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CMBES/SCGB Monthly e-Bulletin

February 2017

Message From the President

From the desk of the CMBES President, Martin Poulin

Greetings Biomed Community,

I was very pleased to see the response to our questionnaire on the supportability issues faced by Clinical Engineering departments across Canada. The next challenge is to work together to try to affect change with some vendors. Perhaps a collective and collaborative approach with some of these vendors will help us move to providing better quality repair services for our customers.

Please plan to attend the Winnipeg conference in May as that is the opportunity to discuss face to face how to move forward with some of these national initiatives. The conference is coming together well so start planning and justifying your need to attend our national conference.

Regards,

Martin

Message du président

Du bureau du président de SCGB, Martin Poulin

Salutations Communauté de Biomed,

J'ai été très heureux de voir la réponse à notre questionnaire sur les problèmes rencontrés pour l'entretien des équipements auxquels sont confrontés les services de génie clinique partout au Canada. Le prochain défi est de travailler ensemble pour essayer de produire un changement avec certains fournisseurs. Peut-être une approche collective et collaborative avec certains de ces fournisseurs nous aidera à fournir des services de réparation de qualité encore plus grande pour nos clients.

S'il vous plaît, commencez vos préparatifs pour assister à la conférence de Winnipeg en mai, car c'est l'occasion de discuter en face à face avec les collègues de la façon de faire avancer certaines de ces initiatives nationales. La préparation de la conférence avance bien, alors commencez à planifier et à justifier votre besoin d'assister à notre conférence nationale dès maintenant.

Cordialement,

Martin

Message from the Vice President

From the Desk of the CMBES Vice President, Mike Capuano

I would like to thank the hundreds of biomedical professionals who took time to complete

the survey on Supportability of Medical Devices. It closed last month with a total of 232 responses. We hope to complete the analysis soon so results can be discussed at this year's conference.

Welcome to New CMBES Members!

From the desk of the Membership Committee Chair, Sarah Kelso

Please join me in warmly welcoming the following new members to CMBES (memberships approved Dec 2016 – Jan 2017). If you see any familiar names, please take the time to personally welcome these new members to our Society.

Carla Francisco
Cliff Benson
Jody Lavery

Maan Manao
Rutvik Patel
Sreeraman Rajan

Avril Sullivan
Joesph Morgan
Rifat Syed

Update on the CMBEC40 Conference

From the desk of the CMBEC40 Committee Chair, Kyle Eckhardt

Dear Colleagues,

The CMBEC40 Organizing Committee is keen to announce two of your Keynote Speakers! We are honoured to introduce two incredible speakers who also hail from Winnipeg.

Tim Hague Sr. has been a Registered Nurse for over twenty years and, along with his son, Tim Jr. are the first ever winners of the Amazing Race Canada. Tim is also a tireless advocate for people living with Parkinson's Disease. Tim has cared for Parkinson's patients as a nurse, as a son to his step-father and is currently living with Parkinson's himself. Tim's close and personal affiliation with the disease, his continued pursuit of physical activity and deep compassion are shining examples of one's ability to "Live your Best." Tim will be the conference's opening speaker on Wednesday May 24th, 2017.

Charles "Chuck" LaFleche is the President and CEO of the St. Boniface Hospital Foundation and a leader in healthcare and health informatics innovation. By founding Momentum Healthcare, Chuck endeavoured to realize the benefits of electronic clinical documentation to support both clinical and research efforts. His leadership at the helm of the St. Boniface Hospital Foundation continues to support the daily activities of 4,000 clinical staff and 250 researchers. As Diamond Jubilee medal recipient in 2012, Chuck was recognized for his significant achievements and contributions to the community and to the health system in Manitoba. Chuck will be speaking about the important role that Foundations play in linking clinical care, academic and research initiatives and fostering a community of innovation and philanthropy. Chuck will give his keynote address to the conference on Thursday May 25th, 2017.

A friendly reminder that the deadline to submit practice, academic and research papers for the conference is **February 17th, 2017**. Please submit your [papers](#) using our online tool, [Exordo](#). Submissions will be reviewed and the authors notified of acceptance by March 17th, 2017.

Registration for the conference will open in the coming week so get your travel and attendance requests ready! We are so looking forward to hosting you in the great city of Winnipeg from May 23rd to 26th, 2017.

Call for Nominations – CMBES 2017 Awards

From the Desk of the Awards Committee Chair, Evelyn Morin

This is your reminder to submit your nominations for the 2017 CMBES Awards and Special Memberships to recognize members of the Society who are making or have made significant contributions to Biomedical Engineering and technology in Canada. Awards include the Outstanding Canadian Biomedical Engineer, Outstanding Canadian BMET, Early Career Achievement Award, and special memberships include Fellow, Emeritus, and Honorary member. Criteria for the awards and special memberships, and information on how to submit a nomination, can be found on the [Awards page](#).

If you know a CMBES member who is deserving of an award or special membership, please consider submitting a [nomination](#). The deadline for receiving nominations is February 28th, 2017.

Congratulations to the CHEO team on Winning CED Teamwork Award!



IFMBE

International Federation of Medical and
Biological Engineering

Clinical Engineering Division (CED)

Clinical Engineering Awards Committee

Dr. Marie-Ange Janvier, PEng
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September 29th, 2016

Dear Dr. Janvier:

It is with great pleasure that the IFMBE/Clinical Engineering Division (<http://cedglobal.org/>) Awards Committee would like to inform you that the Clinical Engineering Team at the Children's Hospital of Eastern Ontario has been chosen by an international panel of reviewers to receive the 2016 IFMBE-

award. Awards are given by an international panel of reviewers to receive the IFMBE/ CED Clinical Engineering Outstanding Teamwork Award. This award recognizes an individual or a group that has fostered and facilitated cooperation between healthcare technology managers to successfully achieve outstanding impact on the Clinical Engineering field. Two awards are given each year.

The criteria for this award are broken down into three main categories: Professional Collaboration, Impact, and Leading Change. In each category, the Awards Committee determined that your team has demonstrated excellence in a wide range of relevant activities over an extended period of time. It was clear to the reviewers that you function very much as a team, with encouragement from leadership and recognition of each team member's efforts.

Congratulations on receiving this award.

To fill the gap in global recognition of Clinical Engineering professionals who have made outstanding contributions to the field of Clinical Engineering and patient outcomes, the IFMBE/CED has established an Awards Committee led by global experts, who are members of or affiliated with the CED Board. The related recognition program recognizes significant contributions to the field and the promotion of outstanding achievements in three categories:

- A) Clinical Engineer Individual Award (one award every three years)
- B) Clinical Engineering Outstanding Teamwork Award (two awards per year)
- C) Best Clinical Engineering Manuscript Award (two awards per year)

Your award plaque reads as follows:



The presentation of the award will take place at an IFMBE, or IFMBE-sponsored, event, to be mutually arranged. Please let me know if you have plans to attend such an event in the next while. A certificate and a plaque will be awarded.

Respectfully,

Tony Easty, PhD, PEng, CCE
Chair, IFMBE/CED Awards Committee

Cc: file

CMBES Membership Spotlight

From the desk of the Professional Affairs Committee Chair, Andrew Ibey

This month's member spotlight is from the CMBES member from the University of Ottawa Heart Institute. Their research was published in the journal of PACE vol.39 in October 2016.

Overview:

The concept of defibrillation has been well established: simultaneously depolarize a critical mass of the myocardium to terminate fibrillatory activity in hopes that sinus rhythm is restored. Factors limiting current flow through the myocardium are the patient's transthoracic impedance and the selected energy of the shock. While manufacturers employ biphasic technology within their devices, most limit the available energy to 200J. In cases of unsuccessful cardioversion with 200J, there are limited evidence-based options available to clinicians to improve the current flow. In this paper we illustrate that applying external force to the self-adhesive defibrillation electrodes can reduce the transthoracic impedance (TTI), suggesting that this maneuver could improve cardioversion success rates.

Highlights:

Key points stemming from this research included:

There is a strong correlation between a patient's body mass index (BMI) and their TTI.

Applying force to self-adhesive electrodes significantly reduces TTI. The force applied by clinicians varies widely. The largest reduction was seen when clinicians were prompted to apply force equivalent to a "push-up".

Scope of the Project:

The scope of the project was twofold: to; highlight the effectiveness of applying force to defibrillation electrodes in reducing TTI and to increase physician's awareness of modifying factors influencing defibrillation success. Future work employing a standardized approach may help improve success rates of cardioversion procedures.

Effect of Applying Force to Self-Adhesive Electrodes on Transthoracic Impedance: Implications for Electrical Cardioversion

F. DANIEL RAMIREZ, M.D.,* SANDRA L. Fiset, M.H.Sc.,† MARK J. CLELAND, C.B.E.T.(C),† TIMOTHY J. ZAKUTNEY, M.H.Sc., P.Eng., C.C.E.,† PABLO B. NERY, M.D.,* GIRISH M. NAIR, M.B.B.S., M.Sc.,* CALUM J. REDPATH, M.B.B.S., Ph.D.,* MOUHANNAD M. SADEK, M.D.,* and DAVID H. BIRNIE, M.B.Ch.B., M.D.*

From the *Arrhythmia Service, University of Ottawa Heart Institute, Ottawa, Ontario, Canada; and †Biomedical Engineering, University of Ottawa Heart Institute, Ottawa, Ontario, Canada

Background: Current guidelines disagree on the role for applying force to electrodes during electrical cardioversion (ECV) for atrial fibrillation, particularly when using self-adhesive pads. We evaluated the impact of this practice on transthoracic impedance (TTI) with varying force and in individuals with differing body mass indices (BMI). We additionally assessed whether specific prompts could improve physicians' ECV technique.

Methods: The study comprised three parts: (1) TTI was measured in 11 participants throughout the respiratory cycle and with variable force applied to self-adhesive electrodes in anteroposterior (AP) and anterolateral (AL) configurations. (2) Three participants in different BMI classes then had TTI measured with prespecified incremental force applied. (3) Ten blinded cardiology trainees simulated ECV on one participant with and without prompting (guideline reminders and force analogies) while force applied and TTI were measured.

Results: The AP approach was associated with 13% lower TTI than AL ($P < 0.001$). Strongly negative correlations were observed between force applied and TTI in the AL position, irrespective of BMI ($P \leq 0.003$). In all cases, 80% of the total reduction in TTI observed was achieved with 8 kg-force (~80 N). All prompts resulted in significantly greater force applied and modest reductions in TTI.

Conclusions: Applying force to self-adhesive electrodes reduces TTI and should be considered as a means of improving ECV success. Numerically greater mean force applied with a "push-up" force analogy suggests that "concrete" cues may be useful in improving ECV technique. (PACE 2016; 39:1141-1147)

cardioversion, impedance, transthoracic, electrodes, atrial fibrillation, body mass index

Introduction

Transthoracic electrical cardioversion (ECV) remains the preferred method for restoring sinus rhythm in patients with atrial fibrillation (AF)¹; however, it is unsuccessful in a sizeable minority (9–14% in contemporary reports).^{2–4} Though advances such as the advent of biphasic waveform shocks⁵ and increasingly refined patient selection for rhythm control strategies^{5,6} have improved

ECV success rates for AF, potentially higher risk options, including pretreatment with antiarrhythmic agents and delivering higher energy shocks, are often required or contemplated for those in whom the procedure fails.^{7,8} Meticulous procedural technique to maximize ECV success is, therefore, imperative as evidenced by efforts to identify optimal electrode placement, initial energy settings, and modifiable chest wall-electrode interface characteristics.^{9,10} The goal of such efforts is ultimately to increase the current delivered to the myocardium in order to depolarize the critical mass required for cardioversion by altering one or both of its major determinants: the operator-selected defibrillator energy level and the transthoracic impedance (TTI).¹¹

Though many contributors to TTI are unmodifiable patient characteristics,^{12,13} applying force to paddle electrodes has been shown to reduce TTI by improving electrical contact at the electrode-skin interface and by decreasing thoracic volume.^{12,14} Applying force to self-adhesive electrode pads may yield similar benefits; however,

Authors F. Daniel Ramirez and Sandra L. Fiset contributed equally.

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If you or your organization has published and it would be of interest to our CMBES membership, we'd like to know about it. Please contact [the secretariat](#) with a copy of your work so we can showcase in our Membership Publications Spotlight!

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