CRT-112

“Very” Very Late Stent Thrombosis: Acute Myocardial Infarction From Drug Eluting Stent Thrombosis Occurring Greater Than 5 Years Post-Implantation

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Background: A serious long-term complication of drug-eluting stents (DES) is the occurrence of very late stent thrombosis (VLST) beyond one year after implantation. While VLST has been observed at least 3 to 5 years following the initial procedure, it remains unknown whether DES thrombosis is a finite phenomenon which abates over time or is a risk that persists indefinitely.

Methods: A retrospective chart and angiographic review was performed to identify a series of patients who presented to our institution with acute myocardial infarction (MI) due to “very” very late stent thrombosis (VVLST), defined as stent thrombosis occurring more than 5 years after DES implantation.

Results: The study group consisted of 6 patients (5 men and 1 woman), aged 32 to 70 years, who had angiographically confirmed definite VVLST. Five of the patients were active smokers and 3 were diabetic. Interval between stent implantation and VVLST ranged from 5.6 to 7.0 years. The DES was sirolimus-eluting in 3 patients and paclitaxel-eluting in 3 patients. None of the patients were taking clopidogrel at the time of VVLST. The interval between clopidogrel discontinuation and VVLST was 1 week in 2 patients, 3-6 months in 2 patients, and greater than 5 years in 2 patients. Only 2 patients were taking chronic aspirin therapy. Therefore, 4 of the 6 patients were on no antiplatelet therapy prior to VVLST. The clinical presentation of VVLST was acute MI in all patients, with ST segment elevation in 5 of the 6. All patients were treated successfully by emergent repeat percutaneous coronary intervention.

Conclusion: Risk of stent thrombosis persists beyond 5 years after implantation of first generation DES. These sobering findings underscore the need for clinical vigilance in these patients and corroborate current PCI guidelines which recommend continuing at least aspirin indefinitely after DES.

Table: Clinical Presentation of VVLST

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Gender</th>
<th>Type of DES</th>
<th>Stent Location</th>
<th>TIMI Flow Grade</th>
<th>Date of VVLST</th>
<th>Door to balloon time (min)</th>
<th>Sx to balloon time (min)</th>
<th>EF (%)</th>
<th>% Fibrotic area (max. NC site)</th>
<th>% Dense calcium area (max. NC site)</th>
<th>% Necrotic core area (max. NC site)</th>
<th>% Fibrotic area (max. NC site)</th>
<th>% Dense calcium area (max. NC site)</th>
</tr>
</thead>
</table>
| 70 | Male | 75 | Yes | NSTE myocardial infarction | 0 | Yes [25] | Yes [25] | Yes | No | No | 71 | Average NC area (%) | 19.21 | 0.379 | -
| 32 | Male | 84 | Yes | NSTE myocardial infarction | 0 | Yes [7] | Yes [12] | Yes | Yes | Yes | 58 | Average NC area (%) | 14.11 | 0.274 | 0.0001
| 54 | Male | 88 | Yes | NSTE myocardial infarction | 0 | Yes [14] | Yes [14] | Yes | Yes | Yes | 23 | Average NC area (%) | 20.02 | 0.0001 | 0.0001
| 46 | Female | 77 | Yes | NSTE myocardial infarction | 0 | No | No [9] | No | No | Yes | 22 | Average NC area (%) | 2.89 | 0.048 | 0.0001
| 61 | Male | 77 | Yes | NSTE myocardial infarction | 0 | Yes [2] | Yes [2] | Yes | Yes | Yes | 21 | Average NC area (%) | 12.02 | 0.0001 | 0.0001
| 63 | Male | 67 | Yes | STE myocardial infarction | 0 | Yes [7] | Yes [25] | Yes | Yes | Yes | 46 | Average NC area (%) | 3.88 | 0.0001 | 0.0001

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Addition of Epifibatide to Bivalirudin During ST-Elevation Myocardial Infarction: Role for Combination Therapy?

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Background: Patients presenting with ST-elevation myocardial infarction (STEMI) represent a high risk group for in-hospital adverse events. The value of epifibatide in addition to bivalirudin in this population for prevention of such events has not been determined.

Methods: 1,849 STEMI patients underwent primary percutaneous coronary intervention; 1,639 received bivalirudin monotherapy compared with 210 who received bivalirudin plus provisional epifibatide. Primary endpoint was a composite of in-hospital death, Q-wave MI, or acute stent thrombosis; adjusted for group differences. Safety was assessed by the occurrence of thrombolysis in myocardial infarction (TIMI)
major bleeding and eptifibatide was modeled into the National Cardiovascular Database Registry (NCDR) bleeding risk score to evaluate independent risk.

Results: Significant procedure related differences exist between groups (Table 1), while in hospital adverse events were similar (OR: 0.12, 95% CI, 0.90 - 2.36). No difference in TIMI major bleeding was seen (3.9% vs. 6%; p = 0.20). Eptifibatide modestly increased the bleeding risk (OR: 1.64; 95% CI, 1.01 - 2.67, p = 0.045), however, it did not improve the NCDR bleeding risk model's ability to predict events.

Conclusion: Use of combination therapy reflects a high risk STEMI population. Despite this, the risk of in-hospital adverse events was not different between patients receiving bivalirudin plus eptifibatide vs. bivalirudin monotherapy. Likewise, combination therapy did not increase rates of major bleeding. Therefore, the use of eptifibatide should be considered in the higher risk STEMI population.

In the Current Era of ST Elevation Myocardial Infarction Treatment, What Patients Are Not Reperfused? - An Observational Analysis
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Background: The current treatment of ST-segment elevation myocardial infarction (STEMI) is mechanical reperfusion by Primary Percutaneous Coronary Intervention (PPCI) or systemic thrombolysis. Several factors are related to non-reperfusion, with advanced age being particularly significant. At present, no study has examined the presentation and characteristics of the non-reperfused patient in Ireland. Further study is clearly needed in this area, especially as the older demographic of the population increases.

Objective: To define, understand and critically evaluate STEMI patients who do not receive reperfusion therapy.

Methods: The Coronary Heart Attack Ireland Register (CHAIR) was used to identify STEMI patients who did not receive reperfusion therapy between January 1st 2007 and December 31st 2011. A retrospective review of patient charts was performed at Cork University Hospital, Mercy University Hospital, South Infirmary Victoria University Hospital and Mallow General Hospital. The contribution of non-reperfusion to patient mortality was also examined in terms of 30-day mortality and 1-year mortality post STEMI.

Results: 77 cases were included. Results indicate that most were female (n=47, 61%) with a median age of 80.39 years. 54.5% (n=42) had a past medical history of coronary heart disease with hypertension being the main risk factor (n=43, 55.8%), 49% (n=38) were considered independent in terms of ADLs. Patient mortality at 30 days post STEMI was 55.8%. This increased to 61% at 1 year.

Conclusion: As the older demographic in our population increases, this patient cohort will become particularly significant. Mortality among these patients is high yet a significant number were considered independent in terms of ADLs. Prospective evaluation of this patient cohort needs to take place to monitor the effect of the introduction of the PPCI National Strategy in Ireland in 2012. Internationally, larger studies are needed to determine the role of social factors as predictors of non-reperfusion.

Predictors of Inappropriate Activation of the Cardiac Catheterization Laboratory for Code STEMI
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Background: Patients presenting with ST elevation myocardial infarction (STEMI) benefit from primary percutaneous coronary intervention (PCI) if performed in a timely manner. Inappropriate activation (IA) of the cardiac catheterization laboratory is associated with significant time and financial costs. Patient level predictors of IA have not been well-characterized. The objective of this study was to determine predictors of IA in patients activated for code STEMI.

Methods: We retrospectively analyzed a cohort of 396 consecutive patients who were activated for code STEMI from January 2009 through April 2011 at a large, urban teaching hospital. Those who underwent emergent coronary angiography (with or without PCI) were categorized as having appropriate activation (n=228). Patients for whom code STEMI activation was subsequently cancelled and did not undergo emergent coronary angiography were categorized as inappropriate activation (n=168). Both groups were compared and predictors for IA were determined using multivariate logistic regression analysis.

Results: IA occurred in 42% of patients activated for code STEMI. Mean age, gender distribution, and history of prior myocardial infarction were similar between the groups. Body mass index < 18.5, use of self-transport to the emergency department, initial complaint, recent cocaine use, history of congestive heart failure, and history of atrial fibrillation were significantly between the two groups. Independent predictors for IA included age ≤ 35 years (odds ratio [OR], 4.85; 95% CI, 1.18-19.96; p=0.03), body mass index < 18.5 (OR, 15.91; 95% CI, 5.38-47.07; p<0.0001), absence of both chest pain and shortness of breath at presentation (OR, 3.21; 95% CI, 1.79-5.76; p<0.0001), recent cocaine use (OR, 5.01; 95% CI, 1.19-10.12; p=0.02), history of congestive heart failure (OR, 3.59; 95% CI, 1.58-8.13; p=0.002), and history of atrial fibrillation (OR, 3.47; 95% CI, 1.19-10.12; p=0.02).

Conclusions: Multiple patient-level characteristics were associated with IA of the cardiac catheterization laboratory. Younger age, absence of both chest pain and shortness of breath, recent cocaine use, and history of heart failure and atrial fibrillation were independent predictors of IA.