

Cardiology News / Recent Literature Review / Last Quarter 2016

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AF Symposium: Orlando, 12-14/1/2017

ACC.17: Washington, DC, 17-19/3/2017

HRS Scientific sessions: Chicago, 10-13/5/2017

EHRA Europace-Cardiostim: Vienna, 18-21/6/2017

ESC Congress: Barcelona, 26-30/8/2017

TOHP Study: Direct Linear Relationship of an Accurate Measure of Usual Sodium Intake to Total Mortality Over a Period of 23-26 Years, With Higher Risk at High Sodium Intake and no Evidence of a U or J Shape

Based on multiple 24-h urine samples collected from pre-hypertensive adults 30 to 54 years of age, among 744 phase I and 2,382 phase II participants randomized to sodium reduction or control, 251 deaths occurred, representing a nonsignificant 15% lower risk in the active intervention (hazard ratio -HR: 0.85; $p=NS$). Among 2,974 participants not assigned to an active sodium intervention, 272 deaths occurred with a direct linear association between average sodium intake and mortality, with an HR of 0.75, 0.95, and 1.00 (references) and 1.07 (p trend=0.30) for <2.3, 2.3 to <3.6, 3.6 to <4.8, and ≥ 4.8 g/24 h, respectively; and with an HR of 1.12 per 1 g/24 h ($p = 0.05$). There was no evidence of a J-shaped or nonlinear relationship. The HR per unit increase in sodium/potassium ratio was 1.13 ($p = 0.04$) (Cook NR et al, *J Am Coll Cardiol* 2016;68:1609-1617).

FRANCE-2 (French Aortic National CoreValve and Edwards) Registry: In High-Risk Patients With Aortic Stenosis Undergoing TAVI, Later Mortality is Due Mainly to Noncardiac Causes / Beyond the First Month After the Procedure, Prosthetic Valve Function Remains Stable, the Incidence of Clinical Events is Low, and Functional Improvement is Usually Sustained

Among 4,201 patients undergoing TAVI, approaches were transfemoral 73%, transapical 18%, subclavian 6%, and transaortic or transcatheter 3% and median follow-up 3.8 years. The 3-year all-cause mortality was 42% and cardiovascular mortality 17.5%. Predictors of 3-year all-cause mortality were male gender ($p < 0.001$), low body mass index, ($p < 0.001$), AF ($p < 0.001$), dialysis ($p < 0.001$), NYHA class III or IV ($p < 0.001$), higher logistic EuroSCORE ($p < 0.001$), transapical or subclavian approach ($p < 0.001$ for both vs transfemoral approach),

need for permanent pacemaker implantation ($p = 0.02$), and post-implant periprosthetic aortic regurgitation grade ≥ 2 of 4 ($p < 0.001$). Severe events occurred mainly during the first month and subsequently in <2% of patients/year. Mean gradient, valve area, and residual aortic regurgitation were stable during follow-up (Gilard M et al, *J Am Coll Cardiol* 2016; 68:1637-1647).

BELIEF Trial: In Patients With Longstanding Persistent AF Undergoing Catheter Ablation, Left Atrial Appendage (LAA) Isolation Improved Long-Term Freedom From Atrial Arrhythmias Without Increasing Complications

Randomly assigned groups (of similar characteristics) comprised 85 AF patients undergoing extensive ablation plus electrical LAA isolation (group 1) and 88 patients having extensive ablation alone (group 2). At 12-month follow-up, 48 (56%) patients in group 1 and 25 (28%) in group 2 were recurrence free after a single procedure (hazard ratio - HR for recurrence with standard ablation: 1.92; log-rank $p = 0.001$). After adjusting for age, sex, and left atrial size, standard ablation was predictive of recurrence (HR: 2.22; $p = 0.004$). During repeat procedures, electrical LAA isolation was performed in all patients. After an average of 1.3 procedures, cumulative success at 24-month follow-up was reported in 65 (76%) in group 1 and in 49 (56%) in group 2 (HR: 2.24; log-rank $p = 0.003$). (Di Biase L et al, *J Am Coll Cardiol* 2016; 68: 1929-1940.).

Incidence of Transcatheter Aortic Valve Thrombosis: 7% / Larger Valve Size Might Pre-Dispose to Thrombosis, Whereas Treatment With Warfarin Appears to Have A Protective Effect

Among 405 patients undergoing TAVI (Edwards valves), CT verified valve thrombosis in 28 of 405 (7%) patients. A total of 23 patients had subclinical thrombosis, whereas 5 (18%) experienced clinically overt obstructive valve thrombosis. The risk of thrombosis in patients who did not receive warfarin was higher (10.7% vs 1.8%; risk ratio -RR: 6.09). A larger valve was associated with an increased risk of thrombosis ($p = 0.03$). In multivariable analysis, a 29-mm valve (RR: 2.89) and no post-TAVI warfarin treatment (RR: 5.46) independently predicted thrombosis. Treatment with warfarin effectively reverted valve thrombosis and normalized valve function in 85% of patients, documented by follow-up transesophageal echocardiography and CT (Hansson NC et al, *J Am Coll Cardiol* 2016;68:2059-2069).

In Contemporary AF Trials, Most (~1/2) Deaths are Cardiac, Whereas Stroke and Bleeding Account for ~6% Each

Among 71,683 patients from 4 trials, a total of 6,206 patients (9%) died during follow-up. Adjusted mortality

rate was 4.72%/year. Cardiac deaths accounted for 46% of all deaths; nonhemorrhagic stroke/SE and hemorrhage-related deaths represented 5.7% and 5.6% of the total mortality, respectively. Those who died had more frequent history of heart failure (odds ratio - OR: 1.75), permanent/persistent AF (OR: 1.38) and diabetes (OR: 1.37); were more frequently male (OR: 1.24) and older (mean difference 3.2 years); and had a lower creatinine clearance (-9.9 ml/min). There was a small, but significant, reduction in all-cause mortality with new anticoagulants vs warfarin (difference -0.42% /year), mainly driven by a reduction in fatal bleedings (Gomez-Outes A et al, *J Am Coll Cardiol* 2016;68:2508-2521).

Long-Term Clinical Outcomes of Subcutaneous (S-ICDs) vs (Mostly Dual-Chamber) Transvenous ICDs (TV-ICDs) in a Matched Cohort: Similar Complication Rates, Albeit of Different Nature, and Similar Appropriate and Inappropriate Shock Rates / The S-ICD Effectively Reduced Lead-Related Complications at the Cost of Nonlead-Related Complications

Among 1,160 patients who underwent S-ICD or TV-ICD implantation, 140 matched pairs were compared (median age 41 years; 40% women). The complication rate was 13.7% in the S-ICD group vs 18% in the TV-ICD group ($p = \text{NS}$). The infection rate was 4.1% vs 3.6% in the TV-ICD groups ($p = \text{NS}$). Lead complications were lower in the S-ICD arm (0.8%) compared with the TV-ICD arm (11.5%) ($p = 0.03$). S-ICD patients had more nonlead-related complications than TV-ICD patients, 9.9% vs 2.2% ($p = 0.047$). Appropriate ICD intervention (antitachycardia pacing and shocks) occurred more often in the TV-ICD group (hazard ratio -HR: 2.42; $p = 0.01$). The incidence of appropriate (TV-ICD HR: 1.46; $p = 0.36$) and inappropriate shocks (TV-ICD HR: 0.85; $p = 0.64$) was similar (Brouwer TF et al, *J Am Coll Cardiol* 2016;68:2047-2055).

LMNA Cardiomyopathy: Malignant Course with High Rates of AV block, Atrial (AA) and Sustained Ventricular Arrhythmias (VA), Systolic Dysfunction, Embolic Events, or Heart Failure (HF) within 7 Years of Diagnosis

Dominant mutations in the *LMNA* gene that encodes the nuclear envelope protein lamin A/C cause a type of arrhythmogenic cardiomyopathy characterized by age-dependent penetrance, and accounts for ~5% of dilated cardiomyopathy cases. Among 122 consecutive *LMNA* mutation carriers, the prevalence of clinical manifestations increased broadly from index evaluation to median follow-up: 46-57% AV block; 39-63% AA; 16-34% VA; and 44-57% LV dysfunction. ICDs were placed in 59%. End-stage HF developed in 19% of patients, and 13% died. In patients without LV dysfunction at presentation, 24% developed

new LV dysfunction, and 7% developed end-stage HF (Kumar S et al, *J Am Coll Cardiol* 2016;68:2299-2307).

REMEDY Study: Patients With Clinical Rheumatic Heart Disease (RHD) Have High Mortality and Morbidity Despite Being Young

Among 3343 RHD patients (2/3 female), although young (median age, 28 years), the 2-year case fatality rate was high (500 deaths, 16.9%). Mortality rate was 116.3/1000 patient-years in the first year and 65.4/1000 patient-years in the second year. Median age at death was 28.7 years. Independent predictors of death were severe valve disease (hazard ratio - HR, 2.36), congestive heart failure (HR, 2.16), NYHA class III/IV (HR, 1.67), atrial fibrillation (HR, 1.40), and older age (HR, 1.02) at enrollment. Postprimary education (HR, 0.67) and female sex (HR, 0.65) were associated with lower risk of death. New heart failure developed in 204 (6.9%) patients, 46 (1.6%) had a stroke or TIA, 19 (0.6%) had recurrent acute rheumatic fever, and 20 (0.7%) infective endocarditis. Previous stroke and older age were independent predictors of stroke/TIA or systemic embolism. Patients from low- and lower-middle-income countries had significantly higher age- and sex-adjusted mortality (Zuehlke L et al, *Circulation* 2016;134:1456-1466).

ESC 0-Hour/1-Hour Algorithm to Rule-out and Rule-in Acute Myocardial Infarction (AMI): Insufficient for Some Emergency Department Physicians to Confidently Send Patients Home / Useful to Identify Patients Requiring Expedited Management / However, the Positive Predictive Value is Modest

The new ESC guidelines to rule-in and rule-out AMI in the emergency department based on high-sensitivity cardiac troponin and sampling at 0 and 1 hour was assessed in 2222 patients. The high-sensitivity troponin T algorithm ruled out 1425 (64.1%) with a sensitivity of 97.1% and ruled-in 292 (13.1%) with a positive predictive value of 63.4%. The high-sensitivity troponin I algorithm ruled out 1205 (54.2%) with a sensitivity of 98.8% and ruled-in 310 (14.0%) with a positive predictive value of 68.1% (Pickering JW et al, *Circulation* 2016;134:1532-1541).

Cost-Effectiveness of Antibiotic Prophylaxis (AP) for Patients at Risk of Infective Endocarditis (IE): Because of the Serious Consequences and High Costs Associated With IE and the Comparatively Low Costs Associated With AP, AP is Cost-Effective, Even When the Number of Prevented IE Cases is Very Low

According to this analysis, AP was less costly and more effective than no AP for all patients at risk of IE. AP was even more cost-effective in patients at high risk of IE. Only a marginal reduction in annual IE rates (1.44 cases in high-risk and 33 cases in all at-risk patients) would be required

for AP to be considered cost-effective at £20 000 (\$26 600) per quality-adjusted life-year. Annual cost savings of £5.5 to £8.2 million (\$7.3–\$10.9 million) and health gains >2600 quality-adjusted life-years could be achieved from reinstating AP in England (Franklin M et al, *Circulation* 2016;134:1568-1578).

A PR \geq 230 ms is Associated With Increased Rates of Heart Failure Hospitalization or Death Among CRT-D Patients

Patients with a PR \geq 230 ms (15%; n=4035) were older and had more comorbidities, including CAD, atrial arrhythmias, DM, and chronic kidney disease. After risk adjustment, a PR \geq 230 ms (vs PR<230 ms) was associated with increased risk of heart failure hospitalization or death among CRT-D (hazard ratio-HR, 1.23; $P<0.001$) but not ICD recipients (HR, 1.08; $P=0.17$) ($P_{\text{interaction}}=0.043$). CRT-D (vs ICD) was associated with lower rates of heart failure hospitalization or death among patients with PR<230 ms (HR, 0.79; $P<0.001$) but not PR \geq 230 ms (HR, 1.01; $P=0.90$) ($P_{\text{interaction}}=0.0025$). (Friedman DJ et al, *Circulation* 2016;134:1617-1628).

PESIT Trial: Pulmonary Embolism was Identified in Nearly 1 of Every 6 Patients Hospitalized for a First Episode of Syncope

A diagnosis of pulmonary embolism was ruled out in 330 (58.9%) of the 560 patients (mean age, 76 years; admitted for a first episode of syncope) on the basis of the combination of a low pretest clinical probability of pulmonary embolism and negative D-dimer assay. Among the remaining 230 patients, pulmonary embolism was identified in 97 (42.2%). The prevalence of pulmonary embolism was 17.3%. Evidence of an embolus in a main pulmonary or lobar artery or evidence of perfusion defects larger than 25% of the total area of both lungs was found in 61 patients. Pulmonary embolism was identified in 45 (12.7%) of the 355 patients who had an alternative explanation for syncope and in 52 of the 205 patients (25.4%) who did not (Prandoni P et al, *N Engl J Med* 2016; 375:1524-1531).

EXCEL: In Patients With Left Main Disease and Low or Intermediate SYNTAX Scores by Site Assessment, PCI With Everolimus-Eluting Stents was Noninferior to CABG With Respect to the Rate of the Composite End Point of Death, Stroke, or MI at 3 Years

Among 1905 patients with left main disease, randomly assigned to PCI (948) or CABG (957), at 3 years, a primary end-point event had occurred in 15.4% in the PCI and in 14.7% in the CABG group ($P=0.02$ for noninferiority; hazard ratio, 1.00; $P=0.98$ for superiority). The secondary end-point event of death, stroke, or MI at 30 days occurred in 4.9% in the PCI and in 7.9% in the CABG group

($P<0.001$ for noninferiority, $P=0.008$ for superiority). The secondary end-point event of death, stroke, MI, or ischemia-driven revascularization at 3 years occurred in 23.1% of the patients in the PCI and in 19.1% in the CABG group ($P=0.01$ for noninferiority, $P=0.10$ for superiority) (Stone GW et al, *N Engl J Med* 2016; 375:111-121).

NOBLE Trial: CABG Might be Better than PCI for Treatment of Unprotected Left Main Disease

Among 1201 patients assigned to PCI (598) or CABG (603), and 592 in each group entering analysis by intention to treat, Kaplan-Meier 5 year estimates of MACCE were 29% for PCI (121 events) and 19% for CABG (81 events), HR 1.48, exceeding the limit for non-inferiority, and CABG was significantly better than PCI ($p=0.0066$). As-treated estimates were 28% vs 19% (HR 1.55, $p=0.0015$). Comparing PCI with CABG, 5-year estimates were 12% vs 9% (HR 1.07, $p=NS$) for all-cause mortality, 7% vs 2% (HR 2.88, $p=0.0040$) for non-procedural MI, 16% vs 10% (HR 1.50, $p=0.032$) for any revascularisation, and 5% vs 2% (HR 2.25, $p=0.073$) for stroke (Mäkikallio T et al, *Lancet* 2016;388 (10061): 2743–2752), Deep vein thrombosis and pulmonary embolism (Di Nisio M, et al, *Lancet* 2016;388 (10063): 3060–3073).

PIONEER AF-PCI Trial: In Patients with AF Having PCI and Stenting, Low-Dose Rivaroxaban plus a P2Y₁₂ Inhibitor for 1 Year or Very-Low-Dose Rivaroxaban Plus DAPT for 1, 6, or 12 Months was Associated with a Lower Rate of Clinically Significant Bleeding than was Standard Therapy with a Vitamin K Antagonist plus DAPT for 1, 6, or 12 Months

Among 2124 AF patients undergoing PCI with stenting randomly assigned to receive low-dose rivaroxaban (15 mg qd) plus a P2Y₁₂ inhibitor for 1 year (group 1), very-low-dose rivaroxaban (2.5 mg bid) plus DAPT for 1, 6, or 12 months (group 2), or standard therapy with a dose-adjusted vitamin K antagonist (once daily) plus DAPT for 1, 6, or 12 months (group 3), the rates of bleeding were lower in the two groups receiving rivaroxaban (16.8% in group 1, 18.0% in group 2, and 26.7% in group 3; hazard ratio-HR for group 1 vs group 3, 0.59; $P<0.001$; HR for group 2 vs group 3, 0.63; $P<0.001$). The rates of death from cardiovascular causes, MI, or stroke were similar in the 3 groups (6.5% / 5.6% / 6%) (Gibson CM et al, *N Engl J Med* 2016; 375:2423-2434).

FRISC-II Study / 15-Year Follow-Up: Superior Early Invasive Treatment Strategy in Patients with Non-ST-Elevation Acute Coronary Syndrome / Postponed Occurrence of Death or Next MI by ~18 Months, and Next Readmission by 37 Months

At a minimum of 15 years' follow-up, the invasive strategy postponed death or next MI by a mean of ~1.5

years ($p=0.0020$) compared with the non-invasive strategy. This effect was larger in non-smokers, patients with elevated troponin T, and patients with high concentrations of growth differentiation factor-15. The difference was mainly driven by postponement of new MI, whereas the early difference in mortality alone was not sustained over time. The invasive strategy led to a mean of ~3-year postponement of death or next readmission to hospital for ischemic heart disease, which was consistent in all subgroups ($p<0.0001$) (Wallentin L et al, *Lancet* 2016;388(10054):1903–1911).

ENSURE-AF (Edoxaban vs Enoxaparin–Warfarin in AF Patients Undergoing Cardioversion): Rates of Bleeding and Thromboembolism Were Low in the Two Treatment Groups

Among 2199 AF patients (mean age 64 years, CHA₂DS₂-VASc score 2.6, therapeutic range on warfarin 70.8%) randomly assigned to receive edoxaban ($n=1095$) or enoxaparin–warfarin ($n=1104$). (SD 1.4), the primary efficacy endpoint occurred in 5 (<1%) patients in the edoxaban group vs 11 (1%) in the enoxaparin–warfarin group (odds ratio - OR 0.46). The primary safety endpoint occurred in 16 (1%) of 1067 patients given edoxaban vs 11 (1%) of 1082 patients given enoxaparin–warfarin (OR 1.48). The results were independent of the TEE-guided strategy and anticoagulation status (Goette A et al, *Lancet* 2016; 388 (10055):1995–2003).

ANTARCTIC: Platelet Function Monitoring With Treatment Adjustment Did not Improve the Clinical Outcome of Elderly Patients Treated With Coronary Stenting for an Acute Coronary Syndrome

Among 877 patients randomly assigned to the monitoring group ($n=442$) or the conventional group ($n=435$), the primary endpoint occurred in 120 (28%) and 123 (28%) patients respectively. Rates of bleeding events did not differ significantly between groups. This study does not support use of platelet function testing in high-risk situations (Cayla G et al, *Lancet* 2016;388 (10055): 2015–2022).

Management Strategies for Renal Artery Stenosis: Overall, the Evidence does not Support a Benefit With Angioplasty and Stenting Over Medical Therapy / Only “High-Risk” Patients (those with Worse Kidney Function, Higher BP, or Flash Pulmonary Edema) May be More Likely to Have Benefit

Among 83 trials reviewed, in 5 of 7 randomized trials, angioplasty and medical therapy led to similar BP control; 8 nonrandomized trials had more variable results, finding mostly no significant differences in mortality, renal replacement therapy, or cardiovascular events but heterogeneous effects on kidney function and BP.

Procedure-related adverse events were rare. Single-group studies found various but inconsistent factors that predict outcomes. Case reports provided examples of clinical improvement after angioplasty in patients with acute decompensation (Raman G et al; *Ann Intern Med* 2016; 165:635-649).

Simplified Swift and Safe Vascular Closure Device (VCD) Deployment Without a Local Arteriogram: Single Center Experience in 2074 Consecutive Patients

Deployment of the VCD was successful in 99.4%. Complete hemostasis was obtained in 98% of cases. In 14 patients, Angio-Seal deployment failed. Mean time for placement of Angio-Seal was <1min, to-hemostasis 1min, and to-mobilization 3h. Only 3 (0.15%) patients had a major complication with vessel occlusion that required emergent vascular surgery with a successful outcome. Two patients developed a local pseudoaneurysm treated with ultrasonography-guided compression. Six small and 4 large inguinal hematomas (one requiring blood transfusion) and 5 cases of retroperitoneal bleeding (one requiring blood transfusion) were recorded (Manolis AS et al, *Indian Heart J* 2016; 68:529-538).

Cost-Effectiveness of Sacubitril–Valsartan Treatment: It Provides Reasonable Value in Reducing Cardiovascular Mortality and Morbidity in Patients With NYHA Class II–IV Heart Failure

The sacubitril–valsartan group experienced 0.08 fewer heart failure hospitalization, 0.69 additional life-year, 0.62 additional QALY, and \$29,203 in incremental costs, equating to a cost per QALY gained of \$47,053 (\$44,531 in patients with NYHA class II and \$58,194 in those with class III or IV). Sacubitril–valsartan treatment was most sensitive to the duration of improved outcomes, with a cost per QALY gained of \$120,623 if the duration was limited to the length of the trial (median, 27 months). Major limitation: the benefit of sacubitril–valsartan is based on a single clinical trial (Sandhu AT et al, *Ann Intern Med* 2016;165:681-689).

RESPECT trial / Long-Term Follow-Up: PFO Closure with the Amplatzer PFO Occluder was Superior to Medical Management in Reducing Recurrent Ischemic Strokes in Patients with True Cryptogenic Stroke and Evidence of a PFO

On further long-term follow-up (mean 5.9 years), among 980 PFO patients with a cryptogenic stroke randomized to either percutaneous closure with the Amplatzer PFO Occluder ($n=499$; procedural success achieved in 96.1% with effective closure in 93.5%) (receiving aspirin 81-325 mg for 6 months and clopidogrel for 1 month) or medical management ($n=481$) (aspirin 46.5%, warfarin 25.2%, clopidogrel 14%, aspirin +

dipyridamole 8.1%, aspirin + clopidogrel 6.2%), there was a significant reduction in recurrent ischemic strokes in favor of PFO closure (HR 0.55, $p = 0.046$). There was a significant benefit in favor of PFO closure among patients with a recurrent cryptogenic stroke (HR 0.46, $p = 0.042$), in patients aged <60 years (HR 0.48, $p = 0.035$), and in those with an atrial septal aneurysm (HR 0.25, $p = 0.007$).

Based on the extended follow-up, the US Food and Drug Administration (FDA) approved the use of the Amplatzer PFO occluder in patients between 18 and 60 years old with a cryptogenic stroke. A strong collaboration between neurologists and cardiologists to exclude other causes of strokes also has been emphasized in the FDA statement. Earlier trials with shorter-term follow-up had reported no benefit with PFO closure: the CLOSURE I trial (with the STARFlex device) and the PC trial (with the Amplatzer device). Results of ongoing trials including REDUCE & CLOSE are awaited (<http://www.acc.org/latest-in-cardiology/clinical-trials/2013/07/19/12/28/respect>).

Cost-Effectiveness of Implantable Cardiac Devices in Patients With Systolic Heart Failure: At a Threshold of £30,000 per QALY Gained, CRT-D is Cost-Effective in a Far Wider Group than Previously Recommended in The UK / In Some Subgroups ICD and CRT-P Remain the Cost-Effective Choice

According to data from 13 randomized trials, at a threshold of £30,000 per QALY gained, CRT-D was cost-effective in 10 of the 24 subgroups including all LBBB patients with NYHA I-III. ICD is cost-effective for all non-NYHA IV patients with QRS duration <120 ms and for NYHA I/II non-LBBB morphology patients with QRS duration 120 ms - 149 ms. CRT-P was also cost-effective in all NYHA III/IV patients with QRS duration >120 ms. Device therapy is cost-effective in most patient groups with LBBB at a threshold of £20,000 per QALY gained (Mealing S et al, *Heart* 2016;102:1742-1749).

ICD in Dilated Cardiomyopathy (DCM): New Meta-analysis including the DANISH Trial Still Indicates a Statistically Significant 24% Reduction in All-Cause Mortality with ICD

A prior meta-analysis that included both primary and secondary prevention ICD trials in 2004 by Desai et al demonstrated a 31% reduction in all-cause mortality with ICD use in patients with non-ischemic DCM, and current ACC/AHA guidelines for ICD implantation in patients with NICM are based on this analysis. However, recently, the DANISH trial which randomized more than 1,100 patients with NICM on optimal medical therapy and/or cardiac resynchronization therapy (CRT) to ICD vs no ICD for primary prevention of sudden cardiac death (SCD) revealed no difference in all-cause mortality between the two groups at 5 year follow up. An updated meta-analysis

of 6 randomized controlled trials (RCTs) (including DANISH) assessing the utility of ICD for primary prevention in 2,970 patients with DCM, demonstrated a statistically significant 23% risk reduction in all-cause mortality in favor of ICD therapy (HR 0.77). In addition, a separate analysis of trials that assessed ICD plus optimal therapy vs optimal therapy alone (after exclusion of trials that involved patients with CRT-D), a statistically significant 24% reduction was found in all-cause mortality with ICD (HR 0.76). (Golwala H et al, *Circulation* 2016 Dec 19. pii: CIRCULATIONAHA.116.026056. [Epub ahead of print])

Catheter Ablation for Atrial Fibrillation (AF) in Hypertrophic Cardiomyopathy (HCM): Effective, Particularly in Patients with Paroxysmal AF and Smaller Atria with Low Complication Rate, but Risk of Relapse is 2-fold Higher

According to a review of 14 studies and meta-analysis of 5, freedom from AF/atrial tachycardia relapse was higher in patients without HCM (after a single procedure: 38.7% HCM vs 49.8% controls, OR=2.25, $p=0.03$; after ≥ 1 procedure: 51.8% HCM vs 71.2% controls, OR=2.62, $p=0.0006$). Risk of procedure-related adverse events was low. Repeat procedures and antiarrhythmic drugs are more frequently needed in patients with HCM to prevent arrhythmia relapse. The outcome in patients with HCM with less dilated atria and paroxysmal AF may be more comparable to the general population (Providencia R et al, *Heart* 2016;102:1533-1543).

Important Review and Other Articles

Anticoagulation during pregnancy (Alshawabkeh L et al, *J Am Coll Cardiol* 2016;68:1804-1813), Exercise & arrhythmias (Manolis AS & Manolis AA, *PACE* 2016;39:748-762), Critical limb ischemia (Shishehbor MH et al, *J Am Coll Cardiol* 2016;68:2002-2015.), Endogenous fibrinolysis (Gurewich V, *J Am Coll Cardiol* 2016;68:2099-2106), Heart failure with preserved ejection fraction and atrial fibrillation (Kotecha D et al, *J Am Coll Cardiol* 2016;68:2217-2228), Hemoglobin A1c and cardiovascular disease (Gore MO & McGuire DK, *J Am Coll Cardiol* 2016;68:2479-2486), MicroRNAs in cardiovascular disease (Barwari T et al, *J Am Coll Cardiol* 2016;68:2577-2584), Alcohol and atrial fibrillation (Voskoboinik A et al, *J Am Coll Cardiol* 2016;68:2567-2576), Prosthetic heart valve thrombosis (Dangas G et al, *J Am Coll Cardiol* 2016;68:2670-2689), Myocardial bridging (Tarantini G et al, *J Am Coll Cardiol* 2016;68:2887-2899), Defibrillators (Al-Khatib SM et al, *Circulation* 2016;134:1390-1404), Diagnostic and treatment strategies for specific dilated cardiomyopathies (Bozkurt B et al, *Circulation* 2016;134:e579-e646), Calcium intake and cardiovascular disease risk (Chung M et al, *Ann Intern Med* 2016;165:856-866), Genetic causes of dilated cardiomyopathy (Favalli V et al, *Heart* 2016; 102:2004-2014)