examined by MTT and its mitochondria membrane potential was determined by flow cytometry with JC-1 assay kits (Abnova).

**RESULTS** We first showed increased survival of transplanted MSCs (11.2±1.4/mm² vs. 3.5±1.6/mm², p < 0.001) and decreased apoptosis of cardiomyocytes (%) in the infarcts (11.20±3.55 vs. 20.51±8.17, p < 0.001) in RS504393 group at day 3. An increased number of capillaries (139.6±21.7/mm² vs. 95.4±17.6/mm², p < 0.001) and increased cardiac myosin-positive area (%) (17.9±6.6 vs. 11.8±3.5, p < 0.001) were then observed at day 21 in this group. A markedly increased LVEF (%) (50.17±10.06 vs. 45.44±9.45, p < 0.001) was also identified at the same time. We further confirmed decreased mitochondria membrane potential of MSCs (0.45±0.11 vs. 3.4±0.3, p < 0.001) and its reduced SDF-1 secretion (80.77±39.02 pg/ml vs. 435.5±77.41 pg/ml, p < 0.001) when co-cultured with Ly6C<sup>high</sup> monocytes (Fig.1). And this is possibly mediated by the over-expressed cytokines secreted by Ly6C<sup>high</sup> monocytes as compared to Ly6C<sup>low</sup> monocytes, including IL-1 (139.45±30.44 vs. 80.05±19.33, p < 0.001), IL-6 (187.82±40.43 vs. 135.5±22.09, p < 0.001), TNF-α (121.77±31.65 vs. 75.3±22.14, p < 0.001) and IFN-γ (142.46±27.55 vs. 88.25±19.91, p < 0.001).

**CONCLUSION** Mobilization of Ly6C<sup>high</sup> monocytes after AMI negatively affects the local trophic effects of transplanted mesenchymal stromal cells. And the probable reason is that over-expressed TNF-α, IL-1/6, INF-γ by Ly6C<sup>high</sup> monocytes lowered mesenchymal stromal cells survival and its subsequent SDF-1 secretion. These results suggest that decreasing the availability of Ly6C<sup>high</sup> monocytes post-AMI may potentially be used in the anti-inflammatory therapies for mesenchymal stromal cell transplantation after AMI.

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**CHRONIC TOTAL OCCLUSIONS (TCTAP A-042 TO TCTAP A-048)**

**TCTAP A-042**

Technical Options for Uncrossable Chronic Total Occlusion

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**BACKGROUND** It has been estimated that chronic total coronary occlusions (CTO) are encountered in 15 to 20 % patients referred for coronary angiography. The benefits of CTO revascularization are well established both in terms of improvement in patients’ symptoms as well as improvement in left ventricular systolic function. The success of CTO revascularization can be attributed to the vast array of hardware that has now become available and also to the vastly enhanced operator expertise. It is however realistic to state that despite the tremendous increase in the rate of successful CTO revascularization, there then comes a subset of CTO where revascularization attempts fail. The reason for such failures given that other variables remain constant is the inability to cross the CTO lesion. This can be due to a failure to cross the lesion with a guide wire (despite guide wire escalation). The second cause of failure commonly is the failure to cross the lesion with a balloon (i.e. Uncrossable CTO lesion). This can occur despite the successful placement of a wire in the distal true lumen. Instances where the balloon passed could not be dilated also constitute the array of CTO PCI failure. The balloon Uncrossable lesions contributes in 2 to 10 % of CTO PCI failure cases. We aim in this study to highlight a multitude of techniques that can significantly improve procedural success in this subset of “Uncrossable” CTO lesions.

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**DEFINITION** Chronic total occlusion is defined as TIMI 0 flow with known duration of occlusion more than three months.

**PATIENTS** A total number of 436 patients spanning over a period from June2006 to January 2014 were included in this prospective study. These were patients having either symptomatic angina or documented myocardial ischemia.

**CTOPCI** All patients received loading dose of dual antiplatelet drugs (Clopidogrel and Aspirin), pre procedural unfractionated heparin 100i.u/kg body weight with further doses based on ACT levels checked at 30 minutes interval. The target ACT being above 250 seconds was maintained. The lesion was deemed “Uncrossable” if attempts to pass a low profile balloon 1.0 to 1.5 mm were unsuccessful.
The failure rate of CTO PCI was 10.5% cases. The causes of failure were found to be most commonly coronary guide wire could not cross the lesion, balloon Uncrossable lesions followed by unable to deploy stent due to no satisfactory TIMI (less than TIMI III) flow.

In 35 patients (7.99) coronary guide wire could not able to cross the lesion. The balloon uncrossable lesions were found in 29 (7.19%) patients. The involved vessels were most commonly RCA in 14 patients (48.27%) followed by LCx in 8 patients (27.58%) and LAD in 7 patients (24.13%). In four patients (0.9%) unable to deploy the stent due to long dissection; small vessels, diffuse disease, unyielding lesions and achieved flow less than TIMI III.

The various techniques to increase guiding catheter support and to modify the lesion were considered in balloon uncrossable lesions. We successfully facilitated the balloon and achieved adequate lesion dilatation in 22 patients (75.86%) out of 29 patients. All the cases of CTO PCI were done with guiding catheters of 7, 8 Fr size with good back up support as per decided as initial strategy. In spite of all these various techniques, in 7 patients (24.12%) lesions were resistant to cross with the balloon. The lesion site calcification was invariable present in all patients. The tortuosity at lesion site was noticed in 5 patients (1.45%). Even with all strategies resistant balloon Uncrossable lesions to leading to CTO PCI failure were observed in 1.59% of total cases.

CONCLUSION The second most common cause of CTO PCI failure is balloon Uncrossable lesions in spite of successful wire positioning in the distal true lumen. In this study we observed Uncrossable lesions in 7.19% cases. The resistant balloon Uncrossable lesions still contributed in 1.59% cases of CTO PCI failure in spite of adaptation of multiple techniques. The calcification and tortuosity at the lesion site primarily accounts for it. The main principle behind to achieve success in CTO PCI of such lesions is to have a strategy for good guide backup support. Once good guide backup support is achieved and there still remains a difficulty in crossing the lesion, lesion modification should be considered. The various technical options are available to facilitate the balloon across the Uncrossable lesions. The simultaneous and sequential applications of various techniques are used to gain a final successful outcome. We finds Uncrossable lesions in spite of good guide support should be tackled initially corsair microcather followed side branch balloon anchor technique. The utilization of various other above mentioned techniques, Tornus microcather and rotational athrectomy should be considered as a last resort as per depending upon operators comfort and experience. The resistant balloon Uncrossable lesions should be treated with optimal drug therapy or coronary artery bypass surgery by considering disease status of other vessels and myocardial are supplied by these lesions.

**RESULTS**

The failure rate of CTO PCI was 10.5% cases. The causes of failure were found to be most commonly coronary guide wire could not cross the lesion, balloon Uncrossable lesions followed by unable to deploy stent due to no satisfactory TIMI (less than TIMI III) flow.

In 35 patients (7.99) coronary guide wire could not able to cross the lesion. The balloon uncrossable lesions were found in 29 (7.19%) patients. The involved vessels were most commonly RCA in 14 patients (48.27%) followed by LCx in 8 patients (27.58%) and LAD in 7 patients (24.13%). In four patients (0.9%) unable to deploy the stent due to long dissection; small vessels, diffuse disease, unyielding lesions and achieved flow less than TIMI III.

The various techniques to increase guiding catheter support and to modify the lesion were considered in balloon uncrossable lesions. We successfully facilitated the balloon and achieved adequate lesion dilatation in 22 patients (75.86%) out of 29 patients. All the cases of CTO PCI were done with guiding catheters of 7, 8 Fr size with good back up support as per decided as initial strategy. In spite of all these various techniques, in 7 patients (24.12%) lesions were resistant to cross with the balloon. The lesion site calcification was invariable present in all patients. The tortuosity at lesion site was noticed in 5 patients (1.45%). Even with all strategies resistant balloon Uncrossable lesions to leading to CTO PCI failure were observed in 1.59% of total cases.

CONCLUSION The second most common cause of CTO PCI failure is balloon Uncrossable lesions in spite of successful wire positioning in the distal true lumen. In this study we observed Uncrossable lesions in 7.19% cases. The resistant balloon Uncrossable lesions still contributed in 1.59% cases of CTO PCI failure in spite of adaptation of multiple techniques. The calcification and tortuosity at the lesion site primarily accounts for it. The main principle behind to achieve success in CTO PCI of such lesions is to have a strategy for good guide backup support. Once good guide backup support is achieved and there still remains a difficulty in crossing the lesion, lesion modification should be considered. The various technical options are available to facilitate the balloon across the Uncrossable lesions. The simultaneous and sequential applications of various techniques are used to gain a final successful outcome. We finds Uncrossable lesions in spite of good guide support should be tackled initially corsair microcather followed side branch balloon anchor technique. The utilization of various other above mentioned techniques, Tornus microcather and rotational athrectomy should be considered as a last resort as per depending upon operators comfort and experience. The resistant balloon Uncrossable lesions should be treated with optimal drug therapy or coronary artery bypass surgery by considering disease status of other vessels and myocardial are supplied by these lesions.

**BACKGROUND**

The aim of study was to evaluate angiographic morphological features of epicardial collateral channels (CCs) on each cardiac chamber.

**METHODS** We reviewed 235epicardial CCs of 155 proximal CTOs, which were divided into three groups: LV-CC (n=86), RV-CC (n=69), and Atrial-CC (n=69) to compare tortuosity.

**RESULTS** Plane tortuosity (two-dimensional) such as V, Z, Ω and snake-like morphology and three-dimensional tortuosity such as loop, corkscrew-like morphology were less frequent in LV-CC than RV or Atrial-CC (32% vs. 54% vs.48%, p<0.008), (25% vs. 78% vs. 71%, p<0.008).

**CONCLUSION** LV-CC has a nature of less tortuous compared with RV or Atrial-CC.

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**TCTAP A-043**

Comparison of Angiographic Morphological Features of Epicardial Collateral Channels According to Cardiac Chamber

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**BACKGROUND** Chronic total occlusion (CTO) in a non-infarct-related artery was reported to worsen immediate clinical outcome in acute myocardial infarction (AMI) patients. However, the prognosis of such patients with preserved left ventricular function after successful primary percutaneous coronary intervention (PCI) has not been clarified yet. We aimed to evaluate whether the presence of CTO contributes to worse prognosis even in patients with preserved left ventricular function after primary PCI.

**METHODS** We retrospectively analyzed 353 consecutive patients with acute myocardial infarction, whose left ventricular ejection fraction (LVEF) was not less than 40% in the echocardiography performed 1 day after primary PCI. We divided patients into two groups according to the presence (n=25) or absence (n=328) of CTO in the non-infarct-related coronary artery, and compared the clinical outcome of patients between the two groups.

**RESULTS** The LVEF estimated by echocardiography after primary PCI was similar between patients with and without CTO (51.1±8.6% vs. 58.0±9.4%; p=0.07). The peak creatine kinase value was also similar between the two groups (1539 vs. 1921 U/L; p=0.23); however, CTO patients were significantly more likely to undergo intra-aortic balloon pumping (56.0% vs. 12.5%; p<0.001) during primary PCI, and 30-daymortality was significantly higher in CTO patients (12.0% vs. 0.9%; p<0.001).By multivariate analysis, cardiogenic shock at arrival was significantly correlated with 30-day mortality.

**CONCLUSION** In AMI patients with CTO, even if their LVEF was during primary PCI, and 30-daymortality was significantly higher in CTO patients (12.0% vs. 0.9%; p<0.001).By multivariate analysis, cardiogenic shock at arrival was significantly correlated with 30-day mortality.

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**TCTAP A-044**

The Impact of the Presence of Chronic Total Occlusion in a Non-Infarct-Related Coronary Artery in Acute Myocardial Infarction Patients: Validation in a Subset of Patients with Preserved Left Ventricular Function After Successful Primary Percutaneous Coronary Intervention

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**BACKGROUND** The aim of study was to evaluate angiographic morphological features of epicardial collateral channels (CCs) on each cardiac chamber.

**METHODS** We reviewed 235epicardial CCs of 155 proximal CTOs, which were divided into three groups: LV-CC (n=86), RV-CC (n=69), and Atrial-CC (n=69) to compare tortuosity.

**RESULTS** Plane tortuosity (two-dimensional) such as V, Z, Ω and snake-like morphology and three-dimensional tortuosity such as loop, corkscrew-like morphology were less frequent in LV-CC than RV or Atrial-CC (32% vs. 54% vs.48%, p<0.008), (25% vs. 78% vs. 71%, p<0.008).

**CONCLUSION** LV-CC has a nature of less tortuous compared with RV or Atrial-CC.

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**TCTAP A-045**

N-Terminal Pro-B-Type Natriuretic Peptide Concentration in Patients with Poor or Good Coronary Collaterals

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**BACKGROUND** N-terminal pro-B-type natriuretic peptide (NT-pro-BNP) provides prognostic information and the degree of left ventricular systolic dysfunction in patients with coronary artery disease. The correlation between NT-pro-BNP level and collateral formation in patients with chronic total occlusion (CTO) has not been reported.

**METHODS** 96 cases of pure single-vessel chronic total occlusion were studied, 60 age- and sex-matched patients who had normal coronary