organs. Another 38.2% (100) had struts immediately adjacent to the external aspect of the IVC, which may represent tenting of the cava. Grade 2 or 3 penetration occurred in 74.4% of Celects, 44.6% of Tulips, 5.3% of Greenfields, and 0% of Opteases ($P = .0000$). Grade 2 or 3 penetration occurred in 49.0% of temporary filters but only 5.3% of permanent filters ($P = .0001$). There was a trend toward association of uniconical filters with grade 2 or 3 penetration ($P = .0645$). Grade 2 or 3 penetration occurred in 18.2% of filters less than 30 days old but in 57.3% of filters 30 days old or older ($P < .0001$). Thirty-two patients had subsequent encounters for abdominal or back pain, but none were conclusively related to penetration.

Conclusions: A majority of filters were placed for prophylaxis or relative indications and were temporary type. Retrieval rate is low. Penetration of the IVC and adjacent organs is common and associated with temporary type and length of time in place. It is unclear if most penetrations cause problems. Monitoring of penetrations with CT may be important to understand the natural history of this condition.

Table.

CT findings	*Grade*
Struts confined entirely within IVC	0
Strut immediately adjacent to external aspect of IVC wall ("tenting")	1
Strut entirely outside IVC lumen ("halo" of retroperitoneal fat around strut)	2
Strut interacts with aorta	3a
Strut interacts with duodenum	3b
Strut interacts with other organs	3c

CT, Computed tomography; *IVC,* inferior vena cava.

Thoracic Aortic Diameter Changes After Endograft Placement: Comparison of Traumatic and Aneurysmal Disease

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Objectives: This study evaluates acute changes in aortic size before and after endograft placement for traumatic injury and aneurysmal disease. We hypothesized that characteristics specific to trauma patients undergoing thoracic endovascular aortic repair (TEVAR), such as hypovolemia or localized spasm around the aortic injury, may result in relative device undersizing.

Methods: This was a retrospective study that evaluated digital imaging of traumatic injury and aneurysmal patients enrolled in the 0802 and 0803 multi-site trials that received the GORE Conformable TAG thoracic device (W. L Gore and Associates, Flagstaff, Ariz). Pre- and posttreatment (30-day) imaging was available for 70 traumatic injury and 54 aneurysmal patients. A standardized protocol was used by an independent single observer to complete measurements of the proximal and distal maximum neck diameters adjacent to the pathology using the orthogonal view on pre- and posttreatment imaging. The resultant changes in diameter for each group were analyzed using *t*-tests. The study was limited by lack of intraprocedural imaging and clinical information on the selection of device sizing.

Results: There was significant difference between patients with traumatic and aneurysmal disease in the changes of the proximal and distal neck diameters from the pre- and posttreatment imaging. In traumatic injury patients, the proximal and distal maximum aortic neck diameters were found to increase after TEVAR significantly more than in patients with aneurysmal disease. The range that the neck diameters changed was greater for patients with traumatic injuries than with aneurysmal disease. In both study populations, smaller pretreatment aortic neck diameters showed a larger change in neck diameter than larger pretreatment aortic diameters. Aortic growth correlated with pretreatment neck diameter and oversizing.

Conclusions: The proximal and distal maximum aortic neck diameters in traumatic injury patients increased significantly more from the pre- and posttreatment imaging than in patients with aneurysmal disease. Pretreatment neck diameter and percent oversizing correlate with the change in the neck diameter. Despite these aortic changes, TEVAR with this device is effective over a wide sizing range.

Table.

Summary of analysis	*Change in proximal neck diameter (mm) (mean, range, variance)*		*Change in distal neck diameter (mm) (mean, range, variance)*	
Traumatic injury	3.06 (−3.59 to 9.47)	6.86	2.99 (−1.61 to 13.69)	4.78
Aneurysmal disease	2.06 (−2.89 to 5.72)	3.46	0.67 (−5.67 to 4.34)	3.08
P value (trauma vs aneurysm)	.019		<.001	

Post-Approval Outcomes of Juxtarenal Aortic Aneurysms Treated with the Zenith Fenestrated Endovascular Graft

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Objectives: To evaluate postapproval outcomes of patients with juxtarenal aortic aneurysms (JRAAs) treated with Zenith Fenestrated Endovascular Graft (zFEN).

Methods: We reviewed clinical data on consecutive patients treated with zFEN in the US at seven institutions with early commercial access from 7/12 to 12/12. Clinical outcomes and compliance to anatomical guidelines were compared with results of the US fenestrated trial (USFT).

Results: Fifty-seven patients were treated. There were significantly more ($P < .05$) patients with coronary artery disease, myocardial infarction, and preoperative renal insufficiency than in the USFT. Twenty-seven patients (47%) did not meet the USFT anatomic criteria of a >4 mm infrarenal neck, and there were significantly more mesenteric stents (13 vs 0; $P < .05$) used in this group than in the USFT, reflecting the higher anatomical complexity of these patients. The total operative time was 250.2 ± 14.8 minutes, fluoroscopy time was 68.9 ± 4.47 minutes, and the average contrast volume was 108.6 ± 5.6 mL. Technical success was 100% in regards to aneurysm exclusion, although in two patients the left renal fenestration was not able to be aligned, and one patient had a kinked renal stent that was successfully re-stented. During this time period, there were a total of 10 endoleaks of which two were type 3 and eight were type II (Table).

Conclusions: Despite higher rates of comorbidities and more challenging anatomy, early 30-day outcomes of JRAAs treated postapproval with zFEN compare well with USFT data.

Table.

Patient demographics and 30-day outcomes	*Study patients*	*zFEN trial patients*	P *value*
No.	57	42	
Age, years	73.3	75.3	.76
Coronary artery disease, n (%)	45 (79)	22 (52.4)	<.05
Chronic obstructive pulmonary disease, n (%)	21 (36.8)	14 (33.3)	.83
History of myocardial infarction, n (%)	34 (59.6)	10 (23.8)	<.05
Technical success, n (%)	57 (100)	42 (100)	1.00
Mortality, n (%)	1 (1.75)	0 (0)	1.00
Postoperative dialysis, n (%)	1 (1.75)	0 (0)	1.00
Endoleak, n	10	9	.62

Patient and Clinical Characteristics Associated with Readmission Among Patients Undergoing Vascular Surgery

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Objectives: Readmission following vascular surgery intervention is frequent, costly, and often considered preventable. Vascular surgery outcomes have recently been scrutinized by Medicare, given high rates of readmission. We determine patient and clinical characteristics that predict readmission in a cohort of vascular surgery patients.

Methods: From 2009 to 2013, the medical records of all patients (n = 2505) undergoing interventions by the vascular surgery service at a single tertiary care institution were retrospectively reviewed. Sociodemographic and clinical characteristics were examined for association with 30-day readmission.

Results: The 30-day readmission rate to the same institution was 9.7% (n = 244). Procedures most likely to result in readmission were below-knee (25%), foot (22%), and toe amputations (19%), as well as lower extremity revisions (22%). Patients covered by Medicaid (16.8%) and Medicare (10.0%) were most likely to be readmitted followed by fee-for-service (9.5%), self-pay (8.0%), and health maintenance organization (5.5%; $P < .05$). Patients urgently admitted were more likely to be readmitted (16.2%) than electively admitted patients (9.1%; $P < .01$). Patient severity (rated using 3M APR DRG software) predicted readmission (16.2% high vs 6.2% low severity; $P < .01$). Initial length of stay was longer for readmitted than nonreadmitted patients (8.5 vs 6.1 days, respectively; $P < .01$). Intensive care unit admission during initial hospitalization was moderately associated with higher readmission rates (18.3% with vs 9.5% without intensive care unit stay; $P < .05$). Discharge destination was also a strong predictor of readmission (rehabilitation, 19.2%; skilled nursing facility, 16.2% vs home, 6.2%; $P < .01$). The effects of urgent admission, illness severity, length of stay, and discharge destination persisted in multivariable logistic regression.

Conclusions: To reduce readmission rates effectively, institutions must identify high-risk patients. Efforts should focus on subgroups undergoing selected interventions (amputations, vascular revisions), as well as urgent admissions and those with extended hospital stays. Patients in need of postacute care upon discharge are especially prone to readmission, requiring special attention to discharge planning and coordination of post-discharge care.

Combined Carotid Endarterectomy and Coronary Artery Bypass Grafting: Which Is Better, Simultaneous or Staged Approach?

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Objectives: To compare the morbidities, mortality, length of stay, and total cost between simultaneous and staged carotid endarterectomy (CEA) and coronary artery bypass grafting (CABG).

Methods: Utilizing the Nationwide Inpatient Sample (NIS), we studied all the patients that underwent CEA and CABG between 2008 and 2010. International Classification of Disease, Ninth Revision codes were used to look for procedure types, comorbidities, and complications. Data analysis was done using SPSS v.19 (IBM, Armonk, NY); statistical significance was defined as $P < .05$.

Results: Both CEA and CABG (CEA/CABG) was done in 8568 patients. CEA/CABG group was categorized into Simultaneous CEA/CABG (SmCC; same day; 4534 [52.9%]), and Staged CEA/CABG (StCC; different days, same admission; 2209 [25.8%]); 1825 (21.3%) patients were excluded (deficient coding). When SmCC was compared with StCC, Length of stay (LOS) and total charges were significantly higher in StCC; however, no significant difference was found in mortality, in-hospital myocardial infarction, or postoperative stroke. After adjustment for comorbidities (hypertension, diabetes mellitus, congestive heart failure, smoking and peripheral vascular disease), comparison of SmCC and StCC yielded comparable results for LOS and total charges, but no significant differences in mortality, in-hospital myocardial infarction, and postoperative stroke between SmCC and StCC (Table).

Conclusions: In patients with combined CEA/CABG, simultaneous surgery carries lower charges, LOS, mortality and stroke rate as compared with staged procedures in the same admission.

Effect of Plavix on Limb Salvage Following Endovascular Lower Extremity Revascularization

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Objectives: This study evaluated amputation-free-survival in patients identified utilizing Plavix (Clopidogrel) following their lower extremity endovascular revascularization (LER).

Methods: Patients 65 years of age and greater undergoing LER were identified from MedPAR files (2007 to 2008) utilizing International Classification of Disease, Ninth Revision codes. Demographics, comorbidities, and severity of disease (claudication, rest pain, ulceration/gangrene [UG]) are evaluated. Postprocedural use of Plavix was identified using the National Drug Code directory and Part D files. Outcomes were measured using χ^2 analysis, multivariable logistic regression, Kaplan-Meier, and Cox regression.

Results: A total of 14,353 patients were identified: 7189 with claudication (50.1%), 1467 with rest pain (10.2%), 5697 with UG (39.7%). Of these, 5416 (37.7%) patients were identified using Plavix after LER. Overall, patients initiated on Plavix had lower amputation rates at 30 days (10.34% vs 14.09%; $P < .0001$), 90 days (14.05% vs 18.71%; $P < .0001$), and 1 year (19.68% vs 24.06%; $P < .0001$). Multivariate logistic regression analysis adjusted by age, gender, race, and comorbidities confirmed that non-Plavix users were more likely to undergo amputation at 30 days (odds ratio [OR], 1.28; 95% confidence interval [CI], 1.14-1.43), 90 days (OR, 1.29; 95% CI, 1.16-1.43), and 1 year (OR, 1.16; 95% CI, 1.05-1.28). Males, blacks, congestive heart failure, diabetes, and renal failure were significant predictors of amputation. In χ^2, logistic regression, and Cox regression analyses, Plavix did not significantly affect amputation rates in patients with claudication or rest pain. Patients with UG who did not receive Plavix were significantly more likely to undergo amputation at 30 days (OR, 1.29; 95% CI, 1.14-1.45), 90 days (OR, 1.28; 95% CI, 1.15-1.43), and 365 days (OR, 1.19; 95% CI, 1.07-1.31).

Conclusions: Utilization of Plavix after LE endovascular revascularization was associated with lower rates of amputation, yet only 38% of the Medicare population was identified as using Plavix after intervention. Patients with UG benefited the greatest with significantly greater amputation-free survival and overall survival. Prospective randomized trials are needed to assess the suggested benefits of Plavix on amputation-free survival after LE endovascular revascularization.

Table. Adjusted and nonadjusted comparison of simultaneous and staged carotid endarterectomy (CEA) and coronary artery bypass grafting (CABG)

	Nonadjusted			*Adjusted*			
	Simultaneous	*Staged*	P	*Odds ratio*	P	*95% confidence interval*	
No.	4534	2209					
LOS, days (median)	9	13	<.01	0.182[a]	<.01	3.178	3.965
Total cost, USD (median)	124,544	171,094	<.01	0.070[a]	<.01	14641	24291
Mortality	181/4%	98/4%	.390	0.943	.671	0.720	1.236
Myocardial infarction	1099/24%	558/25%	.366	0.994	.924	0.880	1.123
Stroke	90/2%	49/2%	.528	0.878	.478	0.613	1.258

LOS, Length of stay.
[a]Standardized coefficient.