Society for Technology in Anesthesia • March 2011

INTERFACE

2011 STA Annual Meeting Photos

(From Left) Dr. Peter Fine, STA Past Presidents Dr. Jeff Feldman & Dr. Mohamed Rehman with STA staff, Annette Schott at the Friday Night Event held at LAVO at the Palazzo, Las Vegas.

STA Annual Meeting held at the Venetian Hotel in Las Vegas, NV January 13-16, 2011.

More Annual Meeting Photos on Page 2

In This Issue!

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(From Left) STA Past President Dr. Mohamed Rehman with STA Board Member Dr. Brian Rothman at LAVO.

STA Annual Meeting Engineering Challenge Award Winners pictured (center) with Session Chair and former STA Past President Dr. Robert "Butch" Loeb (Far Left) and current STA Board Member Dr. Joe Orr (Far Right).

Dr. Kirk Shelley presented Dr. John Doyle with a plaque for his service as STA president during 2010.

Dr. John Doyle (Left) thanked and presented a plaque to Dr. Ravindra Prasad Chair of the 2011 STA Annual Meeting.

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STA President's Message

Kirk Shelley, MD, PhD, STA President

It is with great pleasure that I write this message as the STA president for 2011. I have tremendous pride in this organization and its members. We, as individuals and as a group, have witnessed and participated in the remarkable growth within our field. This society has been at the heart of every major technological advance in Anesthesiology. Two that immediately come to mind are medical simulation and Anesthesia Information Management Systems. It was at an annual meeting where I first heard about these exciting subjects and pondered their potential.

On a professional level, the society has played a critical role in my own advancement within the academic community. I always found a warm welcome for my next outlandish idea/research project and received invaluable feedback. On a personal level, I have loved being the chairman of the STA research committee. That role allowed me to interact with both the well-seasoned investigator working out a subtly in their chosen area of study as well as the resident, new to our field, excited about their first serious research effort. With that came the privilege of presenting hard working researchers awards in recognition of their efforts. I know first-hand, how important such feedback is when one is working in complex and sometimes obscure fields.

Our meeting in Las Vegas this January continued in this great tradition. I admit I was skeptical of the venue. It had been a fair bit of time since I had last visited 'sin city' but I must say I had a great time. The meeting space was very functional and the support staff outstanding. Ravindra Prasad did a fantastic job putting together a thought provoking program. Starting with Dr. Bagian, a physician-astronaut as a keynote speaker, Ravindra covered the important topics of green anesthesia, drug delivery technology, sensor development, information display and AIMS advancements. In addition, there were outstanding workshops and an active trade floor. It had everything I look for in an STA meeting.

Looking towards the future, I see two important paths for our society. First, formalizing and expanding our relationships with like-minded groups. An excellent example is our growing alliance with FAER (Foundation for Anesthesia Education and Research). A combined panel on translational research ('bench to bedside'} efforts is planned for the 2012 annual STA meeting in Florida. Second, there will be a renewed emphasis on student (medical and biomed engineering) and anesthesia resident recruitment. These young people truly are our future. This effort is being led by Mark Ansermino, the Chairman of our Membership Committee.

Finally, I want to point out to our membership that powerful, forward-looking forces are in play when it comes to the future of anesthesia technology. This year alone the FDA will be holding hearings on patient controlled sedation systems (1), automated anesthesia systems being written about in leading anesthesia journals (2) and demonstrations of Transcontinental Anesthesia (3). We truly live in exciting times. I am interested in feedback from our membership. Are these trends that we, as a society, should be encouraging or attempting to slow down? My bias towards the automation of anesthesia care is well known (4). On the other hand, this trend has huge implications regarding the future role of the anesthesiologist in health care.

1. http://edocket.access.gpo.gov/2010/pdf/2010-29927.pdf
2. Liu N, Chazot T, Hamada S, Landais S, Boichut N, Dussaussoy C, Trillat B, Beydon L, Samain E, Sessler DI, Fischler M. Closed-loop coadministration of propofol and remifentanil guided by the bispectral index: a randomized multicenter study. Anesth Analg 2011;112:546–57) – note this group received an award from the STA for their ASA 2010 abstract presentation of this work.
3. http://www.stahq.org/files/2312/9665/8178/STA_2011_Abtract_36.pdf - note this abstract also won an award from the STA at the annual meeting.
4. Shelley, K., Is the automation of anesthesia possible or even desirable? Current Opinion in Anesthesiology, 2008. 21(6): p. 748-749.

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Report from the Executive Director

By Jane A. Svinicki, CAE

STA Takes Las Vegas

Whether at the poker table or the seminar table, STA beat the odds with a successful meeting in Las Vegas. A great turnout, interactive sessions, industry recognition and a happening reception at LAVO night club made for a memorable and productive meeting.

If you were not able to attend, or snowbound, please enjoy the photos from the meeting included in this issue of Interface. And plan to join us next year at the Four Seasons Palm Beach, FL on January 18-21, 2012. Let's hope for gentler winter weather than 2011!

New Leadership Installed

The STA 2011 Board of Directors took office during the business meeting. Congratulations to our distinguished Board. John Doyle, MD, PhD, FRCPC was thanked for his service to STA during the past year by incoming President Kirk Shelley, PhD, MD. Other officers were - President Elect: George Blike, MD; Treasurer: David Reich, MD; At Large Directors: Brian Rothman, MD and Joe Orr, MD; At Large Industry: Christina DeMur; and At Large International: Mark Ansermino, MD.

Collaboration with FAER

During 2011, STA will begin a collaboration with the Foundation for Anesthesia Education and Research (FAER). FAER approached STA to sponsor a joint session on translational research at the 2012 STA annual meeting. This session would focus on the aspects of bringing research to the marketplace. Maxime Cannesson, MD and other members of the Program Committee are working on developing the topics and speakers for this session and the entire annual meeting.

In addition to presenting educational sessions, FAER would like to work with STA on support for residents and medical students and supporting research through grants. The form of this collaboration has yet to be determined, but it is a promising start. STA will be looking for other organizations that we can strategically collaborate with to achieve our goals.

Masimo Innovation Grant

During the Friday evening reception, Masimo was recognized as the first STA Endowment Grant provider. Masimo President Joe Kaini attended and was recognized for the contribution. STA Past President spoke on behalf of STA recognizing the value of ongoing collaboration with industry in developing new technology to make anesthesia safer. Mr. Kaini discussed the contributions of many STA members to anesthesia technology.

(From Left) STA Immediate Past President Dr. John Doyle, Past President Dr. Jeff Feldman with Masimo Inc. CEO, Joe Kiani along with STA Past President Dr. Michael O'Reily and current STA President Dr. Kirk Shelley at LAVO. STA Thanked Masimo Corporation for their $50,000 contribution to the newly formed STA Innovation Endowment.

Jerry Calkins Honored with First Beverlee Anderson Distinguished Service Award

STA President Dr. John Doyle (Left) presents STA Past President Dr. Jerry Calkins with the first Beverlee Anderson Distinguished Service Award during the STA Annual Business Meeting.

Jerry Calkins, MD was honored for his service to STA. The Beverlee Anderson Distinguished Service Award is named for long time STA Executive Director Beverlee Anderson. Ms. Anderson, who is deceased, was instrumental in the formative years of the association. The award honors a member for distinguished service to the Society for Technology in Anesthesia.

Dr. Calkins reminisced about the early days of STA and the contributions of Beverlee Anderson and her cowbell 'call to session.'

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Best Abstracts of the STA 2011 Annual Meeting

Best Clinical Application Award

TRANSCONTINENTAL ANESTHESIA

Thomas Hemmerling, MSc, MD[1]; E Arbeid[1]; L Tang[1]; S Cyr[1]; M Wehbe[1]; F Giunta[2]; C Zaouter[2]
[1]Department of Anesthesiology, McGill University, Montreal, Canada
[2]Pisa University, Pisa, Italy

Introduction: Tele-medicine has been used in different fields of medicine to overcome the lack of specialist and improve health care. The aim of the study is to determine how anesthesia delivery can be achieved remotely.

Methods: After ethics approval in the remote (Montreal General Hospital, Canada) and local centre (University of Pisa, Italy), 20 patients undergoing thyroid surgery in Pisa were enrolled. The remote and local set-up were composed of a *master*-computer (Montreal – '*anesthesia cockpit*'), a *audio-video*-purpose computer (both sites) and a *slave*-computer (Pisa), respectively. Standard internet connection and remote desktop control software were used in both centres. The AV-computer system was used to collect images from distant monitoring of the patient, video-laryngoscopic intubation guidance, vital signs, ventilator parameters, view of the surgery field throughout the surgery, using HD webcams. [Fig 1]. Pre-operative assessment was performed by anaesthesiologists in both centres using standard protocols. Standard TIVA (propofol, remifentanil, rocuronium) was automatically delivered using a closed-loop system (1) and controlled by the remote centre. The performance of the hypnosis was defined as excellent, good, poor or inadequate, when the BIS was respectively within 10%, between 10 and 20%, between 20 and 30% or outside 30% of the target BIS of 45. Pain was assessed using Analgoscore with a score ranging from -9 to 9, with ±3 representing excellent pain control, -3 to -6 and 3 to 6 good pain control, and -6 to -9 and 6 to 9 inadequate pain control. (2) Data are presented as mean (SD) or value, comparison of the pre-op assessment were done by Cohen's Kappa test, SPSS.

	Remote Group (N=20)	Local Group (N=20)	Kappa
ASA (1 / 2 / 3)	11 / 8 / 1	12 / 7 / 1	0.77
Allergies (0 / 1 / 2)	17 / 2 / 1	17 / 2 / 1	1.00
Medical History (0 / 1 / 2 / 3)	10 / 8 / 1 / 1	8 / 9 / 2 / 1	0.56
Airway Assessment			
Mouth Opening (1 / 2 / 3)	17 / 3 / 0	18 / 2 / 0	0.61
Mallampati Classification (1 / 2 / 3)	14 / 6 / 0	9 / 9 / 2	0.55
Thyromental Distance (1 / 2)	20 / 0	20 / 0	1.00
Neck Mobility (1 / 2)	20 / 0	20 / 0	1.00
Larynx Mobility (0 / 1)	20 / 0	20 / 0	1.00

Kappa ≤ 0.2: poor agreement; 0.2 < Kappa ≤ 0.4: fair agreement; 0.4 < Kappa ≤ 0.6: moderate agreement; 0.6 < Kappa ≤ 0.8: good agreement; 0.8 < Kappa < 1: very good agreement; Kappa = 1: perfect agreement.

Table 1: Comparison of pre-operative assessment

Figure 1: Video-stream in Montreal from monitoring in Pisa

Results: The remotely-controlled closed loop system maintained anesthesia for all patients (4 men, 16 women; age: 44 (13) yrs; weight: 66 (14) kg) throughout surgery without any interruption of the internet connection, providing teleanesthetic drug infusion during 100% of the time. Out of the 8 parameters of comparison of preoperative assessment, 4 showed perfect, 2 good and 2 moderate agreement, respectively [Table 1]. The mean propofol dose was 118 (32) µg/kg/min, the mean remifentanil dose 0.28 (0.07) µg/kg/min, the total rocuronium dose 0.63 (0.11) mg/kg; time to extubation was 9.8 (4.0) min. The system showed 57 (20) modifications of propofol doses/h and 36 (9) modifications of remifentanil doses per hour. The clinical performance was very good and is showed in table 2.

Conclusions: Tele-anesthesia is feasible using remote control of an automated anesthesia delivery system; inadequate control of hypnosis was influenced by electrocautery (marked as artifact) causing unreliable BIS values. Preoperative assessment using AV-communication showed overall good agreement with standard assessment.

References:

1. CAS meeting 2010, Montreal, Abstract ID: 803213
2. Journal of Computers 2009; 4: 311-318.

BIS	Excellent (%)	36.6 ± 15.1	Analgoscore	Excellent (%)	68.0 ± 21.9
	Good (%)	32.8 ± 6.4		Good (%)	24.2 ± 18.4
	Poor (%)	13.3 ± 5.6		Insufficient (%)	5.9 ± 10.5
	Inadequate (%)	12.7 ± 10.3		Artifact (%)	1.8 ± 3.2
	Artifact (%)	4.6 ± 3.6			

Table 2: Clinical Performance

Excellence in Technology Award:

LOCATION INDEPENDENCE IN PATIENT MONITORING

Walter Karlen, PhD[1,3]; Mike Blackstock[2]; J Mark Ansermino[1,3]
[1]Electrical & Computer Engineering in Medicine Group
[2]Media and Graphics Interdisciplinary Centre
[3]Pediatric Anesthesia Research Team, The University of British Columbia, Vancouver, British Columbia, Canada

Introduction: Hospital patients require physiological monitoring throughout their stay. Monitoring requirements depend on the hospital unit (e.g. Admission, OR, ICU, ward). Currently, monitoring devices are stationary and are connected by wires to sensors and patient. This is cumbersome for both patient and health care providers, and sensors must be disconnected when the patient is prepared for transfer between units. Further, sensors located in one unit are often incompatible with those in another. We propose a novel concept that simplifies patient monitoring throughout the hospital.

Method:

Approach: We propose a two level wireless network (Fig. 1). A personal area network (PAN) is private to the patient and is responsible for the control of data communication. The PAN host device connects to all required sensors using a wide range of supported protocols (e.g. serial, USB, WiFi and Bluetooth), and is attached to the patient during the entire hospital stay. The PAN host then wirelessly transmits the standardized data to a local area network (LAN) that records patient health information in a database. This information can be retrieved in real time by either stationary monitoring devices or mobile devices of health care providers throughout the hospital network.

Prototype: The prototype consists of two pulse oximeters (Nonin, USA) connected via Bluetooth and wired connection, respectively, to a computer with a Linux operating system that acts as the host for the PAN. The LAN consists of a server running a web-based sensor actuator network portal called Sense Tecnic[1]. A WiFi enabled mobile device is used as the monitoring display.

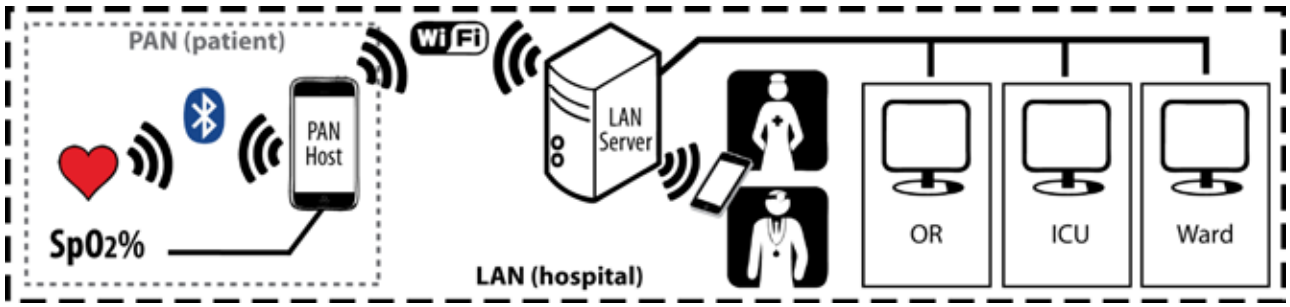

Figure 1: A personal area network (PAN) monitors the patient and transmits the trend data to a local area network (LAN) where health care workers can access the signals in real-time.

Results & Discussion: Blood oxygen saturation and heart rate trend signals are recorded and displayed in real time at a 1 Hz update rate. The web-based data portal allows platform independent, real-time monitoring. The PAN allows for easy connection of sensors to the patient and facilitates monitoring during patient movement and transportation. This approach will facilitate the use of elementary sensors without interruption throughout the hospital. Unit specific sensors can be added to the PAN when required. Future work will include geolocation by indoor triangulation using the WiFi network, and size reduction of the PAN host.

1. MAGIC Broker
2. An Open and Extensible Platform for the Internet of Things. M. Blackstock, N. Kaviani, R. Lea, A. Friday. Internet of Things 2010 Conference, 2010, Tokyo, Japan. http://www.sensetecnic.com

2011 Best of Show Abstract Honorable Mention

IMPACT OF CENTRAL HYPOVOLEMIA ON PHOTOPLETHYSMOGRAPHIC WAVEFORM PARAMETERS IN HEALTHY VOLUNTEERS. PART 1: TIME DOMAIN ANALYSIS

Aymen A. Alian, MD; Nicholas J. Galante, BS; Salman Haider, MD; David G. Silverman, MD; Kirk H. Shelley, MD, PhD
Department of Anesthesiology, Yale University School of Medicine, New Haven, Connecticut

Introduction: Lower body negative pressure (LBNP) is an excellent model for hypovolemic circulatory stress[1], since it rapidly decreases central blood volume by sequestering blood in the lower extremities through application of negative pressure around the legs and abdomen. We hypothesize that during a hypovolemic challenge such as Lower body negative pressure (LBNP), a preservation of ear PPG characteristics and a decrease in finger PPG characteristics will be seen. Our study sought to explore changes in PPG waveform parameters; height, peak area, width 50, maximum and minimum slope (figure 1) and to determine which components of the PPG waveform could serve as early indicators of reduction in central blood volume during LBNP in spontaneously breathing volunteers. Previous work has demonstrated a differential vasoconstrictive response in the finger vs. ear during cold pressor testing[2] , the decreased height of the finger was attributable to greater adrenergic activity in this region.

Methodology: With IRB approval, eleven healthy volunteers age 24-37 underwent a lower body negative pressure (LBNP) protocol consisting of a 3 min baseline and successive 3 min intervals at baseline, 30, 75 and 90 mm Hg (or until the subject became symptomatic). Subjects were monitored with finger and ear pulse oximeter probes, ECG, and finger arterial blood pressure monitor. Data recorded and analyzed with commercially available software (Chart, ADInstruments). Data are presented as median and inter-quartile range (IQR). Friedman ANOVA and Wilcoxon test were used to identify changes in hemodynamic and plethysmographic variables, $P < 0.017$ was considered statistically.

Results: There were no significant changes in the blood pressure variables at 30 mmHg, but at and beyond 75 mmHg, the decreases in systolic, mean and pulse pressure were significant as the increase in diastolic pressure. Heart rate increased significantly by 30 mmHg, reaching a maximum of 75.4% above baseline at symptomatic phase. Finger PPG height, peak area, width 50 and maximum slope de-

Continued on Page 10

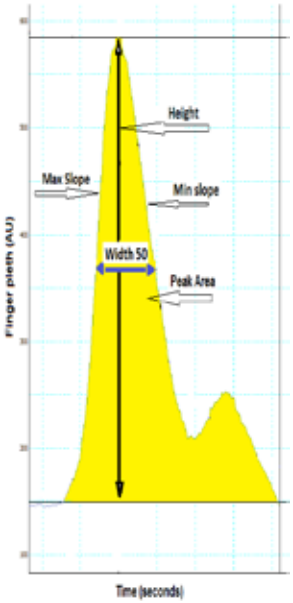

Figure 1

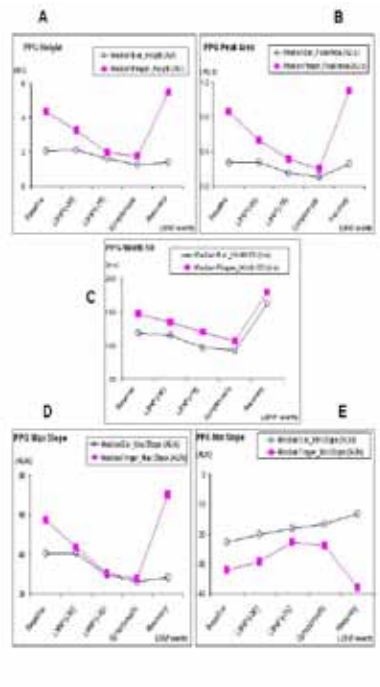

Figure 2

Finger Plethysmography

Parameters	Baseline	LBNP 30	LBNP 75	Symptomatic	Recovery
Height (AU)	4.33(2.87)	3.29(2.23)*	1.97(1.57)*	1.76(2.2)*	5.78(2.5)
% change from baseline		-25.6%	-54.5%	-59.4%	26.1%
Peak area (AU.s)	0.86(0.52)	0.55(0.36)*	0.31(0.22)*	0.198(0.28)*	1.1(0.58)
% change from baseline		-35.4%	-63.9%	-76.9%	28.1%
Width 50 (ms)	146.8(17.8)	134.2(7.4)*	120.1(12.1)*	106.6(15.4)*	179.3(18.2)**
% change from baseline		-8.6%	-18.2%	-27.4%	22.1%
Max slope (AU/s)	57.25(38.03)	43.81(28.4)*	39.61(21.2)*	27.72(30.04)*	70.04(27.6)
% change from baseline		-23.5%	-46.5%	-51.6%	22.3%
Min slope(AU/s)	-32.26(25.9)	-29.58(16.5)	-22.79(18.8)	-23.96(26.8)	-58.28(15.5)
% change from baseline		-9.1%	-29.4%	-25.7%	58.5%

Ear Plethysmography

Parameters	Baseline	LBNP 30	LBNP 75	Symptomatic	Recovery
Height (AU)	2.05(0.77)	2.11(0.64)	1.59(0.57)*	1.24(0.78)*	1.1(0.63)**
% change from baseline		3.1%	-22.2%	-39.5%	-51.6%
Peak area (AU.s)	0.27(0.1)	0.28(0.13)	0.15(0.7)*	0.10(0.11)*	0.26(0.12)
% change from baseline		5.5%	-44.2%	-63.6%	-4.2%
Width 50 (ms)	118.2(16.2)	115.1(13.2)	96.7(12.9)*	92.9(20.9)*	162.1(70.35)
% change from baseline		-2.6%	-18.2%	-21.4%	37.1%
Max slope (AU/s)	40.58(14.2)	41.67(9.2)	29.78(12.3)*	26.33(8.1)*	28.18(8.8)
% change from baseline		0.7%	-26.2%	-34.9%	-30.2%
Min slope (AU/s)	-22.76(11.6)	-20.15(9.4)	-18.06(6.7)	-16.72(3.5)	-13.22(4.7)
% change from baseline		-11.4%	-20.6%	-26.8%	-41.9%

Table 1

2011 Best of Show Abstract Honorable Mention Continued

creased significantly at LBNP 30 mmHg and reached declines of 59.4%, 76.9%, 27.4% and 51.6%, respectively, during the symptomatic phase (table 1). Ear PPG height, peak area, width 50 and maximum slope did not change significantly at LBNP 30 mmHg, but declined significantly at 75 mmHg. During the symptomatic phase, the respective declines reached 39.3%, 61.0%, 21.4% and 34.9% (figure 2).

Discussion: Systolic, diastolic and mean finger arterial blood pressures together with pulse pressure were well preserved. While finger plethysmographic waveforms characteristics showed significant reduction ($p < 0.017$); peak area (38.4%), height (25.6%) max slope (23.5%) and width 50 (8.6%). On the other hand, ear plethysmographic waveform characteristics were not significantly changed. This suggests that finger plethysmographic waveform parameters (height, peak area, width 50, maximum and minimum slope) might be used as a monitor of sympathetic tone. On the other hand, the ear plethysmographic waveform, because of its location, appears to be more reflective of central hemodynamic changes.

Conclusion: PPG waveform parameters may prove to be sensitive and specific as early indicators of blood loss. These PPG changes were observed before profound decreases in arterial blood pressure. The relative sparing of central cutaneous blood flow is likely parasympathetic in nature when compared to a peripheral site where there is high sympathetic tone and vasoconstriction

References:

1. J Gravit Physiol. 2001;8((2)):1-14., 2. Anesth Analg 2001; 92- 1483-86

2011 Best of Show Abstract Honorable Mention

PROPOFOL AND REMIFENTANIL SPARING EFFECT OF NITROUS OXIDE USING CLOSED-LOOP ANESTHESIA CONTROLLER

Ngai Liu, MD, PhD[1]; Nathalie Boichut, MD[2]; Thierry Hérail, MD; Jean-Jacques Bussac, MD[4]; Jan Baars, MD, PhD[5]; Alain Charmeau[6]; Thierry Chazot, MD[1]; Marc Fischler, MD[1]

[1]Department of Anesthesiology, Hôpital Foch, Suresnes, France.
[2]Department of Anesthesiology, Centre Hospitalier Universitaire de Besançon, France
[3]Department of Anesthesiology, Hôpital de Dreux, France
[4]Department of Anesthesiology, Institut P. Calmette, Marseille, France
[5]Department of Anesthesiology, La Charité, Berlin, Germany
[6]Clinique de la Baie des Citrons, Nouméa, New Caledonia

Background: We have developed a proportional-integral-derivative controller allowing closed-loop propofol and remifentanil administration guided by the Bispectral (BIS) monitor[1]. Nitrous oxide (N_2O) has a hypnotic and analgesic effect. We investigated whether the coadministration of N_2O would reduce the amount of propofol and remifentanil required during closed-loop anesthesia maintenance. Drug consumption in all patients, in both men and women was analyzed.

Methods: Patients (ASA I-IV) who were scheduled for minor or major surgery lasting more than 1 hour were randomized in this multicenter trial (11 centers and 34 investigators, NCT00547209). After induction patients were allocated to receive 60 % nitrous oxide-40 % oxygen (N_2O group) or 60 % air – 40 % oxygen (Air Group). In both groups the Dual-loop controller was used to provide induction and maintenance. Anesthesia depth was evaluated by the percentage of time in which the BIS was in the range 40-60 ($BIS_{40\text{-}60}$). Data is presented as mean±SD. Statistical analysis was performed using student-t or Chi-squared tests; $p<0.05$ was considered significant.

Results: 302 patients were included in the N_2O Group, 299 in the Air group. The Dual-loop controller was able to provide anesthesia induction and maintenance for all patients. N_2O and Air groups were similar regarding age (56 ± 16 vs 57 ± 17 yr), weight (74 ± 15 vs 74 ± 16 kg), height (169 ± 9 vs 168 ± 8 cm), maintenance duration (154 ± 106 vs 156 ± 105 min), sex ratio Male/Female (157/145 vs 154/145), use of neuromuscular blocking agent (43 vs 49 % of patients). At similar $BIS_{40\text{-}60}$ (76 ± 15 vs 74 ± 13 %), N_2O decreases propofol (4.8 ± 1.7 vs 5.1 ± 1.6 $mg.kg^{-1}.h^{-1}$, p=0.032) and not remifentanil (0.19 ± 0.09 vs 0.20 ± 0.10 $\mu g.kg^{-1}.min^{-1}$, NS) consumption, in the N_20 vs Air group respectively. The subgroups of men, N_2O_{men}(n=157) and Air_{rmen}(n=154) were well balanced with respect to demography, morphometry and surgical procedure. At similar $BIS_{40\text{-}60}$ (79 ± 14 vs 78 ± 13%), propofol (4.5 ± 1.8 vs 4.5 ± 1.2 $mg.kg^{-1}.h^{-1}$) and remifentanil (0.19 ± 0.09 vs 0.18 ± 0.07 $\mu g.kg^{-1}.min^{-1}$) consumptions were similar (N_2O_{men} vs Air_{men} group respectively). The subgroups of women, N_2O_{women}(n=145) and Air_{women}(n=145) were well balanced with respect to demography, morphometry or surgical procedure. At similar $BIS_{40\text{-}60}$ (73 ± 14 vs 71 ± 13), propofol (5.0 ± 1.7 vs 5.6 ± 1.8 $mg.kg^{-1}.h^{-1}$, p=0.004) and remifentanil (0.18 ± 0.09 vs 0.21 ± 0.10 $\mu g.kg^{-1}.min^{-1}$, p=0.029) consumptions decreased with the coadministration of N_2O (N_2O_{women} vs Air_{women} group respectively). No cases of awareness with recall were recorded.

Conclusions: The Dual-loop controller allowed an unbiased administration of propofol and remifentanil. These results demonstrated that the sparing effect of N_2O on propofol and remifentanil consumption is related to gender. N_2O coadministration allowed significant decrease of propofol and remifentanil consumption in women but the impact is not clinically relevant.

References:

1. Liu et Al. Anesth&Analg in Press.

Society for Technology in Anesthesia Upcoming Events

IARS ANNUAL MEETING

Westin Bayshore Hotel - Vancouver, British Columbia, Canada

Problem Based Learning Discussion:

"Airway Imaging, Gadgets, Algorithms and Physics- Exploring the Clinical Technologies Behind Modern Airway Management"

Saturday, May 21, 2011 7:00am - 8:00am

STA Panel

"Imaging Future Developments in Anesthesia Technology"

Saturday, May 21, 2011 4:15pm-5:45pm

ASA ANNUAL MEETING

Chicago, Illinois

STA Board of Directors Meeting

Sunday, October 16, 2011 8:00am - 2:00pm

Ty Smith Dinner

Sunday, October 16, 2011 6:30pm Cocktails & 7:00pm Dinner

RIVA Crabhouse

Located on NAVY PIER

6:30pm Cocktails

7:00pm Dinner with Presentation To Follow

Speaker

Stuart Hameroff, MD is a *Professor of Anesthesiology & Psychology University of Arizona Tucson and a world renowned expert on consciousness*

Registration Opens May 1, 2011

STA Member & STA Guest of Members: $100 per person

Non Members: $125 per person

**** Pre-Registration is REQUIRED***

Breakfast Panel:

"Communication Technology in the Operating Room: Today & Tomorrow"

Monday, October 17, 2011 7:00am - 8:15am

STA 2012 ANNUAL MEETING

Four Seasons Resort- Palm Beach, FL January 18-21, 2011

Abstract Submissions Opens: June 1, 2011

Engineer Challenge Submission Open: September 1, 2011

Registration Opens: July 1, 2011

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