MB, ChB, FRCA discussed the development of the Bradford Sleep Service in the United Kingdom. The evening concluded with a lively talk by Peter Farrell, BE, MS, PhD, DSC about Innovation and Entrepreneurship in 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. ❖

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Tonsillectomy: Medico-Legal Aspects and Postoperative Complications

Approximately 1 in 8 children undergo tonsillectomy under anesthesia in the United States alone.[1] 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).[2,3] 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.[4] The prevalence of pediatric OSA is 2%-4%[5] and peaks at the age of 3-6 years, which correlates with adenotonsillar hypertrophy.[4] 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,[6] and higher risk of post-anesthetic deaths than adult OSA.[7,8]

The challenge with pediatric OSA starts with correctly establishing a preoperative diagnosis. The assessment starts with clinical screening of patients with questions related to sleep patterns.[9,10] A 22-point validated sleep questionnaire is available and is commonly used as an office based screening tool by pediatricians.[11] The American Society of Anesthesiologists has provided guidelines for preoperative screening patients for OSA.[12] A simple to use screening tool used in adults like STOP-Bang[13] is not available in pediatric patients. Recently, other modalities like magnetic resonance imaging and drug induced sleep endoscopy are used for the diagnosis of OSA and plan for tonsillectomy or other airway procedures.[14,15,16] Polysomnography is the gold standard for diagnosis of pediatric OSA similar to adult OSA. An apnea hypopnea index of more than one is considered OSA in children.[12] Although most tonsillectomies are done for OSA, a preoperative polysomnography, the diagnostic gold standard test for OSA, is not done routinely due to limitations in the technique and the costs.[9,10]

The first mention of tonsillectomy was in Hindu Medicine about 1000 years B.C.[17] 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.[18,19] In spite of being one of the oldest and one of the commonest pediatric surgeries performed, postoperative adverse events following tonsillectomy can be devastating.[7,8,20-23] These complications may be related to the severity of underlying OSA.[20] The post tonsillectomy morbidity and mortality are largely preventable if they are detected early in the perioperative period.[8]

The common surgical postoperative complications after tonsillectomy are related to bleeding.[19] The common anesthesia related complications after tonsillectomy are respiratory events, postoperative nausea and vomiting, postoperative pain, opioid toxicity, and dehydration.[7] Tonsillectomy has one of the highest rates of postoperative nausea and vomiting among all pediatric surgeries.[24] 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.[25] 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.[26] 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.[27]

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.[22,23] In a malpractice claim analysis[7], 242 cases were reviewed from 1984

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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 co morbidity 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

	Fatal injury claims n (%)	Non-fatal injury claims n (%)
	98 (40.5%)	144 (59.5%)
Surgery related	39 (39.8%)	101 (70.1%)
Anesthesia related	36 (36.7%)	32 (22.2%)
Opioid related	16 (16.3%)	6 (4.2%)
Uncategorized	17 (17.4%)	9 (6.3%)

Some claims had overlapping causes between the different categories.

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Table 2: Complications that were associated with malpractice claims

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

- 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.

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Table 3: Inflated adjusted monetary awards for deaths tand injuries

Main variable	Fatal injury claims		Non-fatal injury claims	
	N	Awards (2013 U.S.$)	N	Awards (2013 U.S.$)
Anesthesia Related	10	341,236 (600,240 – 2,143,715)	7	582,751 (654,927 – 25,689,179)
Opioid related	6	1,625,892 (969,932 – 2,142,475)	2	3,484,278 (1,119,137 – 5,849,419)
Surgical related	7	121,2415 (600,240 – 2,331,002)	20	305,153 (102,632 – 821,207)
Uncategorized	0		1	11,721,160 (11,721,160 – 11,721,160)
Total	18	1,193,570 (669,942 – 2,143,715)	28	526,869 (166,059 – 3,819,626)

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.

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References

1 Brouillette, R. T. *The New England journal of medicine* **2013**, *368*, 2428.

2 Erickson, B. K.; Larson, D. R.; St Sauver, J. L.; Meverden, R. A.; Orvidas, L. J. *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery* **2009**, *140*, 894.

3 Powell, S.; Kubba, H.; O'Brien, C.; Tremlett, M. *Bmj* **2010**, *340*, c1918.

4 Lerman, J. *Paediatric anaesthesia* **2009**, *19 Suppl 1*, 100.

5 Bandla, P.; Brooks, L. J.; Trimarchi, T.; Helfaer, M. *Anesthesiology clinics of North America* **2005**, *23*, 535.

6 Perfect, M. M.; Archbold, K.; Goodwin, J. L.; Levine-Donnerstein, D.; Quan, S. F. *Sleep* **2013**, *36*, 517.

7 Subramanyam, R.; Chidambaran, V.; Ding, L.; Myer, C. M., 3rd; Sadhasivam, S. *Paediatric anaesthesia* **2014**, *24*, 412.

8 Cote, C. J.; Posner, K. L.; Domino, K. B. *Anesthesia and analgesia* **2014**, *118*, 1276.

9 Aurora, R. N.; Zak, R. S.; Karippot, A.; Lamm, C. I.; Morgenthaler, T. I.; Auerbach, S. H.; Bista, S. R.; Casey, K. R.; Chowdhuri, S.; Kristo, D. A.; Ramar, K.; American Academy of Sleep, M. *Sleep* **2011**, *34*, 379.

10 Roland, P. S.; Rosenfeld, R. M.; Brooks, L. J.; Friedman, N. R.; Jones, J.; Kim, T. W.; Kuhar, S.; Mitchell, R. B.; Seidman, M. D.; Sheldon, S. H.; Jones, S.; Robertson, P.; American Academy of, O.-H.; Neck Surgery, F. *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery* **2011**, *145*, S1.

11 Chervin, R. D.; Weatherly, R. A.; Garetz, S. L.; Ruzicka, D. L.; Giordani, B. J.; Hodges, E. K.; Dillon, J. E.; Guire, K. E. *Archives of otolaryngology--head & neck surgery* **2007**, *133*, 216.

12 American Society of Anesthesiologists Task Force on Perioperative Management of patients with obstructive sleep, a. *Anesthesiology* **2014**, *120*, 268.

13 Chung, F.; Subramanyam, R.; Liao, P.; Sasaki, E.; Shapiro, C.; Sun, Y. *British journal of anaesthesia* **2012**, *108*, 768.

14 Moon, I. J.; Han, D. H.; Kim, J. W.; Rhee, C. S.; Sung, M. W.; Park, J. W.; Kim, D. S.; Lee, C. H. *The Laryngoscope* **2010**, *120*, 2546.

15 Mahmoud, M.; Gunter, J.; Sadhasivam, S. *Pediatric radiology* **2009**, *39*, 1034.

16 Kandil A, S. R., Tewari A, Ishman S, Shott S, Mahmoud M *American Society of Anesthesiologists Abstract A1209.* **2015**.

17 McNeill, R. A. *The Ulster medical journal* **1960**, *29*, 59.

18 Baugh, R. F.; Archer, S. M.; Mitchell, R. B.; Rosenfeld, R. M.; Amin, R.; Burns, J. J.; Darrow, D. H.; Giordano, T.; Litman, R. S.; Li, K. K.; Mannix, M. E.; Schwartz, R. H.; Setzen, G.; Wald, E. R.; Wall, E.; Sandberg, G.; Patel, M. M.; American Academy of, O.-H.; Neck Surgery, F. *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery* **2011**, *144*, S1.

19 Subramanyam, R.; Varughese, A.; Willging, J. P.; Sadhasivam, S. *International journal of pediatric otorhinolaryngology* **2013**, *77*, 194.

20 Brown, K. A. *Paediatric anaesthesia* **2011**, *21*, 771.

21 Goldman, J. L.; Baugh, R. F.; Davies, L.; Skinner, M. L.; Stachler, R. J.; Brereton, J.; Eisenberg, L. D.; Roberson, D. W.; Brenner, M. J. *The Laryngoscope* **2013**, *123*, 2544.

22 Morris, L. G.; Lieberman, S. M.; Reitzen, S. D.; Edelstein, D. R.; Ziff, D. J.; Katz, A.; Komisar, A. *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery* **2008**, *138*, 315.

23 Richmond, K. H.; Wetmore, R. F.; Baranak, C. C. *International journal of pediatric otorhinolaryngology* **1987**, *13*, 117.

24 Bennett, A. M.; Emery, P. J. *Annals of the Royal College of Surgeons of England* **2008**, *90*, 226.

25 Stoner, M. J.; Dulaurier, M. *Emergency medicine clinics of North America* **2013**, *31*, 795.

26 Kuehn, B. M. *Jama* **2013**, *309*, 1100.

27 Kirchheiner, J.; Schmidt, H.; Tzvetkov, M.; Keulen, J. T.; Lotsch, J.; Roots, I.; Brockmoller, J. *The pharmacogenomics journal* **2007**, *7*, 257.

28 Subramanyam, R.; Varughese, A.; Kurth, C. D.; Eckman, M. H. *Paediatric anaesthesia* **2014**, *24*, 467.

29 Patino, M.; McAuliffe, J.; Francis, L.; Mohamed, M. *International anesthesiology clinics* **2012**, *50*, 41.

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