hemodynamics, which may enhance outcomes and reduce secondary interventions for recurrent stenosis.

Table. Hemodynamic parameters

Variable	*30-day duplex scan*			*Most recent duplex scan*		
	<50% DR	*50-75% DR*	*>75% DR*	*<50% DR*	*50-75% DR*	*>75% DR*
Angio alone, No. (%)	152	15 (9)	0	141	21 (13)	5 (3)
Mean PSV (cm/s)	98 ± 46	198 ± 47	. . .	106 ± 38	204 ± 51	422 ± 45
Angio + IVUS, No. (%)	233	8 (3)	0	232	8 (3)	1 (0.4)
Mean PSV (cm/s)	84 ± 50	182 ± 31	. . . .	82 ± 40	186 ± 28	347

Stress Tests Are Overutilized in the Preoperative Evaluation of Endovascular Aneurysm Repair

Siddharth Patel, Richard Gilmore, Yazan Duwayri, Ravi Rajani, James Reeves, Luke Brewster, Thomas Dodson, Ravi Veeraswamy. Emory University School of Medicine, Atlanta, Ga

Introduction: The ideal approach for cardiac risk stratification in patients undergoing elective endovascular aortic aneurysm repair (EVAR) remains unresolved. Multiple algorithms are used to evaluate patients, with significant variability amongst institutions, and cardiac stress testing remains a widely used modality. Recent American College of Cardiology/American Heart Association guidelines suggest clinical risk factors can identify patients at highest risk for adverse events. We compared the clinical efficacy and cost-savings of risk factor assessment using the revised cardiac risk index (RCRI) vs cardiac stress testing in predicting perioperative cardiac complications after EVAR.

Methods: A single-center retrospective study was conducted to identify patients undergoing EVAR between 2009 and 2011. Of 248 patients who were identified, 42 were excluded due to emergent repair, and 206 patients were included in the analysis. The preoperative assessment was identified and a cost analysis was performed based on CMS reimbursement rates for our geographic area. The RCRI was calculated for each patient and used to stratify them according to predicted risk for a perioperative cardiac event. The 30-day event rates for death or symptomatic cardiac events were calculated.

Results: Complete records for preoperative evaluations were available for 197 of the 206 patients. Of those, 168 (85%) underwent cardiac stress testing, of which 26 patients (13%) were positive, resulting in further testing. Twenty patients with a positive stress test underwent cardiac catheterization, three underwent percutaneous coronary intervention (PCI), and one underwent coronary artery bypass grafting. There were no perioperative deaths. Six patients (2.9%) had clinical symptoms prompting measurement of serum troponin levels, which were elevated. In patients with a negative stress test, five myocardial infarctions (MIs) occurred (3%) vs one MI in patients with a positive stress test (3.8%; $P = .86$). When stratified by the RCRI, patients with fewer than three risk factors had an MI rate of 2.5% vs 16.7% in patients with three or more factors ($P = .04$). Including the resultant procedures, the per-patient cost for routine preoperative stress testing was $3500.

Conclusions: Routine preoperative cardiac stress testing for patients undergoing elective endovascular aneurysm repair is unwarranted. It results in additional invasive testing and therapy with a concomitant cost increase. The RCRI is a reliable tool for risk stratification and guiding preoperative workup in patients scheduled for elective EVAR. The RCRI should replace qualitative physician determination of fitness for EVAR. This represents a potential area for improved resource utilization strategies.

Table. Stress test and perioperative MI by risk score

	Stress test, No. (%)		*MI, No. (%)*	
RCRI risk score	*Yes*	*No.*	*Yes*	*No.*
<3	163 (85)	28 (15)	5 (2.5)	195 (97.5)
≥3	5 (83)	1 (17)	1 (17)	5 (83)

Percutaneous Endovascular Aortic Aneurysm Repair (PEVAR): Results From the First Prospective, Multicenter Randomized Trial

Peter R. Nelson. University of Florida College of Medicine, Gainesville, Fla

Introduction: The first randomized controlled trial was designed and conducted to assess the safety and effectiveness of totally percutaneous endovascular aortic aneurysm repair (PEVAR) using a 21F endovascular stent graft system and an 8F or 10F suture-mediated closure system. A noninferiority trial design was chosen to compare percutaneous access to standard open femoral exposure.

Methods: Between 2010 and 2012, 20 United States institutions participated in a prospective, U.S. Food and Drug Administration-approved randomized trial to evaluate the safety and effectiveness of percutaneous femoral artery access and closure using a "preclose" technique in conjunction with EVAR. A total of 192 patients were enrolled, 41 in a nonrandomized roll-in phase, and then 151 in the randomized phase where patients were allocated 2:1 to percutaneous closure (group C, n = 101) or open femoral exposure (group S, n = 50). PEVAR procedures were performed using the 8F Perclose ProGlide (group C1, n = 50) or the 10F Prostar XL (group C2, n = 51) closure device. All EVAR procedures were performed with the 21F profile IntuiTrak System. Patients were screened using computed tomography with 3-dimensional reconstruction and independent physician review for anatomic suitability and adequate femoral artery anatomy for percutaneous access (eg, absence of anterior wall or circumferential calcification, aneurysm, or extensive scarring). Primary treatment success was defined as procedural technical success and absence of adverse systemic and access-related vascular events at 30 days. Secondary clinical utility and procedural outcomes, ankle-brachial index, blood laboratory analyses, and quality of life were also evaluated with continuing follow-up to 6 months.

Results: Baseline characteristics were similar among all groups. EVAR technical success was 100%, 100%, and 98% in groups C1, C2, and S, respectively. Primary treatment success at 1 month was 88% (C1), 78% (C2), and 78% (S) with a one-sided Blackwelder's test of noninferiority yielding $P = .0036$ for C1 vs S and $P = .1021$ for C2 vs S. Secondary outcomes procedurally to within 1 month are shown in the Table. PEVAR (group C) compared favorably with respect to time to hemostasis, anesthesia time, total procedure time, analgesic use, ipsilateral groin pain, blood transfusion requirement, and quality of life metrics. Final 6-month follow-up is ongoing.

Conclusions: Among trained operators and patients with suitable femoral artery anatomy, a totally percutaneous approach to EVAR is safe, with minimal access-related complications. The ProGlide suture-mediated device specifically performed noninferiorly to standard open femoral exposure. Training, experience, and careful application of the "preclose" technique is of paramount importance in ensuring successful, sustainable outcomes.

Table.

Outcome measure	*Group C1*	*Group C2*	*Group S*
Anesthesia time, minutes	181 ± 65	152 ± 54[a]	203 ± 93
Time to hemostasis, minutes	9.8 ± 17[a]	13 ± 19[a]	23 ± 23
Total procedure Time, minutes	101 ± 43[a]	95 ± 35[a]	136 ± 71
Estimated blood loss, mL	213 ± 205	193 ± 198	280 ± 290
Blood transfusion, % patients	4.0%	16%	14%
Time to ambulation, hours	17 ± 7.2	16 ± 9.1	19 ± 16
Time to normal diet, hours	14 ± 9.4	10 ± 8.4	15 ± 22
Ipsilateral groin pain pre-discharge[b]	2.1 ± 2.2	1.4 ± 2.0[a]	2.6 ± 2.4
Analgesics for groin pain pre-discharge, % patients	18%	12%[a]	30%
Time to hospital discharge, days	1.3 ± 0.7	1.4 ± 0.9	1.8 ± 2.4
Ipsilateral groin pain at 1 month[b]	0.4 ± 0.9	0.1 ± 0.5[a]	0.6 ± 1.5
SF-36 health-related quality of life change at 1 month	9.4 ± 26	8.3 ± 29	1.6 ± 24
Ipsilateral ankle-brachial index at 1 month	1.06 ± 0.16	1.05 ± 0.15	1.06 ± 0.13

Results shown as mean ± SD unless otherwise specified.

[a]$P < .05$ vs group S result.

[b]Scale of 0 (no pain) to 10 (worst pain imaginable).

Sequential Catheterization Amid Progressive Endograft Deployment for Fenestrated and Branched Endovascular Aortic Aneurysm Repair

Gregory A. Stanley, Carlos H. Timaran, M. Shadman Baig, J. Gregory Modrall, David E. Timaran, L. F. Gomez, R. James Valentine. University of Texas Southwestern, Dallas, Tex

Introduction: Fenestrated and branched endovascular aneurysm repair (FEVAR) is an alternative to open repair of complex aortic aneurysms in high-risk patients. Unfortunately, patients with unfavorable anatomy are frequently denied FEVAR because of the risk of technical failure with loss of visceral arteries. The purpose of this study was to assess technical success of FEVAR using a sequential catheterization amid progressive endograft deployment (SCAPED) technique, particularly in patients with unfavorable anatomy.

Methods: During a 12-month period, 39 high-risk patients (31 men and 8 women) underwent FEVAR using customized, physician-modified Zenith endografts that were fenestrated or branched using the SCAPED technique. The visceral vessels were sequentially catheterized through the fenestrations via left brachial artery access in a cranial-to-caudal direction as the endograft was progressively deployed. Each fenestration was deployed, aligned, and catheterized separately while the distal endograft was constrained within the delivery sheath. Technical success was defined as com-