TCT-321
Rotational angiography with Xperswing: safety and accuracy compared to conventional angiography
Leire Unzué1, Juan Luis Delcan2, Jose Luis Rodriguez-Lopez3
1H. MONTEPRÍNCIPE, MADRID, NY; 2H. MONTEPRÍNCIPE, ROADILLA DEL MONTE MADRID, SC; 3PHILIPS, MADRID, SC

Background: Conventional angiography is the gold standard technique for study of coronary artery disease. Is based on the analysis of bidimensional orthogonal projections, minimum of 3 for the left coronary artery and 2 for the right coronary artery. Rotational angiography (RA) “Xperswing” is a new technique that allows the visualization of the coronary arteries from multiple views, with a single contrast injection. The benefits of RA decreasing contrast dose and radiation exposure for diagnostic procedures have been properly demonstrated. However, there is not evidence of these benefits in therapeutic procedures, where the contrast dose reduction may have a greater benefit. The aim of this study is to evaluate the global benefit of the introduction of RA in a Hemodynamic laboratory, comparing the first 100 first procedures developed with this technique with the previous 100 procedures.

Methods: The first 100 cases performed in an institution with RA were analyzed describing clinical characteristics of the patient and the procedure, and comparing to the 100 procedures previous the implantation of this system. Statistical analysis was performed using X2 test for qualitative variables and t Student test for independent variables (SPSS 14.0).

Results: Results are expressed in the table. There were not significant differences in baseline characteristics of the patients or the procedure between both groups. Contrast dose, fluoroscopy time and procedure time were significant lower for the group of RA. The product dose area for fluoroscopy and exposition was also lower in this group.

<table>
<thead>
<tr>
<th></th>
<th>RA (100)</th>
<th>CA (100)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostic procedures</td>
<td>55 (55)</td>
<td>49 (49)</td>
<td>0.39</td>
</tr>
<tr>
<td>Age (years)</td>
<td>64.11 ± 13.89</td>
<td>62.61 ± 17.61</td>
<td>0.49</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>75.00 ± 23.21</td>
<td>69.00 ± 34.51</td>
<td>0.33</td>
</tr>
<tr>
<td>Height (m)</td>
<td>1.69 ± 0.56</td>
<td>1.61 ± 0.39</td>
<td>0.23</td>
</tr>
<tr>
<td>Transradial approach</td>
<td>94 (94)</td>
<td>97 (97)</td>
<td>0.31</td>
</tr>
<tr>
<td>Contrast dose (ml)</td>
<td>126.58 ± 80.76</td>
<td>158.95 ± 64.41</td>
<td>0.00</td>
</tr>
<tr>
<td>Procedure time (min)</td>
<td>58.55 ± 28.71</td>
<td>89.70 ± 25.76</td>
<td>0.05</td>
</tr>
<tr>
<td>DAP fluoro (mGy/cm²)</td>
<td>46709.57 ± 31030.67</td>
<td>78031.75 ± 57320.99</td>
<td>0.01</td>
</tr>
<tr>
<td>DAP exposition (mGy/cm²)</td>
<td>21252.71 ± 13255.37</td>
<td>34642.75 ± 16591.05</td>
<td>0.00</td>
</tr>
<tr>
<td>Total DAP (mGy/cm²)</td>
<td>67962.29 ± 44133.1</td>
<td>112674.50 ± 70133.9</td>
<td>0.01</td>
</tr>
<tr>
<td>Kerma in air (mGy)</td>
<td>922.57 ± 641.95</td>
<td>1258.50 ± 968.27</td>
<td>0.12</td>
</tr>
</tbody>
</table>

Conclusions: RA with Xperswing leads to significant decrease in the radiation exposure, procedure time and dosage of contrast in diagnostic and therapeutic procedures without a significant learning curve.

TCT-322
Radiation Exposure in Standard Views During Diagnostic Coronary Angiography
Debajyoti Banerjee1, Pawan Awasthi2, Anshul Gauri3, Sagar Kohli4, S. Suresh5,6
1Wright Center for Graduate Medical Education, Scranton, PA

Background: There is paucity of data comparing patient radiation exposure with individual standard projections used during diagnostic coronary angiography.

Methods: 755 coronary angiograms performed using Siemens Axiom Artis dTA/CA cardiac/ peripheral angiographic system in a community hospital were studied. Age, gender, height, and weight were recorded. Air Kerma and number of frames/second in the cardiac/ peripheral angiographic system in a community hospital were studied. Age, gender, height, and weight, were recorded. Air Kerma and number of frames/second in

Results: Results are expressed in the table. There were not significant differences in baseline characteristics of the patients or the procedure between both groups. Contrast dose, fluoroscopy time and procedure time were significant lower for the group of RA. Contrast dose, fluoroscopy time and procedure time were significant lower for the group of RA. The product dose area for fluoroscopy and exposition was also lower in this group.

<table>
<thead>
<tr>
<th></th>
<th>RA (100)</th>
<th>CA (100)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostic procedures</td>
<td>55 (55)</td>
<td>49 (49)</td>
<td>0.39</td>
</tr>
<tr>
<td>Age (years)</td>
<td>64.11 ± 13.89</td>
<td>62.61 ± 17.61</td>
<td>0.49</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>75.00 ± 23.21</td>
<td>69.00 ± 34.51</td>
<td>0.33</td>
</tr>
<tr>
<td>Height (m)</td>
<td>1.69 ± 0.56</td>
<td>1.61 ± 0.39</td>
<td>0.23</td>
</tr>
<tr>
<td>Transradial approach</td>
<td>94 (94)</td>
<td>97 (97)</td>
<td>0.31</td>
</tr>
<tr>
<td>Contrast dose (ml)</td>
<td>126.58 ± 80.76</td>
<td>158.95 ± 64.41</td>
<td>0.00</td>
</tr>
<tr>
<td>Procedure time (min)</td>
<td>58.55 ± 28.71</td>
<td>89.70 ± 25.76</td>
<td>0.05</td>
</tr>
<tr>
<td>DAP fluoro (mGy/cm²)</td>
<td>46709.57 ± 31030.67</td>
<td>78031.75 ± 57320.99</td>
<td>0.01</td>
</tr>
<tr>
<td>DAP exposition (mGy/cm²)</td>
<td>21252.71 ± 13255.37</td>
<td>34642.75 ± 16591.05</td>
<td>0.00</td>
</tr>
<tr>
<td>Total DAP (mGy/cm²)</td>
<td>67962.29 ± 44133.1</td>
<td>112674.50 ± 70133.9</td>
<td>0.01</td>
</tr>
<tr>
<td>Kerma in air (mGy)</td>
<td>922.57 ± 641.95</td>
<td>1258.50 ± 968.27</td>
<td>0.12</td>
</tr>
</tbody>
</table>

Conclusions: RA with Xperswing leads to significant decrease in the radiation exposure, procedure time and dosage of contrast in diagnostic and therapeutic procedures without a significant learning curve.

TCT-323
Pre-Procedural Fasting for Diagnostic and Interventional Coronary Procedures – Is It Necessary?
Tahir Hamid1, Yee Cheng Lau2, Quaiser Aleem2, Issaam Oozeerally2, John McDonald2, Macdonald John3, Ravi Singh3, Sanjays Ansa4, Bainbridge Anthony3, Telal Mudawa5, Kanrath Balachandran6
1Royal Albert Edward Infirmary, Wigan, United Kingdom, 2Royal Blackburn Hospital, Blackburn, Lancashire, 3Royal Blackburn Hospital, Blackburn, Lancashire, 4Royal Albert Edward Infirmary, Wigan, Lancashire, 5Royal Albert Edward Infirmary, Wigan, Lancashire, 6Royal Blackburn Hospital, Blackburn, United Kingdom

Background: Patients are traditionally kept fasted (Nil-By-Mouth) pre-procedure for diagnostic and interventional coronary procedures. There exist little evidence and no clear guidelines about the benefits of this practice in patients undergoing cardiac procedures under conscious sedation and local anaesthesia. Fasting patients are at risk of dehydration, contrast induced nephropathy and hypoglycaemia. These risks are magnified in the elderly.

Methods: The data source is a retrospective registry of consecutive patients who underwent diagnostic coronary angiography and percutaneous coronary interventions (PCI) for acute coronary syndrome (ACS) and stable angina at two district general hospitals with no on-site cardiac surgery. Patients with cardiogenic shock or already intubated were excluded from the study.

Results: A total of 4224 coronary procedures were performed over 36 month period including 2900 angiograms and 1324 PCIs. All these patients were not fasted pre-procedure. Details of patients who underwent PCI: Mean age was 67±16 years. 800(65%) male. The admission diagnoses were Non-ST elevation myocardial infarction (NSTEMI) and ST-elevation myocardial infarction (STEMI) in 41%(542/1324) and 8%(110/1324) patients respectively. 18%(237/1324) were diabetics while 42%(555/1324) were hypertensive. PCI was technically successful in 93%(1234/1324) patients, while 6.7%(90/1324) had neutral outcome. 1% (1324) and Intra-Vascular Ultrasound (IVUS) assessments were performed in 4%(52/1324) patients. The average in-hospital stay for ACS patients was 4 ± 1 day. 75% of patients who underwent PCI for stable angina were discharged within 6 hours post-procedure. None of the patients required emergency coronary artery bypass surgery or emergency endo-tracheal intubation.

Conclusions: Our study demonstrates that patients before undergoing diagnostic and interventional coronary procedures need not be fasted. None of our patients required emergency endo-tracheal intubation or developed pulmonary sequelae. We recommend that the traditional stringent fasting protocols be abandoned or changed.

TCT-324
New Simulation System for Percutaneous Coronary Intervention Training Improves Resident Performance
Seth Murphy1, Linda R. Schirmer2, David Bartley2, Paul Brugler2, John McDonald2, Macdonald John3, Ravi Singh3, Sanjays Ansa4, Bainbridge Anthony3, Telal Mudawa5, Kanrath Balachandran6
1Royal Albert Edward Infirmary, Wigan, United Kingdom, 2Royal Blackburn Hospital, Blackburn, Lancashire, 3Royal Blackburn Hospital, Blackburn, Lancashire, 4Royal Albert Edward Infirmary, Wigan, Lancashire, 5Royal Blackburn Hospital, Blackburn, United Kingdom

Background: Percutaneous coronary intervention (PCI) is a well established therapy for coronary artery disease. However, training methods of PCI has yet to be established. Simulation-based training is common in surgery, also in endovascular procedures of...
carotid artery stenting and peripheral artery stenting. However, in PCI, simulation-based training is not yet established and thus we have no previous experience in this area. The aim of this study is to assess the utility of the new artery based simulation system for PCI.

Methods: We reconstructed the whole body type PCI simulating vascular model from the imaging data of 64 raw MDCT, including coronary arteries with a significant stenosis (type A of the AHA/ACC classification) which consisted of materials which can be dilated and can preserve the dilated lumen. We enrolled 14 interventional residents who had no experience in performing PCI but who received lectures for the techniques of PCI and 5 interventional cardiologists who had experienced more than 350 PCI procedures. We divided them into 3 groups: Group A (only lecture), Group B (lecture plus training with the simulator) and Group C (experienced interventionalists). Practical examination using the simulator was performed. Results of examination were graded by one attending interventional cardiologist, using the scoring system of Cardiovascular Intervention and Therapeutics (CVIT). Procedural time, contrast volume, fluoroscopy time were measured.

Results: The score was significantly higher in Group B (112 ± 5.0; p = 0.01) and Group C (121 ± 2.5; p = 0.001) compared with Group A (101 ± 10.1). There was significant more use of contrast dye in Group B (94.9 ± 15.5ml; p=0.004) and Group C (1740 ± 12.9ml; p = 0.008 ) compared to Group A (129.2 ± 35.0ml). Group C significantly reduced procedural time, contrast volume, and fluoroscopy time compared to Group A and B.

Conclusions: New Artery based simulator is very useful tool for training and evaluating PCI techniques.

TCT-325

Patients skin radiation doses in a contemporary cohort of patients undergoing percutaneous interventional cardiology procedures.

Juan Nogales-Aseñón1, Sara Sánchez1, Ana Martínez1, María Yuste1, Jose Orduelas1, Jose Lopez-Minguez1, Reyes González1, Antonio Merchán1, Ginés Martínez2, Francisco Díaz-Corteguera2, Laura García-Serrano3

1University Infanta Cristina Hospital, BADAJOZ, Spain, 2Merida Hospital, Spain

Background: The field of interventional cardiology has drastically developed over last years, currently evolving into more complex procedures with increasing image quality requirement. These procedures result in substantial patient radiation doses.

Methods: We measured patients skin radiation doses in a contemporary cohort of 2417 patients undergoing interventional cardiology procedures: diagnostic coronary angiography (DCA): 1328 (54.9%); percutaneous coronary intervention (PCI): 1043 (43.2%); structural heart intervention (SHI) 42 (1.7%); and renal denervation (RD) 4 (0.2%). These procedures were consecutively performed by five skilled interventional cardiologist using three x-ray equipments (Allura Xper FD10, Philips®). All X-ray systems were calibrated under interventional cardiologist, using the scoring system of Cardiovascular Intervention and Therapeutics (CVIT). Procedural time, contrast volume, fluoroscopy time were measured.

Results: The score was significantly higher in Group B (112 ± 5.0; p = 0.01) and Group C (121 ± 2.5; p = 0.001) compared with Group A (101 ± 10.1). There was significant more use of contrast dye in Group B (94.9 ± 15.5ml; p=0.004) and Group C (1740 ± 12.9ml; p = 0.008 ) compared to Group A (129.2 ± 35.0ml). Group C significantly reduced procedural time, contrast volume, and fluoroscopy time compared to Group A and B.

Conclusions: New Artery based simulator is very useful tool for training and evaluating PCI techniques.

TCT-326

The Occupational Effects of Interventional Cardiology Results from the WIN for Safety Survey

Gill Buchanan1, Alade Chiwegb2, Julinda Mejhibl2, Ghadha Milhildl2, Fiona Mauril2, Patricia Preshibert3, Liliana Grinfeld4, Anna Sonia Petronilar5, Kimberly Skelding6, Angela Hoye7, Roxana Mehran8, Marie-Claude Moricel2

1San Rafaelle Scientific Institute, Milan, Italy, 2San Rafaelle Scientific Institute, Milan, Italy, Milan, Italy, 3Deutsches Herzzentrum Munich, Munich, Germany, 4Imperial College Healthcare Trust, London, United Kingdom, 5Hospital del Mar, Barcelona, Spain, 6Humanitas Institute, Milan, Italy, 7Universidad de Buenos Aires, Argentina, 8University of Pisa, Pisa, Italy, 9Greiser, Health System, N/A, 10Hall York Medical School, Kingston-upon-Hull, United Kingdom, 11Mount Sinai Hospital, New York, USA, 12Institut Cardiovasculaire Paris Sud, Marcy, France

Background: Interventional cardiologists are amongst the most intensive radiation users within medicine.

Methods: A ‘WIN for Safety’ web-based survey was distributed through EAPCI to all catheterization laboratory healthcare professionals, enquiring about radiation protection measures, compliance with monitoring, health (orthopaedic issues), radiation-associated problems (catastrophic and cancer) and restrictions imposed upon the pregnant female.

Results: In total, there were 615 participants: 72.8% were interventional cardiologists. Most (73.5%) of them were male and 63.3% were aged 31-50 years. A radiation collar badge was used by the majority (64.4%) and the most frequently utilized protective measure was the thyroid shield (87.2%). Potential illnesses related to radiation exposure included 19.5% orthopaedic problems (back/neck/hip pain), 5.5% varicose veins, 2.4% blood count problems and 2.0% catacarts. Notably, an association between orthopaedic problems and years of exposure was found (p=0.003). Overall, only 2.2% had ever been diagnosed with a cancer, with a trend for more females to be affected (4.4% vs. 1.8%; p=0.067). Finally, 62.1% have restrictions imposed upon the pregnant female in the working environment.

Conclusions: Awareness of radiation in the field of interventional cardiology is essential. The main risk is orthopaedic problems and measures should be taken for prevention. Cancer has not been demonstrated to be a direct consequence, however we should remain vigilant and monitor individuals.

TCT-327

Rotational angiography with 3D reconstruction following motion field estimation for evaluation of geometry of the implanted Medtronic Corevalve frame: comparison with MSCT.

Carl Schultze1, Peter De Jaegere2, Nicolas Van Mieghem3

1Erasmus Medical Centre, Rotterdam, Zuid Holland, 2Thoraxcenter, Erasmus Medical Center, Rotterdam, Rotterdam, Netherlands, 3Erasmus MC, Rotterdam, Netherlands

Background: Evaluation of the geometry of the implanted Medtronic Corevalve (MCS) frame requires a 3D imaging modality. Rotational angiography (RA) allows 3D reconstruction but the poor temporal resolution precludes compensation for cardiac motion. Novel mathematical algorithms can estimate motion fields allowing motion compensation for image reconstruction of sparse objects. We compared the geometry of the motion compensated RA model with MSCT (gold standard).

Methods: After TAVI a 5 second RA was performed of the implanted MCS frame. A prototype workstation was used for estimation of and correction for motion fields which allows 3D reconstruction of the MCS frame based on all images acquired throughout the cardiac cycle. Additionally retrospective ECG-triggered contrast MSCT was obtained 1 week after TAVI followed by single phase reconstruction of a 3D dataset. A standard MSCT workstation (MMWP, Siemens, Forcheim, Germany) was used to obtain short-axis images of the MCS frame at 4 levels: 1) the inflow, 2) the nadirs of the new leaflets, 3) the inflow, 4) the nadirs of the new leaflets, 5) the commissures. At each level orthogonal smallest (Dmin) and largest (Dmax) diameters, asymmetry (Dmax/Dmin) and area (CSA) were measured on both RA and MSCT. Data for 5 cases are presented here. An extended and detailed analysis of 50 cases will be available for the conference.

Results: The Dmin, Dmax and CSA measurements obtained by MSCT and RA were highly correlated at the different levels (e.g. CSA at inflow R=0.98, p<0.001). Finally, 62.1% have restrictions imposed upon the pregnant female in the working environment.

Conclusions: Awareness of radiation in the field of interventional cardiology is essential. The main risk is orthopaedic problems and measures should be taken for prevention. Cancer has not been demonstrated to be a direct consequence, however we should remain vigilant and monitor individuals.

TCT-327

Rotational angiography with 3D reconstruction following motion field estimation for evaluation of geometry of the implanted Medtronic Corevalve frame: comparison with MSCT.

Carl Schultze1, Peter De Jaegere2, Nicolas Van Mieghem3

1Erasmus Medical Centre, Rotterdam, Zuid Holland, 2Thoraxcenter, Erasmus Medical Center, Rotterdam, Rotterdam, Netherlands, 3Erasmus MC, Rotterdam, Netherlands

Background: Evaluation of the geometry of the implanted Medtronic Corevalve (MCS) frame requires a 3D imaging modality. Rotational angiography (RA) allows 3D reconstruction but the poor temporal resolution precludes compensation for cardiac motion. Novel mathematical algorithms can estimate motion fields allowing motion compensation for image reconstruction of sparse objects. We compared the geometry of the motion compensated RA model with MSCT (gold standard).

Methods: After TAVI a 5 second RA was performed of the implanted MCS frame. A prototype workstation was used for estimation of and correction for motion fields which allows 3D reconstruction of the MCS frame based on all images acquired throughout the cardiac cycle. Additionally retrospective ECG-triggered contrast MSCT was obtained 1 week after TAVI followed by single phase reconstruction of a 3D dataset. A standard MSCT workstation (MMWP, Siemens, Forcheim, Germany) was used to obtain short-axis images of the MCS frame at 4 levels: 1) the inflow, 2) the nadirs of the new leaflets, 3) the inflow, 4) the nadirs of the new leaflets, 5) the commissures. At each level orthogonal smallest (Dmin) and largest (Dmax) diameters, asymmetry (Dmax/Dmin) and area (CSA) were measured on both RA and MSCT. Data for 5 cases are presented here. An extended and detailed analysis of 50 cases will be available for the conference.

Results: The Dmin, Dmax and CSA measurements obtained by MSCT and RA were highly correlated at the different levels (e.g. CSA at inflow R=0.99, nadj R=0.98, coaptation R=0.90, all p<0.05). There were no significant differences between MSCT and RA measurements of Dmin, Dmax or CSA at any of the 4 levels. None of the CRS frames reached nominal dimensions as measured by either MSCT or RA. The asymmetry of the frame decreased progressively across inflow, nadirs, coaptation to the commissures as measured by both MSCT (Dmax/Dmin respectively 1.20, 1.16, 1.07, 1.03) and RA (respectively 1.25, 1.22, 1.06, 1.04).

Conclusions: RA with motion field compensated 3D-reconstruction allows accurate evaluation of 3D prosthesis frame. A preliminary comparison with MSCT and is available in the catheter laboratory at the time of TAVI.

TUESDAY, OCTOBER 23, 8:00 AM–10:00 AM www.jacc.tctabstracts2012.com