CURRICULUM
GOALS AND OBJECTIVES
CLINICAL CARDIOVASCULAR ELECTROPHYSIOLOGY
TRAINING PROGRAM

University of Florida
Gainesville, Florida

1. Mission Statement

   To achieve excellence in the training of fourth year cardiology fellows in the diagnosis and management of arrhythmic disorders and symptoms, including noninvasive and invasive diagnostic and therapeutic modalities with implantation of pacemakers, cardioverter-defibrillators (ICDs), upright tilt table testing and cardiac electrophysiology study, radiofrequency ablation of superventricular, and ventricular arrhythmias. Both a comprehensive work-up and post procedure follow-up of these patients is also an essential component of their learning.

2. Program Goals, Objectives, and Competencies

   A. The objectives of the program are to learn fully the indications, contraindications, risks, limitations, sensitivity, specificity, predictive accuracy, and appropriate diagnostic techniques for evaluating patients with a wide variety of rhythm disorders. Fellows will also learn to choose appropriate therapeutic modalities for patients with cardiac arrhythmias and learn the technical skills for implementing these therapies, including pacemaker and defibrillator implantation, diagnostic electrophysiologic studies, radiofrequency catheter ablation of supraventricular and ventricular arrhythmogenic focus. Fellows will learn the indications for, proper use of, pharmacokinetics, and side effects of antiarrhythmic drugs as well. The types of arrhythmia disorders about which the fellow is expected to become expert over the course of instruction include:
      1. Sinus node function
      2. AV nodal and intraventricular conduction
      3. Supraventricular arrhythmias including atrial fibrillation
      4. Ventricular arrhythmias both idiopathic and ischemic
      5. Clinical conditions including unexplained syncope, aborted sudden death, palpitations, Wolff-Parkinson-White syndrome, and long QT syndrome
      6. Neurocardiogenic syncope

   B. The content will be gained during educational conferences and teaching rounds, outpatient longitudinal clinic experiences, outpatient/inpatient consultations, pacemaker clinic, ICD clinic, by the care of patients before,

during, and after, electrophysiologic studies, during preoperative and postoperative arrhythmia management, and by the performance and analysis of noninvasive and invasive tests, including electrophysiologic studies, electrocardiography, therapeutic electrophysiologic procedures, pacemaker implantation, defibrillator implantation, and arrhythmia surgery. By the time of completion of training, the fellow will be expected to have become highly proficient in all aspects of clinical cardiac electrophysiology. In addition, the fellow will participate in research and scholarly activity.

C. ACGME competency-based education:

1. Medical knowledge of clinical electrophysiology is gained through clinical teaching, lectures, seminars and conferences including journal club and procedural workshops. The fellows should demonstrate an investigatory and analytic thinking approach to clinical situations and know and apply the basic and clinically supportive sciences that are appropriate for clinical electrophysiology.

2. Patient care must be compassionate, appropriate, and effective for the treatment of patients with arrhythmia. In addition, lifestyle modifications should be addressed for primary prevention. This competency can be gained through clinical teaching, lectures, seminars, conferences, workshops, and most importantly self directed learning through case-based scenarios or modules. The fellows should be able to communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families. They should be able to gather essential and accurate information about their patients and make informed decisions about diagnostic and therapeutic interventions based on patient information, preferences, up-to-date scientific evidence, and clinical judgment. The fellows should develop and carry out patient management plans, counsel and educate patients and their families, and use information technology to support patient care decisions and patient education. They should be able to perform competently all medical and invasive procedures considered essential for clinical cardiac electrophysiology. In addition, patient education on primary prevention and maintenance of health is essential for effective treatment of arrhythmia.

3. Practice based learning and improvement should be performed on a daily basis and emphasized through lectures, seminars, conferences including journal club, quality improvement projects, research projects, and clinical teaching. The fellows should analyze practice experience and perform practice-based improvement by obtaining information about the population of patients that are being cared for. Also they should use evidence based medicine and knowledge gained from study designs and statistical methods for diagnostic and

therapeutic care of their patients. In addition, fellows are expected to facilitate the learning of students and other health care professionals.

4. Systems based practice should be performed through awareness of health care system and its resources to provide optimal care for patients. This can be emphasized through clinical teaching, patient safety projects, systems based approach to M&M, and other lectures and conferences. The fellows should know how types of medical practice and delivery systems differ from one another, including methods of controlling health care costs and allocating resources. The fellows should practice cost effective health care and resource allocation that do not compromise quality of care. They should be an advocate for quality patient care and partner with other health care providers.

5. Professionalism is an essential characteristic of a physician. Fellows should demonstrate respect, compassion and integrity with adherence to ethical principles and sensitivity to patients' culture, age, gender and disabilities. This should be emphasized through clinical teaching; case based teaching, mentoring, role modeling, clinical vignettes, and ethics committee.

6. Interpersonal and communication skills result in effective information exchange and teaming with patients, their families, and professional associates. Fellows should create and sustain a therapeutic and ethically sound relationship with patients. They should use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills. In addition, residents must work effectively with others as a member or leader of a health care team. Interpersonal and communication skills are developed and improved through clinical teaching, role modeling, case based teaching, grand rounds, presenting lectures and conferences, writing abstracts, presenting a poster, and scholarly articles.

3. Formal instruction through weekly seminars and conferences and monthly journal clubs will be provided in:

A. Basic cardiac electrophysiology, including but not limited to the genesis of arrhythmias, normal and abnormal electrophysiologic responses, autonomic influences, and the effects of ischemia, drugs and other interventions.
B. Genetic basis of pathological arrhythmias
C. Epidemiology of arrhythmias
D. Clinical cardiac electrophysiology
E. Arrhythmia control device management
F. Clinical trials of arrhythmia management and their impact on clinical practice.

G. Critical review of the literature.

4. CCEP fellows will spend a minimum of twelve months rotating on the Clinical Electrophysiology Service of Shands Hospital at the University of Florida. This time will be distributed among well-defined experiences in a number of specific settings listed below, which are designed to assure that all the educational objectives are met:

A. Electrophysiology Laboratory

The electrophysiology laboratory experience will result in mastery of the accepted indications for invasive electrophysiologic procedures, techniques, pre and post-operative management, and all the technical aspects of diagnostic and therapeutic procedures in patients with cardiac arrhythmias. It will be assured that there is a sufficient range of patients with major disorders including sinus node dysfunction, AV and intraventricular block, supraventricular and ventricular arrhythmias, Wolff-Parkinson-White syndrome, unexplained syncope, sustained ventricular tachycardia and aborted sudden death, and palpitations. The CCEP fellow is expected to master the techniques of venous and arterial catheterization, catheter placement, stimulation of the heart and interpretation of the effects of stimulation, paced induction and termination of tachycardias, the evaluation of complex electrophysiologic phenomena, the recording and interpretation of catheter signals during ablation, direct observation of the electrophysiologic effects of antiarrhythmic agents, the effective and safe performance of catheter ablation, and emergency management of intractable arrhythmias.

B. Inpatient and Outpatient Consultations

The CCEP fellow will attain mastery of arrhythmia consultation on patients with entire spectrum of arrhythmia disorders. The settings in which consultations will be performed include the CCU, SICU, MICU, inpatient wards, outpatient clinics, and emergency department.

C. Intensive Care Units

The CCEP fellow will acquire the skills of arrhythmia management in the ICU setting by actively participating in the care of critically ill patients having recurrent arrhythmias. This experience will include the proper use of antiarrhythmic agents, pacing, defibrillation, cardiopulmonary resuscitation, evaluation for ischemia, and arrhythmia ablation.

D. ICD Implantation

The CCEP fellow will achieve expertise in the evaluation of patients for ICD implantation, implantation of non-thoracotomy ICD systems, defibrillation threshold testing; and testing of anti-tachycardia pacing and low energy cardioversion. The fellow will master the indications for ICD placement and will become skilled at device interpretation, programming, and post-operative management.

E. Pacemaker Implantation

The CCEP fellow will learn the techniques and become skilled in permanent pacemaker prescription, implantation, intraoperative testing, and post-operative management.

F. Longitudinal Outpatient Clinic

The CCEP fellow will acquire mastery of the initial evaluation and longitudinal follow-up of patients with arrhythmic symptoms and diagnosis. This experience will include assessment of patients for the efficacy and side effects of chronic drug or device therapy, and the diagnosis and management of concomitant conditions that might exacerbate arrhythmias. In addition, the CCEP fellow will master the outpatient evaluation of patients referred for arrhythmia consultation.

The CCEP fellow will master the techniques of pacemaker follow-up, reprogramming, indications for device replacement, and evaluation of defective leads.

The CCEP fellow will master the techniques of outpatient management of patients with implanted arrhythmia devices, including device interpretation and reprogramming, interpretation of delivered therapies, interpretation of stored intracardiac electrograms, and determination of the indications for device replacement.

G. Non-invasive Testing

The fellow will obtain experience in the interpretation of electrocardiograms, ambulatory ECG recordings, continuous in-hospital ECG recording, exercise stress tests, transtelephonic ECG readings, relevant imaging studies, such as chest radiography, and tilt table testing during inpatient and outpatient rotations.

H. Educational Conferences

The fellow will attend conferences to compliment his or her patient care educational activities. These conferences will include journal club (once/month), case conferences (at least once/month), ECG conference (at least once/month), didactic lectures, including basic science (once/month), weekly research meetings and a monthly research conference, and clinical electrophysiology teaching rounds.

I. Research Experience

The CCEP fellow will participate in research pertaining to clinical or basic electrophysiology. A meaningful experience will include discussion of hypothesis and study design, data acquisition, data analysis and submitting the study for peer review.