Peri-procedural Myocardial Infarction in Chronic Total Occlusion

Coronary Chronic Total Occlusion Revascularization: Immediate Procedural Outcomes from a Multicenter US Registry

Conclusions:

Systematic measurement of cardiac biomarkers post CTO PCI demonstrates that peri-procedural MI occurs in 8.6% of patients and is more common with the retrograde approach than the antegrade approach. Lower complication rates, with similar radiation exposure and contrast utilization were observed and contrast use encourage us to persist with the radial access including bilateral radial approach to CTOs as the default strategy than double femoral.

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Background:
The risk of peri-procedural myocardial infarction (MI) during percutaneous coronary intervention (PCI) of chronic total occlusions (CTOs) is reported to be low, however it may be underestimated because systematic cardiac biomarker measurement was not performed in prior studies.

Methods:

We retrospectively examined the incidence of peri-procedural MI among 325 consecutive CTO PCI performed at our institution between 2006 and 2012. Complete clinical and procedural data were available for all CTO PCI. The CTO target vessel was the right coronary artery (56%), left anterior descending artery (21.5%), circumflex (20.5%), and left main or bypass graft (1%). The retrograde approach was used in 26.3% of all procedures. The technical and procedural success rates were 77.2% and 76.1%, respectively. The mean procedural time, fluoroscopy time, radiation dose and contrast utilization was 141 ± 72 minutes, 40 ± 22 minutes, 4.6 ± 2.4 Gray and 356 ± 76 ml, respectively. Peri-procedural MI occurred in 28 of 325 patients (8.6%). Seven of those patients had ischemic symptoms. The prevalence of peri-procedural cardiac troponin elevation >3x, >10x, and >20x upper limit of normal was 57%, 24% and 7%, respectively. The incidence of peri-procedural MI was similar among patients with procedural failure vs. procedural success (11.8% vs. 7.6%, p = 0.26), but was higher with the retrograde approach compared to the ante-grade approach (13.8% vs. 6.7%, p = 0.04).

Results:

Mean age was 64 ± 10 years, 99% or patients were men, 47% had diabetes, 26% had prior coronary artery bypass graft surgery and 47% had prior PCI. The CTO target vessel was the right coronary artery (56%), left anterior descending artery (21.5%), circumflex (20.5%), and left main or bypass graft (1%). The retrograde approach was used in 26.3% of all procedures. The technical and procedural success rates were 77.2% and 76.1%, respectively. The mean procedural time, fluoroscopy time, radiation dose and contrast utilization was 141 ± 72 minutes, 40 ± 22 minutes, 4.6 ± 2.4 Gray and 356 ± 76 ml, respectively. Peri-procedural MI occurred in 28 of 325 patients (8.6%). Seven of those patients had ischemic symptoms. The prevalence of peri-procedural cardiac troponin elevation >3x, >10x, and >20x upper limit of normal was 57%, 24% and 7%, respectively. The incidence of peri-procedural MI was similar among patients with procedural failure vs. procedural success (11.8% vs. 7.6%, p = 0.26), but was higher with the retrograde approach compared to the ante-grade approach (13.8% vs. 6.7%, p = 0.04).

Conclusions:

Systematic measurement of cardiac biomarkers post CTO PCI demonstrates that peri-procedural MI occurs in 8.6% of patients and is more common with the retrograde approach than the antegrade approach.

Coronary Chronic Total Occlusion Revascularization: Immediate Procedural Outcomes from a Multicenter US Registry

Methods:

We retrospectively examined the procedural outcomes of 1363 consecutive CTO PCI performed at 3 US institutions [St. Joseph Medical Center, Bellingham, WA, VA Medical Center, Dallas, TX, UT Southwestern Medical Center and VA North Texas Healthcare System, Dallas, TX, VA North Texas Healthcare System and UT Southwestern Medical Center, Dallas, TX].

Results:

Mean age was 65 ± 10 years, 85% or patients were men, 40% had diabetes, 37% had coronary artery bypass graft surgery and 42% had prior PCI. The CTO target vessel was the right coronary artery (55%), circumflex (23%), left anterior descending artery (21%), and left main or bypass graft (1%). The retrograde approach was used in 34.4% of all procedures. The technical and procedural success rates were 85.5% and 84.2%, respectively. The mean procedural time, fluoroscopy time and contrast utilization was 114 ± 63 minutes, 42 ± 29 minutes, and 296 ± 160 ml, respectively. A major procedural complication occurred in 24 patients (1.8%): 3 patients died (1 due to intracranial bleeding, 1 due to delayed cardiac tamponade, 1 due to coronary perforation), 5 had Q-wave myocardial infarction, 3 donor vessel dissections (one requiring coronary bypass graft surgery and one treated with stenting), 2 had equipment entrapment requiring coil occlusion of a ventricular septal defect and the other requiring emergent surgery, 1 had acute stent thrombosis, 1 had a transient ischemic attack and 10 patients had perforations requiring pericardiocentesis or emergent surgery.

Conclusions:

Among 3 high-volume US centers, CTO PCI can be performed with high success and low complication rates, with use of the retrograde approach in approximately one third of patients.

TCT-455

STEMI/NSTEMI Hall D

Tuesday, October 23, 2012, 8:00 AM–10:00 AM

Abstract nos: 457-533

TCT-456

The Radial Approach to CTO Re-Canalisation as is Successful and Safe than Femoral: A Single Centre Observational study

Background: Despite increasing application of the radial route for PCI re-canalization of chronic total occlusion has remained largely a trans-femoral procedure, to allow use of larger catheters and achieve powerful support. We adopted the radial approach as routine for all PCI including CTOs starting 2007 and observed satisfactory treatment of CTOs. In this study, we sought to compare procedural outcomes of radial versus femoral approach to CTO reopening.

Methods: This is a single center observational study of consecutive patients who had CTO re-canalization or attempted re-canalization. Study patients were identified from a prospectively maintained interventional database. Clinical background, procedure detail and outcome were reviewed and analyzed.

Results: 162 (93 radial, 69 femoral) consecutive patients had re-canalization or attempted re-canalization of CTO. Mean age is 65.5 years and males constitute 84.4%. There were no significant differences in baseline characteristics or in target artery between the two groups. All occlusions were >6 months and up to 12 years. Bilateral radial access was used in 31.2%; unilaterial radial in 66.7% and 2 cases had radial + femoral SF diagnostic for contra-lateral lesion. RCA was target artery in 53.0% and 97.2% had multi-vessel disease. Overall success rate was 74.9% and trans-radial vs. trans-femoral was 83.9 vs. 62.3 (p=0.01). The mean fluoroscopy time was 24.9 minutes and was similar for both groups. No significant difference in contrast use and radiation dose was observed. Access site complications were higher among trans-femoral group. One pseudo-aneurysm and two major bleedings were encountered in the femoral group where as systemic and coronary complications are similar for both groups.

Conclusions: Radial approach for CTO re-canalisation did not hamper success and actually was associated with higher success rates than femoral approach, probably thanks to improved guide-wire and supporting micro-catheter technology during the last 5 years covered. Lower complication rates, with similar radiation exposure and contrast use encourage us to persist with the radial access including bilateral radial approach to CTOs as the default strategy than double femoral.

TCT-457

The Use of a dedicated coronary bifurcation stent in patients presenting with myocardial infarction

Maik Grunende1, Solomon Aseyedom1, Peter Dammann1, Maciej Lesiak1, Michael Nowell2, Eulogio Garcia3, Armando Bethencourt3, Pier Woudstra4, Karel Koch5, Marej Vis6, Jose Herentjes7, Yoshinobu Onuma8, David Foley9, Antonio Bartorelli10, Pieter Stela11, Jan Tijssen12, Robbert de Winter12, Joanna Wyzykowska13

1Academic Medical Center - University of Amsterdam, Amsterdam, Netherlands, 2Beaumont Hospital, Dublin, Ireland, 3Poznan University of Medical Sciences, Poznan, Poland, 4heart and lung centre, Wolverhampton, United Kingdom, 5University of Madrid, Madrid, Spain, 6Hospital Son Espases, Palma de Mallorca, Spain, 7ThoraxCenter, Rotterdam, Rotterdam, 8Centro Cardiologico Monzino, IRCCS, Milan, Italy, 9University Medical Center Utrecht, Utrecht, The Netherlands, 10Academic Medical Center - University of Amsterdam, Amsterdam, MI

Background: We previously reported promising outcomes after treatment of coronary bifurcation lesions with the Tryton Side Branch Stent™ in more than 900 patients. Surprisingly, acute coronary syndrome (ACS) as percutaneous coronary intervention (PCI) indication did not predict for adverse outcomes compared to patients without ACS. Therefore, we evaluated the differences in clinical outcomes between patients presenting with stable/unstable angina, NSTEMI and STEMI.

Methods: Patients with stable/unstable angina, NSTEMI or STEMI as PCI indication did not predict for adverse outcomes compared to patients without ACS. One-year clinical outcomes were stratified according to indication and reported as the composite of cardiac death and myocardial infarction (MI), clinically indicated target vessel revascularization (TVR), definite/probable stent thrombosis (ST) and target vessel failure (TVF; composite of any death, MI, and clinically indicated TVR).

Results: We included 786 patients (79% stable/unstable angina, 14% NSTEMI, 7% STEMI). In patients treated for STEMI, death/MI, clinically indicated TVR, and TVF rates were higher than in patients without STEMI. However, these differences were not
Conclusions: Clinical outcomes were not different among patients treated with the Tryton stent presenting with stable/unstable angina, NSTEMI and STEMI. The use of the Tryton stent seems to be safe and feasible in patients presenting with MI, including STEMI.

TCT-458
Late Outcomes of Patients with Myocardial Infarction Undergoing Drug-Eluting Stent Implantation in Daily Clinical Practice
Ricardo Costa1, Amanda Sousa2, Jose Costa Jr3, Adriana Moreira4, Galo Maldonado5, Manuel Canto6, Bruno Palmiers5, Candido Campos Neto4, Fáusto Fereira2, Alexandre Abizaid6, J Eduardo Sousa2
1Instituto Dante Pazzanese de Cardiologia, Sao Paulo, Brazil, 2Dante Pazzanese, Sao Paulo, Brazil, 3Instituto Dante Pazzanese de Cardiologia, Sao Paulo, Brazil, 4HCFR, Sao Paulo, Brazil, 5NIA, Sao Paulo, Brazil, 6Visiting Professor Columbia University, Sao Paulo, Brazil

Background: Previous studies have suggested safety and efficacy of DES in patients with AMI compared to bare metal stents. However, the very long-term follow-up of patients with AMI treated with DES in the real-world clinical practice remains unknown. Our objective was to investigate the late outcomes of patients with recent acute myocardial infarction (MI) treated with drug-eluting stents (DES) in daily clinical practice.

Methods: The DESIRE-Drug-Eluting Stent in the Real World Registry is a prospective, non-randomized clinical trial evaluating the long-term clinical FU of pts undergoing elective or urgent percutaneous coronary intervention (PCI) with DES as the default strategy in a single center. From 05/02 to 05/12, 4,229 pts (6,518 lesions) were treated with 7,000 DES. Clinical FU was performed at 1, 6, and 12 months, and annually up to 10 years (FU in 97%, median = 4.9 years). Patients were divided into 2 groups according to their clinical presentation: Group 1 - patients with recent MI (<30 days), n=656; Group 2 - patients without recent MI, n=3,573, and results were compared.

Results: Group 1 had less co-morbidities, but more multivessel disease (71 vs. 62%, p=0.0002), thrombus containing lesions (12 vs. 1.4%, p<0.0001), TIMI flow 0/1 (8 vs. 1.2%, p<0.0001), and moderate/severe left ventricular dysfunction (20 vs. 8%, p<0.0001) compared to Group 2. Overall, there were 1.6±0.8 stents/patient. Group 1 received more glycoprotein IIb/IIIa inhibitors (13 vs. 2%, p<0.001), but angiographic success was similar in both groups (99%). Clinical outcomes are shown in the Table

<table>
<thead>
<tr>
<th>Cumulative Events</th>
<th>Group 1</th>
<th>Group 2</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac death</td>
<td>6.7%</td>
<td>3.6%</td>
<td>0.0003</td>
</tr>
<tr>
<td>MI</td>
<td>6.5%</td>
<td>7.1%</td>
<td>0.63</td>
</tr>
<tr>
<td>TLR</td>
<td>3%</td>
<td>5.1%</td>
<td>0.04</td>
</tr>
<tr>
<td>Stent thrombosis (ARC)</td>
<td>4.5%</td>
<td>2.0%</td>
<td>0.0001</td>
</tr>
<tr>
<td>- Early (&lt;30 days)</td>
<td>1.1%</td>
<td>0.2%</td>
<td>0.0004</td>
</tr>
<tr>
<td>- Late (1-12 months)</td>
<td>1.4%</td>
<td>0.5%</td>
<td>0.007</td>
</tr>
<tr>
<td>- Very late (&gt;12 months)</td>
<td>2.0%</td>
<td>1.3%</td>
<td>0.15</td>
</tr>
</tbody>
</table>

Conclusions: Patients with primary clinical presentation of recent MI (<30 days) undergoing DES had worse long-term prognosis compared to those without recent MI, including increased rates of cardiac death (p=0.0003) and stent thrombosis (P=0.0001) up to 10 years FU.

TCT-459
Long-Term Outcome in Patients with ST-Elevation Myocardial Infarction and Infarct-Related Coronary Artery Ectasia Treated with Primary Percutaneous Coronary Intervention
Alfonso Campa1nile1, Fabiola Sozzi1, Dario Consommi2, Federico Picione1, Paolo Sgarzi1, 'Ciro Indolfi',1 Amerigo Stabile1, Angela Migliorini1, Roberto Ferrare1,2, Giacomo Rocca2,2, Gian Battista Danzi2,2,1
1Department of Cardiology, Fondazione I.R.C.C.S. Ca’ Granda, Ospedale Maggiore Policlinico, Milano, Italy, 2Epidemiology Unit, Fondazione I.R.C.C.S. Ca’ Granda, Ospedale Maggiore Policlinico, Milano, Italy, 3Laboratory of Interventional Cardiology, Federico II University, Naples, Italy, 4Department of Cardiology, Ospedale di Treviglio, Treviglio, Italy, 5Magna Graecia University, Catanzaro, Italy, 6Department of Cardiology, Ospedale Civico, Palermo, Italy, 7Department of Cardiology, Ospedale Careggi, Firenze, Italy, 8Interventional Cardiovascular Unit, Istituto Clinico Città Studi, Milano, Italy, 9Department of Cardiology, Ospedale San Giovanni Bosco, Torino, Italy

Background: The clinical outcome of patients presenting coronary artery ectasia and acute myocardial infarction is poorly defined. The aim of this study was to analyze the mid-long term clinical outcome of patients treated by primary angioplasty in whom the culprit lesion was localized in an ectatic vessel.

Methods: A systematic review of the databases of eight Italian centers identified 101 patients with coronary artery ectasia who were treated by primary percutaneous coronary intervention (PCI). The end points of the study were the incidence of cardiac death, need of any new revascularization, recurrence of acute myocardial infarction and the combined end point of cardiac death and/or recurrence of acute myocardial infarction during a follow-up mean time of 15.4 months. Cumulative cardiac mortality was evaluated with Kaplan-Meier method. Cox proportional hazard model was used to calculate hazard ratios (HR) and 95% confidence intervals (95% CI) for selected potential predictors of cardiac mortality.

Results: The right coronary artery was the principal ectatic vessel involved in acute myocardial infarction (54%), particularly in Type 3 ectasia (p=0.001). Cardiac mortality rate was 5.9% (95% CI: 1.3-10.5) in hospital, 7.1% (95% CI: 3.4-14.3) at 1 year, and 12.8% (95% CI: 6.2-25.7) at 2 years. The most important factors related with cardiac death and survival were: male gender, TIMI 3, single lesion PCI and successful PCI (reduced mortality), age > 63.5 years, Killip class > 1, and complicated PCI (increased mortality).

Cox proportional-hazards model of cardiac death

<table>
<thead>
<tr>
<th>Variables</th>
<th>No. Deaths</th>
<th>HR</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td>0.17</td>
<td>0.03-0.87</td>
<td>0.03</td>
</tr>
<tr>
<td>Mean age (years) &gt; 63.5</td>
<td>8</td>
<td>4.54</td>
<td>0.96-21.40</td>
<td>0.056</td>
</tr>
<tr>
<td>Killip classification</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Killip class &gt; 1</td>
<td>6</td>
<td>6.51</td>
<td>1.80-23.56</td>
<td>0.004</td>
</tr>
<tr>
<td>PCI characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single lesion PCI</td>
<td>6</td>
<td>0.25</td>
<td>0.07-0.96</td>
<td>0.04</td>
</tr>
<tr>
<td>TIMI &lt; 3</td>
<td>4</td>
<td>0.27</td>
<td>0.08-0.98</td>
<td>0.047</td>
</tr>
<tr>
<td>PCI results</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Successful</td>
<td>5</td>
<td>0.09</td>
<td>0.05-0.67</td>
<td>0.01</td>
</tr>
<tr>
<td>With complications</td>
<td>3</td>
<td>4.75</td>
<td>1.18-19.10</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Conclusions: Based on our observations, the clinical outcome at mid-long term of patients with coronary artery ectasia treated by primary angioplasty in the setting of acute myocardial infarction seems to be in line with that reported in the Italian epidemiological registries for acute coronary syndromes. No association between different types of ectasia and major adverse cardiac events was found.

TCT-460
Comparison of safety and efficacy between transradial intervention (TRI) and transfemoral intervention (TFI) in acute myocardial infarction: result from KORMI registry data
Byung-Hyun Joe1
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Background: It is not still unclear which procedure is superior between TRI and TFI in in-hospital morbidities and outcomes in acute myocardial infarction patients.

Methods: Using KORMI (Korean registry of myocardial infarction) data (from 2008 January to 2011 Aug), in-hospital morbidities and cumulative clinical outcomes of TRI group were compared to those of TFI group in STEMI and NSTEMI patients. Data of

| PCI results | | | | |
| Successful | 5 | 0.09 | 0.05-0.67 | 0.01 |
| With complications | 3 | 4.75 | 1.18-19.10 | 0.03 |