Cardiac Arrest in The Cardiac Catheterisation Laboratory (CCL): Initial Experience with the Role of Simulation Set-up and Training

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Background: With rising numbers and complexity of percutaneous coronary interventions being performed, the incidence of cardiac arrest in CCL is likely to increase. We undertook a series of multi-disciplinary simulation sessions to systematically define problematic areas, practice deficiencies and to propose solutions to improve cardiac arrest care in the CCL.

Methods: In 2018, ten simulation sessions were held at Western Health CCL to simulate different cardiac arrest scenarios. Participants included cardiologists, cardiology and anaesthetic registrars, intensive care registrars, nursing staff and CCL technicians. Post-simulation feedback was analysed qualitatively into common themes.

Results: Problematic areas and challenges encountered during a cardiac arrest scenario in CCL were identified and grouped into four areas of 1) equipment (e.g. CCL C-arm), 2) vascular access and drugs (e.g. standardising concentrations and venous access site), 3) physical environment (e.g. spatial limitations) and 4) resource management (e.g. leadership and role allocation). Proposed solutions included scheduling of regular simulation training for all health professionals who are likely to be involved in management of cardiac arrest in CCL; increasing familiarity with the unusual physical environment and equipment in CCL including automated cardio-pulmonary resuscitation devices and radiation-exposure safety awareness; and rapid formation of 2 team leaders to improve cardiac arrest care efficiency.

Conclusions: Cardiac arrest in CCL is a unique clinical event that differs from other emergency scenarios in hospitals. This necessitates specific training, which can be provided in a structured simulation program to improve technical and non-technical skills with potential to improve cardiac arrest care and clinical outcomes.

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Characteristics of Patients with Cardiogenic Shock Complicating Acute Coronary Syndrome and its Influence on Clinical Outcomes

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Background: Cardiogenic shock (CS) complicates ~5% of patients with acute coronary syndrome (ACS) undergoing percutaneous coronary intervention (PCI), with the highest mortality in certain subgroups despite contemporary ACS treatment.

Methods: Patients with ACS enrolled in the Melbourne Interventional Group registry (2005–2013) with CS (n=636) were analysed according to pre-specified subgroups. Those with STEMI were compared to non-STEMI, and multivessel PCI compared to single-vessel PCI. Short-term MACE (death, MI, target-vessel revascularisation) and long-term National Death Index (NDI)-linked mortality were assessed between the subgroups.

Results: Patients with CS presented with high rates of STEMI (89%) and a preponderance of multivessel disease (70%). However, only 12% underwent multivessel PCI. In-hospital and 30-day MACE were high in the CS cohort (46% and 47% respectively). Long-term NDI-linked mortality was 5% in the entire CS cohort. Subgroup analyses revealed greater in-hospital, 30-day and NDI-linked mortality among those who presented with non-STEMI compared to those with STEMI (63% vs. 38%, 64% vs. 38%, and 79% vs. 47%, respectively; all p<0.01). There was a trend towards higher in-hospital and 30-day mortality among those who underwent multivessel PCI (50% vs. 39%, p=0.07 and 50% vs. 40%, p=0.09). Higher long-term NDI-linked mortality was observed in the multivessel PCI subgroup (63% vs. 49%, p<0.05).
Conclusion: Cardiogenic shock complicating ACS portends very poor short and long-term survival with particularly high mortality in the non-STEMI and multivessel PCI subgroups.

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Clinical Benefits of Prolonged DAPT Following Complex Percutaneous Coronary Intervention

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Aims: Prolonged DAPT requires consideration of both reduced thrombotic events and increased bleeding risk. The associated subtle balance between the benefits and harms depends upon patient’s clinical factors and complexity of the coronary anatomy. Our aim was to assess the safety and efficacy of prolonged (≥12 months) in patients undergoing complex PCI.

Methods and Results: A thorough computer-based search was performed using 4 major databases. Complex PCI was defined as a procedure with at least 1 of the following angiographic characteristics: 3 vessels treated, >3 stents implanted, >3 lesions treated, bifurcation lesions, total stent length >60 mm, left main or proximal LAD, a vein graft stent or >3 lesions treated, bifurcation lesions, total stent length ≥60 mm, left main or proximal LAD, a vein graft stent or chronic total occlusion as target lesion. Of the 3453 titles searched, 3 randomised and 2 observational studies met the inclusion criteria comparing short and prolonged DAPT therapy. We applied a random-effects model to acknowledge the variation in study design, treatment duration, and length of follow-up among studies. There was a reduction in cardiac mortality (OR 1.77, 95% CI 1.09–2.86, P = 0.02, I² = 22%) with prolonged DAPT. Major bleeding was increased with prolonged DAPT (OR 0.39–0.83, P = 0.004, I² = 0%). There was no difference in the all-cause mortality (OR 1.16, 95% CI 0.82–1.63, P = 41, I² = 0%).

Conclusion: Prolonged DAPT reduces cardiac mortality and MACE in complex PCI. The results would need confirmation in a larger randomised study.

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Clopidogrel Versus Ticagrelor on Coronary Microvascular Function After Non-ST Elevation Acute Coronary Syndrome (NSTE-ACS): A Randomised Trial

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Introduction: Ticagrelor has been shown to reduce microvascular injury compared to clopidogrel in ST-elevation myocardial infarction patients. However, comparable data is lacking in NSTE-ACS.

Methods: From Mar 2018-Jan 2019, patients hospitalised for NSTE-ACS were prospectively randomised 1:1 to clopidogrel (300 mg loading then 75 mg daily) or ticagrelor (180 mg loading then 90 mg twice-daily). Coronary microvascular function was assessed with index of microcirculatory resistance (IMR) in the infarct related artery (IRA) and non-IRA before and after percutaneous coronary intervention (PCI) using a standard pressure-temperature coronary wire.

Results: 40 patients were included (17 clopidogrel, 23 ticagrelor). Median age 53.5 (IQR 49.0–61.5) years, 35(87.5%) were male, 11(27.5%) had diabetes, 19(47.5%) were smokers. Median peak troponin T was 527 (175–1006.5) ng/L, median GRACE score 91.5 (78.3–103.3) and median SYNTAX score 13 (6–20). Baseline characteristics were similar between the 2 groups. There was no significant difference in the median baseline IMR between the 2 groups in both the IRA (clopidogrel 14.4 [IQR 12.2–18.6] vs ticagrelor 20.8 [11.3–27.4], p = 0.22) and non-IRA (14.0 [11.0–22.0] vs 14.0 [10.0–29.5] respectively, p = 0.74). 28 patients underwent PCI to the IRA (12 clopidogrel, 16 ticagrelor). There was no significant difference in the median post-PCI IMR between the 2 groups (19.5 [14.5–24.5] vs 29.0 [19.0–35.6] respectively, p = 0.11). However, there was significant worsening of post-PCI compared with pre-PCI IMR in the clopidogrel group (19.5 vs 15.0, p = 0.049) but not in the ticagrelor group (29.0 vs 25.4, p = 0.47).

Conclusion: In our NSTE-ACS patients undergoing PCI, ticagrelor resulted in less disruption of coronary microvascular function compared to clopidogrel.

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