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Abstracts: Review Articles

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Balloon Aortic Valvuloplasty Using Zero-Fluoroscopy Technique: An Evidence-Based Review

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Background: Percutaneous balloon aortic valvuloplasty (BAV), a technique used to manage aortic stenosis (AS), requires X-ray with ionizing radiation and contrast agent for imaging guidance which may pose risk to both the patient and the operator. Furthermore, X-ray cannot clearly display heart valves, increasing the risk of excessive dilatation. The aim of this review is to explain the method and to evaluate the feasibility of zero-fluoroscopy BAV, with ultrasound guidance, in patients with AS.
Methods: Literature searching was done using keywords refined with Boolean operators from PubMed, Cochrane, and ScienceDirect. Three out of 359 studies were reviewed.
Results: In studies by Li Y, et al (2020) and Xie Y, et al (2020), subjects were AS patients who underwent BAV with retrograde approach, guided with transthoracic echocardiography (TTE) or transesophageal echocardiography (TEE) in patient with poor echo window by TTE. For vascular access, femoral artery was punctured. The long axis view of aortic arch facilitates observation of catheter entry from the descending aorta until it reached the junction of aortic sinuses. The long axis view of LV and apical five-chamber view evaluate the catheter and balloon position. The process of balloon dilatation is observed from long-axis view of the aorta and LV. Immediate assessment of BAV result used short axis and long axis. There were significantly good outcomes (decreased mean aortic pressure gradient, increased aortic valve area, no death, no new onset aortic regurgitation) and no serious complication was seen. Hosokawa S, et al (2016) performed BAV guided with intracardiac echocardiogram (ICE) only. The method used was antegrade approach, with transseptal puncture guided with ICE fossa ovalis view. There were good outcomes compared with conventional BAV from previous reports and no major complication was seen.
Conclusions: Zero fluoroscopy BAV is feasible and safe with good outcomes.
Keywords: balloon aortic valvuloplasty, zero-fluoroscopy technique

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Stent Fracture in Right Ventricular Outflow Tract Stenting: A Literature Review

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Background: Transcatheter stenting of right ventricular outflow tract (RVOT) to relief pulmonary arterial stenosis, obstructed conduit, or for percutaneous pulmonary valve implantation is widely practiced. One of the main concerns in RVOT stenting is stent fracture, as RVOT is high risk implant environment for stent fracture due to stent exposure to cyclic stress. This review aim to explain the mechanism of RVOT stent fracture and risk factors underlying it.
Methods: Literature searching was done using keywords refined with Boolean operators from PubMed, Cochrane, ScienceDirect, and ten studies were reviewed.
Results: In general, stent fractures can be influenced by features of the stent and environment where the stent is implanted. In one study, the prevalence of stent fracture in Melody stent (a platinum-iridium stent for TPV replacement) was 25%, with 68% freedom from stent fracture at 2 years. Other studies identified RVOT stent fracture prevalence of 21-43% with bare stents. Variables significantly associated with stent fracture were environments with large compressive forces (apposition to the anterior chest wall, stent juxtaposed to ascending aorta, severe obstruction of RVOT conduit) and larger stent (both in diameter and undeployed length). Compressive forces can result in stent deformations, causing cracks than can progress into full thickness fracture. As stent fracture is caused by an accumulation of fatigue stress, over time there will be ongoing hazard for new stent fracture and for progression of minor fracture to substantial fracture. Thus, duration of follow-up is a key consideration. A method that was shown to decrease the risk of Melody stent fracture by 65% is pre-stenting with bare-metal stent. Putting multiple stents in RVOT might strengthen the stented area and reduce risk of fracture. Pre-dilation of stenotic area are also beneficial in preventing stent fracture.
Conclusions: RVOT fracture is common but preventable by applying the right strategies such as pre-stenting and pre-dilation.
Keywords: Stent Fracture, Ventricular Outflow Tract Stenting

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Atrial Flow Regulator as a Potential New Therapy in Pulmonary Arterial Hypertension: A Review of Current Evidence

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Background: Pulmonary hypertension (PH) is a chronic progressive disease. Left untreated, PH will lead to maladaptive remodeling of the right ventricle (RV), causing heart failure, arrhythmias, and death. Atrial septostomy has been shown to hamper disease progressions, but the uncontrolled shunt size may lead to either severe hypoxemia or early closure. Creation of a interatrial shunt of predetermined diameter is thought to increase right-to-left shunt in a more regulated manner thus increasing cardiac output at lower risk of significant hypoxemia. This review aims to assess the feasibility, effectivity, and safety profile of interatrial shunt implantation using atrial flow regulator device in patients with PAH.
Methods: A search was conducted on October 2020 in six databases: PubMed, Scopus, ProQuest, Cochrane, ScienceDirect, and EBSCO, followed by hand-searching. A total of four papers were then selected.
Results : One study involved 12 patients with severe PAH and the other three were case reports making a total of 15 patients. Implantations of AFR were successful in all patients with either fluoroscopic or echocardiographic guidance. All patients reported subjective amelioration of symptoms as shown by improvement in functional class and six-minute walking distance (6MWD). Improvement on hemodynamic and echocardiographic parameters were noted although not statistically significant. Complication includes atrial flutter (n=1) and post-procedural hypoxia requiring oxygen support (n=6), all resolved during initial hospital stay. Shunts patency were all maintained and resulting hypoxemia was well-tolerated. An ongoing trial called PROPHET (Pilot Study to Assess Safety and Efficacy of a Novel Atrial Flow Regulator (AFR) in Patients with Pulmonary Hypertension) is registered under US NIH. This single arm trial include 30 patients and is expected to be completed later this year.
Conclusions: Pending the result of the clinical trial, current evidences show AFR as a feasible, effective, and safe option to PAH patients.
Keywords: pulmonary arterial hypertension, pulmonary hypertension, atrial flow regulator, interatrial shunt

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Balloon Pulmonary Valvuloplasty Using Zero Fluoroscopy Technique: A Review

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Background: Balloon Pulmonary Valvuloplasty (BPV) is the treatment of choice for patients with pulmonary stenosis. Traditionally, BPV was done using fluoroscopy. However, the stochastic effect to the patient and operator such as cataract development and even cancer should be accounted for. Thus, the non-fluoroscopy technique should be developed further for reducing the detrimental effect of radiation for the operator or patient. We are aiming to discuss more on the feasibility of using zero fluoroscopy for balloon pulmonary valvuloplasty procedure.
Methods: We performed a search in the following databases for articles published in PubMed, ScienceDirect, Scopus, and Proquest. Eligible studies were then selected after filtering through a set of inclusion and exclusion criteria.
Results: Our search process resulted in the identification of one article that fulfilled our final selection criteria. This article stated that there are 34 patients with congenital pulmonary stenosis undergoing BPV under echocardiography guidance without radiation. The pulmonic transvalvular pressure gradient measured on catheterization dropped from 62.8 $\pm$ 10.1 mmHg to 14.7 $\pm$ 4.2 mmHg. The ratio of balloon diameter/annulus pulmonal was 1.34 $\pm$ 0.07. Slight and mild pulmonary regurgitation occurred. No moderate or severe pulmonary regurgitation, peripheral vascular complication, tricuspid valve injury, or cardiac tamponade occurred. The pulmonic transvalvular pressure gradient was 14.1 $\pm$ 4.6 mmHg measured 12 months after the procedure on TTE. No patients underwent surgical repair. Success rate of BPV under echocardiography guidance was high, but it requires a lengthy learning curve because of its difficulty technique to determine the location of the catheter.
Conclusion: This study stated that performing BPV with zero fluoroscopy technique is feasible, safe, and effective, but limited to making the decision that this procedure should be widespread performed.
Keywords: Balloon Pulmonary Valvuloplasty, Zero Fluoroscopy Technique

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Blalock-Taussig Shunt Recanalization: Acute vs Chronic A Literature Review

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Background: The occlusion of a modified Blalock–Taussig Shunt (BTS) due to thrombus formation is rare, leading to life-threatening hypoxemia. Rescue percutaneous interventions, like transcatheter thrombolytic, balloon angioplasty or stent implantation, could allow recanalization of the systemic-to-pulmonary shunt. To determine about the advantages and usefullness of transcatheter recanalization of acute and chronic blocked BTS.
Methods: Using an informative-analysis approach, the evidence-based guide data synthesis from some case reports and clinical research findings about BTS transcatheter recanalization.
Results: Bonnet *et al* (2015) concluded that transcatheter intervention successfully re-established modified BTS patency in 35/39(90%) of blocked BTS cases. Moszura *et al* (2010) had demonstrated the possibility of successful early shunt recanalization with the use of local thrombolytic therapy combined with the balloon angioplasty, and they stated that graft recanalization followed by endovascular stent implatation was effective for old and gradually narrowing BTS due to calcifications and mural thrombus. Illner *et al* (2019) also concluded that percutaneous rotational thrombectomy followed by stenting showed benefit for chronic occluded BTS in complex adult congenital heart disease not suitable for surgical repair.
Conclusions: Transcatheter intervention can be considered as an efficient rescue strategy to restore patency in case of thrombotic obstruction of a modified BTS. Percutaneous emergency recanalization of acute and chronic occluded BTS is a safe method and could avoid redo risky surgery**.**
Keywords: Blocked Blalock-Taussig Shunt, Transcatheter Intervention

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C-Reactive Protein to Albumin Ratio as a Predictor Coronary Artery Disease Severity in Patients with Acute Coronary Syndrome: A Systematic Review

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Background: This study aims to investigate the value of C-Reactive Protein to Albumin Ratio (CAR) in predicting coronary artery disease severity that is determined by SS (Syntax Score) in acute coronary syndrome patients.
Methods: A systematic electronic literature search was performed using PubMed, Cochrane, Google scholar, and Researchgate, in accordance with PRISMA guidelines. Study selection, data extraction, and validity assessment were performed independently by two reviewers.
Results: Some studies have suggested that levels of CAR can be used as a reliable marker in the prediction of CAD severity in patients. Data from 6 studies involving 1.805 ACS patients were included in a systematic review and all the studies suggest that higher CAR was strongly associated with the complexity and severity of CAD, which has better predictive value than CRP or albumin alone. Two studies have suggested that CAR > 6,3 predicts a high SS value with sensitivity and specificity of 86.8% and 43.4%. Hypoalbuminemia and elevated CRP associated with impaired endothelial function through potential mechanism such as decreased antioxidant, anti-inflammatory and anti-platelet aggregation activity.
Conclusions: Our systematic review highlights that CAR can be used to be as a predictor of CAD severity in ACS patient
Key: CRP to albumin ratio, coronary artery disease, acute coronary syndrome.

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Off-Label Use of Atrial Flow Regulator (AFR) for Failing Fontan Circulation: A Systematic Review of Case Reports and Case Series

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Background: Excessive right-to-left shunt in patients with failing Fontan circulation may cause desaturation and clinical deterioration, therefore a device that can limit shunt flow while allowing increased flow when venous pressures rises is needed. This review aims to assess the outcomes of atrial flow regulator (AFR) implantation in failing Fontan circulation as an off-label indication.
Methods: The Medline/PubMed database was searched for all relevant articles published in English through October 2020. We performed a systematic analysis of the accessed publications by using the CARE guidelines.
Results: Three case reports and one case series were included. The type of Fontan consists of fenestrated pericardial (1), fenestrated extracardiac (4), and non-fenestrated extracardiac Fontan (1). All patients developing signs of failing Fontan circulation underwent AFR implantation due to large fenestration except in one patient with non-fenestrated extracardiac Fontan; where secondary fenestration was made with AFR device. The transcatheter implantation of AFR was performed in similar fashion to conventional ASD occluder. The creation of new fenestration with AFR device was done to reduce the size of fenestration with the goal of reducing the right-to-left shunt and increasing the pulmonary flow. AFR may control blood flow that can decompress the distended atrium without uncontrolled and sudden change of Qp/Qs. Across all patients, the procedure was uneventful, short-term and medium-term follow-up showed improvement in peripheral oxygen saturation up to 95% and exercise tolerance. Anticoagulant was continued to reduce the risk of thrombus formation and ensure device patency
Conclusions: In patients with failing Fontan circulation, the off-label use of AFR may serve as a safe and promising alternative procedure to reduce the size of Fontan fenestration, increase pulmonary flow, improve oxygenation and clinical symptoms. However, further studies are necessary to assess the efficacy and long-term outcomes of AFR in failing Fontan circulation.
Keywords: Atrial flow regulator (AFR), failing Fontan circulation

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Efficacy and Safety of Cyanoacrylate Embolization versus Endovenous Laser Ablation in Treating Saphenous Vein Insufficiency: A Systematic Review and Meta-Analysis

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Background: Cyanoacrylate embolization (CAE) is a newly developed non-thermal non-tumescent venous ablation technique that has shown promising results in treating saphenous vein insufficiency. We aimed to assess the efficacy and safety of CAE in comparison to endovenous laser ablation (EVLA) in treating saphenous vein insufficiency.
Methods: We conducted a systematic search through online databases including PubMed, ScienceDirect, and Cochrane in order to find relevant studies. Keywords included were cyanoacrylate, laser, vein, and their synonyms. Primary endpoint was complete occlusion of saphenous vein one-year post-intervention, periprocedural pain, and complications. Venous Clinical Severity Score (VCSS) one-year post-intervention and intervention time were also compared between the two groups.
Results: Five relevant articles were selected for this study, consisting a total of 1432 venous ablation procedures (710 CA and 722 EVLA). In terms of complete venous occlusion, both modalities showed excellent results of 96.1% closure rate in CAE vs 94.4% closure rate in EVLA ($p = 0.12$). However, CAE was associated with less periprocedural pain compared to EVLA (pooled mean periprocedural pain score of 2.8 vs 5.6; $p < 0.001$). Furthermore, some complication occurrence rates were significantly lower in CAE compared to EVLA; including skin pigmentation (1.7% vs 4.8%; $p = 0.006$), nerve damage (1.1% vs 6.3%; $p < 0.001$), and phlebitis (4.6% vs 7.7%; $p = 0.03$). Other complications such as deep vein thrombosis and ecchymosis did not differ significantly between the two groups. Pooled mean VCSS one-year post intervention showed no significant difference between CAE and EVLA (0.97 vs 1.08; $p = 0.07$). Pooled mean intervention time was found to be faster in CAE compared to EVLA (13.9 minutes vs 32.4 minutes; $p < 0.001$).
Conclusion: Cyanoacrylate embolization yields similar efficacy compared to EVLA. However, CAE is associated with less periprocedural pain, lower complication rates, and faster intervention time.
Keywords: Cyanoacrylate embolization, endovenous laser ablation, saphenous vein insufficiency

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Five Years Outcome of Percutaneous Coronary Intervention versus Coronary Artery Bypass Graft in Left Main Coronary Artery Disease: A Meta-Analysis

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Background: Short-term comparison of Percutaneous Coronary Intervention using Drug-Eluting Stent (PCI-DES) with Coronary Artery Bypass Grafting (CABG) to treat Left Main Coronary Artery Disease (LMCAD) had showed favorable outcomes. However, long-term outcomes of PCI-DES in LMCAD remain questionable. This meta-analysis aims to evaluate 5-year outcomes of PCI versus CABG in treating LMCAD.
Methods: A systematic literature search comparing PCI-DES and CABG in LMCAD was conducted on several electronic database. Inclusion criteria were randomized clinical trial (RCT) or non-RCT, patients with LMCAD, PCI versus CABG, and had completed 5 years of clinical follow-up. Selected studies were analyzed using a fixed or random-effect model. The primary endpoint was Major Adverse Cardiac and Cerebrovascular Events (MACCE), defined as composite of all-cause mortality, myocardial infarction (MI), target vessel revascularization (TVR), and stroke. Secondary endpoints included cardiac death, TVR, and stroke.
Results: Total of 4 RCT and 1 non-RCT were selected, with 5.398 patients were pooled in our analysis. Comparing with CABG, PCI was associated with higher rates of MACCE (RR=1.43 [95% CI, 1.19-1.72], p=0.0001) and TVR (RR=2.00 [95% CI, 1.48-2.72], p<0.00001). However, incidence of cardiac death (RR=1.19 [95% CI, 0.84-1.67], p=0.33) and stroke (RR=0.95 [95% CI, 0.60-1.49], p=0.82) were not significantly different.
Conclusions: In patients with LMCAD, PCI had similar outcomes in cardiac death and stroke during five years follow-up compared to CABG. However, MACCE and TVR remain drawbacks and a great challenge to PCI.
Keywords: PCI, CABG, LMCAD, DES

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Hybrid versus Norwood Surgery, The Quest for Improved Outcome : a meta analysis

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Background: The resurgence of Hybrid approach as an alternative option for Hypoplastic Left Heart Syndrome (HLHS) has paved the way for high risk individual to be qualified for stage I surgery. Albeit the absence of Cardiopulmonary bypass in Hybrid arms, survival remains questionable. We sought to compare Inter-stage mortality rate among Hybrid and Norwood cohort with a systematic review and meta-analysis.
Methods: Electronic searches were carried out in PubMed and COCHRANE databases. Individual study quality was assessed using Newcastle-Ottawa Scale. The Cochrane Q test and I^2 test statistic were used to test heterogeneity across studies. The pooled estimate of mortality rate was computed by a random or fixed effects model, depend on the heterogeneity. Forest plot was used to described quantitative result. Sensitivity analysis was performed by leave-one-out analysis.
Results: The search yielded 368 citations, reduced to 30 full text screening of which 14 studies were suitable for inclusion criteria. Based on 14 studies, 468 patients underwent Norwood surgery with 136 mortality rate (29.05%), while Hybrid had 325 patients with 111 death in total (34.15%). Cumulative mortality (30 days after stage I and the interstage phase) was higher in Hybrid patients with (RR : 1.112 95% CI (0.897-1.379) p: 0.332). Similar result was found in early and inter-stage mortality (RR 1.140 95% CI (0.839-1.548) ; RR 1.324 95% CI (0.763-2.295). Overall survival was superior in the Norwood cohort, although this did not reach statistical significance.
Conclusions: Hybrid procedure is associated with poor survival compared to the traditional Norwood surgery during the first stage of HLHS palliation. Nevertheless, due to the preferential selection of Hybrid among the high risk infants, the efficacy of the procedure remains inconclusive. The two cohorts are inequal in risk.

Keywords: Hybrid surgery, norwood surgery, hypoplastic left heart syndrome

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Incidence of Infective Endocarditis in Unrepaired Small Ventricular Septal Defect: a Systematic Review

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Background: Ventricular septal defect (VSD) is the most common congenital heart defects, accounting for 5% infants worldwide. Small VSD has been considered benign; However, controversies arose as there is an obligation to close the defect in order to avoid the development of infective endocarditis. To conduct a systematic review regarding whether to or not to close small VSD. Study group in patients with unrepaired small VSD
Methods: Systematic review of clinical trials were performed by BM, C, and MS independently in eleven databases based on PRISMA statement with a combination of keywords and its synonyms such as "VSD", "CHD", or "IE". A total of nine cohort studies obtained were systematically reviewed and appraised utilizing STROBE statements.
Results: Nine studies showed an overall moderate risk bias results. Small VSD had minimal complications across studies, but populations with co-existing CHD or poor dental hygiene showed higher risk of IE.
Conclusion: Patients with small VSD had relatively good prognosis with minimal complications of IE. However, existence of comorbidities with other diseases or having high risk for developing IE in patients with small VSD should be warranted for VSD closure. Further studies are required to compare two groups of unrepaired and repaired small VSD for the incidence of IE.
Keywords: infective endocarditis, small VSD, VSD closure

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Ischemic Complications Following Thoracic Endovascular Aortic Repair With and Without Revascularization of Left Subclavian Artery: A Systematic Review and Meta-Analysis

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Background: Thoracic Endovascular Aortic Repair (TEVAR) has been widely performed to treat various thoracic aortic pathologies. However, stent-graft placement in the thoracic aorta may result in left subclavian artery (LSA) coverage during TEVAR, potentially leading to ischemic complications. The role of LSA revascularization procedure to prevent ischemic complications in patients with LSA coverage remains controversial. Therefore, we conducted a systematic review and meta-analysis to identify ischemic outcomes in patients who underwent TEVAR covering LSA with revascularization compared to without revascularization procedure.
Methods: A systematic search through electronic databases, including PubMed, Ovid Medline, and Cochrane, was conducted to identify relevant studies. The primary outcome parameters were left arm ischemia (LAI), stroke, and spinal cord ischemia (SCI). Odds ratio (OR) and Confidence Interval (CI) of 95% were measured and reported.
Results : A total of 11.169 patients from 21 studies were identified. Patients who underwent LSA coverage with revascularization had a lower risk of LAI compared to non revascularized patients (OR 0.10; 95% CI 0.01-0.81; $P < .03$; $I^2 = 89\%$). Nevertheless, there were no significant differences in protective risk of stroke (OR 1.15; 95% CI 0.96-1.37; $P < 0.13$; $I^2 = 65\%$) and SCI (OR 0.90; 95% CI 0.70-1.17; $P < 0.43$; $I^2 = 0\%$) between the two groups.
Conclusion: Revascularization procedure in patients with LSA coverage during TEVAR is associated with a lower risk of LAI. However, the risk of stroke and SCI did not differ significantly between revascularized and non-revascularized patients.
Keywords: Left subclavian artery, TEVAR, Left arm ischemia, Stroke, Spinal cord ischemia, Revascularization

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Monocyte to High-Density Lipoprotein (HDL) Ratio (MHR) as A Predictor of Bare-Metal Stent (BMS) Restenosis in Patients undergoing Percutaneous Coronary Intervention (PCI): A Meta-Analysis

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Background: Bare-metal stent (BMS) is still a choice of stent implantation of percutaneous coronary intervention (PCI) particularly to financial-limited healthcare facilities. A high rate of stent restenosis (SR) remains an unsolved problem in this population. An affordable predictor of BMS-SR is needed. One of the novel biomarker is monocyte to high-density lipoprotein ratio (MHR) obtained from complete blood count and lipid profile laboratory results.
Methods: Using Pubmed, Proquest, EBSCOhost, Science Direct, Clinical Key, Scopus, and Cochrane Databases of Systematic Review and Clinical Trial, a search for eligible studies conducted until October 2020.
Results: We identified 3 retro-spective cohort studies involving a total of 1984 patients undergoing PCI. Patients were divided into tertiles based on pre-procedural MHR. Analyses comparing (1) high and low-tertiles MHR and (2) medium and low-tertiles MHR were run to differ the risk of SR in each group. High-tertile (OR 2.23 95%CI 1.78-2.79 p<0.00001) and medium-tertile (OR 1.34 95%CI 1.07-1.69 p=0.01) of pre-procedural MHR are significantly associated with a higher risk of stent restenosis than the low-tertile group. Monocytes play a role in the formation and progression of atherosclerotic plaque activating the inflammation process. MHR is increased in smokers and those with metabolic syndrome.
Conclusions: Monocyte to high-density lipoprotein ratio (MHR) is a novel biomarker that can be used as an inexpensive and affordable predictor of bare-metal stent restenosis. Routine examination of MHR is proposed so that a preventive measurement could be done to avoid this complication.
Keywords: HDL, bare metal stent, restenosis, percutaneous coronary intervention, PCI

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Percutaneous Versus Surgical Pulmonary Valve Replacement in Patients with Right Ventricular Outflow Tract Dysfunction: A Systematic Review and Meta-Analysis

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Background: This study aimed to compare the clinical outcomes between percutaneous pulmonary valve implantation (PPVI) and surgical pulmonary valve replacement in patients with right ventricular outflow tract (RVOT) dysfunction.
Methods: A systematic review and meta-analysis was conducted according to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) statement. We systematically searched the relevant studies from PubMed and Cochrane Library databases from date of inception to October 2020. Outcomes of interest were all-cause mortality, procedural complications, length of hospital stay, post-procedural infective endocarditis, reintervention, 30-day rehospitalization, significant pulmonary regurgitation, and total hospital costs.
Results: Eighteen observational studies comprising 6854 patients (1854 with PPVI and 5000 with surgical procedure) were included. From our analysis, there were no differences between groups in terms of all-cause mortality (odds ratio 0.69; 95% CI 0.42-1.12, p=0.13), reintervention (odds ratio 0.74; 95% CI 0.48-1.14, p=0.17), and total hospital costs (mean difference US$2,505; 95% CI −2,632-7,643, p=0.34). PPVI was associated with a statistically significant decreased in procedural complications (odds ratio 0.32; 95% CI 0.15-0.69, p=0.003), 30-day rehospitalization (odds ratio 0.67; 95% CI 0.50-0.91, p=0.01), and rate of significant pulmonary regurgitation (odds ratio 0.10; 95% CI 0.04-0.25, p<0.00001) compared to surgical procedure. Length of hospital stay was shorter in PPVI than surgical group (mean difference −4.92; 95% CI −5.72-−4.120). However, PPVI appears to be associated with more frequent post-procedural infective endocarditis compared to surgical procedure (odds ratio 3.26; 95% CI 2.15-4.93, p<0.00001).
Conclusions: Our meta-analysis suggests that PPVI is a safe and efficacious alternative to surgical pulmonary valve replacement in patients with RVOT dysfunction, as it results in significantly fewer procedural complications, shorter length of hospital stay, lower rate of 30-days of rehospitalization and significant PR, although it was associated with higher risk of post-procedural IE compared to surgical procedure.
Keywords: Percutaneous pulmonary valve implantation (PPVI), surgical pulmonary valve replacement, right ventricular outflow tract dysfunction

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The Role of Heparin in Prevention of Acute Limb Ischemic in Cardiac Catheterization of Neonates

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Background: To discuss the role of heparin in preventing acute limb ischemic in neonates
Methods: Data was collected from search in the following databases for articles published in Cohrcane, PubMed, Proquest, ScienceDirect, and Scopus. Suitable studies were selected after screening through a series of inclusion and exclusion criteria.
Results: Cardiac catheterization is an important modality in congenital heart disease. Acute limb ischemia is one of the complications that can arise with cardiac catheterization. ALI is a dangerous condition. Cardiac catheterization plays a role in both diagnostics and intervention. One of the complications that can occur with cardiac catheterization is acute limb ischemia. Acute events limb ischemia does not always occur but has a bad impact on neonates. Several studies have shown the use of anticoagulants as prevention. Acute limb ischmeia in pediatrics is quite safe and beneficial to prevent thrombosis. Intravenous heparin is the recommended prophylactic drug. Some study reported the use of heparin with varying doses of either 100 unit per kilogram or 150 unit per kilograms. The use of heparin can reduce the incidence of arterial thrombosis compared to placebo.
Conclusions: Some study showed the benefit of the use of heparin to prevent acute limb ischemia in neonates that undergoing cardiac catheherization.
Keywords: Heparin, acute limb ischemic, cardiac catheterization, neonates

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The Role of Intravascular Ultrasound as an Alternative Guidance for Endovascular Aortic Repair in Comparison to Conventional Angiography: A Systematic Review and Meta-Analysis

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Background: Intravascular ultrasound (IVUS) has recently gained considerable attention in the field of cardiac and vascular intervention. Studies have evidenced its potential utility for endovascular aortic repair. This study investigated the role of IVUS in guiding endovascular repair of two common aortic pathologies, aortic aneurysm and dissection, in comparison to conventional angiography.
Methods: A systematic literature search and article selection was performed using pre-determined inclusion and exclusion criteria at several online databases, including Pubmed, ClinicalKey, ScienceDirect, and Cochrane Library to identify relevant studies. Studies assessing the role of IVUS in assisting endovascular aortic repair were included for further quality assessment. All meta-analyses were performed using Review Manager version 5.4
Results: A total of six non-randomized studies comprising 3,150 (male 62.4%; age range 25-90 years) patients were included in the systematic review. The overall technical success rate was 99.0% and 98.4% for IVUS and angiography group, respectively. The use of IVUS was associated with reduction in the amount of contrast used (MD -38.70; 95% CI [-60.72] – [-16.68]; p<0.001), X-Ray exposure time (MD -8.05; 95% CI [-15.30] – [-0.80]; p=0.03), and mortality (OR 0.42; 95% CI 0.28-0.64; p<0.0001). There were no significant differences in the total procedure time (MD -6.86; 95% CI [-22.29] – 8.57; p=0.38), the incidence of endoleaks (OR 1.25; 95% CI 1.00-1.57; p=0.05), composite late aortic complications (OR 0.74; 95% CI 0.46-1.20; p=0.22), and re-intervention (OR 0.69; 95% CI 0.10-4.91; p=0.71).
Conclusions: IVUS may provide a safer alternative guidance to conventional angiography in assisting endovascular repair of aortic pathologies, particularly in patients who cannot tolerate high doses of contrast agent.
Keywords: Intravascular Ultrasound, Angiography, Endovascular Aortic Repair