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High Neutrophil to Lymphocyte Ratio Predicts Larger Infarct Size and Worse Short-term Outcomes in Patients with Non-ST Elevation Myocardial Infarction

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BACKGROUND High neutrophil to lymphocyte (N/L) ratio has been reported to have a strong predictive value for worse clinical outcomes in patients with ST elevation myocardial infarction. However, the clinical significance of high N/L ratio in the setting of non-ST elevation myocardial infarction (NSTEMI) has not been fully elucidated.

METHODS We performed a retrospective analysis of 481 consecutive patients with NSTEMI who underwent coronary angiography within five days after presentation. Patients with suspected infection, chronic steroid use and active malignancy were excluded. White blood cell, neutrophil and lymphocyte count were obtained from the initial blood sample. Patients were categorized into a high N/L ratio group and control group. Baseline and angiographic characteristics, in-hospital revascularization procedures, heart failure as well as in-hospital major adverse cardiac event (MACE) including death, recurrent myocardial infarction, and target vessel revascularization were compared between the two groups.

RESULTS Among 456 patients included in the final analysis, the median N/L ratio was 3.47 (interquartile range; [2.16-5.57]). The optimal cutoff value in predicting in-hospital MACE was 5.44 by receiver operating characteristic curve analysis (area under the curve was 0.84). As a result, 118 patients (25.9%) were categorized into the high N/L ratio group. Patients with high N/L ratio were older (70[61-80] years vs. 65[56-74] years, $p=0.003$) and had higher white blood cell count ($10.1[8.0-12.4] \times 10^9/L$ vs. $7.9[6.4-9.7] \times 10^9/L$, $p<0.001$) and peak troponin I value ($2.22[0.30-11.8]$ ng/mL vs. $0.39[0.08-3.95]$ ng/mL, $p<0.001$). Other baseline characteristics were comparable between the two groups. Patients with high N/L ratio had a higher rate of three-vessel disease (including left main disease) (36.4% vs. 23.7%, $p=0.007$). There was no significant difference in the rate of impaired coronary flow and in-hospital revascularization. Patients with high N/L ratio had a higher rate of in-hospital MACE (5.9% vs. 0.3%, $p<0.001$) and in-hospital heart failure (23.7% vs. 11.5%, $p=0.001$) compared with the control group. In contrast, the absolute white blood cell count was not associated with in-hospital MACE or in-hospital heart failure.

CONCLUSION High N/L ratio was significantly associated with a larger infarct size indicated by peak troponin I value, and a higher rate of three-vessel disease and in-hospital MACE in patients with NSTEMI.

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Percutaneous Coronary Intervention of Elderly Patients with Acute Myocardial Infarction: The Next Big Challenge

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BACKGROUND Acute myocardial infarction has a higher prevalence in elderly patients however they are underrepresented in clinical trials.

OBJECTIVES The goal of the study is to investigate baseline risk factors, interventional characteristics and hospital outcomes in elderly patients undergoing percutaneous coronary intervention (PCI) for acute myocardial infarction (AMI).

METHODS Retrospective analysis of 1309 patients treated with PCI for acute myocardial infarction (AMI) at the Los Angeles County Hospital + USC Medical Center and Keck Medical Center of USC between January 2008 and June 2014. Patients were divided into 2 groups: age greater than 75 years (group A) and age 75 years or less (group B).

RESULTS Group A had higher in-hospital morbidity (23.33% vs. 16.13% $P=0.03$) and mortality (20.67% vs. 3.71% $P<0.0001$). Hospitalizations and intensive care unit stays were longer (9.67 ± 14.68 days vs. 5.70 ± 7.30 days $P=0.002$) and (5.99 ± 8.23 days vs. 4.16 ± 5.46 days $P=0.04$), respectively. Post-cardiac catheterization group A had more acute renal insufficiency (12.67% vs. 3.62% $P<0.0001$) and cerebral vascular accidents (2.67% vs. 0.69% $P=0.04$). There was no difference in bleeding complications between the two groups. Although, group A was more likely to require intra-aortic balloon pump support (27.33% vs. 13.11% $P<0.0001$); they were less likely to receive glycoprotein IIb/IIIa inhibitors (20.0% vs. 29.59% $P=0.01$), angiotensin-converting enzyme inhibitors or angiotensin receptor blockers (49.33% vs. 72.30% $P<0.0001$), and beta-blockers (66.67% vs. 83.26% $P=0.03$).

CONCLUSION Despite advancements in PCI and the adjuvant management of AMI, advanced age remains an important predictor of procedural complications and is associated with a seven-fold increase risk of in-hospital death. Elderly patients are less likely to receive angiotensin inhibition and beta-blockers after AMI, which may also impact their long-term outcome. Future studies designed to investigate and optimize the management of AMI in elderly patients are needed.

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ST-segment Elevation Myocardial Infarction Resulting from Stent Thrombosis in Contemporary Real-world Practice

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BACKGROUND Stent thrombosis is a most devastating event that occurs after percutaneous coronary intervention (PCI), which can lead to large myocardial infarction and death. In randomized trial, newer generation drug-eluting stent and newer antiplatelet therapy have shown to lower the incidence of stent thrombosis. The aim of our study was to describe the pattern of the patients who presented with ST-segment elevation myocardial infarction (STEMI) due to stent thrombosis in our real-world practice.

METHODS This is a single-center retrospective study of 527 patients who presented with STEMI from 2007 to early 2014. The treatment strategy was at the discretion of the treating physician. Stent thrombosis (ST) was defined based on the angiographic finding (definite ST). Clinical and procedural characteristics were compared between the patients with and without ST. The detailed information for patients with ST regarding the type of previous stent, timing of event, and the use of dual antiplatelet therapy (DAPT) were reviewed.

RESULTS Among 527 patients with STEMI, 57 patients (11%) had angiographically confirmed stent thrombosis. The prevalence of hypertension, diabetes mellitus, dyslipidemia were higher in patients with ST than patients without ST. Patients with ST had higher median CPK (CPK 2319 vs 1508) and lower left ventricular function ($37 + 5\%$ vs $44 + 16\%$), but there was no difference in in-house mortality (2% vs 4%). ST occurred early (<1 month) in 30%, and very late (>1 year) in 56%. The previous stents were bare-metal stent in 19%, 1st generation drug-eluting stent in 33%, and 2nd generation drug-eluting stent in 40%. 48% of patients were taking DAPT (100% of acute ST, 79% of subacute ST, 38% of late ST, and 19% of very late ST). Premature cessation of DAPT was seen only in 12%. In 12% of patients, DAPT was held by the physician for procedures.

CONCLUSION In our cohort of patients, ST was a cause for STEMI in 11% of patients. Patients who presented with ST had more comorbidity, but in-house mortality was similar to non-ST patients. ST was seen in variety of clinical setting regarding the timing, the previous stent, and the concomitant DAPT use. ST is rare but continue to exist in current era.

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Elevated Left Ventricular End Diastolic Pressure is an Independent Predictor of Contrast Induced Nephropathy in Patients with ST Segment Elevation Myocardial Infarction Undergoing Percutaneous Coronary Intervention

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BACKGROUND Contrast induced nephropathy (CIN) has been reported in up to 19% of patients undergoing primary percutaneous coronary intervention (PCI) for ST segment elevation myocardial infarction (STEMI). A recent study showed that a hydration strategy based on left ventricular end diastolic pressure (LVEDP) decreased the incidence of CIN in patients undergoing PCI. Our study explores the relationship between LVEDP and the incidence CIN in patients with STEMI undergoing PCI.

METHODS Patients with STEMI who underwent emergent PCI at our hospital from 2005-2013 were retrospectively analyzed. The PCI and hydration strategies were at the discretion of the operator. CIN was defined as an increase in creatinine of more than 0.5mg/dL or 25% from baseline, within 72 hours post procedure. Patients were categorized into two groups according to LVEDP values measured at the time of cardiac catheterization: LVEDP ≥ 19 mmHg ($n=196$), and LVEDP <19 mm Hg ($n=76$). The clinical and procedural characteristics and incidence of CIN were compared between the 2 groups. Multivariate regression analysis was performed to evaluate for independent risk factors for CIN.

RESULTS Out of 272 patients analyzed, a total of 48 patients (17.6%) developed CIN. Baseline creatinine levels, the prevalence of diabetes mellitus, and the incidence of anterior wall myocardial infarction were similar in CIN group and non-CIN group. Patients with LVEDP ≥ 19 mmHg had statistically significant higher cardiac enzyme than patients with LVEDP <19 . The incidence of CIN in patients with an LVEDP ≥ 19 mm Hg was 41 (21%) compared to 7 (9.2%) in patients with LVEDP <19 mm Hg. This was statistically significant with a chi square statistic of 5.16 with p -value=0.02. A multivariate regression analysis was performed which showed that an LVEDP ≥ 19 mm Hg, as well as intra-aortic balloon pump use and age are independent predictors of CIN in our STEMI cohort.

CONCLUSION In patients with STEMI who underwent emergent PCI, an elevated LVEDP at the time of catheterization was associated with increased incidence of CIN. An LVEDP ≥ 19 mm Hg portends a statistically significant higher risk for CIN in this population and hydration strategies may need to be adjusted accordingly.