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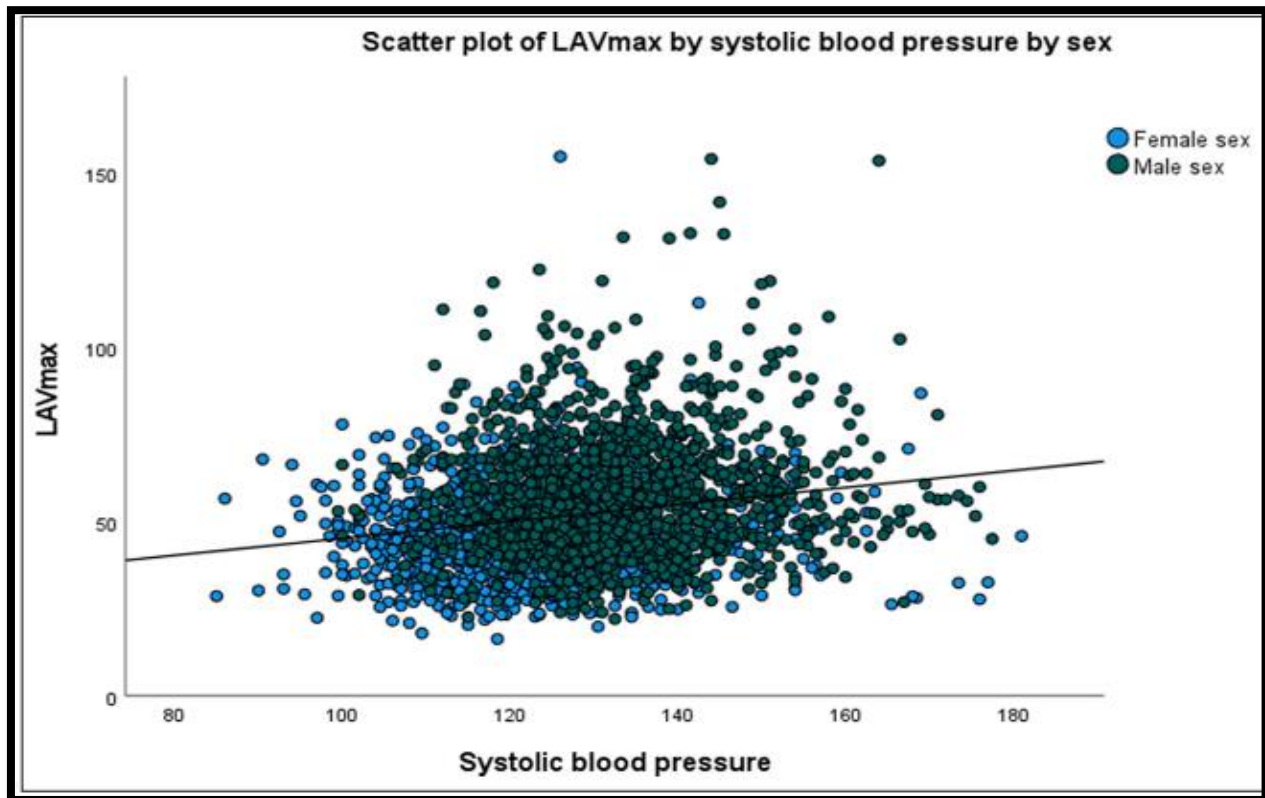
Influence of blood pressure in those in their early 40s on left atrial volumes later in life

Enlargement of Left atrial leads to cardiovascular morbidity and mortality. In the Framingham Heart Study, LA volumetric measures were most strongly correlated with cardiovascular events. These volumetric measures are particularly recognized as predictors of Atrial Fibrillation. Even after the compelling evidence of these parameters, knowledge of factors upstream of left atrial remodeling is limited.¹ There are increasing number of studies demonstrating the reservoir and the active pump function of LA. Most of the studies have agreed on the negative impact of hypertension. While other studies haven't totally supported this result.²

Systolic blood pressure in early 40s may be independently associated with LA volumes in mid-60s

Around 2591 Patients born in 1950 and participated in the Age 40 Program, and the ACE (Akershus Cardiac Examination) 1950 Study were enrolled in the study and data were collected. Study population were divided into quartiles of SBP in their early 40s. The proportion of individuals with an enlarged left atrium in their mid-60s were analysed. Linear regression analyses were used to analyse the associations between BP and left atrial volume. Of the 2591 participants, 50.3% were women and the mean age in the Age 40 Program was 40.1 ± 0.3 years. 128.1 ± 13.6 mm Hg was the Systolic blood pressure and 78.3 ± 9.5 mm Hg was the diastolic blood pressure, while the mean age among the participants was 64.0 ± 0.6 years. In Figure 1, the association between SBP at the ages of 40-43 years and LAV max at ages 62-65 years by sex is demonstrated with a scatter plot. Independent link between Systolic blood pressure and left atrial volumes were noted End-systolic volume was found to be 0.09 mL larger per 1-mm Hg higher systolic blood pressure. Weaker impact of diastolic blood pressure on LA volumes was observed, and was not statistically significant in multivariable analyses. A sensitivity analysis with LA volumes indexed to body surface area as the dependent variable was performed which resulted in similar associations as the nonindexed volumes.

Fig:1 Scatter plot of SBP at age 40-43 years (x axis) and left atrial maximum volume at age 62-65 years (Y axis) by sex



CONCLUSION: This study highlighted that Patient's Systolic blood pressure in their early 40s was independently correlated with LA volumes in their mid-60s. This study concluded that increased blood pressure in early 40s was relevant for LA remodeling in later life.

References:

1. Rønningen, et al. Impact of Blood Pressure in the Early 40s on Left Atrial Volumes in the Mid-60s: Data From the ACE 1950 Study. J Am Heart Assoc. 2022 May 27;e023738
2. Ikejider Y, et al. Impact of Arterial Hypertension on Left Atrial Size and Function. Biomed Res Int. 2020 Sep 14;2020:2587530

Correlation between Estimated Pulse Wave Velocity with all-cause mortality and MI in patients with stable angina

One of the strongest marker of cardiovascular disease is the arterial stiffness assessed by carotid-femoral pulse wave velocity. For the identification of organ damage related to hypertension, current hypertension guidelines have listed carotid-femoral pulse wave velocity as a major marker.¹ Carotid-femoral pulse wave velocity is an incremental predictive marker for future cardiovascular events and all-cause mortality beyond classical risk scores and BP.² However there are limited evidences suggesting that elevated carotid-femoral pulse wave velocity is associated with the poor response of BP to BP-lowering drugs and that carotid-femoral pulse wave velocity regression is related to improved survival.² Measurement of carotid-femoral pulse wave velocity not only requires specialized equipment but also trained staff. Hence, it has not been widely implemented in clinical practice.¹ However in patients with symptomatic stable angina, the prognostic potential of estimated pulse wave velocity during long-term follow-up is unclear.

Association between estimated pulse wave velocity with all-cause mortality and MI was observed in patients with stable angina pectoris beyond traditional risk factors.

Laugesen E et al. aimed to assess the association between estimated pulse wave velocity and all-cause mortality, myocardial infarction and stroke in patients with stable angina undergoing elective coronary angiography. Researchers enrolled 25,066 patients with a known case of myocardial infarction, stroke, heart failure, or valvular with stable angina pectoris undergoing elective coronary angiography. Patients having diabetes were excluded from the study. The association between incident all-cause mortality, MI, and stroke were calculated with the help of multivariable Cox models shown in Kaplan-Meier plot (fig 2,3 ,4). A median follow-up period of 8.5 years reported 779 strokes, 1233 MIs, and 4112 deaths.

Result of this study highlighted the association between estimated pulse wave velocity with all-cause mortality and MI after adjusting for age, SBP, BMI, smoking, eGFR, Charlson Comorbidity Index score, antihypertensive therapy, statins, aspirin etc. The adjusted model with estimated pulse wave velocity was associated with a minor increase in discrimination for mortality

Fig2: Kaplan-Meier plots
A: Estimated pulse wave velocity and death

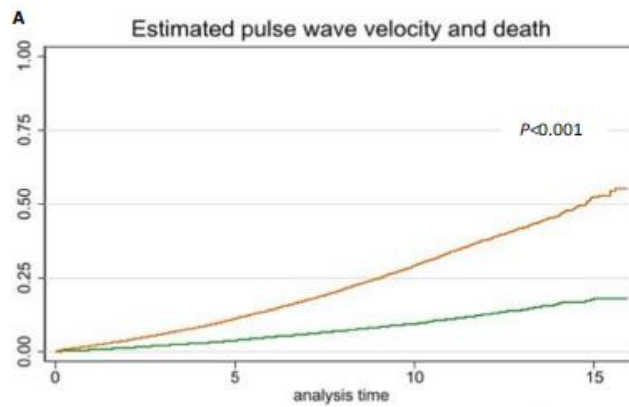


Fig3: Kaplan-Meier plots
B. Estimated pulse wave velocity and myocardial infarction.

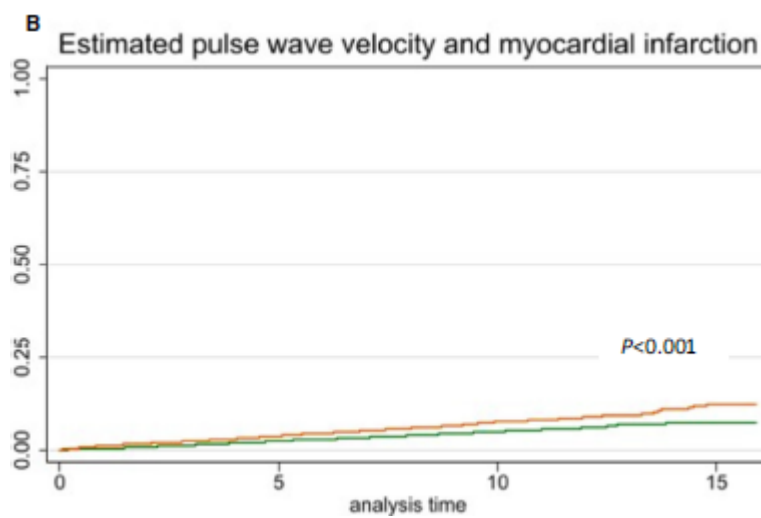
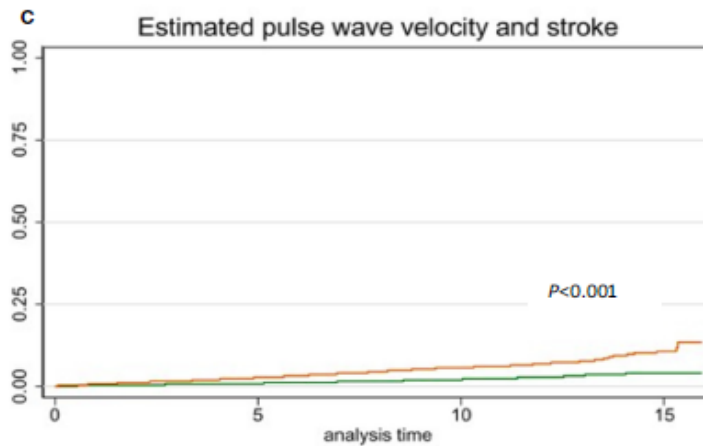


Fig4: Kaplan-Meier plots
C: Estimated pulse wave velocity and stroke



Conclusion: This study demonstrated an association between all-cause mortality and MI beyond traditional risk factors in patients with stable angina. However, there was no improvement observed in the added prediction of mortality to a clinically relevant extent

References

1. Laugesen E, et al. Estimated Pulse Wave Velocity Is Associated With All-Cause Mortality During 8.5 Years Follow-up in Patients Undergoing Elective Coronary Angiography. *J Am Heart Assoc.* 2022 May 17;11(10):e025173.
2. Vlachopoulos C, Terentes-Printzios D, Laurent S, et al. Association of Estimated Pulse Wave Velocity With Survival: A Secondary Analysis of SPRINT. *JAMA Netw Open.* 2019;2(10):e1912831.

Acute Myocardial Infarction and its complication during COVID 19 pandemic: A Systematic Review and Meta Analysis

Globally, COVID-19 pandemic created an overwhelming pressure on the healthcare systems requiring reorganization and realignment to deal with the demanding workload associated with the rise of COVID-19 infection. During the pandemic, not only SARS-COV-2 related mortality has been documented, a substantial excess mortality rate related to non-COVID-19

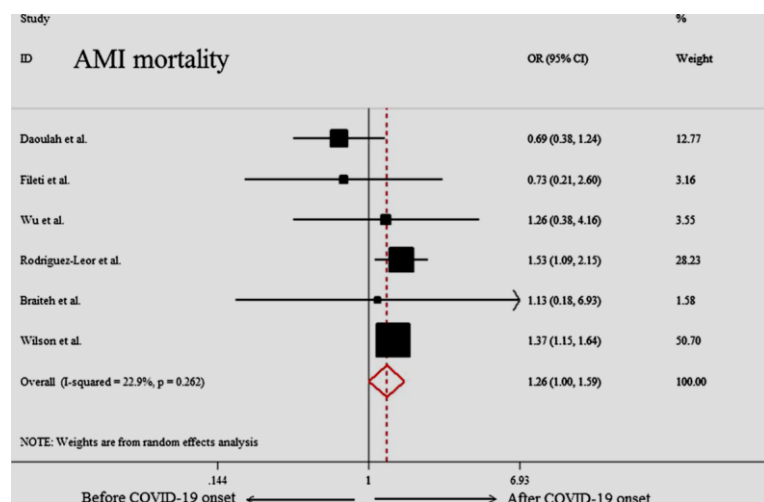
During the COVID-19 pandemic, AMI related hospital admissions significantly decreased compared to pre-COVID period

diseases was observed. This raises concern about the public health consequences of the pandemic related to non COVID.¹

During the COVID-19 pandemic, numerous data suggests decline in the acute myocardial infarction related hospital admissions. Hospitals were perceived as dangerous places, for which patients did not activate emergency medical systems regarding the infection risk. Moreover, patients with AMI had a significantly higher in-hospital mortality during the COVID-19 pandemic when compared to those admitted before COVID-19, which can be due to late arrival to the hospital.²

COVID-19 led to cardiovascular complication included ST elevation myocardial infarction and non-STEMI. ¹Reduction in the AMI related hospital admissions could either because of a lower incidence of AMI at the time of the outbreak, or patients were seeking medical care when they become symptomatic. If the latter explanation is correct, this can lead to catastrophic effects on the prognosis of the patient, as early management of AMI is crucial and life-saving

Fig:5 In-hospital mortality Rate Forest Plot in AMI patients



Pourasghari H et al. aimed to compare the rate of AMI admissions and major complication before and during the COVID pandemic. Patients data were collected through PubMed, Scopus, and Web of Science Core Collection and enrolled 41 studies into it. Original COVID-19 related studies with outcomes such as AMI admissions (STEMI or NSTEMI), AMI mortality rate (including in-hospital mortality), and major complications in patients with MI were included and compared with pre pandemic periods. During COVID-19, AMI hospitalized patients were 35% less compared with pre-pandemic periods, which was statistically significantly. During COVID-19 periods, patients hospitalized for STEMI and NSTEMI were 29% and 34% respectively less compared with pre COVID periods, which was statistically significantly. In-hospital mortality in AMI patients increased overall by 26% during COVID- 19 period, which was not statistically significant (Fig:5). At the same time, in-hospital mortality related to STEMI and NSTEMI patients increased by 15% and 26% respectively in the COVID-19 period, which was not statistically significant.

Conclusion: This study explains the challenges in the health-care systems with the impact of the COVID-19 pandemic. During the COVID-19 pandemic, AMI related hospital admissions significantly decreased. However, there were no significant differences in-hospital mortality rate between the pre and post-COVID- 19 periods. To avoid and prevent collateral damage in AMI patients during pandemic, or in future outbreaks, strategies should be improved.

References:

1. Pourasghari H, et al. Hospitalization, major complications and mortality in acute myocardial infarction patients during the COVID-19 era: A systematic review and meta-analysis. *Int J Cardiol Heart Vasc.* 2022 May 23;41:101058.
2. Toscano O, et al. Acute Myocardial Infarction During the COVID-19 Pandemic: An Update on Clinical Characteristics and Outcomes. *Front Cardiovasc Med.* 2021 Dec 23;8:648290

A Case Report of Infective Endocarditis after Ventricular Septal Defect Device Closure

In children, Ventricular septal defect is considered as the most common form of congenital cardiac disease. Surgical closure of Ventricular septal defect has a minimal risk of morbidity and mortality. Transcatheter closure is considered to be less invasive with faster recovery and lesser hospital stay time. In order to lower the drawback of this surgery, percutaneous techniques have been developed. Transcatheter Ventricular septal defect has the benefit of shorter recovery as it avoids extracorporeal circulatory support of surgical approach. For transcatheter occlusion of Ventricular septal defect, the coil system has developed

A 25-year-old male patient was presented with the history of previous device closure of perimembranous ventricular septal defect during childhood. No residual shunt, intraoperative or postoperative complications, the transcatheter ventricular septal defect closure was successful. Patient had fever of up to 40°C which failed to respond to the medications. An elevated erythrocyte sedimentation rate of 140 mm/h, C-reactive protein of 98 mg/dl, a total leucocytic count of 30,000/mm³ were found in the laboratory investigations. Echocardiography showed vegetation of 20 mm × 5 mm attached to VSD device

Ventricular septal defect closure is safe and effective and prevents the complications of surgical closure

and aortic and moderately severe aortic insufficiency. The VSD was completely closed by the coil with no residual shunt. Based on the results of echocardiography and blood cultures, diagnosis of infective endocarditis was made and empirical therapy of vancomycin was immediately started. Despite administration of vancomycin, no improvement was observed and continued to develop intermittent fever. Leukocytosis, increased ESR, and high CRP were also observed. Patient showed a sign of anemia, dyspnea, and signs of heart failure for which urgent surgical intervention was undergone. A destroyed aortic valve with vegetation and necrotic tissues around the coil was noted. During surgery, infected leaflet and surrounding infected tissue were entirely removed and sent for culture examination. The coil was extracted, Figure (6) and the VSD was closed with the help of Dacron patch. Replacement of Aortic valve was done by size 23 bioprosthetic valve. At the same time, Tricuspid valve was tested and repaired. Moderate doses of inotropes (adrenaline, dopamine, and dobutamine) were continued along with antibiotics.

Figure 6: Transcatheter VSD closure coil with infected tissue, aortic leaflets, and tip of central venous cannula extracted



CONCLUSION: Ventricular septal defect closure is safe and effective and prevents the complications of surgical closure.

References

1. Mubarak Y. Aortic Valve Endocarditis Post Ventricular Septal Defect Device Closure: Case Report. Journal of Cardiology Research Reviews & Reports. SRC/JCRRR-173



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