Sol Cohen (Founder's) Prize Session

The Sol Cohen (Founder's) Prize was won by Dominic Howard of Oxford.

Management of cardiovascular risk in patients with AAA in England: An analysis of 20,000 primary care records

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Recent developments in vascular surgery have dramatically improved short-term mortality after abdominal aortic aneurysm (AAA) repair, but five-year survival has not changed and remains very concerning. Suboptimal management of cardiovascular risk may be partly responsible. Anti-platelet and statin therapy should be mandatory for patients with large AAA, but there is little evidence regarding compliance with national recommendations for cardiovascular risk reduction. This study presents national primary care data for cardiovascular risk management in patients with AAA.

General Practice Records within the Health Improvement Network Database were examined. The study included all cases with AAA, in patients over 50 years old, and data were independently quality-assured. Data were extracted regarding patient demographics, co-morbidity, prescription medications, blood results and blood pressure recordings. Medical therapies for cardiovascular risk management were classified as "antiplatelet", "cholesterol reduction", or "anti-hypertensive" agents. Cox Regression was performed with dose- and time-dependent covariates to investigate the impact of cardiovascular risk reduction.

20,424 patients were identified. 10,894 patients (53.34%) complied with NICE recommendations for cardiovascular risk management with antiplatelet and cholesterol-lowering therapy. 5105 patients did not have a valid recorded serum cholesterol measurement. Five-year survival was 76.68% vs 35.46% in patients with and without active cholesterol reduction ($p < 0.001$) 63.21% vs 43.88% in patients with and without antiplatelet therapy ($p < 0.001$) and 59.08% vs 48.85% in patients with and without anti-hypertensive agents ($p < 0.001$).

The management of cardiovascular risk in AAA patients is unacceptable in England, and deserves urgent, focused attention.

Evolution in vascular trauma management through 12 years of continuous conflict

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Historically, conflicts have provided a catalyst for advancement in casualty care. During contemporaneous conflicts, in an epoch of evidence-based medicine, it is considered that casualty outcomes have improved through the development of trauma systems. We aim to determine whether casualties with vascular injury have benefitted from perceived advances in care during recent conflicts.

Using the UK Joint Theatre Trauma Registry, casualties with vascular injury were identified. Data on casualty demographics; injury mechanism, profile and severity; pre-hospital and intraoperative management; casualty outcome were gathered. Two periods were compared representing the early (EP) and late (LP) phases of conflict, with a watershed of August 2008 and data-lock of July 2012.

From April 2001 there were 133/376 (35%) EP and 243/376 (65%) LP. No significant differences in casualty demographics or mechanisms, profile and severity of injury were noted. There was a significant increase in the opportunity for surgical intervention (EP (40/133) 30% vs LP (114/243) 47% ($p = 0.02$)). Casualty physiological score (RTS) on arrival at surgical facilities were significantly higher in LP 7.84 vs EP 7.52 ($p = 0.006$). Overall survival following vascular injury increased, (EP (34/133) 26% to LP (93/243) 38% ($p = 0.01$,)) as did limb salvage with greater utilization of reverse vein grafts in operated casualties with peripheral arterial injuries (EP (5/28) 18% to LP (36/65) 55% ($p = 0.001$)).

We are first to demonstrate a significant improvement in the outcome of vascular casualties in conflict. Advances in pre-hospital care have provided surgeons with the opportunity to save life and limbs, which at the onset of recent conflicts would not have been achievable.

Remote preconditioning prevents renal injury following contrast-enhanced computed tomography: randomised controlled trial

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Administration of radio-opaque contrast is a common cause of hospital-acquired renal injury, partly mediated through an inflammatory mechanism. We hypothesised that remote ischaemic preconditioning (RIPC) would attenuate post-scan renal injury.

Adult in-patients undergoing contrast-enhanced abdominopelvic CT scans were randomly allocated to receive pre-scan RIPC. Randomisation was stratified for diabetes and pre-existing renal impairment. RIPC was induced using 4 cycles of upper limb ischaemia-reperfusion using a standard blood pressure cuff. Serum creatinine and estimated glomerular filtration rates were measured daily for the first 3 days post-scan.

Over a three month period, 100 patients were randomised. There were three dropouts. Of the remaining 97 patients, 45 were allocated to RIPC and 52 to control. Both groups were well-matched with respect to baseline renal function, medication use, diabetes and pre-hydration. The rate of change of creatinine over the first 24 hours was significantly lower in the RIPC group (−0.08 vs 0.125 micromols/ml/hr; $p = 0.02$). Peak post-scan creatinine as a percentage of baseline was lower in the RIPC group (99% versus 107%; $p = 0.01$) while the trough eGFR as a percentage of baseline was higher in the RIPC group (97% versus 90%); $p = 0.06$).

This pilot trial confirms the practicality of performing RIPC pre-CT scan and suggests that it reduces post-scan renal injury. Further trials to evaluate the effect on renal injury biomarkers are warranted.

A population-based study of incidence and outcome of atrial fibrillation-related thromboembolic events: implications for primary prevention

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Under-use of warfarin in the primary prevention of vascular events due to atrial fibrillation is widespread. Reliable estimation of the clinical consequences of under-treatment at the population level is essential to inform clinical practice and increase risk awareness.

We determined age-specific incidence, pre-morbid anticoagulation, thromboembolism risk scores, and outcome of incident AF-related thromboembolic events in all vascular territories in a prospective population-based study in Oxfordshire, UK (2002–2012). Risk factors, vascular territory, severity of disease, and outcome were compared for AF-related and non-AF-related acute peripheral arterial events (visceral and limb).

In the 92,728 study population, there were 3096 acute cerebral or peripheral arterial events, of which 748 (24.2%) were AF-related, including 73/171 (42.7%) incident peripheral arterial events and 383/1172 (32.7%) incident ischaemic strokes. Age-specific incidence rates increased steeply with age, with 338/456 (74.1%) events occurring at >75 years and 171/456 (37.5%) at >85 years. 89% of patients with AF-related peripheral arterial events had known prior AF and 78.5% of these had $CHADS_2$ scores of >2 (98.5% >2 CHA_2DS_2VASc), yet only 16.9% were anticoagulated prior to event, despite only 23.3% having documented relative/absolute contraindications. Of patients not receiving anticoagulation who had CHA_2DS_2VASc scores >2, 67.9% (36/53) had HAS-BLED scores of <2 (low bleeding risk). Severity of disease, functional outcome and survival were worse for AF-related peripheral arterial events compared to non-AF-related events: immediately threatened limb/visceral organ 66.7% vs 38.8% p = 0.007; 1-year survival 30.1% vs 50.0%, p = 0.02.
A significant proportion of acute peripheral vascular events, particularly those with a poor outcome, are potentially preventable AF-related events in non-anticoagulated high risk patients. The majority of these patients had no contraindications to anticoagulation and were at low risk of bleeding.

Clinical versus radiological outcomes following primary femoropopliteal stenting in the management of peripheral arterial disease

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We examined the medium-term durability, haemodynamic and symptomatic outcomes of primary FP stenting in patients with peripheral arterial disease.
Consecutive patients undergoing primary FP stent implantation for de novo lesions were analysed in this single-centre retrospective study [2004–2011]. Surveillance included three-monthly ankle-brachial pressure index (ABPI), duplex scanning and clinical status assessment for 2-years. Treatment failure was defined as recurrent haemodynamically significant stenosis in the treated segment or symptom recurrence.
249 patients (263 limbs) were identified; median follow-up 24mo (interquartile range [IQR] 16–27). 133 lesions (50.6%) treated were TransAtlantic Inter-Society Consensus (TASC) II A/B and 130 (49.4%) were TASC C/D. Median lesion length was 13cm (8–24). 75 stents (28.5%) were deployed for life-limiting claudication, 170 (64.6%) for critical ischaemia and 18 (6.8%) for acute limb ischaemia. Technical success was achieved in 251 limbs (95.4%). Treatment failure was found in 122 limbs (46.4%) during follow-up; median time to stent failure 7mo (2.3-13.8).
Overall primary(PP), primary-assisted (PAP) and secondary(SP) patency rates were 64.7%, 79.3% and 84.5% at 1-year, and 50.5%, 72.7% and 83% at 2-years, respectively. Mean resting ABPI increased from 0.42 pre-procedure to 0.77 (p = 0.07) at 1 year and 0.64 (p = 0.18) at 2 years. 57.7% reported freedom from symptoms at 2 years.
Despite good assisted and secondary patency rates at 2 years, objective haemodynamic improvement remains poor. Importantly, patient-reported symptom relief remains limited and fails to correlate with radiological findings. This highlights the need for a robust multi-factorial assessment tool to appraise all novel technologies in this territory.

Prior symptoms or brain infarcts will identify higher risk patients with 'asymptomatic' carotid stenosis

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From ACAS and ACST, we know that the risk of stroke for patients with asymptomatic carotid stenosis (ACS) is 1.5-2% pa. Higher risk groups may exist but a simple means to identify them would greatly improve patient selection.
When 3120 patients were entered in ACST (1993–2003) a history of any prior cerebrovascular symptoms and any recent brain scan imaging (CT/MR) was recorded. Analysis of risk associated with either prior cerebral symptoms (in any territory) or brain scan infarction (PBI) was undertaken. 2333/3120 patients had baseline brain imaging and were divided into 2 groups; 1331 with PBI and 1002 with normal imaging and no prior symptoms. All had been randomised in ACST to either early (immediate) or deferred CEA. Rates of first stroke and vascular death were compared during follow up, irrespective of treatment assignation, and in both groups we observed the impact of CEA.
Baseline characteristics of both groups were similar. Patients with symptoms or PBI had a higher stroke risk during long-term follow up (10 years) than those without (absolute risk increase (ARI) 5.8% [1.8-9.8], p = 0.004). The risk of stroke or vascular death was also greater in this group (6.9% [1.9-12.0], ARI, p = 0.007). Both groups of patients benefitted from CEA, though it must be emphasised that ACST was not designed to test this comparison. On multivariate analysis, PBI was associated with a greater risk of stroke (HR = 1.51, 95%CI, 1.17-1.95).
Many currently asymptomatic patients have a history of previous symptoms or 'silent' brain infarction; they have a higher risk of future stroke and may benefit from surgery.

A randomised controlled trial comparing endovenous laser ablation and surgery in the treatment of small saphenous vein superficial venous insufficiency

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In the treatment of small saphenous vein (SSV) insufficiency, short-term results have demonstrated superior recovery rates and less associated pain following endovenous laser ablation (EVLA) when compared to surgery. This two-year follow-up aims to explore whether the longer-term results of EVLA are as good as those following surgery.
Patients with unilateral primary Sapheno-popliteal junction (SPJ) incompetence and SSV reflux were randomised to either EVLA or Surgery (SPJ ligation and stripping/excision of the SSV). Outcomes measured include recurrence, disease specific quality of life (QoL) (Aberdeen Varicose Veins Questionnaire, AVVQ) and post-procedural complications. Of the 106 patients randomised, 88 were seen at two years with equal losses in each group.
Clinical recurrence was higher in the surgery group (n = 10) compared to EVLA (n = 7) (p = 0.736); although both groups were asymptomatic with a median VCSS score of 0 (IQR 0–1, p = 0.348). The most prevalent pattern of recurrence following surgery was related to distal remnant SSV-incompetence (n = 7) as opposed to recanalisation in the EVLA-group (n = 2). No difference in AVVQ scores was seen, with a median score in surgery of 2.75 (IQR 0–7.25) compared to 3.53 (IQR 0–9.22) in the EVLA group (p = 0.412). The majority of patients with early sensory disturbance improved in both groups by 2 years with no difference between groups (p = 1.000). There were no further complications observed between one and two years.
Two year follow-up demonstrates that EVLA of the SSV offers equivalent longer-term benefits as surgery and given the short-term superiority, EVLA should be the first-line treatment. This supports the recent NICE-guidance.

Predicting mortality after abdominal aortic aneurysm repair: Vascular Society Aneurysm Risk Model (VS ARM)

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Current risk-prediction models for abdominal aortic aneurysm (AAA) repair are suboptimal and infrequently used. This study aimed to develop a reliable model for in-hospital mortality after AAA intervention, using rigorous and contemporary statistical techniques to handle missing data.
UK National Vascular Database (NVD) data for AAA interventions over a 15-month period (Feb 2010-Apr 2011) were analysed. Multiple imputation methodology (for missing data) with stepwise model selection was used to generate models of in-hospital mortality following AAA repair using pre-operative variables only(A) or pre and peri-operative variables(B). Two-thirds of the data were used as the 'modelling set', with the remaining third used as the 'validation

set'. Model performance was assessed using receiver operating characteristic (ROC) curve analysis, and compared to existing risk-prediction models.
8088 AAA procedures were recorded in the NVD during the study period, of which 5872/8088 (72.6%) were elective. Model A(9 variables) and B(10 variables) showed excellent discrimination, with areas under the ROC curve(AUC) of 0.89 and 0.92 respectively for all AAA procedures. Separate models for endovascular/open or elective/emergency interventions were not necessary, as a single model (with EVAR and emergency as input variables) performed better. Discrimination remained excellent when considering only elective procedures (AUC 0.82 and 0.85) and was significantly better than existing models ($p < 0.001$ & $p = 0.001$, for models A and B respectively).
The Vascular Society Aneurysm Risk Model appears accurate and outperformed all existing tools in this study. After further validation, the model could be invaluable for pre-operative patient counselling and accurate risk adjustment of published outcome data.

Phlebectomy timing does matter - results of the AVULS trial

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Endovenous ablation is a common treatment for varicose veins with 9800 procedures done in 2011–2012. The fate of the varicosed tributary remains controversial. This randomised clinical study aims to assess simultaneous and delayed tributary treatment.
Patients presenting with symptomatic varicose veins with an incompetent truncal vein and varicosities were assessed and invited to participate in the AVULS randomised clinical trial. Patients undergoing endovenous thermal ablation under local anaesthetic were randomised to either delayed or simultaneous phlebectomy treatment. Patients were reviewed at 6 weeks, 6 months and 1 year, with generic and disease specific quality of life assessed at each visit.
393 patients were screened, 221 invited and 101 patients consented to randomisation. 95% of turn downs wanted single session treatment. At 6 weeks, 36% of the delayed group and 2% of the simultaneous group required further treatment ($p < 0.001$). There was no difference in number of required phlebectomies at further intervention compared to pre-operative estimation. Venous Clinical Severity Score was improved in the simultaneous group at 6 weeks ($p = 0.001$), 6 months ($p = 0.012$) and 1 year ($p = 0.017$). Generic and disease specific quality of life were improved at 6 weeks in the simultaneous group ($p = 0.029$, $p = 0.033$) and converged thereafter. Technical success at 6 months was 94% with no difference between groups.
This study provides evidence of improved clinical outcome of simultaneous trunk and tributary treatment in the local anaesthetic endovenous office setting. Further work is needed to assess cost-benefits.

Ability of ramipril to improve walking distance in patients with intermittent claudication is dependent on its effect on arterial stiffness: results from a randomised controlled trial

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We have previously shown that the angiotensin converting enzyme inhibitor, ramipril, improved walking distance and reduced arterial stiffness in patients with intermittent claudication. In this analysis on the same cohort of patients, we investigated whether ramipril's ability to improve walking distance is dependent on its ability to reduce arterial stiffness.
33 patients (25 males, mean age: 65+/−7.8) with intermittent claudication were randomised to receive ramipril ($n = 14$) or placebo ($n = 19$) for 24 weeks in a double-blind fashion. Walking distance was assessed using a standard treadmill test (1.6 mph at 10% incline) and arterial stiffness indices were assessed using the SphygmoCor device.
After 24 weeks, ramipril improved maximum treadmill walking distance; adjusted mean change difference (95% confidence interval); by 131 (62 to 199) m longer than placebo ($p = 0.001$) and improved treadmill intermittent claudication distance by 122 (56 to 188) m longer than placebo ($p = 0.001$). Ramipril reduced carotid femoral pulse wave velocity (PWVcf) by −1.47(−2.4 to −0.57) m/s compared to placebo ($p = 0.002$) and reduced augmentation index (AIx) by −10.8 (−14.1 to −7.5) % compared to placebo ($p < 0.001$). Changes in walking distance from baseline showed moderately strong correlations with changes in indices of arterial stiffness (PWVcf, $r = -0.43$, $p = 0.021$; AIx, $r = -0.50$, $p = 0.006$; AIx adjusted to 75 beats/minute, $r = -0.50$, $p = 0.006$; central pulse pressure, $r = -0.45$, $p = 0.039$). Correlations remained significant after adjusting for heart rate and mean arterial pressure.
Ramipril improves walking distance in patients with intermittent claudication. This improvement is partly due to its ability to reduce arterial stiffness.