other covariants the mean disease-specific quality of life score was slightly worse after treatment with foam than after surgery ($P = .006$) but was similar in the laser and surgery groups. There were no significant differences between the surgery group and the foam or laser group in measures of generic quality of life. The frequency of procedural complications was similar in the foam group (6%) and the surgery group (7%) but was lower in the laser group (1%) than in the surgery group ($P < .001$). The frequency of serious adverse events was approximately 3% and was similar among the groups. Measures of clinical success were also similar among the groups, but successful ablation of the main trunks of the saphenous vein was less common in the foam group than in the surgery group ($P < .001$).

Comment: The three groups had similar improvements in venous clinical severity score at 6 months, however ablation of the great saphenous vein at 6 weeks occurred significantly less often after foam treatment (complete ablation 55%; partial ablation with a patent segment and no reflux 23%) than after either surgery (compete ablation 84%; partial ablation 6%) or laser treatment (complete ablation 83%; partial ablation 8%). Long-term follow-up therefore will be required to determine the durability of these treatments and the frequency of patients seeking retreatment after each of these forms of therapy of primary varicose veins. See also Abstract 5, "Patient-Reported Outcomes 5-8 Years After Ultrasound-Guided Foam Sclerotherapy for Varicose Veins" in this issue of the *Journal*.

Retrograde Aortic Dissection After Thoracic Endovascular Aortic Repair

Canaud L, Ozdemir BA, Patterson BO, et al. Ann Surg 2014;260:389-95.

Conclusions: Retrograde type A aortic dissection (RTAD) after TEVAR is an uncommon complication, but with a high mortality rate. It occurs more frequently in patients treated for acute and chronic type B dissection, and when the endograft is significantly oversized.

Summary: Thoracic endovascular aortic repair (TEVAR) is utilized for treatment of a wide variety of thoracic aortic pathologies. A potential lethal complication of this procedure is RTAD. So far, data with respect to etiologic factors associated with RTAD are few and hampered by data quality and reporting parameters. The European Registry of Endovascular Aortic Repair Complications reported 63 cases of RTAD among 4750 TEVAR procedures (Eggebrecht H et al, Circulation 2009;120:276-81). While there's a general consensus that RTAD may be more common in patients with acute type B aortic dissection there has been no definitive proven association. In this study the authors sought to provide insight into the etiological and procedural factors associated with RTAD following TEVAR. Data were obtained from the MOTHER Registry (Patterson B et al, Circulation 2013;127:24-32). These data were supplemented by cases from a systematic review of literature and data from both sources aggregated to report the contemporary literature. Univariate analysis and binary logistic regression analysis of patient and technical factors was performed. In MOTHER, RTAD developed in 16 of the 1010 patients (1.6%). Binary logistic regression demonstrated that an indication of TEVAR for aortic dissection (acute, $P = .000212$; chronic, $P = .006$) and device oversizing (odds ratio, 1.14 per 1% increase in oversizing above 9%; $P < .0001$) were significantly more frequent in patients with RTAD. Data from the systematic review was pooled with the MOTHER data and demonstrated that RTAD occurred in 1.7% (168/9894). Most of RTAD occurred in the immediate postoperative period (58%). Mortality rate was high at 33.6%. Odds ratio for RTAD acute aortic dissection was 10.0 (95% confidence interval, 4.7-21.9) and 3.4 (95% confidence interval, 1.3-8.8) for chronic aortic dissection. Incidence of RTAD was not significantly different for endografts with a proximal bare metal stent (2.8%) or a nonbare stent (1.9%; $P = .1298$).

Comment: The majority of RTADs in this study occurred interoperatively (20.9%) or in the immediate postoperative period (50%). However, 29.1% suffered RTAD more than 30 days after the procedure. This combined with the association with aortic endograft oversizing suggests that the complication is likely related to a combination of natural progression of the disease and fragility of the dissected aorta. Further studies should focus on at what point after the occurrence of acute aortic dissection that the risk of RTAD approaches that of treatment of a chronic aortic dissection and what degree of aortic endograft oversizing is optimal to lower the risk of RTAD.

Patient-Reported Outcomes 5-8 Years After Ultrasound-Guided Foam Sclerotherapy for Varicose Veins

Darvall KA, Bate GR, Bradbury AW. Br J Surg 2014;101:1098-104.

Conclusions: Ultrasound-guided foam sclerotherapy has durable results as reported by patient-reported outcomes to at least 5 years. Only 15.3% of limbs treated underwent retreatment for reoccurrence during follow-up.

Summary: Treatment of varicose veins results in significant improvements in health-related quality of life (Baker DM et al, Eur J Vasc Endovasc Surg 1995;9:299-304, and Michaels J et al, Br J Surg 2006;93:175-81). In the UK the National Institute for Health and Care Excellence (NICE) varicose vein clinical guideline published in July 2013 recommends patients with symptomatic varicose veins, regardless of CEAP class, be referred for assessment with duplex ultrasound imaging and consideration of intervention, preferably by endovascular techniques (NICE guideline CG168, London; 2013). However, to date few long-term data have been published on venous interventions; with most existing reports continuing to focus on technical outcomes rather than patient-reported outcome measures. Ultrasound-guided foam sclerotherapy (UGFS) has been reported to be clinically effective with low rates of re-intervention in some studies but other studies have raised concern that UGFS may not be as durable as surgery or endothermal techniques. In this study the authors sought to investigate long-term (5-8 years) outcomes following UGFS focusing on retreatment and disease specific and generic health-related quality of life parameters, symptom improvement, and meetings of patient expectations and overall patient satisfaction. The study utilized consecutive patients undergoing UGFS between April 2004 and May 2007. Patients were invited for review at least 5 years after treatment. Patients completed generic (Short Form 12) and disease-specific (Aberdeen Varicose Vein Symptom Severity Score, AVSS) health-related quality of life questionnaires and questionnaires inquiring about lower extremity symptoms, lifestyle factors, and satisfaction with treatment. Data on retreatment was recorded prospectively. There were a total of 391 limbs and 285 patients included (81.2% response rate) and a median of 71 (interquartile range, 67-78) months following first UGFS treatment. Originally 72.1% had symptomatic uncomplicated varicose veins while 21.9% had undergone previous surgery, and 82.7% had treatment of great saphenous veins and 19.9% had treatment of the short saphenous veins. Disease-specific health-related quality of life scores improved significantly at long-term follow-up, with 88.5% having an improved AVSS compared with baseline. With respect to lower limb symptoms and lifestyle improvement 62.7-93.8 per cent of patients had their pretreatment expectations met or exceeded. 82% overall were very satisfied with their treatments and only 3.3% were dissatisfied. 91% would recommend the treatment to others. Kaplan-Meier analysis indicated 15.3% of limbs required retreatment by 5 years.

Comment: In a recent systematic review the authors concluded that endovenous laser treatment radio frequency ablation and UGFS and surgery provided similar clinical outcomes in terms of reoccurrence, venous clinical severity scores, short-term pain and quality of life (Carroll C et al, Health Technol Assess 2013; 17 i-xvi, 1-141). The authors of the study point out that this finding compared with general lower overall costs of UGFS compared to endovenous thermal techniques and surgery suggest that UGFS may be the most cost-effective option for treatment of varicose veins. See also Abstract 3, "A Randomized Trial Comparing Treatments for Varicose Veins" in this issue of the *Journal*.

Activities of Daily Living Is a Critical Factor in Predicting Outcome After Carotid Endarterectomy in Asymptomatic Patients

Dayama A, Pimple P, Badrinathan B, et al. Stroke 2014;45:1703-8.

Conclusions: A patient's inability to perform basic activities of independent living is associated with adverse postoperative outcomes after carotid endarterectomy (CEA) for asymptomatic lesions.

Summary: The randomized trials of carotid endarterectomy both in North America and Europe assessing the efficacies of CEA for asymptomatic disease generally excluded patients with a number of comorbid medical conditions such as congestive heart failure, unstable angina, uncontrolled atrial fibrillation, or uncontrolled diabetes, etc. However, specific measures of functional status were not utilized in patient stratification in these trials. The authors point out therefore that conventional models of stroke prevention after CEA in asymptomatic patients have not been developed to accurately predict outcomes in patients who are unable to perform activities of daily living (Bekelis K et al, Stroke 2013;44: 1085-90). In this current study the authors sought to assess the effect of preoperative functional status on postoperative outcomes following CEA in asymptomatic patients. The hypothesis was that preoperative functional disability would be associated with worsened postoperative outcomes and in turn impaired survival of the patients. Aided from the National Surgical Quality Improvement Project, a national data set including data from more than 300 hospitals was utilized in this study. Patients were identified by Current Procedural Terminology (CPT) codes and divided into three categories based on functional status; independent, partially dependent and dependent. Thirty-day postoperative stroke, death and other postoperative complications were identified as the study endpoint. Multivariate logistic regression analysis

was used to estimate odds ratios for outcomes controlling for sex, race, diabetes, cardiovascular disease, smoking, and other confounders. There were 19,748 patients with CEA analyzed of whom 19,348 (97.97%) were functionally independent. 377 (1.99%) were functionally partially dependent and 23 (0.12%) were functionally dependent. In the functionally independent group there were 196 (1.01%) strokes, 84 (0.43%) deaths, and 1416 (17.17%) other complications. In the functionally partially dependent group, there were 14 (3.71%) strokes, 10 (2.65%) deaths, and 80 (21.22%) other complications. In a multivariable risk-adjusted model using functionally independent as a reference, functionally partially dependent was associated with death (odds ratio, 3.3; 95% CI, 1.6-6.8; $P < .001$), stroke (odds ratio, 3; 95% CI, 1.7-5.4; $P < .001$), and other complications (odds ratio, 2.5; 95% CI, 1.9-3.2; $P < .001$).

Comment: The complication rates in the patients with inability to perform activities of daily living fall outside guidelines from the Society of Vascular Surgery and the American Heart Association. It appears that activities of daily living are a critical factor in predicting outcomes after CEA in asymptomatic patients and, in combination with improved medical management of asymptomatic carotid stenosis, suggests that in patients with high-grade asymptomatic carotid stenosis, aggressive medical management may be the best option for patients with impaired activities of daily living and high-grade asymptomatic carotid stenosis. In patients considered for CEA for asymptomatic lesions functional status should be vigilantly assessed as an aid in risk stratification along with other objective factors for potentially identifying increased risk of adverse outcome after CEA.

Volume of Carotid Artery Ulceration as a Predictor of Cardiovascular Events

Kuk M, Wannarong T, Beletsky V, et al. Stroke 2014;45:1437-41.

Conclusions: With three-dimensional ultrasound volume of carotid ulceration accurately predicts cardiovascular events.

Summary: Ulcerated carotid plaques have been associated with plaque rupture, intraplaque hemorrhage, and overall decreased plaque stability. In addition, ulceration tends to be associated with greater plaque thickness and plaque volume (Homburg PJ et al, Stroke 2011;42:367-72, and Riccio SA et al, Cardiovasc Ultrasound 2006;4:44). There also appears to be increased stroke risk with ulcerated plaques (Eliasziw M et al, Stroke 1994;25:304-8). Studies of plaque ulceration in the past have characterized the atherosclerotic plaque as complex with (irregular morphology with ulcers) or smooth or by quantifying the number of ulcers observed in a region of interest. In this study the aim was to quantify carotid total ulcer volume by three-dimensional ultrasound to investigate the relationship of total ulcer volume to vascular events (stroke, transient ischemic attack, myocardial infarction, revascularization, or death because of cardiovascular reason). There were 349 at-risk subjects who provided written informed consent for carotid three-dimensional ultrasound and whose plaques were then analyzed for ulcerations. Ulcer volume was defined as a distinct discontinuity in an atherosclerotic plaque, with a volume of ≥ 1.00 mm^3 as measured using manual segmentation. The sum of the volumes of all ulcers seen in both carotids was the total ulcer volume. Participants were monitored for ≤ 5 years for outcomes including cardiovascular events and death. Kaplan-Meier survival analysis demonstrated that subjects with total ulcer volume ≥ 5 mm^3 experienced significantly higher risk of developing stroke, transient ischemic attack, or death ($P = .009$) and of developing stroke/transient ischemic attack/death/myocardial infarction/revascularization ($P = .017$). Lower ulcer volumes did not predict events and ulcer depth did not predict events.

Comment: Intuitively it makes sense that at some level characteristics of the carotid plaque ought to have something to do with its propensity to induce neurologic events. The authors take this concept a bit further in that they can have demonstrated that volume of ulceration can be measured with three-dimensional ultrasound and that this variable correlates with risk for a variety of cardiovascular events. The implication is that the atherosclerotic process in some patients may have a tendency to produce more unstable plaques conferring greater risk for cardiovascular events to the patient and that this risk can somehow be assessed through the use of three-dimensional ultrasound of the carotid plaque.

Aspirin for the Prevention of Recurrent Venous Thromboembolism: The INSPIRE Collaboration

Simes J, Becattini C, Agnelli G, et al. Circulation 2014;130:1062-71.

Conclusions: Aspirin after anticoagulation treatment for venous thromboembolism (VTE) reduces overall risk of reoccurrence by more than a third in a broad cross-section of patients with a first unprovoked VTE without significantly increasing risk of bleeding.

Summary: Unprovoked VTE has a high risk of reoccurrence after discontinuation of vitamin K antagonist therapy. The risk is approximately 10% within the first year and 5% per year thereafter (Boutitie F et al, BMJ 2011;342:d3036). The new oral anticoagulants can lower the risk of recurrent VTE as part of initial or extended therapy. They are effective alternatives to warfarin but also carry bleeding risk and are expensive. Aspirin is a potential low-cost and relatively safe means of preventing further VTE events in the patient with an unprovoked VTE initially treated with anticoagulants. Aspirin has been recently evaluated in the Aspirin for the Prevention of Recurrent Venous Thromboembolism Warfarin and Aspirin (WARFASA) and the Aspirin to Prevent Recurrent Venous Thromboembolism (ASPIRE) trials (Becattini C et al, N Engl J Med 2012;366:1959-67, and Brighton TA et al, N Engl J Med 2012;367:1979-87). These trials demonstrated aspirin reduced the risk of recurrent VTE but were not individually powered to detect moderate treatment effects for particular outcomes or subgroups. Combined patient-level analysis of WARFASA and ASPIRE was planned, and a protocol for the project was developed before publishing and unblinding of the results of either trial. The purpose of the INSPIRE analysis was to more accurately estimate the effects of aspirin treatment; overall, on individual outcomes and in prespecified subgroups of patients. Individual patient data analysis of these trials was performed to assess the effect of aspiring, vs placebo on recurrent VTE, major vascular events (recurrent VTE, myocardial infarction, stroke, and cardiovascular disease death) and bleeding, overall and within predefined subgroups. The primary analysis for VTE, was by intention to treat using the time-to-event data of 1224 patients, 193 had recurrent VTE over 30.4 months median follow-up. Aspirin reduced recurrent VTE (7.5%/yr vs 5.1%/yr; hazard ratio [HR], 0.68; 95% confidence interval [CI], 0.51-0.90; $P = .008$), including both deep-vein thrombosis (HR, 0.66; 95% CI, 0.47-0.92; $P = .01$) and pulmonary embolism (HR, 0.66; 95% CI, 0.41-1.06; $P=.08$). Aspirin reduced major vascular events (8.7%/yr vs 5.7%/yr; HR 0.66; 95% CI, 0.50-0.86; $P = .002$). The major bleeding rate was low (0.4%/yr for placebo and 0.5%/yr for aspirin). After adjustment for treatment adherence, recurrent VTE was reduced by 42% (HR, 0.58; 95% CI, 0.40-0.85; $P = .005$). Prespecified subgroup analyses indicate similar relative, but larger absolute, risk reductions in men and older patients.

Comment: While extended anticoagulation therapy is still the most effective means of preventing recurrent VTE following unprovoked VTE, such therapy is impractical and undesirable for most patients with initial VTE events. The data here show that aspirin is a cheap, safe alternative to reducing VTE risk following an initial period of anticoagulation for an unprovoked initial VTE event. As such, it seems there is no reason to leave patients completely unprotected for recurrent VTE events following an initial period of anticoagulation. Aspirin reduces the risk of another VTE event and is a safe treatment for these patients. Additional data will be needed to know how long to continue aspirin in such patients and whether the safety profile continues over a longer periods of time.