in final blood pressure between the 3 groups. There were no unexpected complications or deaths through 12 months. More serious adverse events (SAEs) that required hospitalization were seen in patients who were assigned to gastric bypass than sleeve gastrectomy or IMT (22% vs 9% vs 8%). Other SAEs that occurred more frequently in the surgery groups included reoperation (6% of gastric bypass patients and 2% of sleeve gastrectomy patients vs no patients in the IMT), intravenous treatment for dehydration (8% of gastric bypass and 4% of sleeve gastrectomy patients vs no IMT patients), and pneumonia, which occurred only in the gastric bypass group (4% of patients).

Table 1. Secondary Efficacy Endpoints.

Parameter	IMT n=41	Bypass n=50	Sleeve n=49	p value[1]	p value[2]
Change in FPG (mg/dL)	-28.0	-87.0	-63.0	0.004	0.003
Change in BMI	-1.9.0	-10.2	-9.0	<0.001	<0.001
% change in HDL	+11.3	+28.5	+28.4	0.001	0.001
% change in TG	-14.0	-44.0	-42.0	0.002	0.08
% change in hsCRP	-33.0	-84.0	-80.0	<0.001	<0.001

[1]Gastric bypass vs IMT; [2]Sleeve vs IMT; FPG=fasting plasma glucose; BMI=body mass index; HDL= high-density lipoprotein; TG=triglycerides; hsCRP=high-sensitivity C-reactive protein.

The investigators caution that the study is limited by its short duration but add that a 4-year extension is ongoing. This was also a single-center trial, and larger multicenter studies will be needed to determine whether observed improvements in glycemic control and CV risk factors and withdrawal of diabetes and CV medications translate into reductions in CV events and/or end organ failure from microvascular disease [Schauer PJ et al. *N Engl J Med* 2012].

TAVR Associated with Increased Late Mortality from Paravalvular Regurgitation

Written by Rita Buckley

One-year data from the Placement of Aortic Transcatheter Valves Trial [PARTNER; NCT00530894] showed that survival rates were similar among high-risk patients with aortic stenosis (AS) who received either transcatheter aortic valve replacement (TAVR) or surgical replacement [Smith CR et al. *N Engl J Med* 2011; Vinall M. *MD Conference Express: ACC 2011*]. Susheel K. Kodali, MD, Columbia University Medical Center, New York, New York, USA, presented outcomes after 2 years of follow-up in the PARTNER trial [Kodali SK et al. *N Engl J Med* 2012].

Inclusion criteria were severe symptomatic AS; an echo-derived aortic-valve area (AVA) ≤0.8 cm^2 (or AVA index <0.5 cm^2/m^2) and a peak velocity ≥40 mm Hg (or peak jet velocity of >4.0 m/s); NYHA ≥II; and high surgical risk (ie, guideline-predicted risk of operative mortality ≥15%, as determined by site surgeon and cardiologist). The risk score threshold was an STS score ≥10 [http://riskcalc.sts.org/STSWebRiskCalc273/de.aspx].

The primary endpoint of the randomized, multicenter trial was all-cause mortality. Other endpoints included cardiovascular (CV) mortality, rehospitalization, strokes and transient ischemic attacks (TIAs), vascular and bleeding events, NYHA functional class, and echocardiographic measures of valve performance (including valve gradient/areas and postprocedural aortic regurgitation [AR]).

At 2 years, there were no significant differences in mortality from any cause between the TAVR group (33.9%; 95% CI, 28.9 to 39.0) and the SAVR group (35.0%; 95% CI, 29.8 to 40.2; p=0.78). CV mortality was also similar in the TAVR and SAVR groups (21.4% [95% CI, 16.8 to 26.0] and 20.5% [95% CI, 15.8 to 25.3], respectively; p=0.80).

The frequency of all neurological events (stroke or TIA) at 2 years was higher with TAVR than with surgical replacement (11.2% vs 6.5%; p=0.05). However, there was no significant difference in the number of overall strokes between the TAVR and SAVR groups (24 vs 20, respectively at 36 months; HR, 1.22; 95% CI, 0.67 to 2.23; p=0.52).

Moderate or severe paravalvular AR was more common after TAVR than after SAVR at both 1 and 2 years (7.0% vs 1.9% at 1 year; 6.9% vs 0.9% at 2 years; p<0.001 for both comparisons). The presence of paravalvular or any AR (mild, moderate, or severe vs none or trace) after TAVR was associated with increased late mortality (HR, 2.11; 95% CI, 1.43 to 3.10; p<0.001), underscoring the importance of close clinical follow-up and echocardiography in patients after TAVR.

Dr. Kodali concluded that TAVR should be considered an option for patients with severe symptomatic AS who are high risk for SAVR. He noted that TAVR remained equivalent to SAVR, with similar rates of all-cause and CV mortality, and that symptom improvement was similar in both groups. Although TAVR valve hemodynamics remained stable at 2 years, the more frequent late development of paravalvular and any significant AR following TAVR was associated with a doubling of late mortality.

Future research appears warranted to focus on further reducing periprocedural TAVR complications, including strokes, vascular events, and short- and long-term risk and prevention of paravalvular AR.

The CABG Surgery Off-or On-Pump-Revascularization Study

Written by Maria Vinall

Results of a study that was designed to compare the benefits and risks of performing coronary artery bypass grafting surgery (CABG) off-pump (beating heart) versus on-pump showed no difference in major clinical events at 30 days, with off-pump procedures associated with reduced rates of transfusions, reoperations for bleeding, acute kidney injury, and respiratory infection/failure but an increased rate of early repeat revascularizations.

The Coronary Artery Bypass Grafting Surgery Off- or On-Pump Revascularization Study [CORONARY; NCT00463294] was designed to test the hypothesis that off-pump CABG would reduce short-term (30 days) major clinical events and that these benefits would be maintained over the long term (5 years). The short-term study results were presented by Andre Lamy, MD, Population Health Research Institute, McMaster University, Hamilton, Ontario, Canada.

CORONARY was a randomized, double-blind international trial (79 centers in 19 countries). Eligibility included patients who were undergoing planned isolated CABG with median sternotomy and at least 1 of the following risk factors: age ≥70 years, peripheral vascular disease, cerebrovascular disease, carotid stenosis >70%, and renal insufficiency. Patients were also eligible if they were aged 60 to 69 and years had at least 1 *additional* risk factor or were aged 55 to 59 years with at least 2 *additional* risk factors—diabetes, urgent revascularization, smoker, or left ventricular ejection fraction (LVEF) ≤ 35%. Each operation was performed by a surgeon with expertise (>2 years; >100 procedures) in the specific type of surgery that the patient was assigned to receive. The first coprimary outcome was a composite of mortality, nonfatal stroke, nonfatal myocardial infarction (MI), and new renal failure that required dialysis at 30 days. The 5-year results will be available in 2016 and comprise the first coprimary outcome plus repeat coronary revascularization at a mean of 5 years. Secondary efficacy outcomes included rates of blood transfusion, recurrent angina, cardiovascular death, and cost-effectiveness.

A total of 4572 subjects (mean age 68 years) participated in the study. Most (81%) were men, and one-third had a prior MI. Baseline preoperative angiograms indicated that the majority (off-pump 56.1%; on-pump 60.4%) had triple-vessel disease. At 30 days, 9.8% and 10.3% of patients who received off-pump versus on-pump procedures reached the primary composite outcome (HR, 0.95; 95% CI, 0.79 to 1.14; p=0.59). Off-pump CABG was associated with significantly fewer blood transfusions and reoperation for bleeding, less acute kidney injury, and fewer respiratory complications but more early repeat coronary revascularizations (Table 1). No difference in primary outcome was noted at hospital discharge, nor were there any differences by subgroup.

Table 1. Outcomes at 30 Days.

	Off-pump	On-pump	RR (95% CI)	p value
Blood transfusions	50.7%	63.3 %	0.80 (0.75–0.85)	<0.001
Reoperation for bleeding	1.4%	2.4%	0.61 (0.40–0.93)	0.02
Acute kidney injury	28.0%	32.1%	0.87 (0.80–0.96)	0.01
Respiratory complications	5.9%	7.9%	0.79 (0.63–0.98)	0.03
Early repeat coronary revascularizations	0.7%	0.2%	HR, 4.01 (1.34–12.0)	0.01

The investigators concluded that in experienced hands, both procedures are reasonable options, based on short-term results. The difference in morbidity that was observed in the 30-day results may or may not lead to clinically significant differences during the long-term follow-up that is being conducted. Whether the unblinded nature of the trial (both patients and investigators were aware of study group assignment, but the endpoint adjudication committee members were unaware) or this interim report will bias the long-term follow-up of trial patients is unclear [Lamy A et al. *N Engl J Med* 2012].

Moderate PE Treated with Thrombolysis (MOPETT Study)

Written by Maria Vinall

Pulmonary embolism (PE) is one of the most common preventable causes of death (responsible for >100,000 deaths annually) and the third leading cause of cardiovascular mortality. Thrombolysis with standard doses of 100 mg tissue plasminogen activator (t-PA) over 2 hours is recommended in appropriately selected severe PE patients (patients with hemodynamic instability