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CARDIOPULSE

Pre-hospital care is critical for the entire acute cardiovascular care management process

Best patient outcome starts during pre-hospital phase: a focused study group within the Acute Cardiovascular Care Association (ACCA)

Patient care crosses over the borders of professions and societies. It begins outside the hospital, where and when cardiac events occur and is not only a cardiologists' concern.

Acute Cardiovascular Care Association (ACCA) continues to reinforce the importance of multi-disciplinary teamwork with emergency physicians, nurses, paramedics, and other specialties involved in the 'survival chain', by creating a dedicated Study Group on Pre-Hospital Care.

Led by Prof. Farzin Beygui (FR), the study group is composed of 14 international experts from different specialties who are strongly convinced of the urgent necessity to collaborate the different levels of care, to improve knowledge and train the whole team involved in the acute cardiovascular care management process, to improve quality of care and outcomes.

The study group aims to be a bridge between different actors of pre-hospital care (emergency specialists, paramedics, general practitioners . . .) and those managing patients after hospital admission (cardiologists, intensivists, surgeons . . .).

As its main objective, the group will focus on identifying evidence gaps and assessing diversities in the management of acute cardiovascular situations (chest pain, acute dyspnoea and cardiac arrest) in all European countries and regions. It will aim to provide necessary recommendations on best practices and optimal behaviour to reduce mortality and morbidity.

A Summit and a survey on pre-hospital care will be conducted to collect data and set the base of related educational initiatives such as registries, position papers, webinars, and more.

Third Acute Cardiovascular Care Association Summit on pre-hospital care: collaboration between cardiologists and out of hospital physicians is vital

A privileged collaboration with national cardiac societies and sister societies is the absolute key to succeed in raising awareness, developing harmonized education for best practices and ensuring local dissemination of recommendations.

The study group, together with the ACCA Committee on Allied Societies (chaired by Prof. Nikolaos Nikolaou) proposed to dedicate the third edition of the annual ACCA Summit to pre-hospital care.

The Summit took place early April in Sophia Antipolis, France and was organized with the scientific collaboration of European Society of Emergency Medicine (EuSEM), European Resuscitation Council

Participants of Third ACCA Summit on Pre-Hospital Care

(ERC), and Council on Cardiovascular Nursing and Allied Professions (CCNAP) addressed by international experts in the fields of acute cardiovascular care and emergency medicine.

Maaret Castrén

Abdel Bellou

The highly valued participation of Prof. Maaret Castrén representing ERC and Prof. Abdel Bellou representing EuSEM in the scientific programme of the Summit, as well as the presence of special guests from CCNAP demonstrated the common desire to collaborate and work as a team to educate professionals in the field and improve patient outcome.

The programme of the Summit attracted 82 participants from 33 countries with recognized national leaders in the field of acute cardiovascular care, but also actors from different fields such as nursing, first aid, resuscitation, emergency, and intensive medicine.

In addition to plenary sessions, participants could actively participate in clinical case-based discussions and take part in workshop sessions focused on triage and early management of patient with chest pain, acute dyspnoea, or cardiac arrhythmias.

Because of its interactive format and large area for discussion, this third Summit was a true opportunity to discuss, learn, and share experiences with professionals having different backgrounds and expertise, working in different emergency medical systems. By identifying major gaps and challenges, ACCA will achieve its first milestone to provide harmonized recommendations for best practices.

The whole Summit programme and webcasts can be found on www.escardio.org/ACCA—Workshop results will be published in coming issues of CardioPulse.

Acute Cardiovascular Care Association: a unique platform for multi-disciplinary exchange

The mission of ACCA is to improve the quality of care and outcome of patients with acute cardiovascular diseases, encompassing the complete care of patients from first medical contact until patient stabilization.

Acute Cardiovascular Care Association is the first and unique platform of scientific exchange in the field, where a multi-disciplinary team can share knowledge and enhance educational skills towards a single goal.

More information about the association and its educational initiatives at: www.escardio.org/ACCA

The Acute Cardiovascular Care Association

The CABANA trial

A new trial has begun, to determine whether catheter ablation of atrial fibrillation is superior to pharmacotherapy

The CABANA (Catheter Ablation vs. Anti-arrhythmic Drug Therapy for Atrial Fibrillation Trial) trial goal is aiming to establishing the appropriate roles for medical and ablative intervention for atrial fibrillation (AF). The CABANA trial is a randomized controlled open-label trial (NCT00911508) designed to test the following hypothesis: the treatment strategy of left atrial catheter ablation for the purpose of eliminating AF will be superior to current state-of-the-art therapy with either rate control or rhythm control drugs for decreasing the incidence of the composite endpoint of total mortality, disabling stroke, serious bleeding, or cardiac arrest. The CABANA study will also compare as secondary outcomes hospitalization rates, freedom from recurrent AF, quality of life and the cost of care for the two treatment approaches.

Inclusion criteria require the AF to be established by electrocardiographic documentation, and will include paroxysmal, persistent, and long-standing persistent AF in the preceding 6 months. Patients are required to be $\geq$65 years of age, or $<$65 years with one or more risk factors for stroke. Thus, lone AF in patients $<$65 years and no stroke risk factors will not be evaluated. Atrial fibrillation patients with more than two failed antiarrhythmic drug treatment periods will also be excluded, as will those with an efficacy failure of amiodarone treatment at any time. With these considerations, CABANA results will only address a specific, though wide, subgroup of patients, which is not totally representative of the usual population seen in a regular Cardiology practice.

CABANA Trial Principal Investigator is Dr Douglas L. Packer from Mayo Clinic, Rochester MN, USA, but this is a global clinical research trial. The study is currently being conducted in 10 countries. In addition to the USA and Canada, international investigators are located throughout Europe, Asia, and the Pacific. As of March 2014, the CABANA trial had included 1477 patients from a projected total enrolment of 2200. The top enrolling sites are located in USA, Russia, and Germany. It is supported by public and private funding: The National Heart, Lung and Blood Institute (NHLBI), St Jude Medical, and Biosense Webster.

The trial started recruiting patients in August 2009 and the estimated primary completion date is September 2017 as the final data

collection date for primary outcome measure. The ablation group strategy involves pulmonary vein isolation using a circumferential ablative approach in the left atrium. Ablation may be performed using a circular mapping catheter-guided ablation, antrum isolation using a circular-guided approach, or a wide area circumferential ablation. Ablation can be performed using radiofrequency or cryoballoon. In the other group, medical therapy, the specific choice of rate control vs. rhythm control drug therapy and the specific drugs to be used will ultimately be left to the discretion of the treating physician.

At the present time, it remains unclear whether drug or ablative therapy is best from a standpoint of long-term mortality or major complications. Additional evaluation of long-term outcomes is also required, as is a careful analysis of the economics of both options and long-term quality-of-life outcomes. The authors believe that this trial will eventually guide therapy and will assist in the allocation of health care economics for years to come. Let us wait for the results!


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Catheter Ablation vs. Antiarrhythmic Drug Therapy for Atrial Fibrillation trial information

CABANA is a global clinical research trial currently being conducted at 130 sites in 10 countries. The goal of the trial to establish the appropriate roles for medical and ablation treatment for atrial fibrillation. In addition to the USA and Canada, international investigators are located throughout Asia, Europe, and the Pacific.

Douglas L. Packer MD,
CABANA trial Principal Investigator,
Mayo Clinic, Rochester, MN, USA

Enrolment numbers

March 2014: 1477

Target: 2200

Active sites: 130

Top enrolling sites and numbers enrolled as of 28 March 2014:

Research Institute of Circulation Pathology—110: Novosibirskaya Oblast, Russia, Dr Evgeny Pokushalov.

Duke University Medical Center—93: Durham, NC, USA, Dr Tristram Bahnson.

Intermountain Medical Center—90: Murray, UT, USA, Dr Jared Bunch.

Herzzentrum Leipzig—73: Leipzig, Germany, Dr Gerhard Hindricks.

Mayo Clinic—62: Rochester, MN, USA, Dr Douglas L. Packer.

Universitat Rostock—34: Rostock, Germany, Dr Dietmar Baensch.

University of North Carolina at Chapel Hill—28: Chapel Hill, NC, USA, Dr Paul Mounsey.

Geisinger Wyoming Valley Medical Center—27: Wilkes-Barre, PA, USA, Dr Pugazhendhi Vijayaraman.

Kerckhoff Klinik—26: Bad Nauheim, Germany, Dr Thomas Neumann.

Loyola University Medical Center—24: Maywood, IL, USA, Dr David Wilber.

Providence Saint Vincent Medical Center—23: Portland, OR, USA, Dr Blair Halperin.

University of Calgary Foothills Hospital—23: Calgary, AB, Canada, Dr George Veenhuyzen.

Policlinico San Donato Center of Clinical Arrhythmia and Electrophysiology—22: San Donato Milanese, Italy, Dr Riccardo Cappato.

Georgia Regents University—21: Augusta, GA, USA, Dr Adam Berman.

Ohio State University Medical Center—21: Columbus, OH, USA, Dr John Hummel.

Further information at: https://www.cabanatrial.org/

British Cardiovascular Society 2014: Annual Conference

Dr *Sarah Clarke* reports on the highlights of the 2014 conference

The British Cardiovascular Society (BCS) Annual Conference was the biggest yet in terms of delegates and the number of plenary sessions and interactive educational sessions which were held in the Education Hall. The British Heart Foundation is a significant supporter of the Conference for which we are grateful.

With a theme of 'Tomorrows World' the Conference looked to the future of cardiovascular medicine and science through its numerous tracks, including Affiliated Group tracks and allied professionals. However, the main objective of the Conference is to deliver high-quality education for the delegate—trainees, trained cardiologists, and allied professionals and to keep all up-to-date. To aid with revalidation in the UK, there is a dedicated track which over the last 5 years has covered all topics in the cardiology curriculum.

Educational sessions provide by the ESC and ACC are included. This year, the BCS introduced 'Lifelong Learning', innovative moderated sessions each with 30 clinical scenarios and accompanying MCQ's answered via keypads. We had outstanding moderators for these sessions from the Mayo Clinic; Drs Rick Nishimura and Carole Warnes and from the UK; Prof. Simon Ray and Dr Clive Lawson. An innovation adopted from the ACC, 'Lifelong Learning' was a big hit!

Our named lectures this year were delivered by Dr Rick Nishimura ('Pericardial Disease- A new look at an old disease') and Prof. Barbara Casadei ('a radical view of atrial fibrillation'). There were over 250 posters presented and a Young Investigator Award in basic science and Young Research Worker Award were battled out. See www.bcs.com for details of the winners!

Prevention and lifelong risk were features and included an introduction to the new JBS3 risk calculator (www.jbs3risk.com) and sessions in exercise including a CPEX session with Mark Richardson from Skunk Anansie showing the energy expended by a rock drummer during a concert! We also met an eight time conqueror of Everest to learn about the impact of altitude on hearts, lungs, and minds!

We expanded the interactive sessions in the Education Hall this year to include technical skills simulation, an imaging village with multi-modality imaging work stations and an MRI scanner to learn post-processing and interpretation cardiac MRI, resuscitation skills work stations and ECG workshops. Back by popular demand were over 100 hot topics. Held in four zones, throughout the conference and in the Education Hall, the hot topics are 15 min fact bursting sessions of FAQ's, 'how to . . .' and interviews with guest speakers and Faculty. Industry and charity colleagues also provided a comprehensive education agenda from their stands which was well received by delegates.

The BCS Annual Conference provides a dedicated forum for high-quality education delivered in lectures and also a vast interactive environment in the Education Hall. Together with the opportunity to network with colleagues the BCS Conference is now a must for all cardiologists!

For further information and updates please see our website www.bcs.com where you will find our daily e-magazine, webcasts, and podcasts from the conference.

Join us next year in Manchester—save the date: 8–10 June 2015! See you there!

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Fusion imaging in catheter-based procedures

Fusion imaging leads to safer procedures and improved results, according to *Itzhak Kronzon, Vladimir Jelnin, Roberto M. Lang,* and *Carlos E. Ruiz*

The last decades have seen a tremendous growth of catheter-based techniques to repair congenital and acquired structural heart disease. *Table 1* provides an inconclusive list of structural heart diseases currently treated by transcatheter techniques. The number of indications and the number of procedures performed has grown exponentially in the last few years (*Table 1*).

One of the most important keys for the success of these procedures is the ability to evaluate, guide, and monitor the heart catheter before, during and after the procedure.

Fluoroscopy has been the most powerful imaging modality used during diagnostic cardiac catheterization and catheter-based procedures. Fluoroscopy provides good images of catheters, wires and radiopaque devices, and structures. Furthermore, interventionalists are familiar with these images. On the other hand, fluoroscopy provides single-plane images and, therefore, does not provide adequate anatomic information regarding soft tissue structures and the intravascular space, frequently requiring contrast agents to evaluate normal and abnormal blood flow and blood poolings. Radiation is yet another important limitation of this imaging modality.

Newer imaging modalities include echocardiography, cardiac computed tomography (CCT), cardiac magnetic resonance imaging (CMR), single-photon emission tomography (SPECT), and positron emission tomography. To further improve the imaging quality and accuracy multiple images acquired from a patient can be registered, overlaid, and merged or fused. Fused images may be created from the same imaging modality, or by combining information from different modalities.

Table 1 Interventions in structural heart disease (partial list)

Creating of shunts: atrial septostomy
Closure of shunts: patent foramen ovale, atrial septal defect, ventricular septal defect, patent ductus arteriosus, other arteriovenous fistulae
Valvular stenosis balloon dilatation: mitral, aortic, pulmonic, tricuspid
Valve replacement: aortic, pulmonic, mitral (valve in valve)
Valve clipping: mitral regurgitation
Closure of prosthetic valve paravalvular leak
Septal alcohol ablation: hypertrophic obstructive cardiomyopathy
Dilatation of vessel stenosis: coarctation of aorta, pulmonary veins, peripheral pulmonic stenosis. Baffle stenosis
Guidance of electrophysiological procedures: ablations, pacing
Closure of left atrial appendage
Closure of pseudoaneurysms: left ventricle, aorta
Repair of aortic aneurysm
Removal of right-sided masses

Two commercially available image fusion systems have been recently introduced. The first provides fusion of three-dimensional (3D) CCT and fluoroscopy.[1] The second produces real-time fusion of two-dimensional (2D) and/or 3D real-time transoesophageal echocardiography (3D RT TEE) with fluoroscopy.[2]

After registration, scale adjustments and landmark positioning, both fusion technologies are capable of superimposing the high-resolution anatomical images obtained with CCT and/or RT 3D TEE onto the fluoroscope screen. This provides an intuitive link between imaging modalities.[3]

Both the CT and the echocardiographic images orientation automatically follow the C arm position. Markings of important landmarks on the CT or echo images appear on the fluoroscope screen for context and guidance. Both fusion technologies allow for better understanding of anatomy, guiding of device placement, and post-deployment evaluation.[4,5]

Figure 1 was obtained from a patient who suffered from congestive heart failure and haemolysis after mitral valve replacement. Transoesophageal echocardiography revealed mitral paravalvular leak (PVL) and the patient was referred for a transcatheter closure of the PVL. Based on the PVL location, it was decided that the best approach to the leak site was a direct needle puncture of the left ventricular apex, crossing the PVL from the LV to the left atrium.[6]

Pre-procedural CCT demonstrates the site of the leak (arrow). The proposed sites of the skin puncture (star) and left ventricular (LV) apical puncture (arrowhead) were identified and marked. The best straight-line route from the LV apex to the PVL was identified and recorded (*Figure 1A*).

After registration, the landmarks obtained from CT appeared on the fluoroscope screen (*Figure 1B*). They served as landmarks for a LV apical needle puncture, and for wire crossing of the PVL.

The use of 3D echo-fluoroscopy fusion in transeptal puncture is demonstrated in *Figure 2*. During this procedure, the interatrial septum could be identified by echocardiography (but not on fluoroscopy). The site of the puncture was marked on the 3D echocardiographic images (blue dot, arrow heads, *Figure 2A–C*) and after registration appeared on the fluoroscopy screen, and served as a marker for the site of transeptal puncture (*Figure 2D*).

The accuracy of fusion images depends on the accuracy and reliability of each of its components and the accuracy of the fusion procedure. Accuracy may be hampered by cardiac and respiratory motion which may create migration of the area of interest. Tissue deformation due to manipulation during the procedure may also affect accuracy. The experience of personnel acquiring and interpreting these images is extremely important.

The modalities, information, processing, and intelligent fusion image guiding may demand the skills, training, and talents of more than a single individual. A team effort by different specialists is frequently needed.

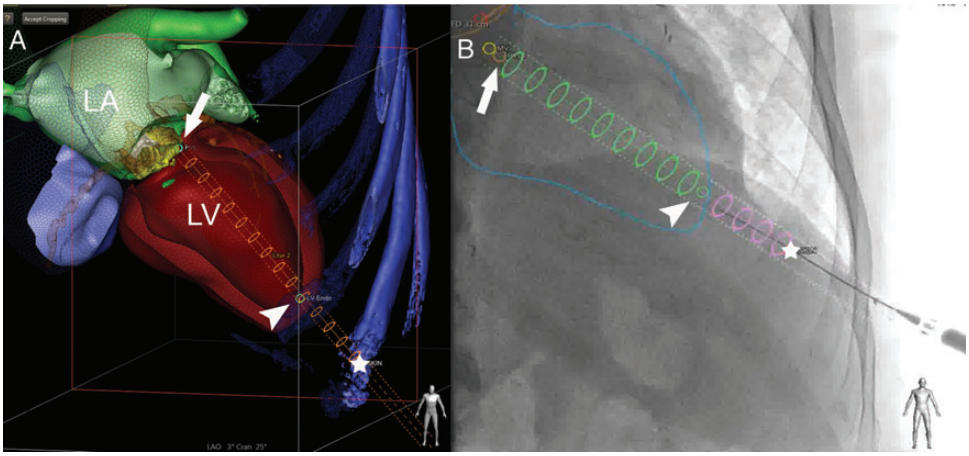

Figure 1 Cardiac computed tomography and fluoroscopy fusion: the landmarks noted on the Cardiac computed tomography imaged (*A*) are demonstrated on the fluoroscopy screen (*B*). (star: site of skin puncture, arrowhead: site of left ventricular apical puncture, arrow: site of the paravalvular leak. Note the straight path from the skin to the target (paravalvular leak) (see also text). Other abbreviations: LA, left atrium; LV, left ventricle.

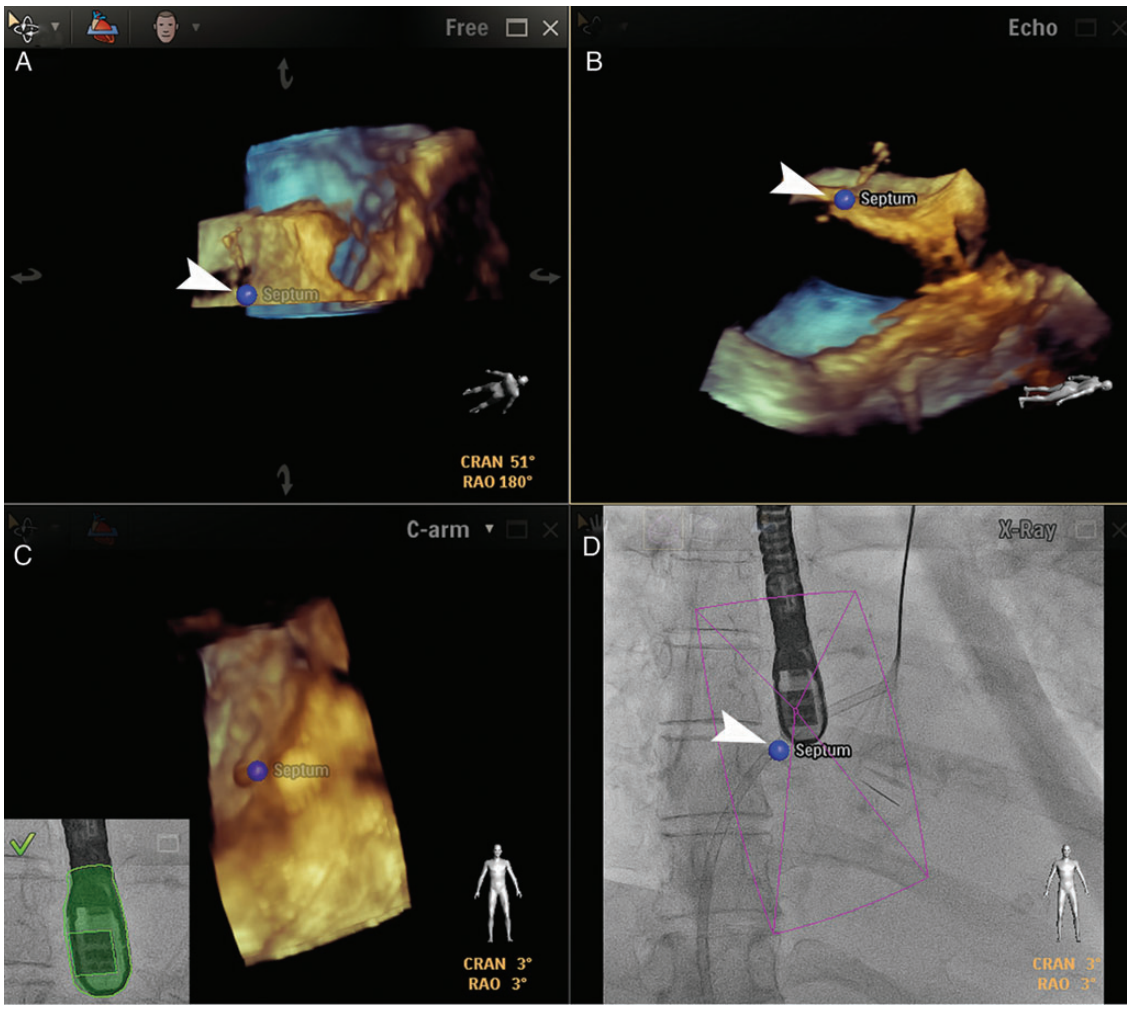

Figure 2 Real-time three-dimensional transoesophageal echocardiography and fluoroscopy fusion: the site of transeptal puncture noted on the three-dimensional images (blue dots, 2*A*–2*C*) appears on the fluoroscopy, and marks the site of the puncture (blue dot, 2*D*).

The field is rapidly progressing, improving, and constantly changing. However, fusion imaging leads to a more accurate planning, improved and safer results, shorter procedures, and less contrast and radiation which means safer procedures for operators and patients.[4,7]

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References

1. Krishnaswamy A, Tuzco EM, Kapadia SR. Three-dimensional computed tomography in the cardiac catheterization laboratory. *Catheter Cardiovasc Interv* 2011;**77**: 860–865.
2. Housden RJ, Arujuna A, Ma Y, Nijhof N, Gijsbers G, Bullens R, O'Neill M, Cooklin M, Rinaldi CA, Gill J, Kapetanakis S, Hancock J, Thomas M, Razavi R, Rhode KS. Evaluation of a real-time hybrid three-dimensional echo and X-ray imaging system for guidance of cardiac catheterization procedures. *Med Image Comput Assist Interv* 2012;**15**:25–32.
3. Markelj P, Tomaževič D, Likar B, Pernuš F. A review of 3D/2D registration methods for image-guided interventions. *Med Image Anal* 2012;**16**:642–661.
4. Jelnin V, Dudiy Y, Einhorn BN, Kronzon I, Cohen HA, Ruiz CE. Clinical experience with percutaneous left ventricular transapical access for interventions in structural heart defects: a safe access and secure exit. *JACC Cardiovasc Interv* 2011;**4**: 868–874.
5. Verma S, Adler S, Berman A, Duran A, Loar D. Localization of fossa ovalis and Brockenbrough needle prior to left atrial ablation using three-dimensional mapping with EnSite Fusion. *J Interv Card Electrophysiol* 2011;**30**: 37–44.
6. Ruiz CE, Jelnin V, Kronzon I, Dudiy Y, Del Valle-Fernandez R, Einhorn BN, Chiam PT, Martinez C, Eiros R, Roubin G, Cohen HA. Clinical outcomes in patients undergoing percutaneous closure of periprosthetic paravalvular leaks. *J Am Coll Cardiol* 2011;**58**: 2210–2217.
7. Kliger C, Jelnin V, Sharma S, Panagopoulos G, Einhorn BN, Kumar R, Cuesta F, Maranan L, Kronzon I, Carelsen B, Cohen H, Perk G, Van Den Boomen R, Sahyoun C, Ruiz CE. CT angiography-fluoroscopy fusion imaging for percutaneous transapical access. *JACC Cardiovasc Imaging* 2014;**7**:169–177.

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