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Abstracts: Original Research Abstract



State-of-the-Art Ventricular Septal Defect Closure Technique in National Heart Center Harapan Kita

M. Abduh¹, R. Prakoso², O. Lilyasari², I. Sakidjan², Y. Kurniawati², O. Lelya², S. N. Siagian², A. A. Sembiring², D. Dwisepto²

¹Faculty of Medicine, Universitas Indonesia

²Division of Pediatric Cardiology and Congenital Heart Disease, Department of Cardiology and Vascular Medicine, Faculty of Medicine Universitas Indonesia, National Cardiac Center of Harapan Kita.

Background: Ventricle septal defect (VSD) is one of the most common congenital heart disease globally along with atrial septal defect. Due to advance in technology, percutaneous VSD closure might be achieved with no exposure to radiation, difficulty during procedure might require hybrid technique. This paper was presented to evaluate the safety and efficacy of zero contrast, minimal fluoroscopy method of VSD device closure.

Method: We retrospectively studied 31 patients with VSD who underwent device closure between February 2020 and June 2021 with difficulty during zero fluoroscopy technique and requires minimal fluoroscopic assistance. Patients who underwent VSD device closure with fluoroscopic technique or require contrast injection were excluded.

Results: A total of 31 patients, 14 males vs. 17 females (45% vs. 55%) were included. The mean age of patients was 10-year-old (ranged from 1 year to 44-year-old). 23 patients diagnosed with perimembranous VSD (74.2%), 5 patients with subaortic VSD (16.2%), 3 with doubly committed subarterial VSD (9.6%) and 1 patient with malaligned VSD. Technical approach used was retrograde transarterial in 25 patients and antegrade transvenous in 6 patients. Only 1 failed case reported due to difficulty in crossing wire and failed introducer entry. Complication during procedure was reported in 1 case where electrocardiographic (ECG) changes to junctional rhythm was seen and resolved spontaneously. The mean fluoroscopic time was 7 minutes 8 seconds (ranged from 6 seconds to 30 minutes 4 seconds). Total procedure time was 60 minutes (ranged from 32 minutes to 126 minutes). After device was deployed, residual VSD shunt was reported in 14 cases (45%) in which all residue was minimal.

Conclusion: VSD device closure with minimal fluoroscopy and zero contrast technique provides a safe alternative to fluoroscopic method with high success rate and low complication.

Keywords: *Ventricular Septal Defect, device closure, zero fluoroscopy, minimal fluoroscopy, zero contrast*



Distal Radial Access for Angiography and Intervention

S. K. Adwiaro¹, N. D. Windityasari¹, R. H. Wibowo¹, A.U. Dewi¹

¹Sumedang Regional Hospital, Sumedang, West Java, Indonesia

Objective: A new puncture site in distal radial area of the anatomical snuff box has been described and performed as a new approach for angiography and intervention in many countries^{1,2,3}. In this registry, we would like to demonstrate the feasibility and safety of distal radial access (DRA).

Material and Method: All patients between June 2020 to September 2021 planned to do Coronary Angiography (CGA) and Percutaneous Coronary Intervention (PCI) in Sumedang Regional Hospital via DRA were entered in this registry. Procedural data, puncture success, crossover rate, and complication were registered.

Results: A total of 96 patients were enrolled (mean age: 58 ± 1 years old, 78% male gender, 79% PCI). Puncture success, which defined as successful sheath placement, was high (N = 83/96, 86.46%) and crossover rate was low (N = 13/96, 13.54%). The complication was observed clinically as hematoma on punctured area, the rate was low (N = 1/96, 1%). Major complication was not encountered.

Conclusion: Distal radial access can be performed in coronary angiography and intervention with high feasibility and safety.

Keywords: Distal Radial Access, Intervention, Angiography

Success rate of snuffbox puncture, diagnostic CAG, and PCI

Variable	Value
Patients who tried the distal radial approach	96
Success rate of snuffbox puncture	83 (86.46%)
Left Distal Radial	60 (72.29%)
Right Distal Radial	23 (27.71%)
Patients with failed snuffbox puncture	13 (13.54%)
Crossover to conventional radial approach	7 (8.43%)
Ipsilateral	-
Contralateral	7
Crossover to the femoral approach	6
Patients with successful snuffbox puncture	83
Success rate of diagnostic CAG	83 (100%)



Mechanical and Enzymatic Isolation Techniques of Umbilical Tissue-Derived Mesenchymal Stem Cells for Cardiovascular Animal Research Study

F. Taufiq^{1,2}, P. P. Sakti^{1,2}, M. A. Bahar^{1,2}, A. Kurniawan^{1,2}, H. P. Riswati^{1,2}, A. Christine^{1,2}

¹Cardiology and Vascular Medicine Resident, Department of Cardiology and Vascular Medicine, Faculty of Medicine, Brawijaya University, Malang, Indonesia

²Cardiology and Vascular Medicine Resident, Department of Cardiology and Vascular Medicine, Dr. Saiful Anwar Hospital, Malang, Indonesia.

Background: Mesenchymal stem cells (MSCs) are the most common cells used in transplantation therapy because of their immunomodulatory properties. For animal research purposes, the source of the MSC to be isolated is important to explore. Umbilical tissue is an alternative source that can be collected noninvasively. However, methods for successful isolation open up challenges for the use of umbilical tissue-derived MSCs in animal studies.

Objective: This study investigated whether mechanical or enzymatic isolation of umbilical tissue – derived MSCs have good results.

Materials and Methods: The umbilical tissue of Sprague Dawley (SD) rats selected based on quality criteria were separated into two different isolation methods, namely mechanical and enzymatic. Isolated MSCs were analyzed for their growth potential, morphology and secondary colony formation capacity. Immunocytochemistry was used to calculate the percentage of isolated cells expressing the MSC surface marker Stro-1. The differentiation potential of MSCs was demonstrated by stimulating MSCs to become osteoblasts and stained with alizarine red to detect the presence of calcium deposits.

Results: Mechanical and enzymatic techniques succeeded in isolating MSCs from umbilical tissue of SD rats. We found no differences in morphology and growth potential in the two methods. Identification of the stro-1 surface marker using immunocytochemistry did not show statistical differences between the two methods ($p>0.05$). MSCs obtained from both methods successfully differentiated into osteoblasts.

Conclusion: Mechanical and enzymatic techniques were successful in isolating MSCs from the umbilical tissue of SD Rats. There were no differences in morphology, growth potential and differentiation potential of MSCs from the two isolation techniques. Both techniques can be used to deepen research on the potential of MSCs in heart disease.

Keyword: Mesenchymal stem cells, mechanical isolation, enzymatic isolation.



An intravenous injection of allogeneic mesenchymal stem cells ameliorates atherosclerotic plaque in rats fed an atherogenic diet

M. A. Bahar¹, F. Taufiq¹

¹Department of Cardiology and Vascular Medicine, Faculty of Medicine, Universitas Brawijaya–Dr. Saiful Anwar Hospital, Malang, Indonesia

Background: Atherosclerosis is considered a chronic inflammatory vascular disease associated with aging, involving inflammatory and immune responses. Changes in the immune response are considered important in the pathological process of vascular disorders caused by hyperlipidemia. Interestingly, mesenchymal stem cells (MSCs), with self-renewal and multipotential abilities, have shown their unique immunomodulatory functions in various pathological processes, especially in atherosclerosis. At the same time, some controversy remains regarding its therapeutic efficacy and mechanism of action. This study aimed to evaluate the effect of allogeneic MSCs on the atherosclerotic plaque in rats fed an atherogenic diet.

Materials and Methods: Twenty male Sprague Dawley (SD) rats were randomly allocated into three groups: six control rats fed a standard diet, six atherosclerotic rats, and eight atherosclerotic rats treated with MSCs. Atherosclerosis was induced by an atherogenic diet for 18 weeks, followed by a 3-week standard diet. MSCs were isolated from the umbilical cord matrix of 19 to 20-day pregnant SD rats. MSCs of passage four were injected intravenously in a single dose of 5×10^6 at week 18. Atherosclerotic plaque of the abdominal aorta was measured by hematoxylin-eosin staining and identified by two anatomical pathologists. Atherosclerotic plaques were quantified using a modified atherosclerotic score.

Results: Atherogenic diet significantly ($p < 0.002$) increased atherosclerotic plaque in rats. Atherosclerotic plaque on MSCs-treated rats was significantly ($p < 0.006$) lower than that of the atherosclerotic group, near to the normal level ($p = 0.386$).

Conclusion: An intravenous injection of allogeneic MSCs is able to reduce atherosclerosis in rats fed an atherogenic diet. This study results can be a scientific basis of MSCs as a potent candidate for atherosclerosis therapy.

Keywords: Mesenchymal stem cells, allogeneic stem cells, atherosclerosis



TGF- β 1 Expression in the Vascular Wall of Atherosclerotic Sprague Dawley Rats Treated with Mesenchymal Stem Cells

A. Christine¹, F. Taufiq¹, P.P. Sakti¹, H.P. Riswati¹, A. Kurniawan¹, M.A. Bahar¹

¹Cardiology and Vascular Medicine Resident - Department of Cardiology and Vascular Medicine, Faculty of Medicine, Brawijaya University – Saiful Anwar General Hospital, Malang, East Java, Indonesia.

Background and aims: Atherosclerosis, the formation of fibrofatty lesions in the artery wall, causes a great deal of morbidity and mortality worldwide. A better understanding of cellular and molecular biology of atherosclerosis is important for selecting the appropriate treatment pathway for this disease. TGF- β 1 is an inflammatory cytokine that plays a role in the pathogenesis of atherosclerosis. But it has been the subject of debate for several years. This study aims to determine the effect of Mesenchymal Stem Cells (MSC) injection on TGF- β 1 expression in endothel, smooth muscle, and macrophage.

Methods: This is an experimental study with Randomized Post-test Only Control Group Design in 24 male SD rats. The samples were randomly divided into 3 groups: negative control group where the samples in standard diet all along the study, positive control group where the samples got three weeks standard diet after atherosclerotic induction, and MSC treatment group where the samples undergone single dose MSC injection to the tail vein of SD rats, followed by three weeks standard diet after atherosclerotic induction. TGF- β 1 expression on endothelium, smooth muscle, and macrophage were measured by immunohistochemistry and measured according to a modified intensity score.

Result: TGF- β 1 expression in almost locations in this study showed that its expression in positive control group was higher than that of in negative control group, but statistically not significant ($p \geq 0.05$). Especially for TGF- β 1 expression in MSC treatment group, it showed fluctuating pattern. Compare to the other groups, it was higher in endothel, but lower in smooth muscle and macrophage. Only its expression in macrophage which showed statistically significant lower in MSC treatment group compared to TGF- β 1 expression in positive control group ($p = 0.046$). Furthermore, when we observed mean of intensity score from all of groups, it showed smooth muscle has the lowest score.

Conclusion: This study has shown that the intravenous administration of MSCs may have a role in repairing atherosclerotic lesions in SD rats mediated in part by reducing TGF- β 1 expression in macrophage.

Keywords: atherosclerosis, mesenchymal stem cells, TGF- β 1



Hemoglobin Level and Platelet to Lymphocyte Ratio at Admission as a Predictor of 1 Year Outcomes in Patients With Acute Myocardial Infarction Undergoing Primary Percutaneous Coronary Intervention With Drug Eluting Stent: A Retrospective Cohort Study in Sanglah General Hospital Bali

G. N. P. Jagannatha¹, I. W. A. S. Pradnyana¹, S. Kamardi¹, P.S. Upadhana¹, I. M. J. R. Artha²

¹Bachelor of Medicine and Medical Profession Study, Faculty of Medicine, Udayana University, Denpasar, Bali, Indonesia; ²Division of Cardiology, Sanglah General Hospital Denpasar, Faculty of Medicine, Udayana University, Denpasar, Bali, Indonesia

Background: Various studies have stated that various hematological parameters can predict the incidence of recurrent infarction in CAD patients. But its role in patients underwent percutaneous coronary intervention (PCI) with drug eluting stent (DES) was still unclear. Objective of this study was to evaluate hematological parameters at admission related to 1-year outcome after primary PCI with DES and determine the optimal cutoff to predict the outcome.

Methods: This study was a cohort retrospective study use 216 medical records of patients with acute myocardial infarction who underwent primary PCI with DES and complete blood count (CBC) at Sanglah General Hospital from 2018 until 2020. The 1-year outcome was determined based on the presence of a major adverse cardiac event (MACE) which includes myocardial reinfarction, malignant arrhythmia, acute heart failure (AHF), stroke, cardiovascular death, and all-cause death. Data were analyzed using SPSS version 21. Pearson chi-square test was used to compare categorical variables based on 1-year MACE. Mann-Whitney U test was used to evaluate the baseline characteristics and hematological parameters to 1-year MACE. A cut-off value for hematological parameters to predict MACE was evaluated using receiver operating characteristics (ROC). The progression of MACE based on the cut-off value was calculated and compared using the Kaplan-Meier method.

Results: During follow-up, 56.4% had MACE. Patients with MACE had lower Hb levels (11.21±2.75 vs 13.19±1.91, $p < 0.001$) with optimal cut-off < 11.7 mg/dL sensitivity 78.8%, specificity 60%; and higher PLR (168.74±59.97 vs 134.01±54.71, $p = 0.001$) with optimal cut-off > 151.85 , sensitivity 66.7%, specificity 73%. Other parameters were not significantly different. Optimal cut-off of PLR was significantly associated with reinfarction (PR 20.162; 95%CI 9.144–44.458), and AHF (PR 1.720; 95%CI 1.325–2.232) with all p value < 0.05 . Optimal cut-off of Hb was also significantly associated with reinfarction (PR 6.239; 95%CI 4.194–9.282), and AHF (PR 1.700; 95%CI 1.318–2.194) with all p value < 0.05 . The Kaplan Meier curve showing the optimal cut-off of PLR and Hb was also associated with earlier MACE progression (HR for PLR > 151.85 , 95%CI 4.27–5.48, $P = 0.000$; HR for Hb < 11.7 , 95%CI 4.87–6.73, $P = 0.000$).

Conclusion: Hb levels and high PLR at the time of admission can be predictors of MACE, especially reinfarction and acute heart failure after primary PCI with DES. Assessing pre-PCI Hb level and PLR may be useful for risk stratification.

Keywords: PCI, acute myocardial infarction, major adverse cardiac event, hemoglobin level, platelet to lymphocyte ratio.



Major Adverse Cardiovascular Events in Coronary Artery Disease Patients Undergoing Percutaneous Coronary Interventions at Sanglah Hospital Denpasar In 2021: A Cross-Sectional Hospital-Based Study

P.S. Upadhana¹, G. N. P. Jagannatha¹, P. I. S. Dewi¹, J. Nolan¹, K. M. N. Pamungkas¹, A. R. Wijaya¹, H. Wirawan²

¹Bachelor of Medicine and Medical Profession Study, Faculty of Medicine, Udayana University, Denpasar, Bali, Indonesia; ²Division of Cardiology, Sanglah General Hospital Denpasar, Faculty of Medicine, Udayana University, Denpasar, Bali, Indonesia

Background: Percutaneous coronary intervention (PCI) is the most common revascularization procedure and have permitted more successful procedures and decreased the morbidity associated with PCIs. This study was conducted to determine the factors that influence the incidence of major adverse cardiovascular events (MACE) in coronary artery disease (CAD) patients undergoing PCI at Sanglah Hospital Denpasar.

Methods: Analytical observational study with a cross-sectional study design was conducted. All patients diagnosed with CAD and had a history of PCI at Sanglah Hospital from December 2020 – June 2021 were enrolled. Univariate analysis was performed to demonstrate the baseline characteristics of the patients. Mann-whitney analysis was performed to determine the characteristics differences of the patients. Chi-Square and logistic regression analysis were performed to determine the association between variables.

Results: There were 197 patients in this study. Most of the patients were male (n=136, 69%) with a median age of 56 years (36-79). The most common types of MACE and comorbidities found in patients were coronary artery revascularization (n=97, 49.2%) and hypertension (n=109, 55.3%). Most of the patients had 3 vascular diseases (n=87, 44.2%). Mann-whitney analysis showed a significant difference in the value of haemoglobin (13.03 vs 14.27 g/dl; p=0.0001) and ejection fraction (55.7% vs 63.1%; p=0.0001) in the patients based on the incidence of MACE. Chi-square analysis showed a significant association between male (p=0.029; PR=1.231; 95%CI=1.010-1.515), dyslipidemia (p=0.012; PR=1.261; 95%CI=1.086-1.464), decreased ejection fraction (p=0.003; PR=1.293; 95%CI=1.113-1.502) were significantly associated with the incidence of MACE in patients. Logistic regression analysis also showed a significant association between male (p=0.029; PR=2.196; 95%CI=1.085-4.445), dyslipidemia (p=0.006; PR=3.828; 95%CI=1.470-9.972) and decreased ejection fraction (p=0.004; PR=3.499; 95%CI=1.502-8.153) with the incidence of MACE in patients.

Conclusion: Male, comorbidity of dyslipidemia and reduced ejection fraction had a significant association with the MACE in the patients. Early intervention against this factor can improve the quality of management in the patient.

Keywords : Coronary artery disease, Percutaneous coronary intervention, Major adverse cardiovascular event



Length Of Stay And Major Adverse Cardiac Events Comparison Between Percutaneous Coronary Intervention And Thrombolytic Therapy In Patients With ST-Elevation Myocardial Infarction During COVID-19 Pandemic: A Retrospective Cohort Study in Sanglah General Hospital Bali

G. N. P Jagannatha¹, I. W. A. S. Pradnyana¹, S. Kamardi¹, P. S. Upadhana¹, I. M. J. R. Artha²

¹Bachelor of Medicine and Medical Profession Study, Faculty of Medicine, Udayana University, Denpasar, Bali, Indonesia; ²Division of Cardiology, Sanglah General Hospital Denpasar, Faculty of Medicine, Udayana University, Denpasar, Bali, Indonesia

Background: Current guidelines highlighted the importance of primary PCI on the management of STEMI, but thrombolytic therapy was recommended as the first-line reperfusion therapy during the COVID-19 pandemic because of the safety outcomes. The better Reperfusion for STEMI patients in terms of safety and effectiveness during the COVID-19 pandemic is still unclear.

Methods: This study was a cohort retrospective study conducted at Sanglah General Hospital from March 2020 until March 2021 and 198 patients were enrolled. Pearson chi-square test was used to compare between the revascularization method, short term MACE (in-hospital-30 day) and long term MACE (>30day after revascularization), which was myocardial reinfarction, malignant arrhythmia, acute heart failure (AHF), stroke, cardiovascular death, and all-cause death. Mann-Whitney U test was used to evaluate the association between LOS base on revascularization strategies. The progression of MACE base on revascularization strategies was calculated and compared using the Kaplan-Meier method.

Results: In this study 22.5% confirmed COVID-19 infection, 45.6% had MACE with in hospital death 2.2% and all cause death of 4.7%. After being compared based on the revascularization strategy, we found a significantly higher incidence of short term AHF (PR 1.720; 95%CI 1.325–2.232; P <0.001) and long term reinfarction with patients who undergo thrombolytic (PR 0.374; 95%CI 0.271–0.571; P <0.001) whereas the other MACE parameters were not related. We compared PCI with the Kaplan-Meier curve and found revascularization with thrombolytic was associated with faster progression of reinfarction (5.42+0.42 vs 8.55+0.21 month; 95%CI 5.01-5.84; P=0.000). The average overall patient's LOS was 2.5+0.74 days with significantly longer LOS in patients who undergo fibrinolytic compared with PCI (2.68+0.82 vs 2.23+0.533 day, p=0.000).

Conclusion: LOS was lower in PCI patients and PCI was also associated with decreased risk of short term, and long term MACE. But the safety outcome must still be considered

Keywords: PCI, Fibrinolytic, MACE, Length of stay, COVID-19.



The Role of IL-1 α in Endothelial Cells of Atherosclerotic Sprague Dawley Rats: Does it contribute to MSC therapy

A. Kurniawan¹, F. Taufiq¹, P.P. Sakti¹, A. Christine¹, M.A. Bahar¹ H.P. Riswati¹

¹Cardiology Resident, Department of Cardiology and Vascular Medicine, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia.

Background: The term atherosclerosis, the principal cause of myocardial infarction refers to the condition of deposition of lipids and other substances in and on the artery walls which will narrow the lumen of the coronary arteries and eventually will disrupt blood flow, causing damage and disorders of the heart muscle. It has been suggested that cytokines and apoptosis are involved in pathogenesis of atherosclerosis. Interleukin-1 (IL-1) including its agonistic isoform IL-1 α is a key mediator in the cytokine network, controlling important functions in the immune system, during development, infection, inflammation, cell-differentiation, tissue remodelling, and even cell death. The aim of this study is to ascertain the effect of Mesenchymal Stem Cells (MSC) injection towards IL-1 α expression

Methods: This is an experimental study with Randomized Post-test Only Control Group Design in 24 male SD rats. Samples were twice randomly allocated into 3 groups: negative control group where the samples in standard diet all along the study, positive control group where the samples got three weeks standard diet after atherosclerotic induction, and MSC treatment group where the samples undergone single dose MSC injection to the tail vein of SD rats, followed by three weeks standard diet after atherosclerotic induction. Then, IL-1 α expression in the endothel of abdominal aorta was measured by immunohistochemistry.

Result: IL-1 α expression in endothel was higher in negative control group (n=6) than that in positive control group (n=6) and followed by its expression in MSC treatment group (n=8), but statistically not significant (p \geq 0.05).

Conclusion: This study showed that intravenous administration of MSC did not change IL-1 α expression although can ameliorate atherosclerotic. It means that ameliorating of atherosclerosis was not mediated by expression of IL-1 α .

Keywords: IL-1 α , atherosclerosis, inflammation, mesenchymal stem cells



The Role of Mesenchymal Stem Cells Injection In IL-6 Expression of Atherosclerotic Rats: Is It Promising?

P.P. Sakti¹, F. Taufiq¹, A Kurniawan¹, A. Christine¹, M.A. Bahar¹ H.P. Riswati¹

¹Cardiology Resident, Department of Cardiology and Vascular Medicine, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia.

Background and aims: Atherosclerosis is responsible for changes in the blood vessel and the principal cause of myocardial infarction, which will narrow the lumen of the coronary arteries and eventually will disrupt blood flow, causing damage and disorders of the heart muscle. The latest advances in basic science have established the basic role of inflammation in mediating all stages of the disease from its inception to progression and ultimately leading to atherosclerotic thrombotic complications and they also have highlighted that interleukin-6 (IL-6) is an upstream inflammatory cytokine that plays a central role in propagating the downstream inflammatory responsible for atherosclerosis. The aim of this study is to ascertain the effect of Mesenchymal Stem Cells (MSC) injection towards IL-6 expression

Methods: This is an experimental study with Randomized Post-test Only Control Group Design in 24 male SD rats. Samples were twice randomly allocated into 3 groups: negative control group where the samples in standard diet all along the study, positive control group where the samples got three weeks standard diet after atherosclerotic induction, and MSC treatment group where the samples undergone single dose MSC injection to the tail vein of SD rats, followed by three weeks standard diet after atherosclerotic induction. Then, IL-6 expression in the endothel of abdominal aorta was measured by immunohistochemistry.

Result: IL-6 expression in endothel was higher in negative control group (n=6) than that in positive control group (n=6) and followed by its expression in MSC treatment group (n=8), but statistically not significant ($p \geq 0.05$).

Conclusion: This study showed that intravenous administration of MSC did not change IL-6 expression although can ameliorate atherosclerotic. It means that ameliorating of atherosclerosis was not mediated by expression of IL-6.

Keywords: atherosclerosis, inflammation, mesenchymal stem cells.



IL-6 Expression in Atherosclerotic Induced Rats

P. P. Sakti¹, F. Taufiq¹

¹Cardiology Resident, Department of Cardiology and Vascular Medicine, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia.

Background and aims: Atherosclerosis is the principal cause of myocardial infarction, which will narrow the lumen of the coronary arteries and eventually will disrupt blood flow to the myocardium. Recent studies have established a fundamental role for inflammation in mediating all stages of this disease from initiation through progression and ultimately, the thrombotic complications of atherosclerosis and they also have highlighted that interleukin-6 (IL-6) is an upstream inflammatory cytokine that plays a central role in propagating the downstream inflammatory response responsible for atherosclerosis. The aim of this study is to measure the intensity score of IL-6 expression in atherosclerotic induced rats.

Methods: The study was an experimental study with Randomized Post-test Only Control Group Design in male SD rats. Samples were randomly allocated into 2 groups: negative control group where the samples in standard diet all along the study and positive control group where the samples got three weeks standard diet after atherosclerotic induction. The intensity score of IL-6 expression in macrophage were compared.

Result: IL-6 expression in macrophage was higher in positive control group than in negative control group, but statistically not significant ($p \geq 0.05$)

Conclusion: As expected, in the group of atherosclerotic rats, IL-6 intensity score was higher than in negative control group although it was not significant. Moreover, IL-6 level can be associated with cardiovascular risk.

Keywords: atherosclerosis, inflammation, interleukin-6



Prototyping and Validating The 3D-printing Based Fluoroscopic Coronary Angiography Simulator as a Learning Media

K. Mawaris¹, P.P.R. Gharini¹, D.W. Anggrahini¹,

¹Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia

Background: Obtaining a good projections of coronary angiogram and interpreting them is a complex ability for cardiology residents to learn. We aimed To create and validate a prototype of learning media which can concretely simulate the fluoroscopic coronary angiography (FCA) phenomenon as well as being realistic, radiation-free, portable, and cost effective.

Methods: Parts of "Research & Development" (R&D) method were applied. Design of the FCA simulator consisted of 2 main components. The first component was a heart's mannequin derived from computed tomography (CT) scan's file and the second component was a fluoroscope simulator. Validation from anatomist and instrumentational engineer used an interview method, while validation from FCA practitioners used a rating scale questionnaires.

Results: The transparent heart was made of 0.3 mm thick polyvinyl chloride while opaque coronary mannequin was printed with resin material and equipped with real catheter. Fluoroscope simulator consisted of minimized "C-arm" system equipped with visible light, white paper screen, and camera that can be moved in 4 axis. A camera was connected to computer screen to reproduce the image. After interviewing anatomist (n=1) and instrumentational engineer (n=1), we obtained validation from cardiology interventionists (n=3), cardiology interventional fellows (n=2), and interventional radiographers (n=3). Prototype was rated as very eligible (90%). Each aspect: relevance to curriculum (94%); educational value (92%); efficiency (88%); accuracy (90%); aesthetic (80%); durability (83%); safety (95%); portability (91%); cost (97%) were also rated as very eligible. Simulated images of right coronary artery were rated as very similar by all FCA practitioners, while left coronary artery's (LCA) were rated as quite to very similar.

Conclusion : A prototype of 3D-printing based FCA simulator has been created. The simulator is able to demonstrate a concrete and visible phenomenon of FCA, as well as being radiation-free, portable, and cost-effective. The simulated images are realistic, however, improvement was needed for LCA's. The prototype is very eligible for diagnostic FCA learning media and ready to be field tested.

Keywords : 3D-printing coronary, fluoroscopy, simulator, validation.



Triglycerides and Glucose Index (TyG) as Predictor of Multi-Vessel Disease on Cardiac Mortality in Non-ST Segment Elevation Myocardial Infarction (NSTEMI) Patients Treated With Early Invasive Strategy

A.P.B. Siagian¹

¹Faculty of Medicine, University of Sumatera Utara, Medan, Indonesia

Background and aims: To determine the association of TyG index with multi-vessel disease and cardiac mortality in NSTEMI patients who were managed by the early invasive strategy

Methods: This study was a retrospective analytical study. The data of NSTEMI patients who were treated by early invasive strategy at Murni Teguh Hospital Medan from January 2021 – September 2021, were collected. Demographic data, glycemic and lipid profile, the degree of coronary vessels obstruction (defined as one (1VD), two(2VD), or three(3VD) vessel disease), and the outcome were collected. The TyG index was calculated by: Fasting triglyceride level [mg/dL]×fasting glucose level [mg/dL]/2. Statistical analysis was done using bivariate analysis, Multivariate analysis, and ROC Curve analysis. P-Value < 0.05 were deemed significant.

Results: 60 subjects were acquired. 23 (38,33%) subjects underwent early invasive strategy because of hemodynamic instability. 12 subjects were expired despite the early invasive management strategy. The TyG mean value was higher in the expired patients (9.805±0.93; P=0.009). The highest TyG mean was found in the 3VD group (9.728±0.98 vs 9.334±0.73 vs 8.928±0.45 vs 8.875±0.80; in 3VD, 2VD, 1VD, and Insignificant lesion group respectively; P=0.01). Post-Hoc analysis showed differences in TyG mean between 1VD and 3VD group (-0.801; P=0.042) and between insignificant lesion and 3VD group (-0.853; P=0.012). The cut-off point of TyG index 9.097 had good predictive ability for 3VD lesion (AUC=0.726; P=0.016; 95% CI 0.581-0.870).

Conclusion: TyG index is significantly associated with complex lesions in coronary angiography of NSTEMI patients and has a good predicting ability for 3VD.

Keywords: NSTEMI, TyG index, Revascularization, Multi-Vessel Disease.



Relationship Between Corrected TIMI Frame Count and In-hospital Major Cardiovascular Events in Patients with ST-Segment Elevation Myocardial Infarction After Primary Percutaneous Coronary Intervention with TIMI 3 Flow

M.H. Cahyadi¹, S. Rifqi², Bahrudin³, I. Uddin², P. Ardianto², A. Wardhani³

¹Resident of Cardiovascular Department, Faculty of Medicine, Diponegoro University/ Dr. Kariadi General Hospital

²Staff of Cardiovascular Department, Faculty of Medicine, Diponegoro University/ Dr. Kariadi General Hospital

³Staff of Cardiovascular Department, Faculty of Medicine, Diponegoro University

Background and aims: Major cardiovascular events (MACE) in ST-Elevation Myocardial Infarction (STEMI) are associated with the successful return of coronary blood flow after primary percutaneous coronary intervention (PPCI). Corrected TIMI frame count (CTFC) is a quantitative assessment of the coronary flow. This study aimed to determine the relationship between CTFC and in-hospital MACE in patients with STEMI after PPCI with TIMI 3 final flow.

Methods: This retrospective study was conducted at the RSUP Dr. Kariadi general hospital from January 2016 to December 2020. CTFC calculated using Radiant dicom viewer software version 2020.2.3. The in-hospital MACE consisted of mortality, cardiogenic shock, acute pulmonary oedema, and arrhythmias. CTFC cut off used ≤ 27 frames as normal flow, and CTFC > 27 frames were slow flow coronary artery.

Results: A total of 132 patients were analyzed, consisting of 70 and patients with CTFC ≤ 27 and 62 patients with CTFC > 27 , respectively. The respective MACE were 12.9% and 41%, in the CTFC ≤ 27 and > 27 groups. Most of the patients had culprit lesions in the right coronary artery, i.e., 72.9% in the CTFC group ≤ 27 vs 51.6% in the CTFC > 27 groups. There was a relationship between CTFC and in-hospital MACE ($p=0.001$; RR 4.891; 95% CI 2.066-11.599).

Conclusions: CTFC is related with in-hospital MACE in patients with STEMI who underwent PPCI with final TIMI 3 flow.

Could Neutrophil-to-Lymphocyte Ratio Predict The Severity of Coronary Artery Disease in Smoker Patients with STEMI? A Study in North Sulawesi Population

S.S. Cahyadi¹, N. O. H. Rantung¹, E. P. Widya¹, J.A. Pangemanan¹, A. L. Panda¹

¹Department of Cardiology and Vascular Medicine, Faculty of Medicine, Sam Ratulangi University, Prof. Dr. R. D. Kandou Hospital, Manado

Background: onset and prognosis of cardiovascular disease (CVD) neutrophil to lymphocyte ratio (NLR) is associated with onset and prognosis of cardiovascular disease (CVD). The neutrophil/lymphocyte ratio (NLR) has emerged as a potential marker of both CAD severity and cardiovascular prognosis. Our aim was to investigate the correlation of NLR value and the complexity of coronary artery disease assessed by SYNTAX score (SS) in actively smoking patients with ST-segment elevation myocardial infarction (STEMI) undergoing primary percutaneous coronary intervention.

Methods: This study design was analytic observational with cross-sectional collection conducted in February-May 2021. The population is STEMI patients who are actively smoking. Statistical analysis was performed using Spearman's correlation and the area under receiver–operating curve (ROC).

Result: 182 patients were included to this study with the mean of age 59.72 ± 10 . The mean of NLR and SS were 4.3 ± 2.5 and 20.31 ± 9 respectively. NLR and SS were significantly correlated with a relatively weak correlation ($r=0.151$, $p=0.042$). The area under ROC of NLR for $SS > 22$ was 0.571. The optimal cutoff value of NLR to predict $SS > 22$ was 3.38 which has a sensitivity of 68% and specificity of 50%.

Conclusion: Higher NLR was an independent predictor of increased CAD complexity in patients with STEMI who are actively smoking.

Keyword: Neutrophil/lymphocyte ratio, coronary artery disease severity, SYNTAX score, smoking

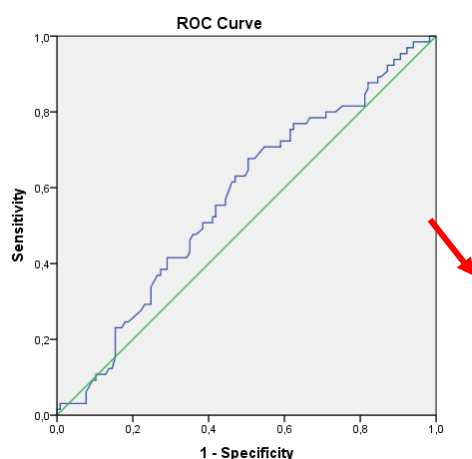


Figure 1 Receiver–operating characteristic (ROC) curves for neutrophil to lymphocyte ratio (NLR) values in prediction of intermediate-high Syntax score (> 22). AUC 0.571, optimal cut-off value 3.38 (red arrow).



EVOLUTION OF CONGENITAL HEART DISEASES INTERVENTION IN TERTIARY ACADEMIC HOSPITAL IN EAST JAVA

I. Kamelia¹, A.G.A Lukitasari¹, V. Yogibuana², H. Martini²

¹ Cardiology Residence of Faculty of Medicine Universitas Brawijaya-Saiful Anwar Hospital, Malang, Indonesia

¹Staff of Cardiovascular Department Faculty of Medicine Universitas Brawijaya-Saiful Anwar Hospital, Malang, Indonesia

Background and aims: To describe the evolution of congenital heart diseases (CHD) intervention in tertiary academic hospital in East Java.

Materials and methods: We analyzed the registry of CHD in Saiful Anwar General Hospital Malang Indonesia from 2017 to 2021. We stratify all procedure based on the types for each year. All data were performed descriptively.

Results: A total of 382 structural and congenital cardiology procedural were performed in catheterization laboratory. There are nine type of procedures performed in catheterization lab for structural and congenital heart diseases. The most frequent procedure performed was diagnostic catheterization for the Right and Left Heart Catheterization with total 258 procedures over 5 years (67.5%), and the least procedure performed was Patent Ductus Arteriosus stenting that had been done once in the last five years. Clinical concerns was in diagnostic catheterization in patient with structural heart diseases to determine the next step of treatment. Some patient underwent defect closure, comprises 54 procedures for PDA closure (14.1%), 28 patient had ASD closure (7%) and 16 patient had VSD closure (4%). Most of the procedure was done by percutaneous technique under fluoroscopy guiding. Meanwhile 2 patient underwent surgical closure for ASD in 2019. Along with the developmental of operational techniques, since 2020 there are 3 procedure for defect closure done under zero fluoroscopy. All of them was procedure for ASD closure.

Conclusions: The congenital heart diseases service in our center has been developed in the last five years. There is shifting phenomenon from the conventional fluoroscopy to the zero fluoroscopy procedure.

Keywords: Interventional cardiology, congenital heart diseases, zero fluoroscopy



Distal Radial Access in ST-Elevation Myocardial Infarction Patients Underwent Primary Percutaneous Coronary Intervention

N. D. Windityasari¹, S. K. Adwiar¹, R. H. Wibowo¹, A. U. Dewi¹

¹Sumedang Regional Hospital, Indonesia

Background and aims: Based on recent studies, distal radial access (DRA) can be an alternative access route for PCI. The aim of this study was to describe the feasibility and safety of distal radial access in Primary Percutaneous Coronary Intervention (PCI).

Material and Method: In this retrospective study, 9 (nine) ST-Elevation Myocardial Infarction (STEMI) patients who underwent primary PCI in Sumedang Regional Hospital from June 2020 to September 2021 were included in the study. Descriptive statistics were used for the analysis.

Result: The mean age 54.78 ± 4.2 years old and all patients are male. The success rate of DRA was 77.78% (N=7/9), one failed case after successful puncture due to tortuosity and the other because of puncture failure. Successful primary PCI via the DRA was achieved in all 7 patients. The left DRA was selected in 5 patients (71.43%). The mean puncture time was 119.14 ± 67.82 seconds, and the DRA puncture was performed within 5 minutes in 85.71% of patients. Local hematoma or major bleeding was not found.

Conclusion: Distal Radial Access can be performed in coronary angiography and primary percutaneous coronary intervention in STEMI patients with high feasibility and safety.

Keywords: Distal Radial, STEMI, Primary PCI



An Alternative Method to induced atherosclerosis in Sprague Dawley Rats: Is It Effective ?

H.P Riswati¹, F. Taufiq¹, P.P. Sakti¹, A. Christine¹, M.A. Bahar¹, A. Kurniawan¹

¹Cardiology Resident, Department of Cardiology and Vascular Medicine, Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia.

Background and aims: Animal models play a pivotal role in the study of human diseases. Appropriate animals for experiment is important for basic to clinical study. Sprague Dawley (SD) rats are widely used for the study of human atherosclerosis. Because SD rats are sensitive to a cholesterol diet. Many dietary studies proposed methods to induced atherosclerosis, but most fail when translated in our laboratory. This study explored an alternative method for inducing atherosclerotic plaque.

Method: SD rats were randomly allocated into 2 groups: negative control group and atherosclerotic-induced group. The negative control group was fed with rodent standard diet AIN 93 M until termination. The atherosclerotic-induced group was fed with atherogenic diet AIN 93 G plus 10% cow oil for the first week, AIN 93 G plus 20% cow oil for the second week, AIN 93 G plus 30% cow oil for the third week, AIN 93 G plus 40% cow oil for the fourth to the seventeenth week. The atherosclerotic-induced group was also injected with a single dose of 60,000 IU of vitamin D3 intraperitoneally at the second week of atherosclerosis induction. The development of atherosclerosis is observed at the 12th, 14th and 17th weeks. The presence of atherosclerosis was observed by hematoxylin-eosin staining in abdominal aorta.

Results: In the atherosclerosis-induced group, foam cells were found at week 12, vascular smooth muscle hyperplasia at week 14 and advanced plaque at week 17. In the negative control group, atherosclerosis stage was not found in each observation week.

Conclusions: The induction of atherosclerosis in this study succeeded in triggering the stages of atherosclerotic development. Therefore, it can be used as an alternative method for atherosclerotic studies using animal model.

Keywords: Atherosclerosis, atherogenic induction

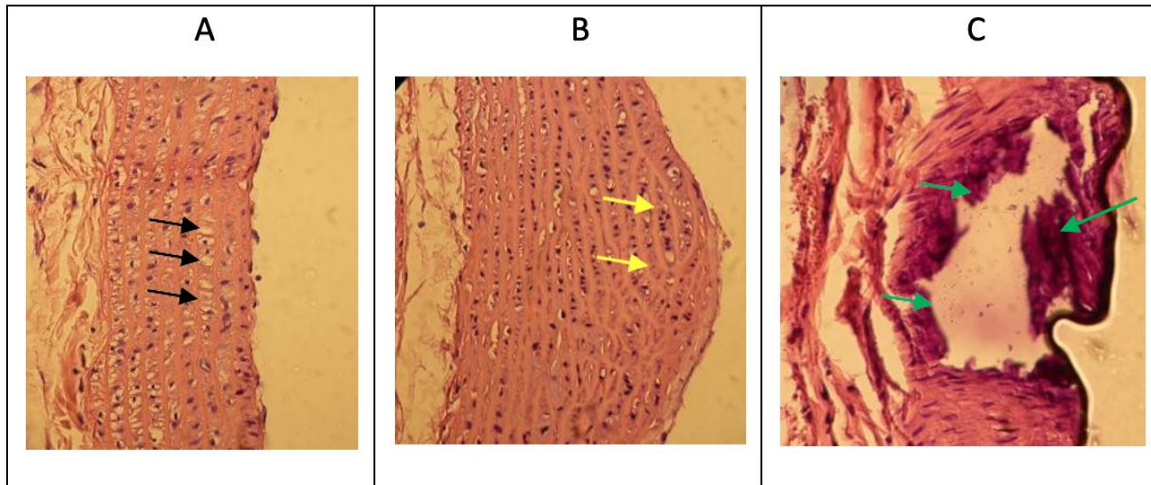


Figure 1. Hematoxylin and eosin staining result in abdominal rats after 12 (A), 14 (B), and 17 (C) weeks atherosclerotic induction. Black arrows show foam cell. Yellow arrows show hyperplasia of smooth muscle. Green Arrows show calcification plaque.



RELATIONSHIP BETWEEN TRIGLYCERIDE TO HIGH DENSITY LIPOPROTEIN RATIO AND MODIFIED GENSINI SCORE IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

D. J. K. Rejosaputro¹, S. H. Rampengan¹, D. U. Djafar¹, R. L. Lefrandt¹, A.L. Panda¹, J. A. Pangemanan¹,

¹Department of Cardiology and Vascular Medicine, Faculty of Medicine Sam Ratulangi University, Prof. Dr. R.D. Kandou General Hospital, Manado, Indonesia

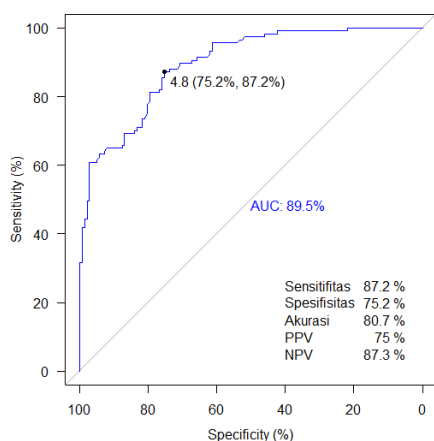
Background and aims: Acute myocardial infarction (AMI) is the most common form of coronary heart disease which contributes to 12.7% of mortality worldwide. The ratio between the amount of triglyceride and high density lipoprotein is called the TG/HDL ratio and from the recent literature, TG/HDL ratio is positively correlated with coronary lesion severity. This study aims to determine the relationship between triglycerides to high density lipoproteins ratio and modified Gensini score in patients with acute myocardial infarction.

Methods: The design of this study was observational with a cross-sectional study design and was carried out on January 1, 2019 - January 1, 2021. The number of samples in this study was 254 patients. The population of this study were patients with acute myocardial infarction (AMI) who underwent coronary angiography procedures.

Results: From the total 254 research subjects, the average age was around 59 years, with 214 patients (84%) male. History of smoking was found in 73 patients (29%). The median TG/HDL ratio was 4.9 (IQR 4.1 and 6.3). To assess the correlation between TG/HDL ratio with modified Gensini score, Spearman correlation coefficient analysis was performed. From the analysis it was found a correlation coefficient $r = 0.837$ ($p < 0.001$). And it was shown that each unit increase in the TG/HDL ratio was associated with a more than fourfold increase in the odds of severe coronary lesions. In ROC analysis, using cut-off point 4.8 as the threshold for severe coronary lesions, the ROC curve shows area under the curve of 89.5%, with sensitivity and specificity, 87,2% and 75,2%, respectively.

Conclusion: There was a positive relationship between TG/HDL ratio with modified Gensini score on AMI patients.

Keywords: Triglyceride to High Density Lipoprotein, Gensini, AMI.





The Association of Cardiovascular Risk Factors with Coronary Stenosis Severity and Lesion Distribution in Patients Undergoing Percutaneous Coronary Angiography

A.R. Lutfia¹, Y.C. Khasanah¹, R.P. Tarigan¹, H. Fakhrudin¹, R. Handayani²

¹General Practitioner, Department of Cardiology, RSUD Abdoel Moloek Bandar Lampung, Lampung, Indonesia;

²Cardiologist, Department of Cardiology, RSUD Abdoel Moloek Bandar Lampung, Lampung, Indonesia

Background: To investigate the association of cardiovascular risk factors (CRFs) with coronary severity stenosis and the location of coronary lesion in patient undergoing percutaneous coronary angiography (PCA).

Methods: We collected 189 medical records from patients who underwent PCA at Abdoel Moloek Hospital Bandar Lampung between October 2020 until March 2021, who fulfilled the inclusion and exclusion criteria. The severity of coronary stenosis determined by vessel score and coronary score. A significant vessel score was defined as stenosis of $\geq 50\%$. The location of coronary lesion was divided to left main (LM), left anterior descending (LAD), left circumflex (LCX), right coronary (RCA) artery. Samples were analysed by logistic regression and chi square. Odd ratio (OR) and confident interval (CI) of 95% were reported.

Results: From 189 samples we found 161 (85.2%) multivessel disease and 28 (14.8%) non multivessel disease. Most frequent CRFs was men 144 (76.7%) and smoking 114 (60.3%). The location of occlusion, LAD 156 (82.5%), RCA 101 (53.4%), LCX 92 (48.7%), and LM 26 (13.8%). The association between severity coronary stenosis with gender (men with multivessel disease 128 cases vs women 33 cases) defined by p value 0.03 with odd ratio (OR) 0.398 (0.170-0.932). Age group 62-68 y.o (34.6%) and type II diabetes (30.8%) and LM were analyzed by logistic regression with p value 0.018 OR 1.48 (1.070-2.045) compared to p value 0.033 OR 0.35 (0.133-0.921). Smoking with p value 0.039 OR 0.536 (0.296-0.972) were significant with RCA.

Conclusion: Men are more likely to have severe coronary stenosis than women. Type II diabetes and age group 62-68 years old were associated with left main coronary lesion, while smoking was associated with right coronary artery lesion.

Key words: coronary angiography, cardiovascular risk, stenosis severe