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Rapid occlusion of internal iliac arteries using aortouniiliac converters in patients with common iliac ectasia to facilitate EVAR. *J. Pasenau, S. Mostowy.* From the Department of Vascular Surgery, Kelowna General Hospital, Kelowna, BC.

Background: Endovascular aneurysm repair (EVAR) in patients with common iliac ectasia or aneurysms requires internal iliac embolization, coverage or branch grafting to prevent endoleak. Internal iliac occlusion with coil embolization involves significant time, radiation and contrast. Use of an amplatzer can be faster but still usually requires multiple runs of contrast. Branch grafting is both time consuming and can use a large contrast load. With the advent of ruptured EVAR, a time-efficient technique with low contrast utilization is optimal. A safe and rapid technique to occlude an internal iliac artery with one 5–10 mL contrast run is described. **Methods:** Treatment of common iliac ectasia up to 34 mm can be accomplished by using up to a 36–12–80 Cook aortouniiliac converter. The proximal end is deployed in the common iliac artery and the distal end in the external iliac artery after one 5–10 mL contrast run is performed via a femoral sheath. The EVAR then proceeds in the usual fashion through this converter, which has occluded the internal iliac. This technique was used to cover an internal iliac artery in 7 EVAR patients between July 2005 and October 2008. One was in the setting of ruptured EVAR. **Results:** No endoleaks due to the covered internal iliac artery were encountered. There was 1 type-2 endoleak secondary to a lumbar artery, which resolved by the 12-month computed tomographic angiogram. Mortality was 0%. Two patients had short-lived, mild buttock claudication. No patients required a secondary procedure. **Conclusion:** Endoleak from the internal iliac has not been an issue in our series of internal iliac occlusions via an aortouniiliac converter. Proximal coverage of the internal iliac may also limit buttock claudication compared with standard coil embolization. Treatment of common iliac ectasia can be rapidly and safely performed using an aortouniiliac converter with minimal time, radiation and contrast utilization. This is particularly advantageous in the ruptured or urgent EVAR setting.

Visceral branch outcomes and reinterventions following branched endovascular repair of thoracoabdominal aortic aneurysms. *T.L. Forbes, S.W. Kribs.* From the London Health Sciences Centre and the University of Western Ontario, London, Ont.

Objective: To report our experience regarding visceral branch outcomes following endovascular repair of thoracoabdominal aortic aneurysms (TAAA) with custom-made branched and fenestrated endografts. **Methods:** A retrospective review of all

patients at our centre who underwent elective endovascular repair of a TAAA since October 2006. Hybrid procedures were excluded from analysis. Outcomes included technical success regarding branches and fenestrations, reinterventions and subsequent procedure-related complications. **Results:** The study cohort consisted of 11 patients (7 male, 4 female) who underwent endovascular repair of a TAAA (mean age 75.4, range 66–82 yr). Custom endografts were planned to incorporate a total of 37 visceral arteries (32 caudally directed side branches, 5 fenestrations). Target vessel vascularization was technically successful with all fenestrations (5/5) and 90.6% of branches (29/32). Two instances of failure resulted in no significant clinical sequelae (a previously patent renal artery had occluded preoperatively, and a celiac artery could not be cannulated). The third instance involved a renal artery bypass graft that could not be cannulated and will require reintervention. There have been no instances of visceral branch thrombosis, stenosis or other adverse sequelae, nor have there have been any other reinterventions in the 2–30 months of follow-up. One late death from aneurysm rupture occurred 8 months after an initial successful repair following retraction of an iliac limb from a short common iliac artery. **Conclusion:** An endovascular approach remains an attractive alternative, especially for higher risk patients with TAAA. Visceral vessel vascularization can be performed with a high degree of success and a low rate of complications and reinterventions.

Mental burden to patients living with abdominal aortic aneurysms. *M.A. Burnett, H.L. Cox, A.G. Lossing.* From St. Michael's Hospital, University of Toronto, Toronto, Ont.

Background: The mental burden of patients' postcardiac surgery and aortic aneurysm repair has been well described. The morbidity associated with the new-onset mental burden has prompted researchers to identify patients at risk. There are no data regarding the mental burden of patients undergoing abdominal aortic aneurysms (AAA) repair in the preoperative phase. **Aim:** We aim to assess the preoperative mental burden of patients undergoing aortic aneurysm repair via either open or endovascular techniques. **Methods:** This is a single-institution pilot study. All preoperative AAA patients from the period of January 2007 to March 2009 were offered the validated Hospital Anxiety and Depression Scale (HADS) survey before their surgery date. Demographic and operative data were collected. Patients with high scores were offered supportive intervention. Statistical analyses employed the FREQ procedure, Fisher exact test, NPARIWAY test, *t* test and Wilcoxon 2-sample test. **Results:** Data from 74 patients have been analyzed. There were 66 male patients and 8 female patients; 58 patients underwent endovascular repair and 16 underwent open repair. There was no significant association between sex ($p = 0.0910$) and

depression. There was no significant association between sex ($p = 0.3703$) and anxiety. There was no significant association between types of surgery ($p = 0.8490$) and anxiety. There was no significant association between type of surgery ($p = 0.0897$) and depression. There was a negative correlation between HADS depression and age ($Pr > t 0.0217$). Indeed, patients 75 years or older had lower depression scores than those younger than 75. Interventions include counselling, education, email availability and patient–physician dialogues. **Conclusion:** This is a novel documentation confirming that there is a mental burden associated with requiring an AAA repair. The intervention and management of this previously undocumented burden in AAA patients will be discussed.

An experience with a less invasive lower limb fasciotomy technique. I. Ali, C. Arthur. From the Queen Elizabeth II Health Sciences Centre, Dalhousie University, Halifax, NS.

A less invasive lower leg fasciotomy technique was used in patients with acute prolonged limb ischemia. The technique involves 2 longitudinal skin incisions (2 inches long) in each compartment of the lower leg, with the fascia incised along the full longitudinal incisions by the scissor. The skin is then approximated with skin staples. If signs of compartment high pressure appear postoperatively, the staples are removed at the bed site without the need of anesthesia or the operating room.

The technique was used in 67 consecutive patients with acute limb ischemia. In 19 patients, the fasciotomy incisions were opened in the postoperative period. All the patients had adequate compartment pressure relief. All the open wounds healed with secondary intention with no need of skin grafting.

It can be concluded from this experience that to overcome the damaging effects of lower limb compartment high pressure, the described technique can be performed in conjunction with acute limb revascularization with less morbidity compared with standard fasciotomy.

Recipient of the Cook Award

Morphometric changes of the perirenal aorta following repair of aortic aneurysms with an endovascular stent which utilizes a double-O nitinol ring: consequences of movement of the sealing rings over time and impact on renal artery patency. M. Kilian,* W. Dang,* R. Moore,† C. Cinà.* From the Divisions of Vascular Surgery,* St. Michael's Hospital, University of Toronto, Toronto, Ont., and the †Peter Lougheed Centre, University of Alberta, Edmonton, Alta.

Objective: To define changes occurring in the neck of an aneurysm repaired with the Anaconda endovascular stent graft system. **Background:** Anaconda stents use a double-O nitinol ring as the sealing apparatus below the renal arteries. The geometry of the stent is designed to create a fish mouth configuration, which can be described in terms of peaks and troughs. The company suggests that the peaks should be placed below the renal arteries, based on the theoretical ground that the troughs may rise over time and occlude the renal arteries. This forces the user to accept an aneurysm neck that is longer than what would be necessary if the peaks were placed above and the troughs just below the renal arter-

ies. Methods: This is a retrospective multicentre study of 40 patients undergoing endovascular aneurysm repair (EVAR) with an Anaconda device. Measurements were obtained before and after surgery, and at 6- and 12-month follow-up, using CT and postprocessing with an Aquarius Workstation (v. 3.5, TeraRecon Inc.). We measured the aortic diameter at the superior mesenteric artery (D1), and at the proximal, middle and distal levels of the infrarenal aortic neck (D2a,b,c); the distance between the peaks and the troughs (PT) of the Anaconda sealing top stent; and the distance from the lowest renal artery to the respective trough (RT). The PT measurements were operationalized electronically to minimize errors, and RT measurements were obtained from centre-line reconstructions of the aorta. Uni- and multivariate analyses of variance were used to study the effect of time on the dependent variables. Tukey post-hoc correction was used for repeated analyses. **Results:** All variables satisfied Levene's test for homogeneity of variance, allowing for the use of parametric tests. No statistical significance was seen between time points for variables D1 ($p = 0.596$) and D2a ($p = 0.341$). Variables D2b and D2c displayed a significant dilation of the aortic neck from the preoperative period to 12-month follow-up; the mean (and SD) values were 24.3 (2.7), 25.8 (2.8), 27.4 (3.3) and 26.8 (3.0) mm ($p = 0.02$) and 24.7 (3.2), 26.6 (3.2), 27.8 (3.7) and 27.5 (3.6) mm ($p = 0.06$), respectively. The PT measurements decreased significantly from the preoperative period to 12-month follow-up; mean (and SD) values were 8.4 (2.3), 5.8 (1.8) and 5.3 (1.9) mm ($p < 0.0001$), indicating a flattening-out of the fish mouth configuration. These measurements also revealed significant differences between individual time points: postoperative to 6-month follow-up (8.4 [SD 2.3] mm v. 5.8 [SD 1.8] mm, $p < 0.0001$) and 6- to 12-month follow-up (5.8 [SD 1.8] v. 5.3 [SD 1.9] mm, $p = 0.005$). Analysis of RT measurements revealed no significant difference between the postoperative values and those at 6- and 12-month follow-up (8.8 [SD 8.9], 8.3 [SD 3.6], 10.6 [SD 3] mm, $p = 0.807$). **Conclusion:** Among patients treated with an Anaconda endovascular system, the aortic neck dilates over time as expected. The fish mouth configuration of the sealing stent flattens at 6- and 12-month follow-up. However, the distance between the trough and the corresponding lowest renal artery does not appear to change significantly.

Assessment of outcomes in octogenarians with ruptured and nonruptured abdominal aortic aneurysms. R. Warburton, B. Ulmer, J. Lim. From the Division of Vascular Surgery, Department of Surgery, University of Saskatchewan, Saskatoon, Sask.

Background: Morbidity and mortality in abdominal aortic aneurysm (AAA) has been widely studied. This study assessed the outcomes of octogenarians, a high-risk population. **Methods:** A retrospective chart review of 337 patients with AAA in the Saskatchewan Health Region from 2003 to 2008. This included elective AAA repair and ruptured AAA (repaired and not repaired). Patients were then divided into groups: ruptured AAA patients younger than 80 years (group 1) and older than 80 years (group 2); and nonruptured AAA patients younger than 80 years (group 3) and older than 80 years (group 4). Comorbid conditions were recorded. The primary outcome of interest was mortality. Secondary outcomes studied were length of stay in hospital and in the intensive care unit (ICU), and respiratory and renal complications. **Results:** Among 337 patients, ruptured AAA occurred in 68 and

nonruptured AAA in 269. Of the 68 patients with a ruptured AAA, 50 were in group 1 and 18 were in group 2. Of the patients with a nonruptured AAA, 229 were in group 3 and 40 were in group 4. There were no statistical differences in comorbidities. Comparisons between group 1 and group 2 were as follows: mortality of 44% versus 72.2% ($p = 0.04$), respiratory complications in 34.9% versus 60% ($p = 0.006$), renal complications in 44.7% versus 75% ($p = 0.036$), length of stay in the ICU 4.7 versus 5.3 days ($p = 0.739$) and length of hospital stay 11.6 versus 9.1 days ($p = 0.414$). Comparisons between group 3 and group 4 were as follows: mortality of 2.6% versus 5.0% ($p = 0.339$), respiratory complications in 31.0% versus 47.5% ($p = 0.041$), renal complications in 11.8% versus 15% ($p = 0.568$), length of stay in the ICU 2.4 versus 2.4 days ($p = 0.886$) and length of hospital stay 10.2 versus 11 days ($p = 0.503$). **Conclusion:** Patients 80 years or older with a ruptured AAA have increased mortality and respiratory and renal complications when controlling for comorbidities. Patient outcomes after nonruptured AAA repair were equal, which likely represents our current preoperative screening process.

Determining access side for endovascular repair of abdominal aortic aneurysms using bifurcated prostheses. *W. Dang, M. Kilian, M.D. Peterson, C. Cinà.* From the Division of Vascular and Cardiac Surgery, St. Michael's Hospital, University of Toronto, Toronto, Ont.

Objective: To examine the effect of the reciprocal orientation of the iliac arteries on a transverse plane in infrarenal aortic aneurysms on the cannulation of the contralateral limb of a bifurcated stent graft system (SGS). **Background:** One essential step in endovascular abdominal aneurysm repair (EVAR) is to selectively cannulate the contralateral limb of the main body of a bifurcated prosthesis. This allows for the introduction of the contralateral limb extension into the SGS. This step may be difficult due to the design of the SGS, iliac tortuosities and anatomic features of the aneurysm. **Methods:** We performed a retrospective review of 100 consecutive patients who presented for EVAR. We collected the following data: reciprocal orientation between the origins of the common iliac arteries on a transverse plane (OOCIA), the common femoral artery used to deliver the main body of the bifurcated prosthesis (access side) and the cannulation time of the contralateral limb. Cannulation times were compared between patient groups using unpaired, 2-tailed, Student t tests, and correlations between all variables were analyzed using a multivariate regression analysis. **Results:** In 84 patients (84%), the origin of the right common iliac artery was in an anterior position compared with the left; in 16 patients the origin of the right and left were at the same level (16%); and in no patient was the right common iliac artery posterior. When all patients were examined, cannulation time was shorter when the main body of the bifurcated prosthesis was delivered through the left femoral artery (mean 9.27 [SD 5.75] v. 15.35 [SD 7.15] min, $p < 0.0001$). This effect was more evident when only patients with left common iliac artery located posteriorly were examined (mean 9.31 [SD 5.80] v. 16.39 [SD 7.58] min, $p < 0.0001$). Multivariate regression analysis showed that there is no correlation between increasing negativity of the OOCIA angle and cannulation time, regardless of access side. **Conclusion:** We have shown that in patients with infrarenal aortic aneurysms, the origin of the right iliac artery is often anterior compared with the left and that cannulation time of the contralateral limb is shorter when the main body of the prosthesis is delivered

from the left. These findings may be used to shorten the operating time and improve efficiency during EVAR.

Combined endovascular and open repair of symptomatic aberrant right subclavian artery and Kommerel's diverticulum. *I. Vucemilo,* T. Rapanos,* C. Zarins,† J. Tittley.** From the Divisions of Vascular Surgery, *McMaster University, Hamilton, Ont., and Stanford University, Stanford, Calif.

Thoracic aortic arch anomalies are rare but may be associated with symptoms requiring intervention. We present the cases of 2 patients with a symptomatic aberrant right subclavian artery (ARSA) originating from a Kommerel diverticulum (KD) from a left-sided descending thoracic aorta. A combined open/endovascular (hybrid) approach was adopted and is presented. Current management of this condition will be reviewed.

Our first patient was a 73-year-old man who presented with undiagnosed coughing. He was found to have a large (4.5-cm) Kommerel diverticulum giving rise to an ARSA, coursing behind the esophagus and trachea. Treatment was staged by first transposing the left subclavian to the left carotid artery. A few weeks later, a right carotid-subclavian bypass was performed. The diverticulum was then successfully excluded using a Zenith TX2 thoracic endoprosthesis via transfemoral access. The total combined hospital stay for all 3 interventions was 6 days. Early (4 mo) follow-up indicated complete exclusion and thrombosis of the ARSA and the KD, although neither the diverticulum nor the ARSA diameter had changed in size.

Our second patient was a 54-year-old woman with ARSA and KD who presented with dysphagia lusoria. She underwent similar, staged repair, with a left carotid-subclavian transposition initially, followed by right carotid-subclavian transposition. She is scheduled for thoracic aortic stent graft exclusion of the diverticulum.

Staging the transposition/bypass of the subclavian arteries may avoid the potential for bilateral simultaneous phrenic nerve dysfunction. Debranching the ARSA, along with exclusion of its origin, is aimed at thrombosing this vessel, reducing its pressure and eliminating symptoms. Defunctioning the left subclavian artery lengthens the proximal sealing neck for the thoracic endoprosthesis and possibly reduces spinal cord ischemia.

Traditional open surgical correction of this problem requires open thoracotomy with an extended recovery period and lengthy hospital stay. Staged debranching of the subclavian arteries, followed by stent-graft exclusion of the thoracic diverticulum is feasible and may be associated with significantly less morbidity and mortality. This approach further illustrates the expanding applications of this interventional modality in dealing with otherwise complex thoracic aortic arch anomalies.

Care gap in the treatment of peripheral arterial disease. *J. Gu, B. Ulmer, G. Pylypchuk.* From the University of Saskatchewan, Saskatoon, Sask.

Background: Peripheral arterial disease (PAD) has several major risk factors that should be well controlled: smoking, hypertension, diabetes and hypercholesterolemia. It is also widely accepted that treatment plans for PAD must encompass a "triple therapy:" an antiplatelet agent (ASA or clopidogrel), an antihypertensive (ACE inhibitor/angiotensin receptor blocker) and a statin. This study assessed patients who were admitted for vascular surgery or angioplasty/stent to determine who was on appropriate medical

therapy at the time of admission. **Methods:** This was a retrospective chart review involving 100 postoperative vascular and postangioplasty patients in the Saskatoon Health Region from April to October of 2008. **Results:** Among the study population, 72.2% were smokers or ex-smokers, 46.5% had diabetes mellitus, 76.9% had hypertension and 71.4% had hypercholesterolemia. Twenty-nine percent of patients were not on an antiplatelet agent, 37% were not on a statin, 47% were not on an ACE inhibitor/angiotensin receptor blocker and 66% were not on the recommended triple therapy. **Conclusion:** This study shows there is a significant care gap in patients with PAD with respect to risk factor management

Midterm results of the Zenith endograft in relation to neck length: When are fenestrated devices necessary? *T.L. Forbes, D.K. Lawlor, G. DeRose. From the London Health Sciences Centre and the University of Western Ontario, London, Ont.*

Objective: The US Fenestrated Endograft Repair Trial for juxtarenal abdominal aortic aneurysms (AAA) recruits patients with 4- to 15-mm neck lengths, and early results report a significant risk of renal artery complications (stenosis, thrombosis) related to stent placement. This is a single-centre study reviewing outcomes after placement of a Zenith endograft in relation to neck length. **Methods:** Single-centre review of all AAAs electively repaired with a Zenith endograft during a recent 5-year period. Patients were divided into those with infrarenal necks 4–15 mm in length and those longer than 15 mm. Clinical outcomes and follow-up CT scans were reviewed. **Results:** Between 2003 and 2008, 318 patients underwent elective repair of an infrarenal AAA with the Zenith endograft. Sixty-eight (21.4%) patients had necks measuring 4–15 mm in length, whereas 250 patients (79.5%) had necks longer than 15 mm. Overall early mortality was 0.09% and did not differ between the groups ($p = 0.11$), and neither did the rate of type-II endoleaks, 19% ($p = 0.11$). Four patients in each group had proximal type-I endoleaks: 2 in each group resolved spontaneously and 2 in each group required further intervention (2 endovascular and 2 conversions to open repair). Type-I endoleaks and reinterventions did not differ statistically between groups ($p = 0.06$). On further analysis, patients requiring reintervention or conversion for type-I endoleaks had other unattractive neck features (large diameter, angulation). There have been no instances during up to 5 years follow-up of new type-I endoleaks. **Conclusion:** These midterm results indicate that patients with shorter infrarenal necks can be treated as effectively as those with longer necks with the Zenith endograft. This indicates that the role of fenestrated devices is more limited than proposed by the ongoing multicentre trial.

Is vascular consultation necessary? Identifying learning needs for referring physicians. *S. Jamshidi, T. Rapanos, D. Szalay. From the Division of Vascular Surgery, McMaster University, Hamilton, Ont.*

Introduction: In Canada, vascular surgeons might be more appropriately described as vascular specialists. Whereas there are a few internists who practice vascular medicine, for the most part, we lack a corresponding medical specialty that focuses exclusively on the diagnosis and medical (noninterventional) treatment of peripheral vas-

lar disease. Limited vascular surgery manpower and the increasing prevalence of vascular disease may result in long waits for initial vascular consultation. When ultimately assessed, the majority of referred patients do not require endovascular or surgical intervention, and a number may not have significant vascular disease. We postulated that many such consultations do not require specialist-specific knowledge and skills to arrive at an accurate diagnosis and initiate treatment. We sought to identify and ultimately address learning needs in referring physicians to help improve the efficiency and utility of consultations to vascular surgeons. **Methods:** Data collection consisted of a retrospective chart review of consecutive new consults over a 3-month period from January to March of 2008 for a single vascular surgeon operating in an urban, tertiary care centre. Information regarding demographics, comorbidities, specialty of the referring physician, diagnosis of the referring physician, diagnosis of the vascular surgeon and plans for further diagnostic testing or treatment were collected. This resulted in a total of 18 predictor variables. A productive consult was defined as one that required further investigation, intervention (medical, endovascular or surgical) or need for follow-up beyond the expected scope of a primary care physician. An accurate referring diagnosis was defined as consensus between the referring physician's diagnosis and that of the vascular surgeon after the consultation. Univariate statistical analyses using Pearson's χ^2 were performed between each of the 18 predictor variables and the outcome variables of diagnostic accuracy and productivity of the consultation. **Results:** Medical record review yielded 166 cases, 48% of patients were male, and the average age was 65 (SD 17) years. Overall, 141 patients (85%) had a referring diagnosis that matched the vascular surgeon's diagnosis, and 68 patients (41%) had what we defined as a productive consultation. A referral from a family physician/general practitioner (GP) ($p = 0.02$) was significantly associated with decreased diagnostic accuracy, whereas a referring diagnosis of venous insufficiency ($p < 0.01$) was significant associated with increased diagnostic accuracy. Although it did not reach the threshold for statistical significance, a referring diagnosis of peripheral arterial disease was the least likely to be accurate. A referral from a GP ($p = 0.05$) and a referring diagnosis of venous insufficiency ($p = 0.03$) were significantly associated with a nonproductive consultation, whereas a referring diagnosis of abdominal aortic aneurysm ($p < 0.01$) was significantly associated with a productive consult. **Conclusion:** Referrals from family physicians/GPs, especially those regarding peripheral arterial disease, were more likely to exhibit diagnostic inaccuracy and result in a nonproductive consult than those from other specialists. A referring diagnosis of venous insufficiency, while more likely to be accurate, was less likely to result in a productive consult. Based on these results, the greatest learning needs for referring physicians are strategies for the accurate diagnosis of peripheral arterial disease and information regarding the available treatment options for venous insufficiency. Focused educational efforts in these areas may have the greatest benefit in improving efficiency of care by initiating earlier appropriate care and reducing long waits for nonproductive consultations.

Results of prosthetic-vein composite graft with remote popliteal arteriovenous fistula in axillopopliteal/tibial bypass. *P. Rheume, S. MacDonald, R.S. Sidhu, J.D.S. Reid. From the Division of Vascular Surgery, St. Paul's Hospital, Vancouver, BC.*

Objective: We have previously reported on our centre's

development and experience with femoral–distal bypass grafting using a composite graft with an adjunctive remote arteriovenous fistula (AVF) to the popliteal vein. High-velocity flow through the expanded polytetrafluoroethylene (ePTFE) component of the graft, afforded by the AVF, was thought to enhance graft patency. This study reports a single institution's experience with this graft configuration, elongated to use inflow from the axillary artery and outflow to the popliteal/tibial arteries. **Methods:** Data were collected retrospectively on all patients undergoing this procedure from May 2003 to March 2009. Graft patency and flow velocity were determined with duplex scanning. **Results:** Six male patients underwent axillopopliteal/tibial bypass for limb salvage. All had failed at least 1 attempt at ipsilateral limb revascularization with suprainguinal inflow procedures (3 patients) and/or infrainguinal bypasses (5 patients). All patients were ineligible for standard femoral–distal bypass grafting owing to groin sepsis (3) or obliterative femoral arterial occlusive disease (3). Arterial outflow was provided to the above-knee popliteal artery (2), the tibioperoneal trunk (2), the anterior tibial artery (1) or the posterior tibial artery (1). Venous outflow for the remote AVF was the above-knee (5) or below-knee (1) popliteal vein. The basilic vein (5) or a segment of the greater saphenous vein (1) was used to create the lower end of the composite graft-remote AVF. Four of 6 limbs were salvaged. Two patients required below-knee amputations despite patent grafts. Two grafts have required revision; one due to embolization at 10 months and one due to disease progression in the outflow artery at 13 months. Both grafts were patent 1 and 47 months after revision, respectively. Two patients died with patent grafts at 4 and 6 months post-graft construction. Two grafts remained patent without revision at 4 and 10 months. The mean velocity at the lower end of the ePTFE graft component was 120 (range 101–152) cm/s. **Conclusion:** Axillopopliteal bypass associated with a remote popliteal AVF is an option for relieving critical limb ischemia in selected patients who lack ipsilateral infrainguinal inflow due to sepsis or atherosclerotic occlusive disease. Only a short segment of vein, usually obtained from the arm, is needed to complete the bypass. High-velocity flow through the long ePTFE component of the graft is promoted by the remote AVF.

Screening for peripheral artery disease among primary care physicians. E. Wooster, D. Wooster, A. Dueck. From the Department of Surgery, University of Toronto, Toronto, Ont.

Introduction: When compared with coronary artery disease and cerebrovascular disease, peripheral artery disease is under-diagnosed and under-treated. We sought to determine if primary care physicians actively screened for peripheral artery disease (PAD) and their attitudes toward disease detection and treatment. **Methods:** Surveys were conducted of primary care physicians in a defined urban area. The survey results were analyzed using SPSS. **Results:** Most of the respondents were general practitioners (85%) and most were community-based (90%). Thirty percent reported seeing more than 10 patients per year with intermittent claudication, and most (80%) referred at least half of them to a vascular surgeon. Only 22% were aware of guidelines for screening patients for PAD. There was no difference in rates of screening for PAD in high-risk patients ($p = 0.19$): 39% of diabetics over age 65, 47% of smokers over the age of 65, 29% of patients with an abdominal aortic aneurysm, 50% of patients with previous myocardial infarction, and 41% of patients

with a previous stroke. Ninety-five percent felt that intermittent claudication was a marker for coronary artery disease or cerebrovascular disease, but only 45% felt that patients with these symptoms could be managed by their primary care physicians in the community. In terms of medical management, ASA was endorsed by 95%, statins by 80%, angiotensin receptor inhibitors by 65%, a walking program by 95% and a smoking cessation program by 95%. Seventy-nine percent believed evidence supported screening for PAD, and 89% felt that their patients were not already on maximal medical management. Most felt their patients were well enough to undergo further medical management (95%), surgical management (79%) or interventional management (84%). **Conclusion:** Knowledge of guidelines and performance of screening was limited, even among high-risk patients. Further research is necessary to determine the knowledge and attitudes of vascular specialists and resource managers toward PAD screening.

Assessment of venous duplex reports with a structured audit tool. D.L. Wooster, E. Wooster, A. Dueck. From the Toronto West Vascular Laboratory, University of Toronto, Toronto, Ont.

Venous duplex reports of patients with leg pain and swelling, suggestive of deep venous thrombosis, have been noted to be of variable quality. A previously developed structured audit tool, based on published guidelines, can give quantitative assessments of such reports. Service gaps, as defined by technical protocol and performance gaps and physician interpretation gaps, can be identified in discrete areas of the duplex study by such an audit. The aims of this study were to apply the audit tool to identify service gaps and to identify strategies for quality improvement.

The venous component of a previously validated structured audit tool was applied to 100 venous duplex reports from 7 community laboratories and 4 hospital imaging departments. The audit tool contained 28 elements in 8 domains, based on the Society for Vascular Ultrasound, Intersocietal Commission for the Accreditation of Vascular Laboratories (ICAVL), College of Physicians and Surgeons of Ontario and Radiological Society of North America ultrasound practice standards. The audit allowed for quantitative scoring of each domain. The results were analyzed to identify common themes in order to infer areas for guideline implementation and focused education initiatives.

The analysis showed overall average scores of 2.6/5 (range 1.8–4.2). Of the 8 domains, demographics (3.9), indication (3.9) and test performed (3.5) compared favourably with other applications of the tool. Description of the test (2.2), findings (2.3), limitations (1.8), interpretation (2.8) and overall clinical applicability (2.6) fell below acceptable norms. Laboratories with ICAVL status performed better; there was no difference between community- and hospital-based facilities, otherwise.

Thematic analysis of the results showed systems issues, knowledge gaps, application gaps and overall service gaps in venous duplex study reports. Educational interventions were identified for each issue.

Adequacy of antithrombotic therapy after blunt carotid injury: 10-year experience and follow-up at a level-I trauma centre. M. Chaput, E. Moss, A. Verdant, J.-F. Blair. From the Hôpital du Sacré-Cœur, Montréal, Que.

Introduction: Blunt carotid injury (BCI) is associated with

high-speed decelerating trauma and presents as false aneurysm or dissection. Therapeutic options include antithrombotic therapy, surgical repair and carotid stenting. Current evidence provides little information about acute and chronic complication rates and indications for surgical repair. **Methods and Results:** We reviewed the cases of 37 consecutive patients who presented with BCI after decelerating trauma at a level-I trauma centre between 1997 and 2008. Of these, 23 had dissection involving the common or internal carotid artery, and 14 had false aneurysms. Nine patients (24.3%) had a cerebral ischemic event; this was fatal in 3 cases. Patients were treated with antithrombotic therapy in 27 cases, anticoagulation in 3 cases and surgical repair for bleeding or expanding hematoma in 4 cases. Clinical follow-up was available in 79% of survivors, and imaging follow-up was available in 59%, on average 1.3 (SD 0.9) years after the event. No late complications were noted, and no patients required surgery after initial discharge. In patients with dissection, the degree of stenosis decreased from 56% (SD 28%) at hospitalisation to 36% (SD 8%) at follow-up ($p = 0.159$). In patients with false aneurysms who were treated medically, the total carotid diameter at the lesion site was 6.2 (SD 1.1) mm at presentation and 6.7 (SD 1.7) mm at follow-up (average difference 0.75 [SD 17] mm, $p = 0.6$ v. 0). Imaging characteristics (degree of stenosis, indexed lesion length and diameter) of the 9 patients presenting with ischemic strokes were reviewed; no unique criterion predicted ischemic events. **Conclusion:** Patients who survive hospitalization after BCI are adequately treated with chronic antithrombotic therapy, but patients who may benefit from early surgery cannot be identified using standard imaging criteria.

Wait time strategy for urgent vascular surgery in Ontario. P.M. Brown, D.T. Zelt. From the Division of Vascular Surgery, Department of Surgery, Queen's University, Kingston, Ont.

Introduction: The Wait Time Information System (WTIS) for Ontario has included vascular surgery as of March 2009. Priority 1 cases that "require immediate-emergency surgery" never enter a wait list. The access target for priority 2 is within 2 weeks. Our hypothesis was that this length of time is inappropriate for many urgent vascular surgical cases. **Methods:** In a small, 2-faculty university practice with 2 or 3 operating days per week, all operating lists are submitted 1 week before date of surgery. These lists are prioritized as our most urgent cases at that time. The emergency time consists of only 1 room at night or on weekends, and is appropriate only for truly emergent vascular cases. Urgent cases must be inserted in elective blocks. If a 2-week target were valid, it would never be necessary to change our 1-week list. We compared the 1-week booking lists from Feb. 28, 2007, to Feb. 20, 2009, with the actual completed operations. In-patient status of substituted cases was noted. We documented diagnosis of substituted urgent cases. All local lists (e.g., arteriovenous fistulae) were excluded. **Results:** The original 1-week booking forms were still available for 230 operating days. Of the 532 operations originally booked 1 week in advance as our "most urgent" cases, only 215 (40%) were actually completed on the final list, as 314 more urgent patients were substituted (220 in-patients). All of these were considered too urgent to wait a second week (as per the Wait List Strategy). Cases added were peripheral vascular disease (80), amputation (111), abdominal aortic aneurysm (45),

carotid endarterectomy (49) and other (19). **Conclusion:** A majority of vascular patients booked on elective lists as priority 2 are too urgent to wait 2 weeks as per the Ontario Wait List Strategy. The most frequent substitution was that of amputation, which is not even considered on the Ontario Wait List Strategy for Vascular Surgery. The Wait List Strategy should be reviewed to show a more realistic urgent category of less than 1 week. Amputation should also be considered as an integral part of the Vascular Wait Time Strategy.

Early mortality following endovascular versus open repair of ruptured abdominal aortic aneurysms. R. Chagpar, T.L. Forbes, D.K. Lawlor, G. DeRose, K.A. Harris. From the London Health Sciences Centre and the University of Western Ontario, London, Ont.

Objective: To review our recent experience with ruptured abdominal aortic aneurysms (RAAA) and to determine whether method of repair influences early survival. **Methods:** Patients at our centre undergoing either endovascular (EV) or open repair (OP) for RAAA over a 6-year period (2003–2008) were reviewed, and data were collected on preoperative clinical comorbidities, hemodynamic factors and outcomes after repair. Univariate analysis was performed to detect factors associated with early mortality, and a multivariate analysis used to determine whether type of repair was an independent predictor of decreased 30-day mortality. **Results:** Of the 161 patients who presented with RAAA, 129 (80.1%) underwent OP, and 32 (19.9%) underwent EV. On univariate analysis, EV was associated with a decreased early mortality relative to OP, (30-d mortality 15.6% v. 43.7%, $p = 0.004$). Patients who survived after repair also tended to be younger ($p < 0.0005$), male (33.1% v. 55.0%, $p = 0.016$), with a higher preoperative systolic blood pressure ($p < 0.0005$), level of consciousness ($p < 0.0005$) and hemoglobin level ($p = 0.010$) and lower preoperative creatinine ($p = 0.014$), urea ($p = 0.002$), international normalized ratio ($p = 0.007$) and blood glucose levels ($p < 0.0005$). On multivariate analysis controlling for these factors, type of repair remained an independent predictor of 30-day mortality (odds ratio 0.112, 95% CI 0.015–0.860, $p = 0.035$). **Conclusion:** While controlling for preoperative factors, endovascular repair is an independent predictor of lower 30-day mortality relative to open repair after RAAA and should be used more commonly in this life-threatening clinical situation.

Functional patency of autologous fistulas for dialysis access: results using an aggressive investigation and treatment algorithm in a tertiary dialysis centre. M. Chaput, J. Bejjani, R. Ghali, M. Leblanc, É. St-Sauveur, B. Montreuil. From the Hôpital Maisonneuve-Rosemont, Montréal, Que.

Introduction: Long-term patency of autologous arteriovenous fistulas (AVF) has been reported, but functional patency, defined as the period during which an AVF is actually used for full double-needle hemodialysis without catheter assistance, remains poorly described. Also, risk factors for thrombosis, non-use or abandonment are ill-defined. **Methods:** Permeability and functionality data were prospectively collected by a dedicated nurse for all autologous AVFs created between 2002 and 2008 in 1 tertiary hospital. Patients were systematically referred for fistulography if they presented

intra-access flows below 400 mL/min as assessed by ultrasound probe or if they had AVF maturation delay. Primary patency was defined as the time from creation to thrombosis or to any procedure performed to assist patency. Assisted primary patency was defined as the time from creation to thrombosis (including all maintenance procedures). Functional primary and assisted primary patency was also studied and was determined according to the time intervals of dialysis using only the AVF. **Results:** Demographic and patency data were collected for 480 consecutive AVFs created during the study period. Follow-up until thrombosis, abandonment, kidney transplant or death was complete for 93.75% of patients, whereas 6.25% (30 patients) were transferred to other dialysis units during follow-up. The 5-year primary and assisted primary patency was 24.2% (SD 3.1%) and 52.0% (SD 3.8%), respectively. Of 169 patients with events, 79 (46.7%) had thrombosis, 63 (37.3%) were nonfunctional due to poor maturation and 27 (16.0%) were ligatured because of steal (6.5%), venous hypertension (3.6%), infection (2.4%), aneurysm (2.4%) or neuropathy (1.2%). Functional 5-year primary and assisted primary patency was 21.0% (SD 3.4%) and 49.1% (SD 4.7%), respectively. Multivariate Cox regression was performed to assess risk factors for thrombosis and non-use. **Conclusion:** An aggressive investigation and treatment algorithm enhances long-term secondary permeability of autologous AVFs. Careful follow-up and reporting of functionality is important in understanding the clinical impact of AVFs in hemodialysis patients.

Complement activation leads to systemic inflammation after ruptured abdominal aortic aneurysm. W.S. Johnson, B.B. Rubin, T.F. Lindsay. From the Toronto General Hospital, Toronto, Ont.

Objective: Ruptured abdominal aortic aneurysm (RAAA) is associated with systemic inflammation and multiorgan injury that is dependent on complement activation in animals as an early initiator of the inflammatory response. We hypothesized that complement activation would be significantly greater in RAAA compared with elective abdominal aortic aneurysm (EAAA) repair to account for large differences in organ injury. **Methods:** A total of 11 RAAA and 13 EAAA patients enrolled in a blood-sampling protocol after ethics approval. Blood was drawn preincision (PI), prerulease of the aortic clamp (PR), 2 and 4 hours postrelease (2PR, 4PR) and on postoperative days 1 and 2 (D1, D2). Classical, Mannan-binding lectin and alternative pathway complement activation were tested in plasma using enzyme-linked immunosorbent assay (ELISA). Cytokine levels of interleukin-6 (IL-6) and tumour necrosis factor (TNF) were measured by ELISA. Whole-blood neutrophil oxidant burst was measured in response to phorbol myristate acetate stimulation. **Results:** Results are shown in the Table. **Conclusion:** These data provide the first human evidence of complement activation following RAAA. Complement activation occurs in both EAAA and RAAA. However, there is differential activation of the Mannan-binding lectin pathway in RAAA during the early phase of reperfusion that may contribute to the heightened inflammatory response observed clinically in these patients. Confirmation of this inflammatory response in RAAA is provided by significant differential elevation of both IL-6 and TNF during reperfusion. Finally, neutrophils sampled from RAAA patients have a primed oxidant burst response observed from the preincision sample that persists into the postoperative period. These primed inflammatory cells

Table. Inflammatory response measured before and after ruptured and elective abdominal aortic aneurysm repair

| Complement activation; injury | Time period; mean (SEM) | | | | | |
|--|-------------------------|--------------------|--------------------|--------------------|--------------------|------------------|
| | PI | PR | 2PR | 4PR | D1 | D2 |
| Classical pathway activation, au/mL | | | | | | |
| RAAA | 11.83 (3.00) | 11.36 (2.81) | 16.40 (4.95) | 18.28 (4.08) | 11.49 (1.30) | 14.16 (2.59) |
| EAAA | 10.38 (1.62) | 8.60 (1.59) | 10.76 (2.43) | 10.67 (2.09) | 10.57 (2.59) | 8.94 (1.56) |
| Classical/MBL pathway activation, nM | | | | | | |
| RAAA | 14.74 (9.25) | 12.40 (3.76) | 27.65 (12.9)* | 24.51 (9.56)* | 13.24 (3.78) | 12.31 (1.45) |
| EAAA | 6.26 (0.99) | 5.14 (0.87) | 5.50 (1.15) | 5.63 (0.96) | 8.81 (1.64) | 9.40 (2.27) |
| Alternative pathway activation, ug/mL | | | | | | |
| RAAA | 1.44 (0.19) | 1.59 (0.25) | 2.47 (0.56) | 4.10 (0.65) | 2.55 (0.42) | 2.69 (0.65) |
| EAAA | 0.93 (0.19) | 1.31 (0.25) | 2.53 (0.56) | 2.66 (0.65) | 2.51 (0.42) | 3.21 (0.49) |
| IL-6, pg/mL | | | | | | |
| RAAA | 121.3 (33.9) | 186.9 (85.3) | 654.1 (400.5) | 899.5 (310.2)* | 768.5 (173.6)* | 277.7 (56.6) |
| EAAA | 1.81 (1.81) | 32.46 (14.1) | 242.9 (34.7) | 264.8 (32.7) | 208.5 (23.6) | 178.2 (30.9) |
| TNF, pg/mL | | | | | | |
| RAAA | 4.74 (1.42) | 3.81 (0.79) | 16.3 (10.6)* | 17.1 (8.62)* | 7.95 (2.26) | 9.79 (3.49) |
| EAAA | 3.02 (1.12) | 2.80 (0.86) | 4.36 (1.58) | 4.42 (1.44) | 4.01 (1.09) | 5.66 (1.33) |
| PMA stimulated oxidant burst, CL/Phago/30min | | | | | | |
| RAAA | 1490.6 (200.7)* | 2085.7 (603.7)* | 2029.4 (566.4)* | 2109.9 (493.9)* | 1872.6 (516.6)* | 959.4 (124.6) |
| EAAA | 726.9 (138.1) | 934.0 (157.0) | 1072.3 (195.2) | 1209.2 (205.9) | 916.4 (116.3) | 911.6 (136.4) |

2PR = 2 hours postrelease of aortic clamp; 4PR = 4 hours postrelease; D1 = postoperative day 1; D2 = postoperative day 2; EAAA = elective abdominal aortic aneurysm; IL-6 = interleukin-6; MBL = Mannan-binding lectin; PI = preincision; PR = prerulease of aortic clamp; RAAA = ruptured abdominal aortic aneurysm; SEM = standard error of the mean; TNF = tumour necrosis factor. *p < 0.05 v. EAAA by analysis of variance calculated using SAS 9.1.

have substantial potential to generate an oxidant burst and produce tissue injury. The mechanism defined by these data suggests that anticomplement intervention directed against the Mannan-binding lectin pathways may blunt the inflammatory response following RAAA and have the potential to reduce multiorgan injury and improve outcomes in these patients.

Health-related quality of life in patients with symptomatic peripheral vascular disease. A. Hill, L. Carvalho Perron. From the Division of Vascular Surgery, University of Ottawa, Ottawa, Ont.

Objective: The objective of this study was to document the health-related quality of life (HRQL) of patients before and after surgical treatment for symptomatic peripheral vascular disease from a short- and midterm perspective. **Methods:** From 2004 to 2007, patients submitted to surgical revascularization for symptomatic peripheral vascular disease of the lower limbs were prospectively assessed with the SF-36. The study was conducted at a vascular tertiary care referral centre. At 6- and 12-month postoperative follow-ups, questionnaires were sent by mail to the participants. Preoperative and the first 12-month follow-up results were

reported. The HRQL was measured with the SF-36. Scores were also compared with age-corrected SF-36 population scores. **Results:** Among the cohort of 188 patients who underwent elective surgery for critical limb ischemia during the study period, 128 were included in the study. Sixty patients were not able to participate owing to a period of interruption during recruitment. The baseline characteristics of the excluded participants were analyzed and matched with the study group, and no statistically significant difference was found. The SF-36 was completed by 128 patients. Seventeen were lost to follow-up. Postoperative complications included myocardial infarction in 2.3% of patients, wound infection in 4.7% and major amputations in 3.1%. Observed in-hospital mortality was 3.9% and after a year's follow-up was 15.6%. The 91 patients included in the analysis presented the following mean (and 95% CI) scores preoperatively: physical function 31.3 (27–35.8), role-physical 14.8 (8.5–21), bodily pain 31.6 (26.9–36.3), vitality 36.3 (31.9–40.7), general health 52.5 (47.5–57.5), social functioning 59.6 (53.2–66), role-emotional 47.4 (38.1–56.8), mental health 64.4 (59.2–69.7), physical health summary 30.5 (29–32) and mental health summary 45.7 (42.7–48.6). The scores after 1-year follow-up were: physical function 40.2 (34.3–46.1), role-physical 28.6 (20.5–36.8), bodily pain 54 (48.5–59.5), vitality 44.4 (39.7–49.1), general health 53.3 (48.8–57.8), social functioning 64.9 (58.9–70.9), role-emotional 48.1 (38.5–57.7), mental health 69.9 (65.6–74.3), physical health summary 35.9 (33.8–38) and mental health summary 46.5 (43.7–49.2). Four of 8 domains of the SF-36 presented statistically significant change: physical function, role-physical, bodily pain and vitality after a 1-year follow-up period. There was also difference in the physical health summary score. However, SF-36 individual and summary scores compared unfavourably with population norms that were adjusted for age only. **Conclusion:** After a year's follow-up, patients with symptomatic peripheral vascular disease present improvement in HRQL. Scores for both groups compare unfavourably with population scores adjusted for age only.

Impact of endovascular surgery on operative experience for vascular fellows and surgery residents. R. Jamjoom, D. Obrand, M.M. Corriveau, O. Steinmetz, C. Abraham, K. MacKenzie. From the Division of Vascular Surgery, McGill University, Montréal, Que.

Purpose: We sought to evaluate the effect of a progressively developed operating room-based endovascular program on the operative experience of vascular surgery fellows and rotating surgery residents in core surgery, general surgery and cardiac surgery at our 2 university teaching hospitals. **Methods:** A review of all operative procedures carried out by staff vascular surgeons in a single vascular fellowship program at 2 university teaching hospitals over 6 academic years between July 2003 and January 2009 was performed. Monthly data for all cases including operative procedure type, procedure category (abdominal aortic aneurysm [AAA], thoracic aortic pathology [TAA], infrainguinal occlusive peripheral vascular disease [iiPVD], carotid, other vascular disease [OthVasc]), operative approach (open v. endovascular) as well as trainee assistant's level and intraoperative role were collected for the entire study period. Data collected for trainees included level of training, number of months on vascular service, total cases performed and cases performed in each major procedure category (AAA, TAA, iiPVD, carotid, OthVasc) during the training period. Data were analyzed to determine trends in overall case volume and utilization

of endovascular techniques in our practice. We then evaluated how operative experience for vascular surgery fellows and rotating surgery residents was influenced over time by the use of endovascular interventions in the operating room. **Results:** During the 67-month period from July 2003 to January 2009, there were a total of 6394 procedures performed by 6 staff vascular surgeons at both teaching hospitals (mean 97, range 72–140 per mo). Of these procedures, 5150 were categorized as open procedures, whereas the remaining 1244 were endovascular. Data for total number of cases as well as procedure numbers in each case category are summarized in Table 1 and Table 2. The overall proportion of endovascular

Table 1. Annual procedural volume of staff vascular surgeons in a single vascular fellowship program at 2 university teaching hospitals

| Procedure | Academic year; no. (% endovascular)* | | | | | | p value |
|-------------|--------------------------------------|-----------|-----------|-----------|-----------|-----------|---------|
| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008† | |
| Total cases | 1050 (10) | 1134 (16) | 1240 (20) | 1161 (27) | 1148 (39) | 1297 (45) | < 0.01 |
| AAA | 144 (30) | 141 (37) | 146 (42) | 141 (39) | 157 (54) | 150 (57) | < 0.01 |
| TAA | 13 (85) | 31 (71) | 25 (84) | 25 (76) | 28 (93) | 17 (81) | NS |
| iiPVD | 205 (18) | 220 (26) | 268 (38) | 300 (51) | 328 (62) | 421 (57) | < 0.001 |
| All LE PVD | 290 (13) | 332 (17) | 397 (26) | 386 (40) | 415 (49) | 482 (50) | < 0.001 |
| Carotid | 52 (11) | 69 (29) | 113 (20) | 87 (16) | 66 (14) | 78 (2) | < 0.01 |
| OthVasc | 551 | 536 | 559 | 524 | 484 | 421 | |

AAA = abdominal aortic aneurysm; iiPVD = infrainguinal occlusive peripheral vascular disease; LE PVD = lower extremity peripheral vascular disease; NS = not significant; OthVasc = other vascular disease; TAA = thoracic aortic pathology.
*Unless otherwise indicated.
†These are projected numbers based on 7-month data.

Table 2. Selected monthly procedural volume for vascular fellows and rotating surgery residents at 1 of 2 teaching hospitals*

| Surgeon; procedure | Academic year; mean no. [range] (% endovascular)† | | | | | | p value |
|--------------------|---|------------------|-------------------|------------------|-----------------|------------------|---------|
| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008‡ | |
| Fellows | | | | | | | |
| No. cases | 242 (8) | 206 (15.5) | 410 (15) | 242 (24) | 346 (28.6) | 401 (33) | < 0.01 |
| AAA | 6.3 [4–9] (15) | 4.2 [3–6] (40) | 6.3 [3–11] (39) | 3.6 [3–7] (42) | 6.0 [5–10] (51) | 6.5 [2–12] (54) | < 0.001 |
| iiPVD | 5.8 [4–10] (11.5) | 3.2 [1–6] (21) | 6.7 [1–10] (22.8) | 7.5 [1–16] (50) | 7.9 [1–14] (48) | 11.7 [8–16] (53) | < 0.001 |
| Carotid | 1 | 3 [1–4] | 3 [1–6] | 2.7 [2–4] | 2.6 [1–6] | 4.2 [3–5] | |
| Residents | | | | | | | |
| No. cases | 244 (5) | 294 (10) | 149 (6) | 325 (14.5) | 260 (18.5) | 246 (19) | < 0.001 |
| AAA | 3.6 [1–6] (36) | 3.2 [1–6] (28.5) | 3.6 [1–3] (37.5) | 4.1 [1–9] (48.6) | 2.6 [1–6] (50) | 2.5 [2–3] (60) | NS |
| iiPVD | 5.3 [1–8] (4) | 3.4 [1–8] (19) | 5.6 [2–8] (9) | 5 [1–10] (44) | 6.6 [2–14] (38) | 8.7 [6–18] (36) | < 0.001 |
| Carotid | 1 | 1 | 1.4 [1–3] | 2.6 [1–5] | 2.8 [1–5] | 2.5 [1–6] | |

AAA = abdominal aortic aneurysm; iiPVD = infrainguinal occlusive peripheral vascular disease; LE PVD = lower extremity peripheral vascular disease; NS = not significant; OthVasc = other vascular disease; TAA = thoracic aortic pathology.
*Data from both hospitals will be presented at the meeting.
†Unless otherwise indicated.
‡These are projected numbers based on 7-month data.

cases progressed from 9% in 2003 to 31% in 2008/2009. A similar progressive trend was seen in AAA and iiPVD surgery, whereas endovascular use in thoracic aortic pathology remained stable and its use in carotid disease has diminished significantly since 2004. **Conclusion:** Clinical practice in our centre has evolved, resulting in a dramatic increase in endovascular procedures with only moderate increases in overall annual caseload. Vascular fellows have seen an increase in overall case volume, which seems to be due mainly to the increase in endovascular procedures for PVD. The significance of a reduction in open AAA volume and open infringuinal procedures for vascular fellows is unclear and requires further study. Whereas overall procedural case volume for rotating surgery residents was essentially unchanged during the study period, again, this appeared to be due to an increased number of endovascular procedures for PVD, with a concomitant decrease in open AAA and PVD procedures. The changing pattern in vascular surgery practice in teaching hospitals may require a reevaluation of case distribution to both vascular surgery fellows and rotating residents to ensure optimal operative experience.

Improving surgical wait times for patients undergoing aortic aneurysm repair. *P. Jetty, S. Jacob, T. Brandys, G. Hajjar, A. Hill, S. Nagpal.* From the Division of Vascular and Endovascular Surgery, The Ottawa Hospital and the University of Ottawa, Ottawa, Ont.

Objective: The Ontario government is implementing plans to increase access and reduce wait times for certain surgical health services. It is currently in the process of identifying surgical wait times for patients undergoing abdominal aortic aneurysm (AAA) repair based on set guidelines. The objective of this study was to identify the factors affecting surgical wait times for AAA repair, as well as the interval time periods from initial diagnosis of an aneurysm to the patient's first visit with a surgeon and subsequent preoperative work-up. **Methods:** This retrospective cohort study identified a total of 206 patients who underwent repair of a non-ruptured infrarenal AAA by 5 vascular surgeons at The Ottawa Hospital from January to December 2008. Using the OASIS electronic hospital records and office charts, the following variables were recorded: date of the aneurysm diagnosis, date of surgery, first and last visit with a vascular surgeon, method of repair, aneurysm size, first imaging modality and preoperative cardiology work-up. The surgical wait time was defined as the median period of time between the date the decision was made to operate (date of the last visit by the surgeon) and the date the operation was performed. **Results:** Of the 206 patients identified, 31 patients (15%) were urgently admitted to have their aneurysm repaired due to large AAA diameter or presence of symptoms. Their overall median surgical wait time was 34 (interquartile range [IQR] 14–66) days; it was 42 (IQR 20.5–71.5) days for the elective patients. Univariate analysis revealed that patients undergoing endovascular aneurysm repair (EVAR) had shorter surgical wait times than patients undergoing open surgical repair (29.5 v. 41.5 d, $p = 0.02$). There was a large variation between individual surgeons' wait times (27–44 d, $p = 0.005$). Patients with larger diameter AAAs had significantly shorter wait times than patients with smaller diameter AAAs. The overall wait time (period of time for preoperative work-up from the date of AAA diagnosis to the operation date) was significantly higher for patients undergoing cardiology consultation and work-up (131 v.

48 d, $p < 0.0001$). The multivariate analysis was performed using linear regression modelling. Patients who underwent EVAR had lower overall wait times (diagnosis to operation: -41.0 d, $p = 0.026$) and surgical wait time (-9.1 d, $p = 0.1$) compared with open repair patients. There was a difference of 26 days between the surgeons with the longest and shortest surgical wait times ($p = 0.0009$). Patients enrolled in an aneurysm surveillance program saw surgeons more quickly once the aneurysm reached a surgical size, compared with patients who had imaging elsewhere and were subsequently referred to the vascular surgeon (-20.3 d, $p = 0.02$). We also identified 1 surgeon who had a significantly longer wait time to see patients for their first visit in the clinic compared with the surgeon with the shortest wait time (32.1 d, $p = 0.01$). **Conclusion:** Overall surgical wait times appear to be within the guidelines set by the Ontario Ministry of Health; however, this includes a significant proportion of patients being urgently admitted due to size or symptoms in order to avoid inappropriate wait times. Open repair patients have longer preoperative work-up times and surgical wait times compared with EVAR patients, likely a result of increased cardiology work-up, increased operative time and the limitation of intensive care unit bed occupancy. An aneurysm surveillance program provides a rapid and efficient method for identifying and treating patients with surgical-sized AAAs. Due to discrepancies with clinic and surgical wait times among individual surgeons, a "single queue" practice model would provide an efficient method of delivering care for all patients with AAAs.

Coding accuracy of abdominal aortic aneurysm repair procedures in administrative databases: a note of caution. *P. Jetty,* C. van Walraven.†* From the *Division of Vascular Surgery, The Ottawa Hospital and the University of Ottawa; and the †Department of Medicine, University of Ottawa; Clinical Epidemiology Program, Ottawa Hospital Research Institute (OHRI) and the Institute for Clinical Evaluative Sciences, Ottawa, Ont.

Background: Administrative databases have been used to compare methods of abdominal aortic aneurysm (AAA) repair. This requires the use of procedural codes whose accuracy has not been established. In this study we measured the accuracy of codes for open AAA repair and endovascular aneurysm repair (EVAR) in administrative databases. **Methods:** Between April 2000 and July 2005, we identified all surgeries of nonruptured AAAs using an open or EVAR technique at a tertiary-care teaching hospital. During the same time period, we identified all patients who were coded with either an open AAA repair or EVAR. **Results:** During the study period, 514 people had an elective AAA repair or were coded with one. Coding quality of open AAA repair was poor (sensitivity 48.1%, specificity 77.4%, accuracy 52.9%), whereas that for EVAR was slightly better (sensitivity 58.2%, specificity 100%, accuracy 93.6%). We developed an algorithm that included similar procedures and considered anesthetic type to improve the identification of both open repair (sensitivity 97.7%, specificity 86.9%, accuracy 95.9%) and EVAR (sensitivity 84.8%, specificity 99.5%, accuracy 97.3%). **Conclusion:** Administrative database codes that are routinely used to identify open AAA repairs or EVARs are inaccurate. However, slight modifications to the coding algorithms permit the use of administrative databases to study AAA repair.