降圧目標を見直す時期 (LBCT 05)

SPRINT：試験の結果、強化降圧管理が有意に有益であることが示された

SPRINT : Study shows significant benefits of intensive blood pressure management

降圧目標を収縮期血圧120mmHg未満の達成とした患者は心筋梗塞（MI）、心不全または脳卒中のリスクが24%低く死亡リスクは27%低かった、とのSystolic Blood Pressure Intervention Trial（SPRINT）試験の結果がAmerican Heart Association学会で発表され、*New England Journal of Medicine*オンライン版に掲載された。SPRINTでは9,300人超の人々を、2つの降圧目標（120mmHg未満または140mmHg未満）のいずれかにランダムに割り付けた。参加者は50歳以上、心血管系疾患リスクが高く、収縮期血圧が130mmHg以上、糖尿病や脳卒中歴は有していなかった。特に最初の1年間に、スタディ中の血圧は降圧薬で調整された。その結果、降圧目標120mmHg未満に割り付けられた群において主要評価項目である心血管イベントが25%、総死亡が27%減少したと報告された。積極的治療は75歳以上の高齢者においても50～74歳の成人と同様に有効な様であった。このトライアルは1年早く終了された。

Full Text

Patients whose blood pressure target was lowered to reach a systolic goal of less than 120 mmHg had their risk for myocardial infarction (MI), heart failure or stroke reduced by 24 percent, and their risk for death lowered by 27 percent. Compared to a systolic blood pressure goal of less than 140 mmHg, aggressive treatment appeared to be as effective for adults age 75 and older as for adults age 50-74, according to results from the Systolic Blood Pressure Intervention Trial (SPRINT) presented at the American Heart Association (AHA) Scientific Sessions and published online in the *New England Journal of Medicine* (*NEJM*) on Nov. 9.

Intensive blood pressure management, however, was also associated with an increased risk for some serious adverse events, such as hypotension, fainting, and acute kidney abnormalities, although there was no evidence for permanent kidney damage so far. Future data analysis and studies will investigate effects of blood pressure treatment to this lower goal on kidney function in more detail.

"The positive results of this trial have taken most investigators by surprise, and the strong benefits of treatment seem to outweigh the risks," says Alfred Cheung, M.D., chief of nephrology & hypertension at University of Utah Health Care, and co-author on the study. He cautioned, however, that, "before deciding to treat blood pressure aggressively, it may be prudent to wait until additional questions are answered."

Cheung, who led a network of 17 out of approximately 100 participating clinical sites in the U.S. and Puerto Rico, notes that results are still pending on how intensive treatment might impact dementia, cognition, and kidney disease. Additionally, nothing is known about long-term effects of sustained treatment, nor cost effectiveness. On average, SPRINT trial participants were followed for just over three years.

In September 2015, the National Institutes of Health announced that the SPRINT trial was stopped one year early due to the marked cardiovascular and survival benefits of lowering systolic blood pressure to 120 mmHg, well below the current guidelines of 140, or 150 for those over age 60 years. Researchers reported a 25 percent reduction in the primary cardiovascular outcome and 27 percent reduction of all-cause mortality in those randomized to the lower 120 mm blood pressure target.

These results may have implications for the 1 billion adults worldwide with hypertension, the leading cause of heart disease and stroke. Adults age 75 and older could potentially benefit the most from interventions based on positive SPRINT results because this age group carries the greatest burden of hypertension: over 75 percent have the condition. At the same time, they would be predicted to be most at risk for any potential side effects that are still under investigation.

SPRINT randomly assigned over 9,300 participants to one of two blood pressure targets: less than 120 mmHg or less than 140 mmHg. Participants were age 50 years or older, at increased risk for cardiovascular disease, had a systolic blood pressure of at least 130 mmHg, and did not have diabetes or history of stroke. Blood pressure was adjusted with antihypertensive medications over the course of the study, especially during the first year. Healthy life styles were encouraged in all participants, who were monitored for a total of slightly more than three additional years.

The results from SPRINT differ from a previous large blood pressure trial on people with diabetes, which demonstrated that a blood pressure target of 120 mmHg did not significantly reduce the risk for cardiovascular events. Cheung says the difference in outcomes between these two trials may stem from SPRINT's large sample size as well as its inclusion of more older adults and individuals with kidney disease, while excluding patients with diabetes.

"We saw great cardiovascular health improvements in just three years, but it could be even a lot more over the course of 10 or 30 years, if intense blood pressure treatment continues. Therefore, these results are very exciting and could have profound implications on blood pressure treatment in years to come." says Cheung.
Nonetheless, he cautions that it remains to be determined how SPRINT results will influence official medical guidelines for treating hypertension.

Tulane University Epidemiology professor Dr. Paul Whelton, who is chair of the national steering committee for the study, says, "Individual patients should consult with their primary healthcare provider to determine how our results should influence their treatment. Some healthcare providers may recommend more intensive blood pressure reduction at this time, but others may wish to see more details."

The research was supported by the National Heart, Lung, and Blood Institute, National Institute of Diabetes and Digestive and Kidney Diseases, National Institute on Aging and National Institute of Neurological Disorders and Stroke. Many centers in the Department of Veterans Affairs also participated in this trial.

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糖尿病治療薬は心不全リスクを低下させ、心不全を予防する可能性がある(LBCT 02)

EMPA-REG OUTCOME：新たなクラスの2型糖尿病治療薬は心不全による入院および死亡を減少させる

EMPA-REG OUTCOME: New class of type 2 diabetes drug reduces hospitalizations and deaths from heart failure

新たなクラスの2型糖尿病治療薬（SGLT2阻害薬）が心不全による入院および死亡を有意に低下させることが初めて示された。SGLT2阻害薬は尿中への糖排泄を増加させることにより血糖値を低下させる。EMPA-REG OUTCOMEとして知られる大規模臨床試験から得られたこの結果は、2015年American Heart Association（AHA）学会で発表された。心疾患リスクファクターを有する2型糖尿病患者が、標準治療に加えエンパグリフロジン（10mgまたは25mg)またはプラセボを1日1回内服する群のいずれかにランダムに割り付けられた。実薬投与群では、プラセボ投与群に比べ体重減少に加え血糖値および血圧低下が大であった。さらに、心不全による入院（35%）、心不全による入院および心疾患による死亡の合計（34%）、および心不全による入院および死亡（39%）が有意に減少したことも明らかにした。AHA学会でのこの結果は、9月に European Association for the Study of Diabetes年次集会で初めて発表された結果を敷衍したもので、*New England Journal of Medicine*に掲載された。

Full Text

For the first time, research shows that a new class of type 2 diabetes drugs (SGLT2 inhibitors) significantly reduce hospitalizations and death from heart failure. The findings, from a large clinical trial known as EMPA-REG OUTCOME, were presented by Yale professor of medicine and clinical chief of endocrinology, Dr. Silvio E. Inzucchi, at the 2015 American Heart Association (AHA) Scientific Session in Orlando, Florida.

Many individuals with type 2 diabetes also have heart failure. Treatment for heart failure is limited and prior efforts to treat patients with type 2 diabetes drugs showed no benefit for heart failure. But a new class of type 2 diabetes drugs (SGLT2 inhibitors) that reduce blood reduce blood glucose levels by increasing its excretion in the urine had not been studied.

In the EMPA-REG trial, patients with type 2 diabetes and risk factors for heart disease were randomized to receive once-daily doses of either the glucose-lowering drug empagliflozin (10 mg or 25 mg doses), or a placebo. The drug or placebo was given in addition to standard care.

At the end of the trial period, investigators found that patients treated with the drug experienced greater reductions in blood glucose and blood pressure, as well as weight loss, compared to those on placebo. They also found major significant reductions in hospitalizations for heart failure (35%); the combined result for heart failure hospitalization or dying from heart disease (34%); and the combined result for being hospitalized or dying from heart failure (39%).

Additionally, Inzucchi and his colleagues analyzed outcomes for subgroups of patients who had heart failure at the beginning of the trial and those who did not. "We found that reductions in the hospitalization outcomes were similar between the two subgroups," he said. "So, one conclusion that could be proposed is that the drug not only appeared to prevent deterioration in patients who already had heart failure but also appeared to prevent that condition from developing in patients who never had it before."

The findings reported Nov. 9 at the AHA session amplify results first presented at the annual meeting of the European Association for the Study of Diabetes in September and published by *The New England Journal of Medicine*.

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SOCRATES-REDUCED：Vericiguatは増悪した慢性心不全患者のナトリウム利尿ペプチド濃度を改善する

SOCRATES-REDUCED Study: Vericiguat improves natriuretic peptide levels for patients with worsening chronic heart failure

初回解析で主要評価項目の達成はできなかったが、左室駆出率（LVEF）の低下した慢性心不全の増悪（WCHF）患者で1日10mgのvericiguatを投与された患者はプラセボ群に比べ、ＮＴ-ｐｒｏＢＮＰ低下およびＬＶＥＦの改善が大で、臨床イベントが少なかった。SOCRATES-REDUCEDは、LVEF<45%でWCHFイベント後4週以内の安定した患者を対象とした第II相用量設定試験であった。研究者らは、LVEFの低下したWCHF患者456人をプラセボまたはvericiguatを4種類の1日用量のうちのいずれかを12週間投与される群にランダムに割り付けた。初回解析において、ベースラインから12週後までのNT-proBNP値の変化は、統合vericiguat群とプラセボ群とで有意差はなかった。二次解析の結果から、vericiguatの用量が大きいほどNT-proBNP値低下が大きいという用量反応関係が示唆された。今回の用量設定のように、1日10mgまでのvericiguatは安全で12週後の血圧や心拍数には有意な影響がなかった。この結果は2015年American Heart Association学会で発表され、同時に*JAMA*に掲載された。

Full Text

Although the primary analysis of the primary end point was not achieved, compared to placebo, patients with worsening chronic HF and reduced left ventricular ejection fraction (LVEF) receiving vericiguat 10mg daily experienced a greater reduction in NT-proBNP, greater improvement in LVEF, and fewer clinical events. This *JAMA* study is being released to coincide with its presentation at the American Heart Association's Scientific Sessions 2015.

Worsening chronic heart failure (WCHF) is a major public health problem around the world. Despite an often rapid and substantial in-hospital improvement in HF signs and symptoms with standard therapy, approximately 25 percent of patients are rehospitalized within 30 days and 30 percent of patients may die within 1 year.

The SOCRATES-REDUCED trial was a phase II, dose-finding study of stable patients with LVEF<45% within 4 weeks of a WCHF event. This study, which included patients from across Europe, North America, and Asia, was conducted to determine the optimal dose and tolerability of the drug vericiguat to reduce elevated natriuretic peptide levels.

Mihai Gheorghiade, M.D., of the Northwestern University Feinberg School of Medicine, Chicago, and colleagues randomly assigned 456 patients with WCHF and reduced LVEF to receive placebo or 1 of 4 daily target doses of the medication vericiguat for 12 weeks.

Overall, 351 patients (77 percent) completed treatment with the study drug with valid 12-week N-terminal pro-B-type natriuretic peptide (NT-proBNP) levels and no major protocol deviation. In the primary analysis, change in NT-proBNP levels from baseline to week 12 was not significantly different between the pooled vericiguat group and placebo. The secondary analysis suggested a dose-response relationship, such that higher vericiguat doses were associated with greater reductions in NT-proBNP level. Rates of any adverse event were 77 percent and 71 percent among the placebo and 10-mg vericiguat groups, respectively.

Although the primary analysis of the primary end point was not achieved, compared to placebo, patients receiving vericiguat 10mg daily experienced a greater reduction in NT-proBNP, greater improvement in LVEF, and fewer clinical events. As titrated in this study, vericiguat doses up to 10 mg daily were safe and did not meaningfully influence blood pressure and heart rate at 12 weeks.

"Among patients with worsening chronic HF and reduced LVEF, compared with placebo, vericiguat did not have a statistically significant effect on change in NT-proBNP level at 12 weeks but was well-tolerated. Further clinical trials of vericiguat based on the dose-response relationship in this study are needed to determine the potential role of this drug for patients with worsening chronic HF," the authors write.

This study was funded by affiliates of Bayer and Merck Sharp & Dahme, a subsidiary of Merck & Co., Inc., Kenilworth, New Jersey.

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心不全に対する硝酸薬療法により活動レベルが低下する (LBCT 01)

NEAT-HFpEF：心不全患者に対する一般的な薬剤は活動レベルを増加させな

NEAT-HFpEF: Common medication for heart failure patients does not increase activity level

心駆出率の保たれた心不全（HFpEF）患者は、硝酸イソソルビド内服後に運動してもプラセボを内服した場合と比べ運動耐容能が増加することはなかった、と2015年American Heart Association学会で発表され同時に*New England Journal of Medicine*に掲載された。Nitrate's Effect on Activity Tolerance in Heart Failure with Preserved Ejection Fraction（NEAT-HFpEF）試験と呼ばれる、多施設共同、ランダム化二重盲検、2期間、12週間のクロスオーバー試験では、HFpEF患者110人が調査された。患者は2つの治療群（プラセボ6週間投与後に硝酸イソソルビド6週間投与、または硝酸イソソルビド6週間投与後にプラセボ6週間投与）のいずれかにランダムに割り付けられた。いずれの群の患者も入浴時や水泳時以外は加速度計を1日24時間装着し、間欠的な運動試験を施行された。全ての用量（30～120mg）の実薬群内服中の1日当たり全体の活動量は、プラセボ内服期間と比較し少なかった。ベースラインと比較し、平均1日加速度計単位は硝酸薬の用量が増加するにつれて減少したが、プラセボにおいてはそうではなかった。さらに、硝酸薬は運動試験（6分間歩行距離）やQOLスコアも改善しなかった。

Full Text

Heart failure patients with preserved ejection fraction (HFpEF) did not have increased exercise tolerance after taking isosorbide mononitrate, compared to a placebo, according to a study presented at the American Heart Association's Scientific Sessions 2015. The findings come from the National Heart, Lung, and Blood Institute's Heart Failure Clinical Research Network and are also published in the *New England Journal of Medicine*.

Importantly, the HFpEF patients' daily activity level was assessed with accelerometers, devices patients wore to measure movement throughout the study. Daily activity progressively and significantly decreased as the dose of the nitrate increased, says Margaret Redfield, M.D., first author and cardiologist at Mayo Clinic's Rochester, Minnesota, campus.

"It is important to relieve symptoms in heart failure, so patients can be more active. Inactivity perpetuates deconditioning and frailty in heart failure," Dr. Redfield says. "While nitrates are commonly prescribed for symptom relief in HFpEF, the effects of nitrates in patients with HFpEF have not been studied."

In a multicenter, randomized, double-blind, two-period, 12-week crossover study called the Nitrate's Effect on Activity Tolerance in Heart Failure with Preserved Ejection Fraction (NEAT-HFpEF) Trial, 110 patients with HFpEF at 20 sites were studied. Patients were randomized into one of two treatment groups:

1. Six weeks of placebo first, followed by six weeks of isosorbide mononitrate
2. Six weeks of isosorbide mononitrate, followed by six weeks of placebo

Each six-week treatment period began with two weeks without drug treatment, considered the baseline. When taking the isosorbide mononitrate, the patients took 30 milligrams per day for a week, then 60 milligrams per day for a week and then finally 120 milligrams per day for at least two weeks. Each patient wore an accelerometer 24 hours a day, except when bathing or swimming, and underwent intermittent exercise tests.

Results showed that patients were active for 18 fewer minutes per day during the 120-milligram dose of isosorbide mononitrate, compared to when they received a placebo. Previous observational studies using accelerometer data from implanted pacing defibrillator devices in patients with heart failure and reduced ejection indicate that even 10 fewer minutes of activity per day is associated with adverse outcomes, such as death or hospitalization for heart failure.

During all study drug doses (30 to 120 milligrams), patients were less active overall per day, compared to when they received the placebo. Compared to the baseline, the average daily accelerometer units decreased progressively with increasing doses of the nitrate, but not the placebo. In addition, the nitrate also did not improve exercise test (six-minute walk distance) or quality of life scores.

"We speculated that the daily activity data is more sensitive to the true impact of a drug on overall functional status," Dr. Redfield says. "Unfortunately, nitrates actually decreased daily activity in heart failure patients. The decrease in activity occurred in the absence of adverse effects on six-minute walk distance and in association with directionally adverse, albeit not statistically significant, effects on quality-of-life scores. These findings suggest that activity levels were sensitive to subtle adverse effects of isosorbide mononitrate. Use of patient-worn devices to assess the impact of therapies on patient's lives is an important advancement in the way new therapies are studied."

Co-authors are: James Levine, M.D., Ph.D., Gabe Koepp, Barry Borlaug, M.D., and Horng Chen, M.D., all of Mayo Clinic; Kevin Anstrom, Ph.D., Steven McNulty, and Eric Velazquez, M.D., all of Duke Clinical Research Institute; Martin LeWinter, M.D., University of Vermont Medical Center; Susan Joseph, M.D., Washington University School of Medicine; Sanjiv Shah, M.D., Northwestern University; Marc Semigran, M.D., Harvard University; G. Michael Felker, M.D., Duke University Medical Center; Robert Cole, M.D., Emory University; Gordon Reeves, M.D., Thomas Jefferson University; Ryan Tedford, M.D., Johns Hopkins University School of Medicine; W.H. Wilson Tang, M.D., Cleveland Clinic Foundation; Monica Shah, M.D., NHLBI; and Eugene Braunwald, M.D., Harvard University Medical Center.

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重度の虚血性僧帽弁閉鎖不全症患者に対しては僧帽弁形成術より置換術の方が信頼できる

Mitral valve replacement is more reliable than repair for patients with severe ischemic valve regurgitation

2015年American Heart Association学会で発表され*New England Journal of Medicine*に掲載されたスタディにおいて、Cardiothoracic Surgical Trials Network（CTSN）の研究チームが虚血性僧帽弁閉鎖不全症（IMR）に対し、僧帽弁置換術を施行された患者は僧帽弁形成術を施行された患者に比べ、術後2年間の心不全率が低く心血管関連の再入院が少ないことを明らかにした。研究者らは251人の患者を術後2年間にわたり追跡し、IMR治療としての僧帽弁形成術と僧帽弁置換術とを比較した。22の臨床施設において、研究者らは左室収縮末期容積指標をモニターし患者の左室リバース・リモデリングを評価した。2年間の期間終了時、患者は脳卒中、その後の僧帽弁手術、心不全、再入院、閉鎖不全再発、QOLおよび死亡率についても評価を受けた。手術2年後の左室リバース・リモデリングまたは生存率は、僧帽弁形成術患者と僧帽弁置換術患者とで差がなかった。しかし、弁逆流の再発は形成術群で多く、それにより心不全イベントや心血管系再入院が多くなった。

Full Text

Ischemic mitral regurgitation (IMR) can increase a patient's risk for adverse cardiovascular events and even death. While there is no definitive treatment for IMR, patients may be treated with mitral valve repair or valve replacement. In a study presented at the American Heart Association Scientific Sessions 2015, and published in the *New England Journal of Medicine*, a team of researchers from the Cardiothoracic Surgical Trials Network (CTSN) found that recipients of a mitral valve replacement for IMR experienced a lower rate of heart failure and fewer cardiovascular-related hospital readmissions in the two years following surgery.

"We evaluated clinical outcomes as well as echocardiographic data to compile the results of the trial," said Daniel Goldstein, M.D., professor and vice chairman of the Department of Cardiothoracic Surgery at Montefiore Einstein Center for Heart and Vascular Care and Albert Einstein College of Medicine, and first author of the study. "It is clear from these findings that after a two-year post-surgery period, there is no difference in left ventricular reverse remodeling or survival between patients who received mitral valve repair and those who received valve replacement. There was more recurrence of the leaking of the valve, however, in the repair group, which led to more heart failure adverse events and more cardiovascular readmissions."

The Cardiothoracic Surgical Trials Network, which includes Montefiore Einstein Center for Heart and Vascular Care, the Icahn School of Medicine at Mount Sinai and the Perelman School of Medicine at the University of Pennsylvania, among others, followed 251 patients over a two-year postoperative period, and compared mitral valve repair to valve replacement for treating IMR. At 22 clinical centers, researchers assessed the degree of a patient's left ventricular reverse remodeling by monitoring left ventricular end systolic volume index. At the end of the two-year period, patients were also evaluated for the occurrence of stroke, subsequent mitral valve surgery, heart failure, re-hospitalization, recurrent regurgitation, quality of life and mortality.

"Expert opinion favors surgical correction of severe ischemic mitral regurgitation, but the optimal surgical strategy remains controversial, leading to practice pattern variations. The results of this trial should better inform therapeutic decisions for the care of these complex patients," said Annetine C. Gelijns, Ph.D., the Edmond A. Guggenheim professor and chair of the Department Population Health Science and Policy at Icahn School of Medicine at Mount Sinai, and the principal investigator for the Data Coordinating Center based at Mount Sinai.

At the American Heart Association Scientific Sessions 2014, one-year postoperative results were presented, concluding that there was no difference in left ventricular end systolic volume index for mitral valve repair or replacement. However it was also reported that patients with a mitral valve repair experienced significantly more recurrent regurgitation than those with a mitral replacement. "From a patient's perspective, the observed differences in MR recurrence are reflected in higher rates of heart failure and hospitalizations, and these have a measurable effect on formal measures of quality of life" said Alan J. Moskowitz, M.D., professor and vice-chair of Population Health Science and Policy at the Icahn School of Medicine.

"Building on the one-year clinical data reported in 2014, we concluded that while there was no difference in the rate of survival for valve replacement or repair, mitral valve replacement did prove to be a more durable option for the treatment of severe ischemic regurgitation," said Michael A. Acker, M.D., chief of the division of Cardiovascular Surgery and the William Maul Measey, professor of Surgery in the Perelman School of Medicine at the University of Pennsylvania, and senior author of the study. "Recurrence of MR led to increased cardiovascular readmissions and more heart failure adverse events when compared to replacement. Until we can reliably predict the patients who will recur after repair, replacement is a more reliable treatment for patients with severe ischemic mitral regurgitation. Additional research is needed to better predict the patients who can be repaired without recurrence."

The study was presented as the Late-Breaking Clinical Trial (Abstract 23690): Two-Year Outcomes following Mitral Valve Repair or Replacement for Severe Ischemic Mitral Regurgitation.

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併用療法により心臓施術後の片頭痛が減少する (CS 01)

CANOA：クロピドグレルとアスピリンの併用により心房中隔欠損症に対するカテーテル閉鎖術後の片頭痛の発現および回数が減少する

CANOA: Clopidogrel plus aspirin reduces occurrence and number of migraines following transcatheter closure of an atrial septal defect

クロピドグレルとアスピリンの併用を3か月間行うことで心房中隔欠損症（ASD）に対するカテーテル閉鎖術を施行された患者の片頭痛の頻度が減少した、とのCANOA試験の結果が2015年American Heart Association学会で発表され同時に*JAMA*に掲載された。カテーテルを用いたASD閉鎖術後患者の約15%において片頭痛発作の新規発症が認められ、初回エピソードの多くは施術後数日から数週間以内に発症すると報告されている。研究者らは、ASD閉鎖術の適応で片頭痛歴のない患者171人を抗血小板薬2剤併用療法（アスピリン+クロピドグレル[クロピドグレル群]、84人）または抗血小板薬単剤療法（アスピリン+プラセボ[プラセボ群]、87人）にランダムに割り付け、カテーテルを用いたASD閉鎖術後3か月間追跡した。クロピドグレル群では施術後3か月以内の1か月当たりの片頭痛平均日数がプラセボ群よりも減少し（0.4日対1.4日）、片頭痛発作頻度が低かった（クロピドグレル群9.5%対プラセボ群22%）。片頭痛発現患者においては、クロピドグレル群の方が重症度が低かった。

Full Text

Three months of clopidogrel plus aspirin was associated with a reduced frequency of migraine in patients who had undergone transcatheter closure of an atrial septal defect (ASD) in the CANOA study.

Josep Rodes-Cabau, M.D., of Laval University, Quebec City, Canada, and colleagues randomly assigned 171 patients with an indication for ASD closure and no history of migraine to receive dual antiplatelet therapy (aspirin + clopidogrel [the clopidogrel group], n = 84) or single antiplatelet therapy (aspirin + placebo [the placebo group], n = 87) for 3 months following transcatheter ASD closure. This *JAMA* study is being released to coincide with its presentation at the American Heart Association's Scientific Sessions 2015.

Occurrence of new-onset migraine attacks has been reported in approximately 15 percent of patients following transcatheter ASD closure, with the majority of initial episodes occurring within the days to weeks following the procedure. Aspirin is often prescribed for 6 months following the procedure. Preliminary studies have suggested an association with a lower incidence and severity of migraine headaches following ASD closure when ticlopidine or clopidogrel is added to aspirin treatment.

The CANOA researchers found that patients in the clopidogrel group had a reduced average number of monthly migraine days within the 3 months following the procedure (0.4 days) vs. the placebo group (1.4 days) and a lower incidence of migraine attacks (9.5 percent for the clopidogrel group vs. 22 percent for the placebo group). Among patients with migraines, those in the clopidogrel group had less-severe migraine attacks (zero patients with moderately or severely disabling migraine attacks vs. 37 percent [7 patients] in the placebo group). No significant increase in adverse events was observed with the use of dual vs. single antiplatelet therapy.

"Further studies are needed to assess generalizability and durability of this effect," the authors write.

This study was funded by unrestricted grants from Sanofi and St. Jude Medical and a grant from the Foundation of the Quebec Heart and Lung Institute.

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グループ療法は心血管リスクファクターを改善する (LBCT 02)

グループ療法は心血管系の健康を促進する有効で費用対効果の高い方法である

Group therapy is an effective and cost-efficient way to promote cardiovascular health

グループ療法に基づいた治療行為は心血管系リスクファクターの全般的な改善を達成する、と2015年American Heart Association学会で発表され、*Journal of the American College of Cardiology*に掲載された。3か月にわたり、全参加者は健康的な生活習慣を促進する目的でトレーニングおよび動機付けグループセッションに参加した。その後、参加者は2群（介入群277人およびコントロール群266人）に分けられた。次の12か月間に、介入群は態度や行動の変容を促進する目的で月1回のグループ治療セッションに参加した。同じ期間中、コントロール群は個別の定期検診を受けるのみであった。プログラムスタート時のトレーニングセッション終了後、割り付けられた群に関係なく、多くの参加者（71%）においてFuster-BEWATインデクスが改善した。しかし次のステージでは、介入群とコントロール群とで有意差が認められた。介入群では、67%の参加者が心血管リスクファクターの改善を示したのに対し、コントロール群では56%であった。禁煙した者は介入群においてほぼ2倍であった（39%対20%）。同様に、介入群の46%において運動レベルが増加した。

Full Text

A health-care intervention based on group-therapy achieves an overall improvement in cardiovascular risk factors. The intervention, based on mutual support among participants, is especially successful in helping participants to stop smoking.

A simple support-group intervention program aimed at promoting general health, similar to the group-therapy activities of Alcoholics Anonymous, yields significant improvements in the control of the 5 most important cardiovascular risk factors (blood pressure, exercise, weight, diet, and tobacco smoking); the improvement was especially clear for stopping smoking.

The intervention has been tested in the Fifty-Fifty Program, a groundbreaking randomized controlled clinical trial in a group of 543 adults. The Fifty-Fifty Program works with adults to increase their knowledge and develop attitudes and skills conducive to a healthy lifestyle in the context of mutual support among equals. The results of the trial confirm that the intervention helps participants to adopt healthy habits and to improve their control of cardiovascular risk factors. At the end of the 1 year intervention, the results are clear: 67% of the participants showed an improvement in the Fuster-BEWAT index, a measure of the 5 main cardiovascular risk factors, compared with 56% of the control group; moreover, almost half the participants reduced their tobacco consumption.

The results were presented at the Scientific Sessions of the American Heart Association annual meeting, and simultaneously published in the *Journal of the American College of Cardiology*.

The Fifty-Fifty Program is an initiative of the SHE Foundation, led by Valentín Fuster, M.D., Ph.D., Director of the Centro Nacional de Investigaciones Cardiovasculares del Carlos III (CNIC), and the Spanish Agency for Consumer Affairs, Food Safety and Nutrition (AECOSAN), an executive branch of the Ministry of Health, Social Services and Equality. The goal of the program is to achieve fundamental improvements in adult health through training and motivational workshops in which participants support and encourage each other to make and sustain appropriate lifestyle changes. In this way, the program aims to incentivize people to modify their lifestyle habits and learn to control the major cardiovascular risk factors.

The methodology for using peer support to control chronic diseases is well-established; however, there is little hard scientific evidence showing long-term benefits from this type of intervention. Fuster explains that the idea was inspired by the success of Alcoholics Anonymous: 'The effectiveness of these group-therapy interventions got me thinking that the same strategy could be applied to other health problems, including cardiovascular disease.' Two pilot programs were conducted, one on the Caribbean island of Grenada and the other in Cardona, Spain. With encouraging results from these studies, the investigative team undertook a more extensive study with 543 participants (71% women) distributed in locations across Spain. Each participant had at least 1 cardiovascular risk factor.

Over a 3-month period, all participants took part in training and motivational group sessions aimed at promoting healthy lifestyle habits. These meetings focused on motivations for change, stress management, stopping smoking, a healthy diet, taking regular exercise, and self-control of blood pressure. From this shared starting point, the participants were divided into 2 groups: 277 in the intervention group and 266 in the control group. Over the next 12 months, the intervention group met for monthly group-therapy sessions aimed at promoting changes in attitudes and behavior, encouraging participants to go beyond simple awareness and make real progress in the control of cardiovascular risk factors. The control group merely received individual medical check-ups during the same period.

After the training sessions at the start of the program, most participants (71%) showed an improvement in the Fuster-BEWAT index, irrespective of group assignment. However, at subsequent stages, significant differences appeared between the intervention and control groups. In the intervention group, 67% of participants showed an improvement in cardiovascular risk factors, compared with 56% in the control group. The results were even more positive for tobacco consumption, with almost twice as many intervention-group participants stopping smoking (39% versus 20%). Similarly, 46% of the intervention group members increased their level of physical activity.

The authors were especially pleased with the results obtained with smokers. Of the 138 smokers at the start of the study, 21 stopped after the educational workshops, but this figure increased after the intervention to 32 (23%), 24 of whom were from the intervention group.

According to the research team, the data confirm that 'although training in healthy habits is important and has a positive impact on health, these benefits tail off if not reinforced over time.' The study clearly shows that although there was an initial general improvement in smoking, 80% of control group participants showed no improvement at the end of the follow-up period. Fuster emphasizes that the data show that a support group intervention is 'effective and cost-efficient'.

A further follow-up is scheduled for 12 months after the intervention period, to monitor the evolution of cardiovascular risk factors in the Fuster-BEWAT index in the intervention and control groups. The team has launched a similar study in Harlem, New York.

The FAMILIA Project was created by cardiologist Valentin Fuster, M.D., Ph.D., Director of Mount Sinai Heart and Physician-in-Chief of The Mount Sinai Hospital. Dr. Fuster's initiative is made possible thanks to a $3.8 million in grant support to Mount Sinai Heart by the American Heart Association (AHA). For the FAMILIA Project Mount Sinai has partnered with NYC's Administration for Children's Services (ACS), Division of Early Care and Education Head Start programs.

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遺伝子情報を開示することにより健康上の転帰が変化する (LBCT 02)

MI-GENES：心血管疾患の遺伝子リスク情報を開示することはLDLコレステロール値低下につながる

MI-GENES: Disclosing genetic risk information for cardiovascular disease leads to lower LDL cholesterol levels

冠動脈疾患（CHD）に対する遺伝子リスクを開示することにより低比重リポ蛋白(LDL)コレステロールが低下する、と2015年American Heart Association学会のlate-breaking clinical trialとして発表された。心筋梗塞関連遺伝子（MI-GENES）スタディは、既知の動脈硬化性血管疾患を有さずスタチンを内服しておらず中等度のCHDを有する45～65歳の207人を対象とした。10年間の心筋梗塞（MI）確率は5～20%であった。対象者は、従来のリスクファクターのみに基づく10年心疾患リスクを開示される群と、従来のリスクファクターと遺伝子リスクスコア（GRS）を開示される群とにランダムに割り付けられた。GRSはCHDに関する28の遺伝子変異から導き出された。両群ともに、心疾患リスクは遺伝子カウンセラーから開示され、その後スタチン使用に関して医師と相談した。リスク開示から6か月後の血中LDLレベルは、遺伝子リスク情報を開示された群で約10mg/dL低かった。この患者群では、スタチン治療を開始された者が多かったことによりLDLレベルが低下した。今回のスタディは、遺伝子リスク情報を開示することはそれに関連した健康上の転帰の変化をもたらし得ることを示している。

Full Text

A group of researchers led by Mayo Clinic has discovered that disclosing genetic risk for coronary heart disease (CHD) results in lower low-density lipoprotein cholesterol (LDL). The findings of the Myocardial Infarction Genes (MI-GENES) Study were presented at the annual American Heart Association Scientific Sessions 2015 as a late-breaking clinical trial.

In this study, the investigators tested the hypothesis that incorporating genetic risk information into CHD risk estimates would lead to lowering of LDL levels. Participants were randomized to receive a CHD risk estimate that included genetic risk information versus an estimate based on conventional risk factors alone. Conventional risk factors include high blood pressure, diabetes, physical inactivity and a history of smoking. Six months after risk disclosure, the LDL levels were nearly 10 milligrams per deciliter of blood lower in those randomized to receive genetic risk information. The lower LDL levels resulted from a greater proportion of individuals in this group being started on statin medication.

"This study demonstrates for the first time that disclosing genetic risk information for a common disease such as CHD can result in changes in a relevant health outcome, in this case, LDL levels," says Iftikhar Kullo, M.D., Mayo Clinic cardiologist and lead author. "The study also demonstrates the feasibility of placing genetic risk information into the electronic health record to empower patients and physicians to make decisions related to initiation of a statin medication. This is an important advance in the area of precision medicine for cardiovascular diseases."

The MI-GENES Study included 207 people, ages 45-65, with no known atherosclerotic vascular disease who were not on a statin and were at intermediate risk for CHD. The 10-year probability of myocardial infarction was 5 to 20 percent. They were randomized to receive a 10-year probability of heart disease based on conventional risk factors alone versus conventional risk factors plus a genetic risk score (GRS). The GRS is derived from 28 genetic variants associated with CHD risk. For both groups, heart disease risk was disclosed by a genetic counselor, followed by a discussion with a physician about statin use. Participants' LDL levels were checked at three and six months.

"Our ability to predict the risk of an individual to suffer such an event is somewhat limited," Dr. Kullo says. "Incorporating genetic risk information into CHD risk estimates may improve our ability to more precisely identify individuals at risk."

The study was one of the genomic medicine pilots initiated in the last phase of the Electronic Medical Records and Genomics Network that is funded by the National Human Genome Research Institute.

Co-authors are: Hayan Jouni, M.D.; Iyad Isseh, M.B.B.S.; Erin Austin, Ph.D.; Teresa Kruisselbrink, M.S., C.G.C.; Sherry-Ann Brown, M.D., Ph.D.; Victor Montori, M.D.; Raad Haddad, M.B.B.S.; Daniel Schaid, Ph.D.; and Kent Bailey, Ph.D., all of Mayo Clinic; Ulrich Broeckel, M.D., Medical College of Wisconsin; and Robert Green, M.D., Brigham and Women's Hospital and Harvard Medical School.

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2型糖尿病に対しては短時間の高強度運動が優れている(Abstract 18838)

2型糖尿病患者においては低強度運動よりも短時間の高強度運動の方が心血管リスクファクターを改善する

Burst exercise improves cardiovascular risk factors more than lower-intensity exercise for patients with type 2 diabetes

2型糖尿病患者において短時間の高強度運動は30分間の持続性の低強度運動よりもコレステロール、血糖および体重を改善した、と2015年American Heart Association学会で発表された。このスタディは、2型糖尿病の診断後直後にスタディに組み入れられた患者76人（男性70%、平均年齢67歳）を対象に施行された。患者は、目標とした65%の心拍数で30分間の運動を週5回行う群、または85%の心拍数で10分間の運動を週5回行う群にランダムに割り付けられた。3か月後に、10分間の短時間の高強度運動により3か月の血糖パターンが0.82%低下したのに対し、持続性の低強度運動を行った群では単に0.25%低下したのみであった。短時間運動群患者は実質的により運動する結果となり、全体でHbA1c値が2.3倍改善し、ボディーマスインデックスが3倍減少した。短時間運動患者はまた、コレステロール値や負荷試験で計測した心臓適応能の改善が大であった。

Full Text

Short bursts of high-intensity exercise improved cholesterol, blood sugar and weight among Type 2 diabetes patients more than 30 minutes of sustained, lower-intensity exercise, according to research presented at the American Heart Association's Scientific Sessions 2015.

Researchers found that after three months of high-intensity exercise in 10-minute bursts done three times per day, five days a week, led to an average 0.82 percent decrease in three-month blood sugar patterns compared with just 0.25 percent among those who performed more sustained, lower-intensity exercise also five times per week.

Exercise is known to help reduce cholesterol and weight as well as manage Type 2 diabetes - all risk factors for heart disease. Historically, diabetes management programs have focused primarily on low-intensity, sustained exercise, said lead study author Avinash Pandey, an undergraduate student at the University of Western Ontario in London, Ontario, Canada.

"However, more may be accomplished with short bursts of vigorous exercise, in which patients achieve a higher maximum target heart rate, and may be easier to fit into busy schedules," Pandey said. "We also found that these 10 minute intervals may be easier to fit into busy schedules, since people randomized to that regimen were more consistent with exercise and ended up doing more exercise per week."

The study was conducted in 76 patients with Type 2 diabetes (70 percent male, average age 67) who were recruited for the study shortly after their diagnosis. Patients were randomly assigned to either 30 minutes of exercise five days a week at 65 percent of their target heart rate or ten minutes of exercise three times a day, five days a week at 85 percent of their target heart rate.

Burst exercise patients actually ended up exercising more, and overall, experienced a 2.3-fold greater improvement in HbA1c levels as well as a three-fold reduction in body mass index. Burst exercise patients also showed greater improvements in their cholesterol levels and stronger cardiac fitness, as measured by stress testing.

Researchers said it's unclear why shorter bursts of high-intensity exercise would lead to more significant improvements compared with sustained, lower-intensity exercise. One theory is that higher intensity exercise uses energy in a different way, suggests Pandey.

"We are hoping to continue looking at burst exercise and sustained exercise in larger and more diverse patient populations. With further study, burst exercise may become a viable alternative to the current standard of care of low-intensity, sustained exercise for diabetes rehabilitation."

Pandey's co-author is Paul Poirier, M.D., Ph.D.

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スタディにより一般人口における"無症状"の心発作有病率を調査する

認識されていないMI患者の多くにおいて、心電図検査や臨床評価から心筋瘢痕は検出されない

Myocardial scars not detected by electrocardiography or clinical evaluation for most people with an unrecognized MI

多人種の中年以降を対象としたスタディにおいて、心筋瘢痕保有率は約8%であったが、そのうち約80%は心電図検査や臨床評価では認識されなかった、と2015年American Heart Association学会で発表され*JAMA*に掲載された。研究者らは心臓磁気共鳴画像（CMR）を用いて心筋瘢痕保有率を調査した。参加者は多人種、スタディ開始時の2000～2002年に45～84歳であり、臨床上の心血管疾患（CVD）は有していなかった。10年後（2010～2012年）の調査において、参加者1,840人（平均年齢68歳；男性52%）が心筋瘢痕検出のためガドリニウムを用いたCMR画像検査を施行された。スタディ開始時および10年後に心血管疾患リスクファクターおよび冠動脈石灰化（CAC）スコアが計測された。CMRにより検出された心筋瘢痕保有率は7.9%（1,840人中146人）であった。これまで認識されていなかった心筋瘢痕は6.2%であり、1.7%は臨床的に認識されたMIであった。したがって、78%（146人中114人）の心筋瘢痕は臨床的または心電図（ECG）評価では認識されなかった。男性の方が女性よりも心筋瘢痕保有率が高かった（12.9%対2.5%）。

Full Text

In a multiethnic, middle-aged and older study population, the prevalence of myocardial scars was nearly 8 percent, of which nearly 80 percent were unrecognized by electrocardiography or clinical evaluation, according to a study in the November 10 issue of *JAMA*. This issue, a cardiovascular disease theme issue, coincides with the American Heart Association's Scientific Sessions 2015.

Ischemic heart disease is an important public health concern, but a considerable proportion of myocardial infarctions (MIs) are clinically unrecognized. Given the aging population, it is important to understand the prevalence, risk factors, and prognosis of unrecognized MI. In patients who survive an MI, normal contractile tissue is replaced by noncontractile fibrosis. Myocardial scarring leads to abnormal heart function and poor prognosis. The prevalence of and factors associated with unrecognized MI and scar have not been previously defined using contemporary methods in a multiethnic U.S. population, according to information in the article.

David A. Bluemke, M.D., Ph.D., of the National Institute of Biomedical Imaging and Bioengineering, Bethesda, Md., and colleagues examined the prevalence of myocardial scar using cardiac magnetic resonance (CMR; considered a standard of reference for defining the presence of myocardial scar). Participants were multiethnic, 45 through 84 years of age and free of clinical cardiovascular disease (CVD) at study entry in 2000-2002. In the 10th year examination (2010-2012), 1,840 participants (average age, 68 years; 52 percent men) underwent CMR imaging with gadolinium to detect myocardial scar. Cardiovascular disease risk factors and coronary artery calcium (CAC) scores were measured at study entry and year 10.

The overall prevalence of myocardial scar by CMR was 7.9 percent (146 of 1,840). The prevalence of previously unrecognized myocardial scar was 6.2 percent, whereas 1.7 percent had clinically recognized MI. Thus, 78 percent (114 of 146) of myocardial scars were unrecognized by clinical or electrocardiography (ECG) evaluation. Men had a higher prevalence of myocardial scar than women (12.9 percent vs. 2.5 percent).

Of individual risk factors, age, male sex, CAC score, body mass index, current smoking, and use of antihypertensive medications at study entry were associated with higher odds of myocardial scar.

"The clinical significance of unrecognized myocardial scar remains to be defined, although prior myocardial scar has been noted pathologically in more than 70 percent of patients with sudden cardiac death but without prior known coronary artery disease," the authors write. "Further studies are needed to understand the clinical consequences of these undetected scars."

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小児心臓移植における3D復元はドナーのサイズマッチングを改善する可能性がある

Potential of 3D reconstruction to improve donor size matching in children receiving heart transplants

新たな3Dコンピュータモデリングシステムは、心移植を受ける小児に対する最良のサイズのドナー心臓を外科医が選択する能力を有意に改善する可能性がある、と2015年American Heart Association学会で発表された。今のところ移植センターでは、可能性のあるドナー心をドナーの体重とレシピエントの体重を比較し患者の胸部X線上の心臓サイズに基づき上限と下限を拾い上げ適合性を評価している。しかしこの評価法は正確ではなく、大きさや容積の差異がレシピエントの転帰に多大な影響を与え得る。今回の新たな3Dシステムを開発するために研究者らは、99パウンドまでの小児において、MRIおよびCT画像を用いた健常小児の3Dによる心臓復元の新しいライブラリーを作成した。その後、このライブラリーを用いて小児移植レシピエントが必要とする正しい心臓サイズを確実にするための最良のドナー体重を予測した。そして既に心移植を受けた小児の移植前後の画像を用いた。実際に移植された小児の術後データと移植仮想イメージを比較すると、3D画像システムは正確に適切な大きさの心臓を見極めることが明らかになった。

Full Text

A new 3D computer modeling system may significantly improve a surgeon's ability to select the best sized donor heart for children receiving heart transplants, according to research presented at the American Heart Association's Scientific Sessions 2015.

Transplant centers currently assess compatibility of a potential donor heart by comparing the donor weight to the recipient weight and then picking an upper and lower limit based on the size of the patient's heart on chest X-ray. But the assessment is not precise and variations in size and volume can have a major effect on the recipient's outcome.

While survival in pediatric heart transplantation have improved, there are still too few donors to meet the demand, so "it is critical to optimize the range of acceptable donors for each child," said study author Jonathan Plasencia, B.S., a Ph.D. student at Arizona State University's Image Processing Applications Lab in Tempe, Arizona.

"3D reconstruction has tremendous potential to improve donor size matching," he said. "We feel that we now have evidence that 3D matching can improve selection and hope this will soon help transplant doctors, patients, and their parents make the best decision by taking some of the uncertainty out of this difficult situation."

To develop the new 3D system, the researchers created a novel library of healthy children's 3D reconstructed hearts using MRI and CT images in children weighing up to 99 pounds. They then used the library to predict the best donor body weight to ensure the correct heart size needed for pediatric transplant recipients. Then they used before and after images from infants who had already received a heart transplant. When they compared the post-operative data from the real infants with the virtual transplant images, they found that the 3D imaging system accurately identified an appropriate size heart.

"As the virtual library grows, the ability to accurately predict donor heart volumes will improve, and analyzing future transplant cases using 3D matching will allow us to predict the true upper and lower limits of acceptable donor size," he said. "This may allow more effective organ allocation on a national scale and minimize the number of otherwise acceptable organs that are ultimately discarded."

Researchers suggested that one day transplant teams may be able to use the 3D process to perform virtual transplants before an actual procedure to rapidly measure a donated heart to ensure a better fit and to reduce the risk of mismatching in pediatric transplants.

The 3D process was a collaborative effort developed at the Arizona State University, along with researchers at Phoenix Children's Hospital and St. Joseph's Hospital and Medical Center, also in Phoenix. The team was overseen by Steven D. Zangwill, M.D., medical director of Heart Transplant and Heart Failure at Phoenix Children's Hospital.

Although not yet to the point of replacing size matching for transplants, the investigators are encouraged by what they have found and have already implemented the techniques to supplement standard of care at Phoenix Children's Hospital, Plasencia said.

The big question is how long it will take to further test the technique and move it into actual use. "We are hoping that over the course of the next year, we will have a better sense of its validity in a prospective study," Plasencia said.

Co-authors are Justin Ryan, Ph.D..; Jacob Lindquist, B.S.; Susan Sajadi, B.S. Micheal Van Auker, Ph.D.; Randy Richardson, M.D.; Erik Ellsworth, M.D.; Susan Park, C.P.N.P.; Robyn Augustyn, B.S.; Richard Southard, M.D.; John Nigro, M.D.; Stephen Pophal, M.D.; David Frakes, Ph.D. and Steven Zangwill, M.D. Author disclosures are on the manuscript.

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医師によるCPR：心臓マッサージを続けるか人工呼吸のために中断するか？(LBCT)

心臓マッサージを継続することと人工呼吸のために心臓マッサージを中断することを比較したスタディにおける予想外の結果

Unexpected findings in study of continuous pumping vs. interrupting manual chest pumping for rescue breathing

院外CPRに対し緊急の医療レスポンダーが心臓マッサージを継続して行うことは、心臓マッサージを中断して人工呼吸を行うことと比較し生存に関する有益性は得られなかった、と2015年American Heart Association学会で発表され*New England Journal of Medicine*に掲載された。心停止後生存し退院した患者において持続心臓マッサージはまた、脳機能保護においても優れてはいなかった。今回のクロスオーバートライアルには院外心停止を来した患者23,711人が含まれ、うち12,653人は持続心臓マッサージ（1分間当たり約100回と手動換気1分間10回）を行われる介入群であり、11,058人は心臓マッサージを中断される（30回心臓マッサージを行い中断し換気を2回行った後心臓マッサージを再開）コントロール群であった。これらの患者において、介入群のうち1,129人つまり9%、およびコントロール群のうち1,027人つまり9.7%が生存し退院した。患者は退院前に機能状態をRankin スケールスコアで評価された。神経学的機能スコアが良好な状態で退院した患者は、コントロール群で7.7%であり介入群で7%であった。

Full Text

Continuous chest compressions during out-of-hospital CPR by emergency medical responders did not offer survival advantages, when compared to interrupting manual chest pumping to perform rescue breathing. Nor were continuous chest compressions better in protecting brain function among those who survived the cardiac arrest and were later discharged from a hospital.

These unexpected findings come from the largest study so far of emergency medical services responses at the scene of adult cardiac arrests not caused by trauma.

The project leader is Dr. Graham Nichol, University of Washington professor of medicine, director of the UW Medicine Center for Prehospital Emergency Care, and holder of the Leonard A. Cobb Medic One Foundation Endowed Chair in Prehospital Emergency Care. Dr. Joe Ornato of the Virginia Commonwealth University Health System was the senior investigator.

"The results of this study may well change emergency medical services CPR practice," Nichol said, "Both groups did well. But it appears that patients treated by EMS providers who interrupted chest compressions to deliver rescue breathing using a bag mask appear to survive a bit more often."

The research is also the largest randomized trial ever conducted in patients with cardiac arrest. It found that those patients with out-of-hospital cardiac arrest who received continuous compressions were less likely to survive long enough to be transported or admitted to a hospital. They also had fewer days alive and out of hospital during the first month after their cardiac arrest.

The results were published Monday, Nov. 9, in the *New England Journal of Medicine* and were accompanied by an editorial by Rudolph W. Koster of Academic Medical Center Amsterdam.

The findings were also presented that afternoon at the American Heart Association Scientific Sessions 2015 in Orlando, Florida. The paper is titled, "Trial of Continuous or Interrupted Chest Compression during CPR." From earlier studies, emergency medical services staff and researchers were concerned that CPR methods that alternate chest pumps with a few lung inflations might reduce blood flow and possible survival.

The CPR researchers wanted to determine if continuous chest compressions at about 100 per minute, accompanied by manual ventilations at about 10 per minute, provided better results than did an approach that repeats the pattern: 30 chest pumps, halt to give two ventilations, resume pumping. Each group received rescue breaths through a bag valve mask. The mask is placed over the patient's nose and mouth and is squeezed to push air into the patient's lungs.

The research involved 114 emergency medical services agencies across the United States and Canada. Most of the locations were urban, but some were suburban and a few were rural.

The cluster-randomized crossover trial included 23,711 out-of-hospital adult cardiac arrest patients, with 12,653 in the intervention group receiving continuous chest compressions, and 11,058 in the control group receiving interrupted chest compressions. Of these, 1,129 patients, or 9 percent of those in the intervention group, and 1,072 patients, or 9.7 percent of those in the control group, survived and were discharged from hospitals.

The researchers also wanted to know what percentage of the control and intervention groups not only survived, but also did not suffer from serious brain damage. Patients received a Rankin scale score of their functional status before they left the hospital. The discharged patients with favorable neurological function scores made up 7.7 percent of the control group and 7 percent of the intervention group.

Nichol emphasized that this particular study evaluated CPR by emergency medical services providers at the scene and during transport to the hospital, not bystander CPR. Bystanders assisting at the scene of a cardiac arrest generally perform continuous chest compressions without rescue breathing.

Nichol added that researchers will continue to analyze the data gathered during the emergency medical services CPR study.

The published study was supported by funding from the National Heart, Lung and Blood Institute of the National Institutes of Health, grants in partnership with the U.S. Army Medical Research & Materiel Command and included the Resuscitation Outcomes Consortium Investigators. The study also received funding from the Canadian Institute of Health Research, Institute of Circulatory and Respiratory Health, Defence Research and Development Canada, the Heart and Stroke Foundation of Canada, and the American Heart Association.

Other UW researchers from the UW School of Medicine and the UW School of Public Health contributed work to the study. The included Drs. Susanne May, Peter Kudenchuk and Thomas D. Rea. Other contributors included: University of Alabama, University of Pittsburgh, Johns Hopkins University, University of Ottawa, University of Toronto, University of Wisconsin, University of British Columbia, and University of Texas, Southwestern.