The Heart Rhythm Society (HRS)/American Society of Anesthesiologists (ASA) Expert Consensus Statement on the Perioperative Management of Patients with Implantable Defibrillators, Pacemakers and Arrhythmia Monitors: Facilities and Patient Management: Executive Summary

This document was developed as a joint project with the American Society of Anesthesiologists (ASA), and in collaboration with the American Heart Association (AHA), and the Society of Thoracic Surgeons (STS)

George H. Crossley, MD, FHRS,[1] Jeanne E. Poole, MD, FHRS,[2] Marc A. Rozner, PhD, MD,[3*] Samuel J. Asirvatham, MD, FHRS,[4] Alan Cheng, MD,[5!] Mina K. Chung, MD, FHRS,[6] T. Bruce Ferguson, Jr., MD,[7##] John D. Gallagher, MD,[8*] Michael R. Gold, MD, PhD, FHRS,[9#] Robert H. Hoyt, MD,[10] Samuel Irefin, MD,[11*] Fred M. Kusumoto, MD, FHRS,[12] Liza Prudente Moorman, MSN, ACNP, FHRS,[13] Annemarie Thompson, MD[14*]

From [1]St. Thomas Research Institute and University of Tennessee College of Medicine, Nashville, Tennessee, [2]University of Washington, Seattle, Washington, [3]University of Texas, Department of Anesthesiology and Perioperative Medicine, Houston, Texas, [4]Mayo Clinic, Rochester, Minnesota, [5]Johns Hopkins University School of Medicine, Baltimore, Maryland, [6]Cleveland Clinic, Department of CV Medicine, Cleveland, Ohio, [7]East Carolina Heart Institute, Department of Cardiovascular Sciences, Greenville, North Carolina, [8]Dartmouth Medical School, Hanover, New Hampshire, [9]Medical University of South Carolina, Charleston, South Carolina, [10]Iowa Heart Center, West Des Moines, Iowa, [11]Cleveland Clinic, Department of Anesthesiology, Cleveland, Ohio,[12]Mayo Clinic, Jacksonville, Florida,[13]University of Virginia Health Systems, Charlottesville, Virginia, and [14]Vanderbilt University Department of Anesthesiology, Nashville, Tennessee.

[*]Representing the American Society of Anesthesiologists.

[#]Representing the American College of Cardiology Foundation.

[!]Representing the American Heart Association.

[##]Representing the Society of Thoracic Surgeons.

Preamble

The purpose of this document is to provide an expert consensus on the management of patients with cardiovascular implantable electronic devices (CIEDs) during and after surgical or medical procedures. This writing group, appointed by the Heart Rhythm Society (HRS) and the American Society of Anesthesiologists (ASA), is a representative group of experts in pacemaker and defibrillator management. Each of the authors is an expert in the management of CIEDs in the setting of medical procedures that might interfere with their function. The writing and reference groups are described in the main article. This statement represents the consensus of the writing committee. In generating its consensus, the committee reviewed a large body of literature, which consists mainly of case reports and small series of cases. There are no randomized controlled trials and very few case series to rely upon; therefore, many of the recommendations are based upon the extensive experience of the

ABBREVIATIONS **ASA** = American Society of Anesthesiologists; **ATP** = antitachycardia pacing; **CIED** = cardiovascular implantable electronic device; **CIED team** = the physician, nurse, and technicians who care for the patient's CIED; **CRT-D** = cardiac resynchronization therapy defibrillator; **CT** = computed tomography; **ECT** = electroconvulsive therapy; **EOL** = end of life; **ERI** = elective replacement indicator; **EMG** = electromyography; **EMI** = electromagnetic interference; **GI** = gastrointestinal; **HRS** = Heart Rhythm Society; **ICD** = implantable cardioverter-defibrillator; **IEAP** = industry-employed allied professional; **ILR** = implantable loop recorder; **J** = joule; **LV** = left ventricle; **perioperative team** = the anesthesiologist, surgeon, and/or other physicians and nurses associated with the procedure and the preparation for that procedure; **PM** = pacemaker; **RF** = radiofrequency; **RFID** = Radio frequency identification; **TENS** = transcutaneous electrical nerve stimulation; **TUNA** = transurethral needle ablation; **TURP** = transurethral resection of the prostate (Heart Rhythm 2011;8:e1–e18)

Endorsed by the Heart Rhythm Society, the American College of Cardiology Foundation and the American Heart Association. **Address reprint requests and correspondence:** Sonja Olson, Heart Rhythm Society, 1400K Street, NW, suite 500, Washington DC 20005. E-mail: solson@hrsonline.org.

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writing group. Consequently, there has been no assignment of levels of evidence. The consensus document is intended to provide guidance to health care professionals who care for patients with CIEDs. It is especially intended to give CIED professionals guidance in the provision of an appropriate prescription for the perioperative care of patients with CIEDs. In preparing this Executive Summary, we have emphasized those aspects we believe best reflect the overall intent and content of the consensus document.

Consensus document: The document represents the consensus of the writing committee, which was developed as described above. In writing a "consensus" document, it is recognized that consensus does not mean that there was complete agreement among all writing group members. The expert panel identified those aspects of perioperative management of CIEDs for which a true "consensus" could be achieved. Surveys of the entire writing group were used to identify these areas of consensus. For the purposes of this document they defined a consensus as 85% or greater agreement by the authors of this document.

Appropriate use of the consensus document: When using or considering the guidance given in this document, it is important to remember that there are no absolutes with regard to many clinical situations. The ultimate judgment regarding care of a particular patient must be made by the health care provider and patient in light of all the circumstances presented by that patient, the management options available, as well as the relative risks and benefits. This document focuses on the management of patients with CIEDs who are undergoing medical procedures. The writing committee focused specifically on perioperative management of the CIED and explicitly excluded issues concerning magnet resonance imaging because of the evolving technology in that area. Further, they did not address the wider arena of the assessment of the perioperative clinical risk of these patients, many of whom have medical conditions that remarkably increase their surgical risk. Certain details have been removed from this executive summary. We recommend reading the entire article for a comprehensive review.

Introduction

The perioperative period poses unique challenges to assure a high degree of patient safety for patients with pacemakers and defibrillators. The potential problems that can occur in patients with a CIED in the perioperative setting are detailed. We provide recommendations for the appropriate preoperative evaluation, intraoperative management and postoperative care of the patient with a CIED undergoing medical procedures. Table 1 displays our general areas of consensus.

We strongly believe that the best perioperative care of a patient with a CIED will result from the CIED team providing a specific prescription for CIED management to the procedural team. Information regarding the nature of the planned procedure and potential risks for the patient with a CIED must be shared with the CIED team in order for this prescription to be formed. It is our strong consensus that physicians without experience in CIED management will have a difficult time navigating through the morass of technological differences and recommendations. Therefore, we strongly recommend that the patient's own CIED team (or another available CIED team) give the operative team recommendations for the perioperative management of the CIED.

Table 1 General principles of CIED management

- The perioperative management of CIEDs must be individualized to the patient, the type of CIED and the procedure being performed. A single recommendation for all CIED patients is not appropriate
- A CIED team is defined as the physicians and physician extenders who monitor the CIED function of the patient
- The surgical or procedural team should communicate with the CIED team to identify the type of procedure and likely risk of EMI
- The CIED team should communicate with the procedure team to deliver a prescription for the perioperative management of patients with CIEDs
- For most patients, the prescription can be made from a review of the records of the CIED clinic. A small percentage of patients may require consultation from CIED specialists if the information is not available
- It is inappropriate to have industry-employed allied health professionals independently develop this prescription

Most patients will not need a *de novo* preoperative evaluation by the CIED management team as generally the required information resides in the records of the CIED clinic. If this information is not accessible, the next best approach is to have an available CIED team evaluate that patient and provide a recommendation and the necessary communication to the operative team. However, it is not appropriate for the perioperative evaluation and prescription to be determined and delivered by an industry-employed allied professional (IEAP).[1] We strongly support the prior HRS recommendations that representative members of the CIED manufacturers cannot be placed in a position of medical responsibility to provide independent prescriptive recommendations or independent post-operative CIED care. That is well beyond their scope of practice.[1] That is not to say that an IEAP cannot assist with the technical part of that evaluation as long as the IEAP is under the supervision of a physician experienced in CIED management.

Problems unique to the CIED patient and electromagnetic interference risk during surgical or medical procedures

Electromagnetic interference

EMI causing malfunction of pacemakers and defibrillators is well-described[2] and is the most common problem occurring in patients with CIEDs. The perioperative period is particularly problematic as patients are exposed to a number