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REVIEW

Echocardiography and Lung Ultrasonography: The Dynamic-Duo in Distinguish TACO and TRALI - a Literature Review

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Transfusion associated circulatory overload (TACO) and transfusion-related acute lung injury (TRALI) are acute respiratory distress syndromes that occur within 6 hours of transfusion. These are the main causes of blood transfusion-related morbidity and account for the majority of all blood transfusion-related deaths. With the increasing understanding of its pathogenesis, pulmonary transfusion reaction has attracted people's attention as a potentially preventable medical complication. Diagnostically, it is still very challenging to distinguish TACO and TRALI. In this review, we will discuss the role of echocardiography and lung ultrasonography modality in differentiating TACO and TRALI. Both TACO and TRALI developed acute respiratory distress (hypoxemia) within 6 hours after transfusion, and showed infiltration on the front chest radiograph, indicating the presence of pulmonary edema. Lung Ultrasound (LUS) allows rapid and immediate evaluation of a variety of diseases including pulmonary edema. The high repeatability within and between evaluators, ease of learning, short exam time, and the non-invasive nature of the technology make it an advantageous instant care tool. The display of three or more B-lines in two or more bilateral intercostal spaces should be regarded as a diagnosis of pulmonary edema. Echocardiography can also provide key information about the pathogenesis of pulmonary edema after blood transfusion and replace invasive hemodynamic monitoring in this regard. Evidence of elevated cardiac filling pressure or systolic and/or diastolic dysfunction suggests a diagnosis of TACO in the case of circulatory overload and pulmonary edema. On the contrary, the absence of echocardiographic abnormalities is the core of TRALI diagnosis. Although TACO and TRALI share similar clinical presentations, the use of echocardiography combined with LUS may play a role in distinguishing these life threatening blood transfusion-related complications.

Keywords: TACO; TRALI; pulmonary edema; echocardiography; lung ultrasonography

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REVIEW

Systolic Blood Pressure Variability as Predictor of Adverse Outcomes in Patients Underwent Myocardial Revascularization: A Systematic Review and Meta-Analysis

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Background: Coronary Arterial Disease (CAD) has a large morbidity and mortality burden, becoming the leading cause of death worldwide. High Systolic Blood Pressure (SBP) Variability has been associated with increased cardiovascular disease risk. However, the evidence of its impact on myocardial revascularization outcome is still lacking. This study aimed to investigate the SBP variability prognostic value in patients who received myocardial revascularization.
Method: Literature search was conducted on PubMed, EMBASE, Cochrane Library, Google Scholar, and ProQuest. The outcomes were all-cause mortality and major adverse cardiovascular events (MACEs).
Result: Five cohort studies involving a total of 11,214 patients received myocardial revascularization were included, of which three studies reported data in Percutaneous Coronary Intervention (PCI) and two studies analyze the outcome on Coronary Arterial Bypass Grafting (CABG). On pooled analysis of PCI group, elevated SBP variability significantly associated with higher all-cause mortality (Hazard ratio [HR] 1.63; 95% confidence interval [CI] 1.34–1.98; $p < 0.0001$; $I^2 = 0\%$) and increased MACEs (Hazard ratio [HR] 1.38; 95% confidence interval [CI] 1.19–1.62; $p < 0.0001$; $I^2 = 12\%$). On pooled analysis of CABG group, increased SBP variability have non-significant association with higher mortality (Hazard ratio [HR] 1.29; 95% confidence interval [CI] 0.85–1.94; $p <= 0.24$; $I^2 = 85\%$)
Conclusion: Increased SBP variability was significantly associated with higher all-cause mortality and MACEs in patients undergoing PCI, but its association is insignificant to all-cause mortality in patients who received CABG.

Keywords: Blood Pressure Variability, PCI, CABG, mortality, MACE

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REVIEW

Risk of Myocardial Infarction in Human Immunodeficiency Virus-positive Patients

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Background: Human Immunodeficiency Virus (HIV) induces chronic progressive immune system dysfunction and systemic inflammation, predisposing patients to other diseases including myocardial infarction. Myocardial infarction (MI), on the other hand, is the leading cause of death all around the world and its complication extends from heart failure to sudden cardiac death. As a consequence, MI events in HIV-positive patients are related to poorer outcomes. This review weighs up the risk of HIV-positive patients from developing MI compared to the general population.
Method: We conducted literature review from Pubmed, PMC, Google Scholar, and ResearchGate. Studies published between January 2012 and November 2021 meeting the inclusion/exclusion criteria were selected.
Result: Fourteen of 305 studies reviewed met the inclusion and exclusion criteria. Several studies reported higher crude MI incidence rate per 100.000 person-years (283:165), relative risk (1.4; 95% CI 1.3-1.6), and hazard ratio (HR 1.48) of HIV-positive patients compared to the general population, having adjusted to traditional cardiovascular risk factors. Other studies identified a decline in incidence rate of MI per 100.000 person-years, from 268 in 1996 to 195 in 2011 as well as a decrease in adjusted rate ratio of MI from 1.8 (95% CI: 1.3-2.6) in 1996-1999 to 1.0 (95% CI: 0.7-1.4) in 2010-2011. One study stated that HIV infection did not significantly increase the risk of MI.
Conclusion: HIV infection augments the risk of myocardial infarction beyond traditional cardiovascular risk factors. However, incidence of MI is multifactorial and smoking is suggested to play a crucial role.

Keywords: human immunodeficiency virus infection, myocardial infarction, relative risk, incidence rate, hazard ratio

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REVIEW

SARS-CoV2/COVID-19 treatments and Class III antiarrhythmic agents: A systematic review of potential drug-drug interactions

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Background: COVID-19, a novel coronavirus disease-2019 responsible for the ongoing global pandemic, significantly increases the risk of arrhythmias, especially in patients with severe COVID-19. Hypoxia and electrolyte disturbance become major etiologies of the development of acute arrhythmias with atrial fibrillation, atrial flutter, and ventricular tachycardia (both mono and polymorphic) as the more likely to occur. Currently, several drugs are empirically used as treatments for COVID-19 with various effectivity and results such as remdesivir, favipiravir, tocilizumab, sarilumab, and dexamethasone. A clinician needs to be aware of potential drug-drug interaction between widely used COVID-19 drugs and antiarrhythmic agents to prevent adverse effects and further patient deterioration. This systematic review evaluated clinically significant drug interactions between four COVID-19-related medications and three different class III antiarrhythmic agents (Amiodarone, dronedarone, and sotalol) and describes adverse events ascribed to drug interactions between each agent.
Method: We systematically reviewed the literature to January 5, 2022, according to PRISMA guidelines using four different databases: PubMed, Cochrane, Scopus, and Google Scholar. Clinically important drug interaction between agents was obtained from Lexicomp ® and Liverpool© databases. The authors used recommendations agreed by the Indonesian Ministry of Health and the National Institute of Health (US).
Result: The most demanding drug interaction was observed in the combination of amiodarone and dexamethasone due to dexamethasone decreasing the antiarrhythmic effect of amiodarone, thus worsening the symptom. Amiodarone also decreases the metabolism of remdesivir causing bradycardia in a susceptible patient. On the other hand, tocilizumab and sarilumab are known to increase amiodarone metabolism. Generally, moderate interactions were found between amiodarone plus remdesivir/tocilizumab/sarilumab and dronedarone plus remdesivir/dexamethasone coadministration.
Conclusion: Drugs empirically used to treat COVID-19 have several interactions with class III antiarrhythmic drugs that are commonly used in patients with severe COVID-19 complicated with cardiac injury and arrhythmia. Clinicians should be aware of the likely risk of drug interactions to preserve patient safety and optimize patient recovery.

Keywords: *Drug-drug interaction, Antiarrhythmic, COVID-19*
REVIEW

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Efficacy of Ultrafiltration Therapy Compared to Diuretic Therapy on Volume Overload in Patients with Acute Decompensated Heart Failure (ADHF)-Meta-analysis

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Background : Acute heart failure (AHF) has several different etiologies contributing to it. Clinical symptoms of AHF occur with rapid onset or exacerbation, accompanied by increased plasma levels of natriuretic peptide which is often life-threatening, requiring immediate medical intervention. In patients with chronic heart failure (CHF), symptoms of acute exacerbations can occur, this condition is known as acute decompensated heart failure (ADHF). Although diuretics are often used to treat ADHF, due to the response and complications they cause, extracorporeal ultrafiltration (UF) is used as an alternative therapy to reduce volume overload in ADHF patients. Therefore, This study will perform a meta-analysis of the results obtained from several studies on UF and compare them with standard diuretic treatment for reducing volume overload in ADHF patients.
Methods: The search of published scientific articles was carried out systematically using the PRISMA (Preferred Reporting, Items for Systematic Reviews and Meta Analysis) method. A search was conducted with the PubMed database and the Cochrane library published in the last 10 years regarding the efficacy of using UF compared to diuretic therapy in ADHF patients.
Results: Based on the results of statistical analysis of 7 RCT studies with a total of 507 patients. The use of UF therapy can reduce the risk of worsening HF (OR=0.54; 95% CI 0.21 to 1.40; p=0.20; I^2=75%) and reduce the risk of decreased kidney function compared to diuretic therapy to reduce volume overload. (OR=1.41; 95% CI 0.88 to 2.28; p=0.15; I^2=0%). However, there was no significant difference in the amount of fluid removed and the amount of weight loss in the two types of therapy.
Conclusions: The use of ultrafiltration therapy can reduce the risk of worsening HF and reduce the risk of side effects compared to the use of conventional therapy.

Keywords: Heart Failure, Ultrafiltration

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REVIEW

Potential Effects of Intermittent Fasting on Improving Coronary Heart Disease Risk Factors: A Systematic Review and Meta-Analysis of Randomized Controlled Trial

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Background: Intermittent fasting (IF) and continuous energy restriction (CER) are two dietary regimens that have been found to reduce cardiovascular risk. IF is gaining popularity as a weight-loss and dysmetabolic diseases treatment strategy. Despite the lack of large, randomized controlled trials addressing the link between intermittent fasting and cardiovascular outcomes, existing human studies show that this diet could lower the risk of coronary heart disease (CHD) by improving weight control and dyslipidemia. Intermittent fasting can create a variety of impacts through several mechanisms. According to the Oxidative stress hypothesis, lower calorie intake causes mitochondria to produce fewer free radicals. In addition, IF can induce a ketogenic state that enhances HDL and lowers other lipid profiles in the blood. This study aimed to evaluate the effect of IF on coronary heart disease risk factors.
Method: This study was a systematic review and meta-analysis. The article search was conducted using PubMed, SpringerLink, ProQuest and EBSCOHost. The articles were collected using the PRISMA diagram, critically appraised using PICO analysis, then the data were analysed using Review Manager 5.4.1 with Random Effect Model. The results were effect size, heterogeneity, and study model. Data were expressed as mean difference (MD).
Result: Fourteen articles with a total of 915 patients reported the role of IF on improving coronary heart disease risk factor. Based on the analysis, IF significantly reduced body weight (MD=-1.51;95%CI-2.23to-0.97;p<0.0001) and waist circumference (MD=-2.78;95%CI-4.60to-0.95;p=0.003) compared to CER. Furthermore, IF also showed a positive effect on lipid profile by reducing triglyceride and LDL while increasing HDL, although not statistically different in comparison to CER.
Conclusion: Intermittent fasting may have potential effects on the risk reduction of CHD by reducing the body weight, waist circumference and improving lipid profile. However, it requires a close monitor in some conditions to prevent unwanted side effects such as hypoglycemia and ketoacidosis especially for people with hormonal disorders, pregnant or breastfeeding women, and diabetes. These findings should encourage future research with larger participants to address potencies of intermittent fasting for better cardiovascular outcomes.
Keywords : Intermittent Fasting ; Lipid Profile; Coronary Heart Disease