

## Highlights from the 5th Kansas City Heart Rhythm Symposium

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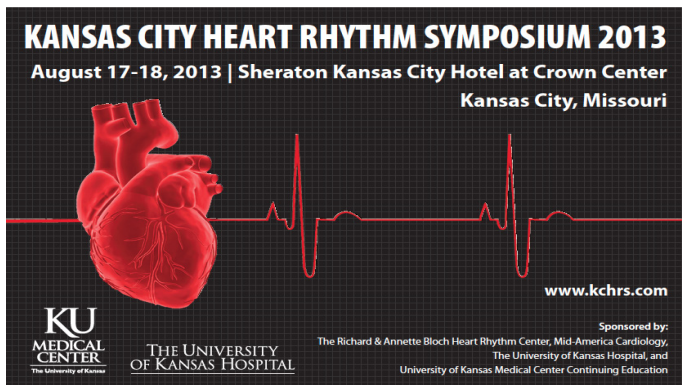
*The University of Kansas Medical Center*

Kansas City Heart Rhythm Symposium (KCHRS), the annual heart rhythm symposium of the Kansas City area returned back in its 5th year to a fantastic reception from the audiences who have been eagerly waiting for this event. Since its inception in 2009, this event has become a great success story and is becoming bigger and better with each passing year. This conference is a great platform that brings together experts in the field of electrophysiology to share their innovative work and experience with other health care providers in the Midwest area. Dr. Dhanunjaya Lakkireddy, Professor of Medicine at the University of Kansas Medical Center was the course director for this year's KCHRS. We bring to you the highlights and presentations from the 5th KCHRS held on August 17-18, 2013 at Sheraton Kansas City Hotel, Crown Center Kansas City.

approach, assessing reverse modeling via ECHO at 6 months and optimizing the AV interval.

Dr. John Day, Medical Director of the Intermountain Heart Rhythm Services then presented an interesting talk on the role of atrial fibrillation (AF) in causing dementia. He emphasized that many of the risk factors for dementia and AF were the same and AF doubled the risk for dementia. He also stressed on the potential role of chronic anticoagulation related microbleeds and how these microbleeds increased the progression of dementia. Besides, AF causes fluctuations in cerebral blood flow and significant systemic inflammation, thus contributing to the pathogenesis of dementia. Dr. Day then presented data to support that ablation of AF decreases the risk for stroke and dementia. He also reiterated the role of aggressive risk factor management such as treating hypertension; screening for sleep apnea as accessory steps in preserving cognitive function.

Dr. Niraj Varma from the Cleveland Clinic was the next speaker. He spoke about the importance of maintaining electrical synchrony in order to preserve mechanical synchrony. He discussed the strategies to identify the optimal candidate for CRT placement and steps needed to ensure adequate response to CRT. He also discussed the role of CRT in AF and presented data from studies that have shown benefit of CRT in optimizing heart failure in patients with AF. He also stressed on the importance of avoiding right ventricular pacing as it may create a physiological left bundle branch block and therefore can worsen heart failure. Further, he discussed how CRT is beneficial in improving renal function in patients with heart failure and decreased glomerular filtration rate.



### KANSAS CITY HEART RHYTHM SYMPOSIUM 2013

#### Day-1 August 17th, 2013

After the curtain raiser by the course director, Dr. James Daubert, Professor of Medicine at the Duke University delivered the opening presentation on CRT non-responders. He remarked that nearly 2/3rd of the patients responded to CRT and that the effects were quite dramatic. He explained that the response in therapy was due to remodeling of the heart. Dr. Daubert then stated that the reasons for lack of response to CRT were multifactorial. He suggested improving the biventricular pacing to nearly 100%, which requires frequent optimizations of the pacing intervals as ways to maximize cardiac output. Dr. Daubert also suggested other strategies to improve response to CRT such as, having two left ventricular leads, endocardial placement of left ventricular lead via trans-septal



**Course Director Dr. Dhanunjaya Lakkireddy starting the proceedings of the 5th KCHRS**



**Dr. Andrea Natale during his presentation on adjunctive strategies in improving the outcomes of non-paroxysmal AF ablation**

Dr. Albert Waldo was awarded with the Kansas University Pioneer in Cardiovascular Electrophysiology Award for his countless and distinguished contributions to the field of electrophysiology. Dr. Albert Waldo is Professor of Medicine at the Case Western Reserve University and was the keynote speaker for the 5th KCHRS. His talk was on the history of cardioversion. He summarized the work of various scientists leading up to the evolution of modern day cardioversion and defibrillation techniques. He especially emphasized the works of Dr. Bernard Lown and Dr. Naum Gurvich. Later in his talk, Dr. Waldo presented the works of Dr. Michel Mirowski and Dr. Morton Mower in leading up to the development of implantable cardioverter defibrillators.

Next presenter was Dr. Rhea Pimentel, Associate Professor of Medicine at the University of Kansas Hospital. She discussed the various indications for rhythm monitoring. She also explained the reasons and stressed on the importance of rhythm monitoring in patients with cryptogenic stroke. Further, she discussed the advantages and disadvantages of the different kinds of monitoring systems and recorders. Dr. Pimentel also presented information about new generation recorders that can be attached to smart phones for the purposes of rhythm monitoring. She later emphasized the role of implantable loop recorders in helping identify AF in patients with cryptogenic stroke.

The focus of the next talk was on reducing radiation in the electrophysiology lab by Dr. Dhanunjaya Lakkireddy, Professor of Medicine at the University of Kansas Hospital. He stressed on the principle of “ALARA (As Low as Reasonably Allowed)” and explained in detail the radiation doses with various cardiology procedures and the relative radiation exposure among various physicians. Interventional cardiologists and electrophysiologists were being exposed to highest amounts of radiation among all physicians. Dr. Lakkireddy then presented the role of the latest 3D anatomic mapping systems in decreasing radiation dose per procedure. Further, he explained the role of the new Mediguide technology that has helped decrease the radiation dose by nearly 40-60%. He then presented the initial data from LESS RADS prospective registry from his institution, which showed that the fluoroscopy time was decreased by 61% and the procedural time was decreased by 27%. Above all he stressed the importance of human factors in continuously reminding oneself about the dangers of fluoroscopy and putting consistent effort to minimize exposure both for the patients and self.

The next speaker was Dr. Sanjeev Saksena, Professor of Medicine

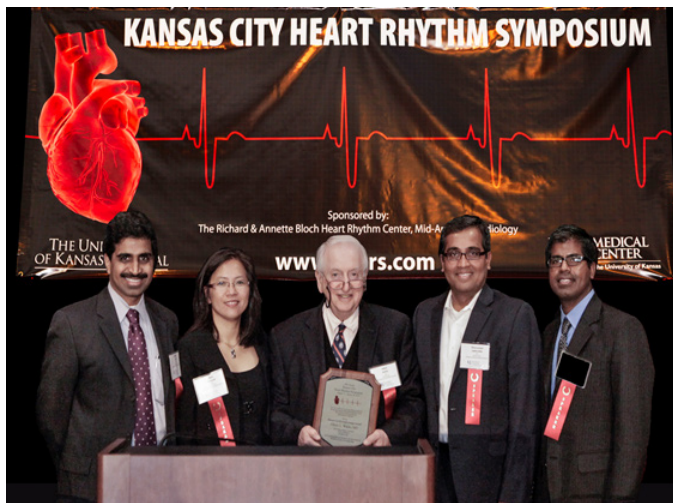
at the Rutgers Robert Wood Johnson Medical School. His talk was focused on antiarrhythmic drugs for rhythm control in AF. He highlighted the paucity of effective antiarrhythmic drugs in development. He then discussed the various existing anti-arrhythmics and how heart failure, coronary artery disease and diabetes adversely affected the outcomes in patients with AF. Further, Dr. Saksena, presented evidence showing that patients who were maintained in sinus rhythm >75% of the time on antiarrhythmic drugs have decreased cardiovascular hospitalizations. He also said that patients who are in sinus rhythm <75% of the time have poor outcomes. He concluded his talk by saying that the outcomes of antiarrhythmic drugs in current use of rhythm control in AF are a composite of benefit from effective rhythm control and potential adverse interactions with co-morbidities, either due to a progressive disease or specific interaction with AF subgroups.

KCHRS presenter Dr. Samuel Asirvatham, Professor of Medicine at the Mayo Clinic presented on “MRI compatible pacemakers” He explained the effects of electromagnetic interaction with pacemakers and ICD’s, such as failure to deliver anti-bradycardia pacing, inappropriate delivery of anti-tachycardia therapy, resetting of programmed parameters and damage to the pulse generator and or myocardial interface. He described heating of the lead tips to be of major concern in patients undergoing MRI. Dr. Asirvatham then explained how the static, gradient magnetic field and the modulated radiofrequency field of the MRI interfered with the various functions of the pacemakers and ICD’s. He reinforced the characteristics of the MRI conditional devices and the contraindications to MRI such as abandoned or old leads and in new implants that are less than 6 weeks old.

Following Dr. Asirvatham’s presentation was a talk by Dr. Abraham Kocheril, Director of Electrophysiology at Christie Clinic on the role of genetic testing in electrical and structural cardiomyopathies. He presented the data on hypertrophic cardiomyopathy and the various genes that have been linked to this condition. He stressed that the role of genetic testing in this condition was limited to identifying asymptomatic individuals at high risk, diagnosis, appropriate clinical management and predicting prognosis. Further, he discussed about the various genes affecting the long QT syndrome. Dr. Kocheril did not advocate mass screenings because the full set of genes causing these conditions are still largely unknown at this time and therefore a negative test does not rule out these conditions.

The next topic was “Understanding Lead and Cardiac Device Failure and Appropriate Management Strategies” and was presented by Dr. Madhu Reddy, Assistant Professor of Medicine at the University of Kansas Hospital. He discussed the trends in malfunction of the various leads and the increasing complexity of the current generation devices. Further, he emphasized the causes for lead failure, its various manifestations and the methods to identify lead failure. He stressed on the lead integrity algorithm in identifying lead failure. He also discussed the various risks and benefits of lead extraction and lead abandonment. He reiterated that lead failure was almost unavoidable and in these situations prompt and regular follow up was the best way forward.

With her presentation on understanding the bleeding and stroke risk in patients with AF, Dr. Anne Gillis, Professor of Medicine at the University of Calgary and former president of the Heart Rhythm Society started the post lunch session. She discussed the various stroke risk predictor scores for AF and the need for appropriate



**Albert Waldo receiving the Kansas University Pioneer in Cardiovascular Electrophysiology Award. Left to right: Dr. Raghuvveer Dendi, Dr. Rhea Pimentel, Dr. Albert Waldo, Dr. Dhanunjaya Lakkireddy and Dr. Madhu Reddy**

anticoagulation. She stressed that aspirin was not effective at preventing stroke in those with low CHADS2 scores. She highlighted the European and Canadian guidelines for anticoagulation in patients with AF. Further, she emphasized how CHA2DS2-Vasc score was helpful in risk stratification of patients with a low CHADS2 score. She also presented data to support that oral anticoagulation decreases the stroke risk and has a very low risk of bleeding. She concluded by saying that “stroke prevention trumps bleeding risk in most cases”.

Next to present was Dr. Sana Al-Khatib, Associate Professor of Medicine at the Duke University. Her talk was focused on the role of various types of oral anticoagulants in decreasing stroke risk in patients with AF. She discussed the various complications of oral anticoagulation and called for a delicate balance between decreasing stroke risk and bleeding complications. She presented the data from various clinical trials on new generation oral anticoagulants in decreasing stroke risk in AF. According to the data, apixaban was found to have better outcomes and lower risk of bleeding as compared to warfarin. Dr. Al-Khatib advocates appropriate patient selection for direct thrombin inhibitors use because of their limitations such as lack of antidote and their cost.

Dr. Andrea Natale, Director of Texas Cardiac Arrhythmia Institute was the next presenter and he presented on left atrial appendage exclusion for stroke prophylaxis. He highlighted the various epicardial and endocardial approaches to left atrial appendage exclusion. He also explained in detail the various devices, risks, benefits and complications from these devices. He then presented clinical data from PROTECT-AF, CAP, ASAP and PREVAIL studies to support left atrial appendage exclusion. He also explained the possible reasons for increased peri-procedural adverse events noted in the PROTECT-AF study, which was largely due to inexperience with this new procedure. Further, he presented data that suggests incomplete closure of the left atrial appendage with remnant small leaks did not increase the risk of stroke. Various methods to decrease the pericardial effusion arising from LARIAT procedure were also discussed in detail by Dr. Natale.

Presenting next was Dr. Douglas Packer, Professor of Medicine at Mayo Clinic. His talk focused on renal denervation in cardiac arrhythmias, heart failure and hypertension. He highlighted the role

of autonomic ganglia involved in the pathogenesis of hypertension and arrhythmias. He also discussed in detail the various approaches for denervation and the advances made in catheter technology for renal denervation and their advantages and disadvantages. He summarized the outcomes of the SIMPLICITY-HTN trials to make the case for renal denervation in improving blood pressure control. In AF, renal denervation also seemed to slow the heart rate, however, it did not eliminate the atrial remodeling and the atrial electrograms. Dr. Packer also suggested the beneficial role of renal denervation in ventricular tachycardia (VT). Finally, he discussed the complications of renal denervation procedure.

Dr. Raghuvveer Dendi, Assistant Professor of Medicine at the University of Kansas Hospital talked at length about the evaluation and management of neurocardiogenic syncope and its differentiating features from seizures and postural orthostatic tachycardia syndrome (POTS). He stressed on the importance of history in the evaluation of syncope. Further, Dr. Dendi focused on POTS, its clinical manifestations, evaluation and management. He described the contrasting features of tonic cardiac sympathetic function in these two conditions. Salt loading was the primary treatment modality in both the conditions; in addition midodrine was an important agent in treatment of both the conditions. Inappropriate sinus tachycardia and the role of sinus node modification in treating this condition were also elaborated.

Next speaker was Dr. Kathleen Blake from the American Medical Association. She laid emphasis on the importance of making the correct diagnosis, utilization costs and loss of productivity caused by syncope. The median length of stay for an admission of syncope in the United States is an average of 3 days and there were about 1.12 million ED and outpatient visits in 2006 for this condition. She stressed on the importance of “net reclassification effect” to make the correct diagnosis of syncope. She also presented the various risk stratification systems like ROSE, San Francisco and Boston syncope rules. She also presented in detail the Calgary Risk score, Syncope Evaluation in the ED (SEEDS) and Rapid access blackouts triage clinic systems (RABTC). She concluded by urging the audience to use a value-based approach in the evaluation and management of syncope.

Dr. Richard Fogel, President Elect – Heart Rhythm Society from the St. Vincent Heart Center of Indianapolis was the next to present on imaging in the management of cardiac arrhythmias. During his presentation he outlined the various imaging tools used currently by electrophysiologists. He discussed the advantages of intra-cardiac echocardiography, which helped improve visualization of the interatrial septum during transeptal procedures and thus decreased the fluoroscopy and procedural times although at a higher cost. Further, the advantages and disadvantages of 3D electroanatomical mapping systems were discussed in length. He advocated for the use of right technology at the right time.

The next topic was “Durable Pulmonary Vein Isolation: Can the Mission Ever be Accomplished” presented by Dr. Andre d’Avila, Associate Professor of Medicine at Mount Sinai Hospital. He emphasized the importance of pulmonary vein isolation in AF. He described the recurrence of AF largely due to reconnection of the pulmonary veins after the ablation and this was in the order of 90-95%. He discussed the roles of ablation lesion size, gap lines, contact force, visual gap and edema for failing to achieve complete electrical isolation. Dr. d’Avila therefore proposed that good contact force, lack



**Dr. John Day and Dr. Richard Fogel in discussion**

of visual gap, impedance drop  $>10\%$ , proper testing, pace capturing and ablation as the best methods to improve outcomes of pulmonary vein isolation.

The last speaker for the day 1 was Dr. David Callans, Professor of Medicine at the University of Pennsylvania. During his talk he emphasized on the various techniques to make AF ablation more effective. He discussed the role of various emerging technologies such as cryoablation, force-sensing catheters, hybrid surgical/catheter ablation technologies to achieve complete electrical isolation of the pulmonary veins. He also demonstrated how patient's respiration could adversely affect catheter location during AF ablation. He outlined various confounding factors that affect catheter stability and compromise the contiguity of ablation lesions. Further, he discussed how jet ventilation( a high frequency, low volume ventilation) helps in minimizing catheter movement with ventilation.

### Day-2, August 18th, 2013:

The second day of the KCHRS-2013 started with presentations by winners of the Manohar Gowda Cardiovascular Research Award moderated by Dr. James Vacek, Professor of Medicine, University of Kansas Hospital. The third placed abstract was presented to the audience by Dr. Nima Ghasemzadeh who is currently cardiology fellow at the Emory University School of Medicine, Atlanta. He presented his research work on "Soluble Urokinase Plasminogen Activator Receptor (suPAR) is Associated with severity of CAD and Predicts Adverse Cardiovascular Outcomes". Their study found that plasma suPAR was associated with severity of CAD and that it was an independent predictor of both mortality and myocardial infarction in patients with CAD. They also found that plasma suPAR can predict re-hospitalization in a subset of patients with left ventricular dysfunction.

Dr. Farshad Forouzanmehr's abstract "Metformin Beyond Diabetes: Metformin Attenuates Atherosclerosis and Vascular Aging Independent of Glucose Level" received the second prize. Dr. Forouzanmehr is also a cardiology fellow at the Emory University School of Medicine, Atlanta. Their study concluded that metformin has pleiotropic beneficial effects independent of glucose levels and therefore can attenuate vascular aging and atherosclerosis.

The first place winner of the abstract competition was Dr. Uma Mahesh Avula, who is a post-doctoral fellow at the University of Michigan, Ann Arbor. He presented his work on "Left Atrial-

Pulmonary Vein Infarction Leads to Spontaneous Atrial Fibrillation after Regional Action Potential Duration Prolongation" Their study found that atrial infarctions were associated with fibrotic scars that extended into the posterior wall of the left atrium and pulmonary vein sleeves. They also found that the scar border zones anchor the AF sources like rotors and spontaneous focal discharges. The presentations by these young investigators were well liked and appreciated by the audience.

Dr. James Vacek, Professor of Medicine at the University of Kansas Medical Center, presented the awards to the winners.

Next to follow was the debate on generator replacement in patients who received ICD or CRTD with subsequent improvement in EF to greater than 40% at the time of elective replacement indicator. Dr. Martin Emert, Associate Professor of Medicine at the University of Kansas Hospital, strongly supported generator replacement in these patients. To support his argument he presented evidence from various studies suggesting that the substrate for VT/VF does not go away even though ejection fraction improves and therefore the need for generator replacement. Debating against the topic was Dr. Sana Al-Khatib, Associate Professor of Medicine at the Duke University. She supported her argument based on lack of robust data on ICD/CRTD replacements. She also cited the lack of data on ICD/CRTD in patients with EF  $>40\%$  and also the adverse outcomes related to ICD's as her reasons to refute the argument. The debate ended with the conclusion that more studies were necessary to evaluate the indications for generator replacement in patients with improved EF following ICD/CRTD implantation.

Dr. Samuel Asirvatham, Professor of Medicine at Mayo clinic was the next speaker to present his views on "Subcutaneous ICD's: Why, Who and How?" He outlined the various risks associated with transvenous leads and how subcutaneous ICD's can avoid the complications from transvenous leads such as infection, lead fracture and lead recalls. Dr. Asirvatham also presented the various indications, features, ideal location and the advantages and disadvantages of subcutaneous ICD's. Major limiting factor was the non-availability



**Dr. Anne Gillis and Dr. Dhanunjaya Lakkireddy**



**Winners of the Manohar Gowda Cardiovascular Research Award Dr. Nima Gasamzadeh (third), Dr. Farshad Forouzandeh (second), Dr. Uma Avula (first) with Dr. James Vacek and Dr. Dhanunjaya Lakkireddy (from left to right).**

of pacing support in the subcutaneous ICD's.

Dr. Anne Gillis presented on "Cardiac Device Infection: Intricacies in Management". She presented the data on the increasing incidence of infection in patients with cardiac devices and the challenges faced in diagnosing this. She also presented the guidelines for treatment, lead extraction and antimicrobial prophylaxis in patients with implanted cardiac devices. She also strongly advocated the practice of early lead removal in cases of infection to decrease adverse outcomes.

Dr. Edward Rhee, Director of Electrophysiology at the Phoenix Children's Hospital was the next speaker and he presented his experiences and challenges in arrhythmia management in adults with congenital heart disease. He highlighted to the audience that nearly 85% of children with congenital heart disease are surviving into adult life after complex cardiac surgery. Electrophysiology care is extremely complicated in these patients because of the anatomical changes after surgery. He also shared intriguing details about intra atrial reentrant tachycardia ablation in patients with repaired congenital heart disease and how pre-procedural planning was helpful for successful ablation.

This was followed by a presentation by Dr. Loren Berenbom, Professor of Medicine at the University of Kansas Medical Center on "Tools and Techniques for Successful Lead Removal: Notes from a Seasoned Extractor". Dr. Berenbom highlighted the various tools, techniques and tips for successful lead extraction. He also emphasized the role of experience in decreasing complications during lead extraction. He called for a team approach with appropriate surgical back up during lead extraction. Careful preplanning for assessing comorbidities was also equally important before attempting lead extraction.

The next speaker was Dr. Andrea Natale, Director of Texas Cardiac Arrhythmia Institute presenting his views on adjunctive strategies in improving the outcomes of non-paroxysmal AF ablation. His talk was focused on non pulmonary vein triggers of AF like left atrial appendage, vein of Marshall and coronary sinus. He stressed on the importance of eliminating these additional triggers to improve the outcomes of AF ablation. He also advised electrophysiologists to be persistent and patient while looking for non pulmonary vein triggers of AF.

This presentation was followed by a talk on "Comprehensive Management of Ventricular Tachycardia Storm" by Dr. David Callans, Professor of Medicine at the University of Pennsylvania. He

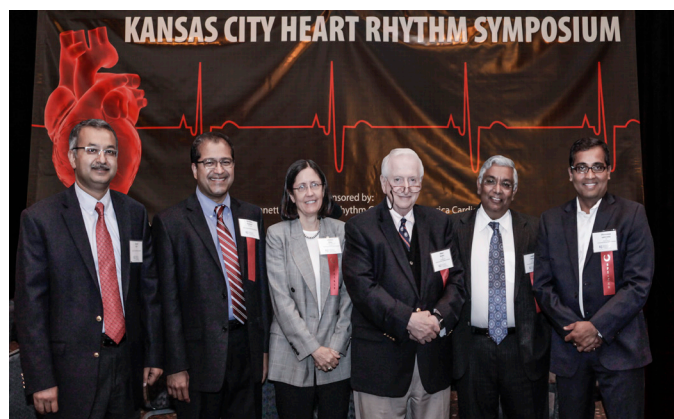
said that 10% of the patients with ICD presented with VT storm. He proposed various strategies such as maximal medical therapy, sedation, catheter ablation and autonomic denervation to treat VT storm. Dr. Callans also reinforced on the need to distinguish patients with primary ischemia and heart failure in those presenting with VT storm and treat them appropriately.

Dr. Douglas Packer, Professor of Medicine at Mayo Clinic was the next speaker and he presented on the "Role of Left Ventricular Assist Devices in VT ablation". He outlined the challenges faced during VT ablation and how assist devices can help achieve successful ablation of the VT. He suggested that ECMO did better in studies when compared with other hemodynamic support. He also stressed on the importance of understanding the VT substrate and establishing the goals of VT ablation. Dr. Packer advised to quiet the storm with assisting devices. He outlined the appropriate situations where an assist device could play a role in VT ablation.

Following this was an exciting talk by Dr. Andre d'Avila, Associate Professor of Medicine at Mount Sinai Hospital on "Epicardial VT Ablation: Tips and Tricks". He introduced to the audience the safe access to epicardial access and highlighted the methods, complications and challenges associated with this procedure. Common complications from this procedure are adhesions, abdominal fistula, pericardial bleeding and loculated effusions. Dr. d'Avila also emphasized how the thickness of epicardial fat affected the outcomes of VT ablation via epicardial route.

The last speaker for the day was Dr. Luigi Di Biase, Associate Professor of Medicine at Albert Einstein College of Medicine. He presented his views on how premature ventricular contractions (PVC), although benign, in some situations can cause cardiomyopathy. Dr. Di Biase also presented data to suggest that PVC ablation is feasible, effective and can reverse LV dysfunction. He also suggested that successful PVC ablation in patients with CRT can improve response to CRT by improving percentage BiV pacing and removing the dysynchronous LV remodeling that can impact LV function.

The 5th KCHRS was a grand success this year. Its objectives of bringing in expertise in electrophysiology from around the country to be shared with the greater MidWest area healthcare providers were clearly met as can be seen from the content and the quality of the speakers. Dr. Lakkireddy concluded the conference with his closing remarks and announced the dates for the 6th Annual KCHRS, which will be held on August 16th and 17th of 2014, in Kansas City, Missouri.



**Left to right Dr. Sumer Dhir, Dr. Abraham Kocheril, Dr. Kathleen Blake, Dr. Sanjeev Saxena and Dr. Dhanunjaya Lakkireddy**



Dr. Andrea Natale



Dr. John Day



Dr. Niraj Varma



Dr. Albert Waldo



Dr. Rhea Pimentel



Dr. Dhanunjaya Lakkireddy



Dr. Sanjeev Saksena



Dr. Samuel Asirvatham



Dr. Abraham Kocheril



Dr. Madhu reddy



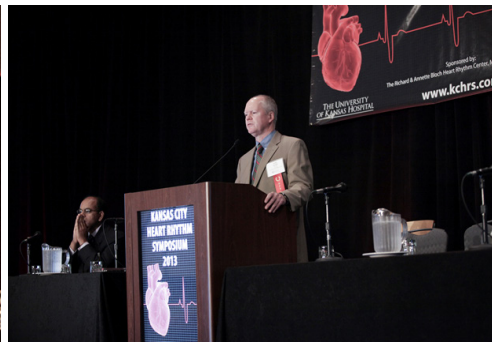
Dr. Anne Gillis



Dr. Sana Al-Khatib



Dr. Douglas Packer



Dr. John Daubert



Dr. Andre d'Avila



Dr. David Callans



Dr. Uma Mahesh Avula



Dr. Martin Emert



Dr. James Vacek



Dr. Edward Rhee



Dr. Berenbom



Dr. Douglas Packer



Dr. Luigi Di Biase



The Kansas University EP faculty sharing a lighter moment during the conference