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Transapical Left Ventricular Vent (TLVV) during veno-arterial ECMO support: a bridge to solution in acute cardiogenic shock

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Introduction: One of the main limitations of Veno-Arterial ECMO (VA-ECMO) support is the inappropriate unloading of the Left Ventricule (LV). The increased risk of pulmonary edema and impairs LV function reduces the possibility of a recovery or the feasibility of other definitive treatments such as permanent LVAD implantation or emergency heart transplantation. The solution proposed by our centre is the transapical implantation of a transapical LV vent (TLVV) through a minimal invasive approach. TLVV reduces significantly the pulmonary edema and it gave the chance to convert VA-ECMO circuit to a short-term LVAD as a bridge to solution.

Methods: From January 2010 to June 2012, 16 consecutive pediatric and adult patients supported by peripheral AV ECMO for acute profound cardiogenic shock underwent TLVV implantation. Cannulation was done in the ICU through a minimally invasive approach using the seldinger technique using an arterial high-flow multi-perforated cannula. TLVV was subsequently connected to the venous inflow line of the AV ECMO. The switch from AV ECMO to short term LVAD has been done in two stages: the weaning from the right circulatory support (intermediate stage: A-A ECMO) and the subsequent weaning from the oxygenator.

Results: In-hospital mortality was in 12 patients (75,0%) pulmonary function significantly improved after implanting TLVV and the VA ECMO circuit was simplified to a short term LVAD through an intermediate stage of A-A ECMO in order to evaluate the right ventricular and the pulmonary function in two different times. Ten patients were successfully bridged to a definitive treatment: heart transplantation in 3 patients, permanent LVAD implantation in 2 patients and bridge to recovery in 5 patients. In hospital survival in patients arrived to these solutions was 8/10 (80,0%).

Conclusions: In our series the double drenaage both of the right and the left side of the heart improved pulmonary function and it gave the possibility to switch from the VA ECMO to a short-term LVAD in the majority of cases. After clinical stabilisation of patients it was possible to access to a definitive treatment. We think that in the setting of an AV ECMO, TLVV implantation is useful in order to identify the best candidate for permanent LVAD, heart transplantation or recovery reducing significantly the risk of unecessity.

STATE OF THE ART – ACUTE CORONARY SYNDROMES – CURRENT GUIDELINES AND FUTURE PROSPECTS

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Evaluation of the safety of the ESC 2011 guidelines for rapid rule-out of NSTEMI using high-sensitivity cardiac troponin I

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Purpose: High-sensitivity cardiac troponin (hs-cTn) assays have been shown to significantly improve the early diagnosis of acute myocardial infarction. The 2011 ESC guidelines for the management of acute coronary syndromes in patients without persistent ST-segment elevation contain for the first time a new fast track rule-out protocol including hs-cTn. We intended to verify the safety of this fast track protocol in our prospective study setting.

Methods: Out of our ongoing prospective international multicenter study 2187 consecutive patients who presented with symptoms suggestive of acute myocardial infarction. The 2011 ESC guidelines for the management of acute coronary syndromes in patients without persistent ST-segment elevation contain for the first time a new fast track rule-out protocol including hs-cTn. We intended to verify the safety of this fast track protocol in our prospective study setting.

Results: All patients were divided in line with the ESC algorithm into the subgroups of late presenters with chest pain onset/maximum (CPM) ≥ 6 hours and early presenters with CPM < 6 hours. In the former group, rapid rule-out was based on a single measurement using hs-cTnI and in the latter group, on two hs-cTn levels, at presentation and at 3 hours.

Results: NSTEMI was the final diagnosis in 18%. There were 77.8% (n=1778) having a hs-cTnI below the cutoff at presentation. The ESC protocol allowed the rule-out of NSTEMI at presentation in 26% of the total group and after 3 hours in additional 16%. Using only the hs-cTnI criteria, the protocol correctly ruled-out 96.1% (95% CI 94.1 to 97.5%) of applicable patients at presentation and 96.9% (95% CI 94.4 to 98.4%) after 3 hours. Adding clinical criteria (pain assessment, GRACE Score, exclusion of differential diagnoses) the protocol correctly ruled-out 99.3% (95% CI 98.1 to 99.8%) at presentation and 99.4% (95% CI 97.8 to 99.9%) after 3 hours. Pain assessment was the key additional criterion.

Conclusions: Using a novel high-sensitivity assay for troponin I, the 2011 ESC guidelines provide an effective way of rapid rule-out of NSTEMI with a very high however not perfect rule-out.

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Outcomes at 1 year in atrial fibrillation patients with versus without an acute coronary syndrome: insights from the prospective GARFIELD Registry

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Purpose: To compare cardiovascular outcomes in patients with atrial fibrillation (AF) with versus without a history of acute coronary syndrome (ACS).

Methods: Adults (≥18 years) with newly diagnosed non-valvular AF and ≥1 additional stroke risk factor (investigator defined) were enrolled at 540 sites in 19 countries. The effect of prior ACS on 1-year outcomes was determined using a Cox proportional hazards model, adjusting for antithrombotic treatment and CHADS2-VASc risk factors. Follow-up data were available in 95%.

Results: Of the 10,614 adults enrolled, 10% had a history of ACS (Table). Patients with prior ACS were at higher risk of an ACS recurrence versus those without ACS (event rate 4.2% vs 0.5%, adjusted HR 8.46% 95% CI 6.83-11.10) but not for death (3.8% vs 2.0%; HR 1.01, 95% CI 0.62-1.64), stroke (1.4% vs 1.2%; HR 1.03, 95% CI 0.47-2.25) or major bleed (0.7% vs 0.5%; HR 0.75, 95% CI 0.26-2.18).

Baseline characteristics

| Variable | No ACS (n=9545) | ACS (n=1060) | P
|----------|----------------|--------------|---
| Woman, % | 44.8 | 27.6 | <0.001
| Age, mean (SD), y | 70 (11) | 72 (10) | <0.001
| Congestive heart failure, % | 19.7 | 32.5 | <0.001
| Hypertension, % | 77.3 | 66.2 | <0.001
| Coronary artery disease, % | 10.3 | 99.2 | <0.001
| Diabetes mellitus, % | 50.7 | 35.8 | <0.001
| Prior stroke or transient ischaemic attack, % | 14.1 | 17.5 | 0.002
| Vascular disease, % | 6.1 | 14.7 | <0.001
| Risk score, mean (SD) | 3.0 | 7.5 | <0.001
| – CHA2DS2-VASc | 1.8 (1.2) | 2.3 (1.2) | <0.001
| – HAS-BLED | 3.1 (1.6) | 4.4 (1.6) | <0.001
| Oral antithrombotic therapy initiated at diagnosis, % | 9.1 | 24.7 | <0.001
| – VKA + AP | 46.9 | 29.8 | <0.001
| – AP only | 24.5 | 31.7 | <0.001
| – None | 15.3 | 6.8 | <0.001

AP: aspirin; VKA, vitamin K antagonist.

Conclusions: In AF, a history of ACS is associated with a high 1-year risk of recurrent ACS, but not with more death, stroke or bleeding events.

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Primary results of the PROMISE trial: myocardial protection with intraoperative adenosine given before reperfusion in patients with STEMI

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Purpose: The multicenter PROMISE trial (NCT 00781404) investigated the effect of intraoperative adenosine (ADO) administered at the time of primary percutaneous coronary intervention (PCI) on infarct size, microvascular obstruction (MVO), and post-infarction remodeling.

Methods: Randomized, parallel, double blinded, placebo-controlled clinical trial in 201 first STEMI patients within 6 hours of symptoms onset (SO) with persistent TIMI flow 0-1 after crossing the culprit lesion. Patients were randomized to receive 4 mg ADO or saline over 2 min distal to the lesion, immediately before reperfusion performed mostly with thrombectomy and direct stenting. Relative infarct and MVO mass (% of LV mass) after gadolinium administration and LV ejection fraction (LVEF) where assessed by magnetic resonance imaging (MRI) 2-7 days and 6 months after reperfusion. MRI imaging could not be performed during the acute phase in 20 patients, mainly due to previously unknown claustrophobia.

Six-months follow-up with MRI could be performed in 138 patients.

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