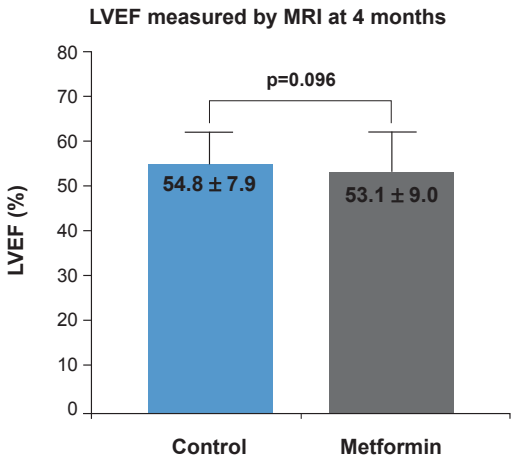
arms, respectively. For those that had a successful MRI, the primary endpoint of LVEF at 4 months was similar for both arms (53.1±9.0 vs 54.8±7.9; p=0.096; Figure 1), as was the secondary endpoint of NT-proBNP and other relevant laboratory markers (Table 1).

Figure 1. MRI Determination of LVEF



LVEF=left ventricular ejection fraction; MRI=magnetic resonance imaging.
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Table 1. Principal Secondary Endpoint and Laboratory Markers at 4 Months

	Metformin Group	Placebo Group	p Value
Principal secondary endpoint			
NT-proBNP at 4 months; IQR, ng/L	167 (65–393)	167 (74–383)	0.66
Laboratory markers at 4 months			
Creatinine; IQR, µmol/L	79 (70–87)	79 (72–89)	0.61
Glucose; IQR, mmol/L	5.7 (5.2–6.3)	5.6 (5.2–6.2)	0.96
HbA1C; IQR, %	5.9 (5.6–6.1)	5.9 (5.7–6.1)	0.15

IQR=interquartile range; N-proBNP=N-terminal brain natriuretic peptide.

Adverse events were similar in both arms, with no deaths or episodes of lactic acidosis. There was no evidence of superiority of metformin in subgroup analyses by sex, age, body mass index, MI location, TIMI flow pre-PCI, admission levels of glucose, or NT-proBNP.

Metformin 500 mg twice daily beginning after PCI and continuing for 4 months does not preserve LVEF after STEMI in patients without diabetes. Even though metformin appears to be safe, the current results do not support its routine use in this patient setting.

Bariatric Surgery for Treatment of Type 2 Diabetes in Obese Patients: 3-Year Outcomes (STAMPEDE)

Written by Brian Hoyle

Of the more than 25 million Americans with type 2 diabetes mellitus (T2DM), fewer than half can attain adequate glycemic control. Bariatric surgery has resulted in improved glycemic and cardiovascular risk factor control in observational and short-term randomized studies, including the 1- year results of the Surgical Treatment and Medications Potentially Eradicate Diabetes Efficiently trial [STAMPEDE; Schauer P et al. *N Engl J Med* 2012]. The 3-year STAMPEDE data, presented by Sangeeta R. Kashyap, MD, Cleveland Clinic, Cleveland, Ohio, USA, compared the effect of bariatric surgery with intensive medical therapy versus intensive medical therapy alone on glycemic control [Schauer PR et al. *N Engl J Med* 2014].

In the single-center trial, 150 patients aged 20 to 60 years with uncontrolled diabetes (HbA1C >7.0%) and body mass index (BMI) 27 to 43 kg/m^2 were randomized to medical therapy alone (MT; n=50), MT plus laparoscopic Roux-en-Y gastric bypass (n=50), or MT plus laparoscopic sleeve gastrectomy (n=50). The MT regimen involved regular follow-up with extensive medication titration to achieve a target HbA1C of 6.0%. Subjects were encouraged to participate in a weight management program, such as Weight Watchers. The primary endpoint was the 3-year success rate in achieving HbA1C ≤6%. Secondary endpoints were changes in fasting plasma glucose (FPG), lipids, blood pressure, BMI, carotid intima media thickness (CIMT), medication usage, adverse events, and quality of life.

Thirteen patients (9%) were either lost to follow up (n=4) or withdrew consent (n=9), such that the 3-year analysis included 40, 48, and 49 patients in the MT alone, gastric bypass and sleeve gastrectomy arms, respectively. The three arms were comparable at baseline. The primary outcome, attainment of an HbA1C ≤6%, occurred in 5%, 38% and 24%, respectively, in the MT, gastric bypass, and sleeve gastrectomy arms with no significant differences between surgical arms (Table 1). Bariatric surgery also resulted in significant improvements in a number of secondary outcomes, including FPG, high-density lipoprotein, triglycerides, and medication usage. Both bariatric surgery approaches similarly reduced the percentage of patients on insulin, compared to MT alone. At 3 years, the percentage of patients requiring insulin in the MT, gastric bypass, and sleeve gastrectomy arm was 55%, 6%, and 8%, respectively. Requirement for cardiovascular medications was also substantially reduced by bariatric surgery. Only gastric bypass was associated with significantly diminished relapsed glycemic control compared with MT (Table 1).

Table 1. Primary and Secondary Outcomes at 3 Years

Parameter	Medical therapy n=40	Bypass n=48	Sleeve n=49	p[1]	p[2]
Primary Outcome					
HbA1C ≤6%	5%	37.5%	24.5%	<0.001	0.012
HbA1C ≤6%, no medications	0%	35.4%	20.4%	<0.001	0.002
Secondary outcomes					
HbA1C ≤7%	40%	64.6%	65.3%	0.02	0.02
Change in FPG, mg/dL	-6	-85.5	-46	0.001	0.006
Relapse of glycemic control at 3 years	80%	23.8%	50%	0.03	0.34
% change in high-density lipoprotein	+4.6	+34.7%	+35.0	<0.001	<0.001
% change in triglycerides	-21.5	-45.9	-31.5	0.01	0.01
% change in CIMT	0.048	0.013	0.017	0.36	0.49

CIMT=carotid intima media thickness; FPG=fasting plasma glucose; 1gastric bypass versus medical therapy; 2sleeve gastrectomy versus medical therapy.

Both types of bariatric surgery similarly and significantly decreased HbA1C at multiple time points throughout the 3-year trial (Table 2).

Table 2. Change in HbA1C

	Value at Visit, Average (Median)				
Treatment	Baseline	Month 6	Month 12	Month 24	Month 36
Medical therapy	9.0 (8.5)	7.1 (6.8)	7.5 (6.9)	7.7 (7.3)	8.4 (7.6)
Gastric bypass	9.3 (9.2)*	6.3 (6.2)*	6.3 (6.1)*	6.5 (6.4)*	6.7 (6.6)*
Sleeve gastrectomy	9.5 (8.9)*	6.7 (6.4)*	6.6 (6.4)*	6.8 (6.8)*	7.0 (6.6)*

*p<0.001 compared with MT at the same time point; the bariatric surgeries were not significantly different from each other.

Gastric bypass and sleeve gastrectomy also rapidly and significantly decreased BMI, and maintained the decrease over 3 years, compared with the modest reduction achieved with MT alone (p<0.001 for both), with gastric bypass proving significantly superior to sleeve gastrectomy from 6 months onward (p=0.006; Table 3).

Table 3. Change in BMI

	Value at Visit, kg/m^2				
Treatment	Baseline	Month 6	Month 12	Month 24	Month 36
Medical therapy	36.4	34.6	34.2	35.0	34.8
Gastric bypass	37.1	28.2	26.7	27.3	27.9
Sleeve gastrectomy	36.1	28.3	27.1	27.9	29.3

Adverse events were infrequent and similar between the study arms, with the exception of gastrointestinal complications, which occurred in 13 of 50 (26%) bypass patients.

The findings support bariatric surgery as a treatment option for moderately-to-severely obese patients with uncontrolled T2DM to improve glycemic control in the near-term. Longer follow-up of clinical results and larger experience in routine clinical practice will provide further insight into the durability of efficacy and the prognosis associated with adverse events with each of these bariatric surgery procedures.

Single-Center Study Finds Bivalirudin Associated With Increased Ischemic Risk in Primary PCI for STEMI (HEAT PPCI)

Written by Muriel Cunningham

Adeel Shahzad, PhD, Liverpool Heart and Chest Hospital, Liverpool, United Kingdom (UK), presented results from the How Effective Are Antithrombotic Therapies in Primary Percutaneous Coronary Intervention trial [HEAT PPCI; NCT01519518]. All patients with ST-segment elevation myocardial infarction presenting at a single UK center were randomized to open-label treatment with heparin (70 units/kg body weight preprocedure) or bivalirudin (bolus of 0.75 mg/kg followed by 1.75 mg/kg/hour infusion during the procedure) on top of preprocedure dual antiplatelet therapy. The glycoprotein IIb/IIIa inhibitor, abciximab, was available for "bailout" from ischemic complications in both groups. Patients were excluded if they had active bleeding at presentation; administration of oral antiplatelet therapy was contraindicated, had a known intolerance or contraindication to the study medications, or had previously enrolled in the study.

The study protocol received full UK ethics approval and both drugs were administered according to the approved labeling. The ancillary benefit of this consent approach was to improve generalizability of the study results by allowing for enrollment of subjects that would not typically be included. The primary efficacy endpoint was major adverse cardiac events (MACE) at 28 days. Major bleeds, defined as Type 3 to 5 per the Bleeding Academic Research Consortium definitions, was the primary safety endpoint. A clinical events committee blinded to treatment assignment adjudicated key clinical events.

Over a 22-month period, 1917 patients presented for emergency angiography and 1829 eligible patients were randomized. Only seventeen patients did not give informed consent after the acute intervention. Of those randomized, 905 were in the bivalirudin analysis and 907 were analyzed from the heparin group. The demographic characteristics were similar between the two treatment groups. The median age was ~63 years, ~27% were female, and >95% were Caucasian. Approximately 12% of patients had a previous MI. Procedural details are presented in Table 1.