

## The Year in Cardiothoracic and Vascular Anesthesia: Selected Highlights From 2013

Harish Ramakrishna, MD, FASE,\* Benjamin A. Kohl, MD, FCCM,† Jacob T. Gutsche, MD,‡ Jens Fassl, MD,§  
Prakash A. Patel, MD,‡ Hynek Riha, MD, DEAA, FCCP,|| Kamrouz Ghadimi, MD,¶ William J. Vernick, MD,‡  
Michael Andritsos, MD,‡ George Silvey, MD, PhD,\*\* and John G.T. Augoustides, MD, FASE, FAHA‡

This article reviewed selected research highlights of 2013 that pertain to the specialty of cardiothoracic and vascular anesthesia. The first major theme is the commemoration of the sixtieth anniversary of the first successful cardiac surgical procedure with cardiopulmonary bypass conducted by Dr Gibbon. This major milestone revolutionized the practice of cardiovascular surgery and invigorated a paradigm of mechanical platforms for contemporary perioperative cardiovascular practice. Dr Kolff was also a leading contributor in this area because of his important contributions to the refinement of cardiopulmonary bypass and mechanical ventricular assistance.

The second major theme is the diffusion of echocardiography throughout perioperative practice. There are now guidelines and training pathways to guide its generalization into everyday practice. The third major theme is the paradigm shift in perioperative fluid management. Recent large randomized trials suggest that fluids are drugs that require a precise prescription with respect to type, dose, and duration. The final theme is patient safety in the cardiac

perioperative environment. A recent expert scientific statement has focused attention on this issue because most perioperative errors are preventable. It is likely that clinical research in this area will blossom because this is a major opportunity for improvement in our specialty. The patient care processes identified in these research highlights will further improve perioperative outcomes for our patients.

© 2014 Elsevier Inc. All rights reserved.

**KEY WORDS:** *cardiopulmonary bypass, Dr Gibbon, Dr Kolff, artificial heart, ventricular assist device, extracorporeal membrane oxygenation, surgical robotics, case report, basic perioperative echocardiography, transesophageal echocardiography, transthoracic echocardiography, fluid prescription, crystalloids, colloids, balanced salt solutions, normal saline, hydroxyethyl starch, goal-directed therapy, clinical trial networks, guidelines, safety culture, perioperative protocol, transition of care, human factors, health systems, leadership, professionalism*

**T**HIS ARTICLE IS THE SIXTH in the annual series for the *Journal of Cardiothoracic and Vascular Anesthesia*.<sup>1</sup> We thank our editor-in-chief, Dr. Kaplan, and the editorial board for the opportunity to continue this series, namely the research highlights of the year that pertain to the specialty of cardiothoracic and vascular anesthesia. The major themes selected for this past year are outlined in this introduction, and then each highlight is reviewed in detail in the main body of the article.

The literature highlights in our specialty for 2013 begin with the sixtieth anniversary of the first successful cardiac surgical procedure with cardiopulmonary bypass conducted by Dr. Gibbon. This major milestone revolutionized the practice of cardiovascular surgery and invigorated a paradigm of mechanical platforms for contemporary perioperative cardiovascular practice. Dr. Kolff was also a leading contributor in this area because of his important contributions to the refinement of cardiopulmonary bypass and mechanical ventricular assistance.

The second major theme in our specialty for 2013 is the diffusion of echocardiography throughout perioperative practice, including noncardiac surgery and the intensive care unit. There are now guidelines and training pathways to support and guide the implementation of this advanced technology into everyday perioperative practice. The third major theme for 2013 is the paradigm shift that is taking place in perioperative

---

From the \*Assistant Professor, Director of Cardiac Anesthesia, Mayo Clinic, Scottsdale, AZ; †Assistant Professor, Director of Critical Care, Department of Anesthesiology and Critical Care, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA; ‡Assistant Professor, Cardiovascular and Thoracic Section, Department of Anesthesiology and Critical Care, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA; §Assistant Professor, Cardiovascular and Thoracic Section, Department of Anesthesia and Intensive Care Medicine, University of Basel, Basel, Switzerland; ||Clinical Assistant Professor, Cardiothoracic Anesthesiology and Intensive Care, Department of Anesthesiology and Intensive Care Medicine Institute for Clinical and Experimental Medicine, Prague, Czech Republic; ¶Senior Fellow, Cardiovascular and Thoracic Section, Department of Anesthesiology and Critical Care, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA; ‡Clinical Associate Professor, Director of Cardiothoracic and Vascular Anesthesiology, Department of Anesthesiology, Ohio State University, Columbus, OH; and \*\*Professor, Anesthesiology and Critical Care, Icahn School of Medicine, Mount Sinai Hospital, New York, NY.

Address correspondence and reprint requests to John G. T. Augoustides, MD, FASE, FAHA, Associate Professor, Cardiothoracic Section, Anesthesiology and Critical Care, Dulles 680, HUP, 3400 Spruce Street, Philadelphia, PA, 19104-428. E-mail: [yiandoc@hotmail.com](mailto:yiandoc@hotmail.com)

© 2014 Elsevier Inc. All rights reserved.

1053-0770/2601-0001\$36.00/0

<http://dx.doi.org/10.1053/j.jvca.2013.10.018>

fluid management. Recent large randomized trials have refined the idea that fluids should be viewed as drugs that should be precisely prescribed with respect to type, dose, and duration. The final theme for 2013 is patient safety in the cardiac perioperative environment. A recent expert scientific statement has focused considerable attention on this issue because most errors are preventable. It is likely that clinical research in this area will blossom because this is a major opportunity for improvement in our specialty. The themes selected for this sixth highlights article have only sampled the advances in our specialty for 2013. The patient care processes identified in these highlights will further improve perioperative outcomes for our patients.

#### THE 60TH ANNIVERSARY OF CARDIOPULMONARY BYPASS

In October 1931 at the Massachusetts General Hospital, John H. Gibbon Jr witnessed the death of a 53-year-old woman from acute pulmonary embolism, despite heroic surgery.<sup>2-3</sup> This experience sparked the idea of cardiopulmonary bypass (CPB), which led this remarkable surgical pioneer to develop a CPB model and then to conduct the first successful cardiac operation with CPB on May 6, 1953 at Thomas Jefferson University in Philadelphia.<sup>2-4</sup> The patient was an 18-year-old college student with severe right ventricular heart failure secondary to a large atrial septal defect.<sup>2</sup> The closure of the atrial septal defect was repaired on CPB by Gibbon with a total CPB time of 45 minutes. The patient recovered uneventfully. Although there were earlier cardiac surgical procedures with CPB, Gibbon and his team were responsible for the first successful case, fulfilling the dream held by a surgical research fellow in Boston more than 20 years previously.<sup>2-4</sup> This case was reported by Gibbon at a surgical symposium held shortly thereafter.<sup>5</sup> John H. Gibbon is therefore a founding father of CPB, which has become a cornerstone in the conduct of cardiac surgery in the contemporary era for the full spectrum of procedures.

The first consequence of this major milestone in our specialty has been gradual evolution of mechanical applications within the scope of CPB and beyond to include ventricular assist devices, extracorporeal membrane oxygenation, and robotics, all of which have been comprehensively reviewed recently in the Journal.<sup>6-12</sup> This set of indications for mechanical devices have been responsible for gradual paradigm shifts within our specialty and throughout anesthesiology and critical care.

The second consequence of this major milestone has been the singular importance of seminal case reports, which, despite the drift to randomized trials within perioperative cardiothoracic practice, retain a vital niche, as outlined in a superb recent editorial in the Journal.<sup>13</sup> The transformative power of case reports in our specialty since Gibbon have included Barnard's description of the first successful heart transplant in 1967, Kaplan's description of electrocardiographic lead V<sub>5</sub> monitoring in 1976, Kaplan's description of intravenous nitroglycerin in adult cardiac surgical patients, the advent of percutaneous coronary intervention in 1978, vasopressin for hemodynamic rescue in challenging pheochromocytoma resections in 2004, and the recent recognition of hormonal resection as a

therapeutic option for severe gastrointestinal bleeding associated with ventricular assist devices.<sup>14-19</sup> Case reports retain a niche because they may be hypothesis generating and may lead to significant progress in the practice and safety of our specialty.<sup>13</sup> Although case reports are rarely cited and deflate the impact factor of a major Journal, there remains a strong consensus to publish outstanding case reports in our Journal, given their aforementioned merits.<sup>13</sup>

The consequences of the landmark clinical achievements of John H. Gibbon forever transformed cardiovascular perioperative practice. The pervasive influence of CPB and related mechanical circulatory approaches are clearly evident in the educational content of leading contemporary professional societies in cardiovascular and thoracic anesthesiology such as the Society of Cardiovascular Anesthesiologists (full meeting details available at [www.scahq.org](http://www.scahq.org), last accessed October 5, 2013), the European Association of Cardiothoracic Anaesthesiologists (full details available at [www.eacta.org](http://www.eacta.org), last accessed on October 6, 2013), the Indian Association of Cardiovascular and Thoracic Anaesthesiologists (full meeting details available at [www.iacta2014.com](http://www.iacta2014.com), last accessed on October 8, 2013), and the Chinese Society of Cardiovascular and Thoracic Anesthesiologists (full meeting details available at [www.csaol.cn](http://www.csaol.cn), last accessed on October 7, 2013). Despite the amazing progress in CPB and mechanical circulatory support in the last 60 years, the frontiers are still advancing with multiple current controversies, including CPB monitoring and ventricular assist devices, which have invigorated the pro/con section of the Journal.<sup>20-23</sup>

The Journal also published this year a special article as a tribute to Dr. W. J. Kolff, an intellectual giant in the development of mechanical organ support.<sup>24</sup> Before his immigration to America, Dr. Kolff made major strides in his early experiments with dialysis and CPB. After his immigration to America, Dr. Kolff had a prestigious career, based initially at the Cleveland Clinic (1950-1967) and then at the University of Utah (1967-1997). This remarkable physician-scientist was a founding member of the American Society for Artificial Internal Organs and in his sustained career made important contributions to the development of clinical dialysis, CPB, and the total artificial heart.<sup>24</sup> Because of these multiple innovations, it is beyond doubt that he has contributed significantly to contemporary perioperative cardiovascular practice.<sup>24</sup> Our specialty has been significantly influenced by the seminal contributions of cardiovascular pioneers such as Dr. Gibbon and Dr. Kolff. The paradigm shifts in cardiothoracic and vascular anesthesia that have resulted from the contributions of these perioperative pioneers have opened new worlds that continue to be explored for the achievement of excellence in the care of our patients.<sup>2,24</sup>

#### THE DIFFUSION OF ECHOCARDIOGRAPHY THROUGHOUT PERIOPERATIVE PRACTICE

Perioperative echocardiography as a skill set has become a standard feature in the contemporary practice of cardiac anesthesia with guidelines published beginning in 1999 for transesophageal, epicardial, and epiaortic imaging. A controversy has recently developed regarding whether general

Download English Version:

<https://daneshyari.com/en/article/5884175>

Download Persian Version:

<https://daneshyari.com/article/5884175>

[Daneshyari.com](https://daneshyari.com)