

SNAPSHOT IN CARDIOLOGY

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These articles were taken from the *New England Journal of Medicine*, *The Lancet*, and *JAMA* between January 1, 2019 and August 31, 2019. All research articles on cardiology were included; reviews and guidelines were excluded.

January 2019

Bhatt DL, Steg PG, Miller M, et al; REDUCE-IT Investigators. Cardiovascular risk reduction with icosapent ethyl for hypertriglyceridemia. *N Engl J Med.* 2019;380(1):11-22.

Icosapent ethyl, a purified eicosapentaenoic acid ethyl ester, given at 2 g twice daily significantly lowered the risk of ischemic events in patients with cardiovascular disease or diabetes and other risk factors who have elevated triglyceride levels despite the use of statins vs those who received placebo.

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Ference BA, Kastelein JJP, Ray KK, et al. Association of triglyceride-lowering LPL variants and LDL-C-lowering LDLR variants with risk of coronary heart disease. *JAMA.* 2019;321(4):364-373.

Patients with triglyceride-lowering lipoprotein lipase gene variants and low-density lipoprotein (LDL) cholesterol-lowering LDL receptor gene variants were associated with a similar lower risk of coronary heart disease per unit difference in apolipoprotein B.

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Halliday BP, Wassall R, Lota AS, et al. Withdrawal of pharmacological treatment for heart failure in patients with recovered dilated cardiomyopathy (TRED-HF): an open-label, pilot, randomised trial. *Lancet.* 2019;393(10166):61-73.

The TRED-HF trials showed that, in patients with previous dilated cardiomyopathy who were now asymptomatic, phased withdrawal of heart failure medications will experience a relapse following treatment withdrawal.

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Manson JE, Cook NR, Lee IM, et al; VITAL Research Group. Marine n-3 fatty acids and prevention of cardiovascular disease and cancer. *N Engl J Med.* 2019;380(1):23-32.

Among men aged 50 years or older and women aged 55 years or older in the US, n-3 fatty acid supplementation did not lower the incidence of major cardiovascular events or cancer vs placebo.

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Manson JE, Cook NR, Lee IM, et al; VITAL Research Group. Vitamin D supplements and prevention of cancer and cardiovascular disease. *N Engl J Med.* 2019;380(1):33-44.

Vitamin D supplementation did not lower the incidence of invasive cancer or cardiovascu-

lar events among men aged 50 years or older and women aged 55 years or older in the US vs placebo.

McCartney PJ, Eteiba H, Maznyczka AM, et al; T-TIME Group. Effect of low-dose intracoronary alteplase during primary percutaneous coronary intervention on microvascular obstruction in patients with acute myocardial infarction: a randomized clinical trial. *JAMA*. 2019;321(1):56-68.

Adjunctive use of low-dose intracoronary alteplase during a primary percutaneous intervention did not reduce the incidence of microvascular obstruction in patients presenting within 6 hours of an acute ST-segment elevation myocardial infarction due to a proximal-mid-vessel occlusion of a major coronary artery.

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Rosenstock J, Perkovic V, Johansen OE, et al; CARMELINA Investigators. Effect of linagliptin vs placebo on major cardiovascular events in adults with type 2 diabetes and high cardiovascular and renal risk: the CARMELINA randomized clinical trial. *JAMA*. 2019;321(1):69-79.

In adults with type 2 diabetes, hemoglobin A1c levels between 6.5% and 10.0%, high cardiovascular risk, and high renal risk, linagliptin, a selective dipeptidyl peptidase 4 inhibitor, added to usual care resulted in a noninferior risk of a composite cardiovascular outcome over a median 2.2 years vs placebo added to usual care.

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Taggart DP, Benedetto U, Gerry S, et al; Arterial Revascularization Trial Investigators. Bilateral versus single internal-thoracic-artery grafts at 10 years. *N Engl J Med*. 2019;380(5):437-446.

No significant between-group differences were observed in the rate of all-cause death at 10 years among patients who were scheduled for coronary artery bypass grafting undergoing bilateral internal thoracic artery grafting or those undergoing single internal thoracic artery grafting.

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Wiviott SD, Raz I, Bonaca MP, et al; DECLARE-TIMI 58 Investigators. Dapagliflozin and cardiovascular outcomes in type 2 diabetes. *N Engl J Med*. 2019;380(4):347-357.

The DECLARE-TIMI 58 trial showed that, in patients with type 2 diabetes who had or were at risk for atherosclerotic cardiovascular disease, treatment with dapagliflozin did not affect the rate of major adverse cardiovascular events when compared with placebo; however, dapagliflozin lowered the rate of cardiovascular death or hospitalization for heart failure.

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Zelniker TA, Wiviott SD, Raz I, et al. SGLT2 inhibitors for primary and secondary prevention of cardiovascular and renal outcomes in type 2 diabetes: a systematic review and meta-analysis of cardiovascular outcome trials. *Lancet*. 2019;393(10166):31-39.

This systematic review and meta-analysis of randomized, placebo-controlled, cardiovascular outcome trials showed that sodium-glucose cotransporter-2 inhibitors moderately reduced major adverse cardiovascular events in patients with type 2 diabetes, but only in the subgroup with atherosclerotic cardiovascular disease. In addition, sodium-glucose cotrans-

porter-2 inhibitors robustly reduced hospitalizations for heart failure and progression of renal disease regardless of whether the patients had existing atherosclerotic cardiovascular disease or a history of heart failure.

Zenati MA, Bhatt DL, Bakaeen FG, et al; REGROUP Trial Investigators. Randomized trial of endoscopic or open vein-graft harvesting for coronary-artery bypass. *N Engl J Med.* 2019;380(2):132-141.

Among patients undergoing coronary artery bypass grafting, no significant differences were observed in the risk of major adverse cardiac events between those randomized to open vein-graft harvesting and those randomized to endoscopic vein-graft harvesting.

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Zheng SL, Roddick AJ. Association of aspirin use for primary prevention with cardiovascular events and bleeding events: a systematic review and meta-analysis. *JAMA.* 2019;321(3):277-287.

In this systematic review and meta-analysis, the authors showed that, based on data from randomized clinical trials enrolling at least 1000 participants with no known cardiovascular disease and a follow-up of at least 12 months, aspirin use was associated with a lower risk of cardiovascular events and an increased risk of major bleeding.

February 2019

Carrier M, Abou-Nassar K, Mallick R, et al; AVERT Investigators. Apixaban to prevent venous thromboembolism in patients with cancer. *N Engl J Med.* 2019;380(8):711-719.

Using apixaban 2.5 mg twice daily for thromboprophylaxis in ambulatory patients with cancer just starting chemotherapy who were at intermediate-to-high risk for venous thromboembolism significantly lowered the rate of venous thromboembolism vs placebo; however, apixaban increased the rate of major bleeding episodes compared with placebo.

Cholesterol Treatment Trialists' Collaboration. Efficacy and safety of statin therapy in older people: a meta-analysis of individual participant data from 28 randomised controlled trials. *Lancet.* 2019;393(10170):407-415.

This meta-analysis analyzed 28 randomized trials on statin therapy, showing that statin therapy significantly reduces major vascular events over all ages, with the exception of patients aged 75 years or older where there is fewer direct evidence.

Khorana AA, Soff GA, Kakkar AK, et al; CASSINI Investigators. Rivaroxaban for thromboprophylaxis in high-risk ambulatory patients with cancer. *N Engl J Med.* 2019;380(8):720-728.

In high-risk ambulatory patients with cancer, rivaroxaban 10 mg daily did not result in a significantly lower incidence of venous thromboembolism or venous thromboembolism-related deaths in the 180-day trial period; however, during the intervention period, rivaroxaban substantially lowered the incidence of such events, with a low incidence of major bleeding.

Lerman BJ, Popat RA, Assimes TL, Heidenreich PA, Wren SM. Association of left ventricular ejection fraction and symptoms with mortality after elective noncardiac surgery among patients with heart failure. *JAMA.* 2019;321(6):572-579.

Among patients undergoing elective noncardiac surgery, those with heart failure (with or without symptoms) had a significantly higher risk of mortality 90 days postoperation compared with those without heart failure.

Van Spall HGC, Lee SF, Xie F, et al. Effect of patient-centered transitional care services on clinical outcomes in patients hospitalized for heart failure: the PACT-HF randomized clinical trial. *JAMA.* 2019;321(8):753-761.

The PACT-HF trial showed that, in patients hospitalized for heart failure in Ontario, Canada, implementation of a patient-centered transitional care model compared with usual care did not improve a composite of clinical outcomes.

Velazquez EJ, Morrow DA, DeVore AD, et al; PIONEER-HF Investigators. Angiotensin-neprilysin inhibition in acute decompensated heart failure. *N Engl J Med*. 2019;380(6):539-548.

In patients with heart failure with reduced ejection fraction, sacubitril-valsartan therapy led to a greater reduction in the concentration of NT-proBNP than did enalapril therapy; however, there were no significant between-group differences concerning the rates of worsening renal function, hyperkalemia, symptomatic hypotension, and angioedema.

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Williamson JD, Pajewski NM, Auchus AP, et al; SPRINT MIND Investigators for the SPRINT Research Group. Effect of intensive vs standard blood pressure control on probable dementia: a randomized clinical trial. *JAMA*. 2019;321(6):553-561.

The risk of probable dementia was not significantly reduced in ambulatory adults aged 50 years or older with hypertension, but without diabetes or a history of stroke whose blood pressure was being treated to obtain a systolic blood pressure less than 120 mm Hg vs less than 140 mm Hg.

March 2019

Anderson CS, Huang Y, Lindley RI, et al; ENCHANTED Investigators and Coordinators. Intensive blood pressure reduction with intravenous thrombolysis therapy for acute ischaemic stroke (ENCHANTED): an international, randomised, open-label, blinded-endpoint, phase 3 trial. *Lancet*. 2019;393(10174):877-888.

The ENCHANTED trial showed that, in patients ≥ 18 years old with acute ischemic stroke and a systolic blood pressure ≥ 150 mm Hg, intensive blood pressure lowering (target systolic blood pressure 130 to 140 mm Hg within 1 hour) is safe; however, the observed reduction in intracranial hemorrhage did not improve clinical outcomes compared with guideline-recommended treatment.

Blomström-Lundqvist C, Gizurarson S, Schwieler J, et al. Effect of catheter ablation vs antiarrhythmic medication on quality of life in patients with atrial fibrillation: the CAPTAF randomized clinical trial. *JAMA*. 2019;321(11):1059-1068.

The CAPTAF trial showed that, in patients in Sweden and Finland aged 30 to 70 years who have been receiving treatment for atrial fibrillation for more than 6 months and have experienced treatment failure with 1 antiarrhythmic drug or β -blocker, those treated with catheter ablation had an improvement in their quality of life at 12 months vs those on antiarrhythmic medication alone.

Ference BA, Ray KK, Catapano AL, et al. Mendelian randomization study of ACLY and cardiovascular disease. *N Engl J Med*. 2019;380(11):1033-1042.

This analysis of inherited variants in the genes encoding ATP citrate lyase (ACLY) and 3-hydroxy-3-methylglutaryl-coenzyme A reductase (HMGR) showed that genetic variants that mimic the effect of ATP citrate lyase inhibitors and statins appeared to lower plasma low-density lipoprotein cholesterol using the same mechanism of action and they had similar effects on the risk of cardiovascular disease per unit decrease in the low-density lipoprotein cholesterol.

Landoni G, Lomivorotov VV, Nigro Neto C, et al; MYRIAD Study Group. Volatile anesthetics versus total intravenous anesthesia for cardiac surgery. *N Engl J Med*. 2019;380(13):1214-1225.

While volatile (inhaled) anesthetic agents have cardioprotective effects, there was no difference in death from any cause 1 year after patients underwent coronary-artery bypass grafting between volatile or total intravenous anesthesia.

Ray KK, Bays HE, Catapano AL, et al; CLEAR Harmony Trial. Safety and efficacy of bempedoic acid to reduce LDL cholesterol. *N Engl J Med*. 2019;380(11):1022-1032.

In patients with atherosclerotic cardiovascular disease, heterozygous familial hypercholesterolemia, or both, bempedoic acid added to maximally tolerated statin therapy did not

increase the incidence of overall adverse events vs placebo and it significantly lowered low-density lipoprotein cholesterol levels.

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Yau TM, Pagani FD, Mancini DM, et al; Cardiothoracic Surgical Trials Network. Intramyocardial injection of mesenchymal precursor cells and successful temporary weaning from left ventricular assist device support in patients with advanced heart failure: a randomized clinical trial. *JAMA*. 2019;321(12):1176-1186.

In patients with advanced heart failure who are undergoing a left ventricular assist device implant, intramyocardial injections of mesenchymal precursor cells, did not improve successful temporary weaning from left ventricular assist device support at 6 months vs injections of a cryoprotective medium as sham treatment.

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Zaman A, de Winter RJ, Kogame N, et al; TALENT trial investigators. Safety and efficacy of a sirolimus-eluting coronary stent with ultra-thin strut for treatment of atherosclerotic lesions (TALENT): a prospective multicentre randomised controlled trial. *Lancet*. 2019;393(10175):987-997.

The TALENT trial showed that, in an all-comer population, a sirolimus-eluting stent with a biodegradable polymer coating and ultra-thin struts (Supraflex) was noninferior to an everolimus-eluting stent with a durable polymer coating (Xience) for a device-oriented composite clinical end point (ie, cardiac death, target-vessel myocardial infarction, or clinically indicated target lesion revascularization) at 12 months.

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Zhong VW, Van Horn L, Cornelis MC, et al. Associations of dietary cholesterol or egg consumption with incident cardiovascular disease and mortality. *JAMA*. 2019;321(11):1081-1095.

In an analysis 29 615 participants in the US (median follow-up of 17.5 years), those with a higher consumption of dietary cholesterol or eggs had a significantly higher risk of incident cardiovascular disease and all-cause mortality, which occurred in a dose-response manner.

April 2019

Hamada H, Suzuki H, Onouchi Y, et al; KAICA Trial Investigators. Efficacy of primary treatment with immunoglobulin plus ciclosporin for prevention of coronary artery abnormalities in patients with Kawasaki disease predicted to be at increased risk of non-response to intravenous immunoglobulin (KAICA): a randomised controlled, open-label, blinded-endpoints, phase 3 trial. *Lancet*. 2019;393(10176):1128-1137.

The KAICA trial showed that intravenous immunoglobulin plus ciclosporin was safe and effective as the primary treatment to prevent coronary artery abnormalities in Japanese patients with refractory Kawasaki disease.

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Lemkes JS, Janssens GN, van der Hoeven NW, et al. Coronary angiography after cardiac arrest without ST-segment elevation. *N Engl J Med*. 2019;380(15):1397-1407.

Concerning overall survival at 90 days, there was no difference between performing an immediate coronary angiography and a percutaneous coronary intervention (if needed) and performing a coronary angiography after neurologic recovery in patients who were successfully resuscitated after out-of-hospital cardiac arrest, but who had no signs of ST-segment elevation myocardial infarction.

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Lopes RD, Heizer G, Aronson R, et al; AUGUSTUS Investigators. Antithrombotic therapy after acute coronary syndrome or PCI in atrial fibrillation. *N Engl J Med*. 2019;380(16):1509-1524.

The AUGUSTUS trial showed that, in patients with atrial fibrillation who had an acute coronary syndrome or had undergone a percutaneous coronary intervention, using the combination of a P2Y12 inhibitor and apixaban (without aspirin), compared with the use of a vitamin K antagonist, aspirin, or both, led to less bleeding, fewer hospitalizations, and no significant differences in the incidence of ischemic events.

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Mark DB, Anstrom KJ, Sheng S, et al; CABANA Investigators. Effect of catheter ablation vs medical therapy on quality of life among patients with atrial fibrillation: the CABANA randomized clinical trial. *JAMA*. 2019;321(13):1275-1285.

The CABANA trial showed that, among patients with symptomatic atrial fibrillation, catheter ablation resulted in clinically significant improvements in quality of life at 12 months vs medical therapy.

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Mehra MR, Uriel N, Naka Y, et al; MOMENTUM 3 Investigators. A fully magnetically levitated left ventricular assist device -final report. *N Engl J Med*. 2019;380(17):1618-1627.

The final analysis of the MOMENTUM trial showed that, among patients with advanced heart failure, a left ventricular assist device with a centrifugal-flow pump was superior to a device with an axial-flow pump in terms of survival free of disabling stroke or reoperation to replace or remove a malfunctioning device.

Packer DL, Mark DB, Robb RA, et al; CABANA Investigators. Effect of catheter ablation vs antiarrhythmic drug therapy on mortality, stroke, bleeding, and cardiac arrest among patients with atrial fibrillation: the CABANA randomized clinical trial. *JAMA*. 2019;321(13):1261-1274.

While catheter ablation is effective in restoring sinus rhythm in patients with atrial fibrillation, it did not significantly reduce the composite end point of death, disabling stroke, serious bleeding, or cardiac arrest compared with conventional medical therapy.

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Pluymaekers NAHA, Dudink EAMP, Luermans JGLM, et al; RACE 7 ACWAS Investigators. Early or delayed cardioversion in recent-onset atrial fibrillation. *N Engl J Med*. 2019;380(16):1499-1508.

In patients with hemodynamically stable, recent-onset (<36 hours), symptomatic atrial fibrillation, delayed cardioversion was shown to be noninferior to early cardioversion at 4 weeks regarding the restoration of sinus rhythm.

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Villanueva C, Albillos A, Genescà J, et al. β blockers to prevent decompensation of cirrhosis in patients with clinically significant portal hypertension (PREDESCI): a randomised, double-blind, placebo-controlled, multicentre trial. *Lancet*. 2019;393(10181):1597-1608.

In patients with compensated cirrhosis and clinically significant portal hypertension (ie, a hepatic venous pressure gradient ≥ 10 mm Hg) without high-risk varices, treatment with β -blockers reduced the incidence of ascites.

May 2019

Bhatt DL, Pollack CV, Weitz JI, et al. Antibody-based ticagrelor reversal agent in healthy volunteers. *N Engl J Med.* 2019;380(19):1825-1833.

This phase 1 trial showed that treatment with intravenous PB2452, a monoclonal antibody fragment that binds ticagrelor with high affinity, led to an immediate and sustained reversal of the antiplatelet effects of ticagrelor.

Chan MTV, Wang CY, Seet E, et al; POSA Study Investigators. Association of unrecognized obstructive sleep apnea with postoperative cardiovascular events in patients undergoing major noncardiac surgery. *JAMA.* 2019;321(18):1788-1798.

The POSA study showed that unrecognized severe obstructive sleep apnea in at-risk patients who were undergoing major noncardiac surgery had a significantly higher risk of 30-day postoperative cardiovascular complications.

Diener HC, Sacco RL, Easton JD, et al; RE-SPECT ESUS Steering Committee and Investigators. Dabigatran for prevention of stroke after embolic stroke of undetermined source. *N Engl J Med.* 2019;380(20):1906-1917.

In patients with a recent embolic stroke of an undetermined source, dabigatran was not superior to aspirin for the prevention of a recurrent stroke, and, while dabigatran did not increase the incidence of major bleeding, it increased the incidence of clinically relevant nonmajor bleeding events.

Lederle FA, Kyriakides TC, Stroupe KT, et al; OVER Veterans Affairs Cooperative Study Group. Open versus endovascular repair of abdominal aortic aneurysm. *N Engl J Med.* 2019;380(22):2126-2135.

When comparing endovascular repaired with open repair of asymptomatic abdominal aortic aneurysms, the long-term overall survival rates were similar, but more patients with endovascular repair underwent more secondary therapeutic procedures.

Ma H, Campbell BCV, Parsons MW, et al; EXTEND Investigators. Thrombolysis guided by perfusion imaging up to 9 hours after onset of stroke. *N Engl J Med.* 2019;380(19):1795-1803.

The EXTEND trial showed that, in patients who had an ischemic stroke, but with salvageable brain tissue detected on automated perfusion imaging, alteplase treatment given within 9 hours after the onset of a stroke increased the percentage of patients with no or minor neurologic deficits compared with placebo.

Mack MJ, Leon MB, Thourani VH, et al; PARTNER 3 Investigators. Transcatheter aortic-valve replacement with a balloon-expandable valve in low-risk patients. *N Engl J Med.* 2019;380(18):1695-1705.

In patients with severe aortic stenosis and low surgical risk, transcatheter aortic valve replacement with transfemoral placement of a balloon-expandable valve significantly lowered the rate of the composite of death, stroke, or rehospitalization at 1 year compared with surgery.

Popma JJ, Deeb GM, Yakubov SJ, et al; Evolut Low Risk Trial Investigators. Transcatheter aortic-valve replacement with a self-expanding valve in low-risk patients. *N Engl J Med.* 2019;380(18):1706-1715.

Transcatheter aortic-valve replacement with a self-expanding supra-annular bioprosthesis was noninferior to surgical aortic valve replacement with respect to the composite end point of death or disabling stroke at 24 months in patients with severe aortic stenosis who were at a low surgical risk.

Tarakji KG, Mittal S, Kennergren C, et al; WRAP-IT Investigators. Antibacterial envelope to prevent cardiac implantable device infection. *N Engl J Med.* 2019;380(20):1895-1905.

The use of an absorbable, antibiotic-eluting envelope with cardiac implantable electronic devices significantly lowered the incidence of major infections vs the standard-of-care infection prevention strategies alone.

Wise RA, Chapman KR, Scirica BM, et al. Effect of aclidinium bromide on major cardiovascular events and exacerbations in high-risk patients with chronic obstructive pulmonary disease: the ASCENT-COPD randomized clinical trial. *JAMA.* 2019;321(17):1693-1701.

In patients with moderate to very severe chronic obstructive pulmonary disease and a history of cardiovascular disease or at least 2 atherothrombotic risk factors, aclidinium bromide 400 µg twice daily was noninferior to placebo for the risk of major adverse cardiovascular events over 3 years.

June 2019

Hahn JY, Song YB, Oh JH, et al; SMART-CHOICE Investigators. Effect of P2Y12 inhibitor monotherapy vs dual antiplatelet therapy on cardiovascular events in patients undergoing percutaneous coronary intervention: the SMART-CHOICE randomized clinical trial. *JAMA*. 2019;321(24):2428-2437.

The SMART-CHOICE trial demonstrated that P2Y12 inhibitor monotherapy after 3 months of dual antiplatelet therapy was noninferior to prolonged (12 months) dual antiplatelet therapy in terms of major adverse cardiac and cerebrovascular events in patients undergoing a percutaneous coronary intervention with drug-eluting stents.

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Huded CP, Tuzcu EM, Krishnaswamy A, et al. Association between transcatheter aortic valve replacement and early postprocedural stroke. *JAMA*. 2019;321(23):2306-2315.

In patients who were treated with femoral and nonfemoral transcatheter aortic valve replacement between 2011 and 2017 in the US, the rate of 30-day stroke following transcatheter aortic valve replacement remained stable.

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Makkar RR, Yoon SH, Leon MB, et al. Association between transcatheter aortic valve replacement for bicuspid vs tricuspid aortic stenosis and mortality or stroke. *JAMA*. 2019;321(22):2193-2202.

In patients who underwent a transcatheter aortic valve replacement for aortic stenosis, there were no significant differences in 30-day or 1-year mortality between patients with bicuspid and patients with tricuspid aortic stenosis; however, patients with bicuspid stenosis had an increased 30-day risk for stroke.

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Nagel E, Greenwood JP, McCann GP, et al; MR-INFORM Investigators. Magnetic resonance perfusion or fractional flow reserve in coronary disease. *N Engl J Med*. 2019;380(25):2418-2428.

The MR-INFORM trial showed that patients with typical angina and either two or more cardiovascular risk factors or a positive exercise treadmill test who were randomized to myocardial-perfusion cardiovascular magnetic resonance imaging lowered the incidence of coronary revascularization when compared with fractional flow reserve.

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Neumann JT, Twerenbold R, Ojeda F, et al. Application of high-sensitivity troponin in suspected myocardial infarction. *N Engl J Med*. 2019;380(26):2529-2540.

A risk-assessment tool that integrated the concentrations of high-sensitivity troponin I or high-sensitivity troponin T at presentation to the emergency department with a suspected myocardial infarction, the dynamic changes occurring during serial sampling, and the time between sample acquisitions showed that lower concentrations of high-sensitivity troponin in patients presenting to the emergency department with symptoms suggestive of a myocardial infarction were associated with a lower likelihood of myocardial infarction and a short-term risk of cardiovascular events.

Ojji DB, Mayosi B, Francis V, et al; CREOLE Study Investigators. Comparison of dual therapies for lowering blood pressure in black Africans. *N Engl J Med.* 2019;380(25):2429-2439.

The CREOLE study showed that black patients in sub-Saharan Africa with uncontrolled hypertension had better blood pressure-lowering results with amlodipine plus either hydrochlorothiazide or perindopril than they did with perindopril plus hydrochlorothiazide at 6 months.

Piccolo R, Bona KH, Efthimiou O, et al; Coronary Stent Trialists' Collaboration. Drug-eluting or bare-metal stents for percutaneous coronary intervention: a systematic review and individual patient data meta-analysis of randomised clinical trials. *Lancet.* 2019;393(10190):2503-2510.

This meta-analysis of randomized clinical trials on new-generation drug-eluting stents or bare-metal stents among patients undergoing percutaneous coronary intervention showed that drug-eluting stents reduced the risk of the primary outcomes by reducing the risk of myocardial infarction, definite stent thrombosis, and target vessel revascularizations.

Shah SJ, Voors AA, McMurray JJV, et al. Effect of neladenoson bialanate on exercise capacity among patients with heart failure with preserved ejection fraction: a randomized clinical trial. *JAMA.* 2019;321(21):2101-2112.

In patients with heart failure with preserved ejection fraction with New York Heart Association class II or III, use of neladenoson resulted in a nonsignificant dose-response relationship regarding change in exercise capacity from baseline to 20 weeks vs matching placebo.

Spahn DR, Schoenrath F, Spahn GH, et al. Effect of ultra-short-term treatment of patients with iron deficiency or anaemia undergoing cardiac surgery: a prospective randomised trial. *Lancet.* 2019;393(10187):2201-2212.

In patients with anemia or isolated iron deficiency undergoing elective cardiac surgery, the patients who received the combination treatment consisting of intravenous iron, subcutaneous erythropoietin alpha, vitamin B12, and oral folic acid the day before surgery had a lower rate of red blood cell and total allogeneic blood product transfusions than did patients receiving placebo.

Watanabe H, Domei T, Morimoto T, et al; STOPDAPT-2 Investigators. Effect of 1-month dual antiplatelet therapy followed by clopidogrel vs 12-month dual antiplatelet therapy on cardiovascular and bleeding events in patients receiving PCI: the STOPDAPT-2 randomized clinical trial. *JAMA.* 2019;321(24):2414-2427.

In patients who underwent a percutaneous coronary intervention, a significantly lower rate of a composite of cardiovascular and bleeding events was reached with 1 month of dual antiplatelet therapy followed by clopidogrel monotherapy vs 12 months of dual antiplatelet therapy with aspirin and clopidogrel, which met the criteria for both noninferiority and superiority.

Bornstein NM, Saver JL, Diener HC, et al; ImpACT-24B investigators. An injectable implant to stimulate the sphenopalatine ganglion for treatment of acute ischaemic stroke up to 24 h from onset (ImpACT-24B): an international, randomised, double-blind, sham-controlled, pivotal trial. *Lancet*. 2019;394(10194):219-229.

The ImpACT-24B trial in patients with anterior-circulation acute ischemic stroke not undergoing reperfusion therapy showed that active sphenopalatine ganglion stimulation is safe for patients who are ineligible for thrombolytic therapy.

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Campbell BCV, Ma H, Ringleb PA, et al; EXTEND, ECASS-4, and EPITHET Investigators. Extending thrombolysis to 4.5-9 h and wake-up stroke using perfusion imaging: a systematic review and meta-analysis of individual patient data. *Lancet*. 2019;394(10193):139-147.

In this systematic review and meta-analysis of individual patient data, alteplase, when compared with placebo, helped patients with ischemic stroke who were beyond 4.5 hours from stroke onset achieve better functional outcomes, and, while the rate of symptomatic intracerebral hemorrhage was higher with alteplase, no differences were observed in the rate of mortality.

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Flint AC, Conell C, Ren X, et al. Effect of systolic and diastolic blood pressure on cardiovascular outcomes. *N Engl J Med*. 2019;381(3):243-251.

While both the burden of systolic hypertension and the burden of diastolic hypertension independently predicted adverse outcomes for the composite outcome of myocardial infarction, ischemic stroke, or hemorrhagic stroke, elevated systolic blood pressure had a stronger effect on the composite outcome.

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Gerstein HC, Colhoun HM, Dagenais GR, et al; REWIND Investigators. Dulaglutide and cardiovascular outcomes in type 2 diabetes (REWIND): a double-blind, randomised placebo-controlled trial. *Lancet*. 2019;394(10193):121-130.

The REWIND trial showed that weekly subcutaneous injections of dulaglutide 1.5 mg reduced cardiovascular outcomes in both men and women with or without previous cardiovascular disease.

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Jahan R, Saver JL, Schwamm LH, et al. Association between time to treatment with endovascular reperfusion therapy and outcomes in patients with acute ischemic stroke treated in clinical practice. *JAMA*. 2019;322(3):252-263.

In this retrospective cohort study, patients with anterior-circulation large-vessel occlusion acute ischemic stroke who were treated with endovascular-reperfusion therapy with a faster onset-to-puncture time were shown to have better outcomes as concerns the likelihood of achieving independent ambulation at discharge, reducing in-hospital mortality/hospice discharge, and lowering the risk of symptomatic intracranial hemorrhage.

Johnston KC, Bruno A, Pauls Q, et al; Neurological Emergencies Treatment Trials Network and the SHINE Trial Investigators. Intensive vs standard treatment of hyperglycemia and functional outcome in patients with acute ischemic stroke: the SHINE randomized clinical trial. *JAMA*. 2019;322(4):326-335.

The SHINE randomized clinical trial in adult patients with hyperglycemia and acute ischemic stroke who were enrolled within 12 hours from stroke onset showed that there were no differences between those who received continuous intravenous insulin using a computerized decision support tool (intensive treatment) vs those who received insulin on a sliding scale that was administered subcutaneously for up to 72 hours (standard treatment).

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Rissanen TT, Uskela S, Eränen J, et al; DEBUT trial investigators. Drug-coated balloon for treatment of de-novo coronary artery lesions in patients with high bleeding risk (DEBUT): a single-blind, randomised, non-inferiority trial. *Lancet*. 2019;394(10194):230-239.

In patients with ≥ 1 risk factor for bleeding, an ischemic de-novo lesion in a coronary artery or bypass graft that could be treated with drug-coated balloons, and a reference vessel diameter of 2.5 to 4.0 mm, a percutaneous coronary intervention with a drug-coated balloon (paclitaxel and iopromide) was superior to bare-metal stents.

August 2019

Duncan MS, Freiberg MS, Greevy RA Jr, Kundu S, Vasan RS, Tindle HA. Association of smoking cessation with subsequent risk of cardiovascular disease. *JAMA*. 2019;322(7):642-650.

While the risk of cardiovascular disease was significantly lower in heavy smokers within 5 years from smoking cessation vs current smokers, the risk of cardiovascular disease remained significantly higher beyond these 5 years when compared with people who have never smoked.

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Husain M, Birkenfeld AL, Donsmark M, et al; PIONEER 6 Investigators. Oral semaglutide and cardiovascular outcomes in patients with type 2 diabetes. *N Engl J Med*. 2019;381(9):841-851.

The event-driven, randomized, double-blind, placebo-controlled PIONEER 6 trial showed that, in patients with type 2 diabetes at high cardiovascular risk, oral semaglutide was not inferior to placebo regarding the primary end point, ie, the first occurrence of a major adverse cardiovascular event (death from cardiovascular causes, nonfatal myocardial infarction, or nonfatal stroke).

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Metra M, Teerlink JR, Cotter G, et al; RELAX-AHF-2 Committees Investigators. Effects of serelaxin in patients with acute heart failure. *N Engl J Med*. 2019;381(8):716-726.

The RELAX-AHF-2 trial showed that serelaxin did not lower the incidence of cardiovascular death in patients who were hospitalized for acute heart failure with dyspnea, vascular congestion on chest radiography, increased plasma concentrations of natriuretic peptides, mild-to-moderate renal insufficiency, and a systolic blood pressure of at least 125 mm Hg.

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Nasrallah IM, Pajewski NM, Auchus AP, et al; SPRINT MIND Investigators. Association of intensive vs standard blood pressure control with cerebral white matter lesions. *JAMA*. 2019;322(6):524-534.

In adults with hypertension who were randomized to a systolic blood pressure goal of less than 120 mm Hg (vs those randomized to a systolic blood pressure goal of less than 140 mm Hg), there was a smaller increase in cerebral white matter lesion volume and a larger decrease in total brain volume.

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NCD Risk Factor Collaboration (NCD-RisC). Long-term and recent trends in hypertension awareness, treatment, and control in 12 high-income countries: an analysis of 123 nationally representative surveys. *Lancet*. 2019;394(10199):639-651.

In high-income countries, despite the improvements in hypertension awareness, treatment, and control, the control rates have reached a plateau; however, these rates varied between the countries analyzed.

Panza JA, Ellis AM, Al-Khalidi HR, et al. Myocardial viability and long-term outcomes in ischemic cardiomyopathy. *N Engl J Med.* 2019;381(8):739-748.

This study showed that the assessment of myocardial viability is not associated with a long-term benefit of coronary artery bypass grafting in patients with ischemic cardiomyopathy.

Schunk SJ, Zarbock A, Meersch M, et al. Association between urinary dickkopf-3, acute kidney injury, and subsequent loss of kidney function in patients undergoing cardiac surgery: an observational cohort study. *Lancet.* 2019;394(10197):488-496.

In patients undergoing elective cardiac surgery, preoperative urinary concentrations of the renal tubular stress marker dickkopf-3 (DKK3) was shown to be an independent predictor both for postoperative acute kidney injury and for a subsequent loss of kidney function.

Walker KA, Sharrett AR, Wu A, et al. Association of midlife to late-life blood pressure patterns with incident dementia. *JAMA.* 2019;322(6):535-545.

Patients with mid-to-late life sustained hypertension and a pattern of midlife hypertension and late-life hypotension had an increased risk of dementia vs patients with mid-to-late life normal blood pressure.

Yang WY, Melgarejo JD, Thijs L, et al; International Database on Ambulatory Blood Pressure in Relation to Cardiovascular Outcomes (IDACO) Investigators. Association of office and ambulatory blood pressure with mortality and cardiovascular outcomes. *JAMA.* 2019;322(5):409-420.

The IDACO trial, a population-based cohort study, showed that patients with a higher 24-hour and nighttime blood pressure measurements had a significantly greater risk of death and a composite cardiovascular outcome (cardiovascular mortality plus nonfatal coronary events, heart failure, and stroke).