VASCULAR ANAESTHESIA SOCIETY OF GREAT BRITAIN AND IRELAND

Eighteenth Annual Scientific Meeting
8th & 9th September 2014
The Grand Central Hotel, Glasgow

ABSTRACT BOOKLET

Contents

SESSION 1

Cardiopulmonary exercise testing and preoperative B-type natriuretic peptides for preoperative risk stratification in elective vascular surgery.

Bruce M. Biccard

Perioperative Research Group, Department of Anaesthetics, Nelson R Mandela School of Medicine, University of KwaZulu-Natal, Private Bag 7, Congella, 4013, South Africa.

biccardb@ukzn.ac.za

Abstract

Patients undergoing vascular surgery have a reported 30 day mortality of 3.8% (95% confidence interval (CI) 2.4-5.8%).[1] Open abdominal aortic aneurysm (AAA) surgical patients are at a profoundly high risk with an expected 30 day incidence of major adverse cardiac events (MACE) defined as mortality or myocardial infarction of about 1 in 10.[2]

The suggested approach to preoperative risk stratification for vascular surgical patients has in general been grouped together with that of the other noncardiac surgeries in the European[3] and American Heart Association /American College of Cardiology guidelines.[4] The appropriate tool for further risk stratification of high risk vascular surgical patients however is unclear. When considering AAA risk stratification, although management guidelines have been proposed for elective aortic surgery,[5] there is little consensus on what constitutes an acceptable preoperative workup, probably because there is little data to suggest a preferable preoperative risk stratification tool in these patients. A systematic review of preoperative risk models used to predict adverse outcomes following elective AAA surgery suggested that the current risk stratification tools provide poor discrimination, are poorly calibrated, and in general have little validation.[6] Importantly, the potential role of cardiopulmonary exercise testing (CPET) or B-type natriuretic peptides (NPs) for preoperative risk stratification are not considered in these papers. The evidence for these two preoperative risk stratification tools for vascular surgery is explored.

B-type natriuretic peptides

The association between preoperative NPs and major postoperative cardiovascular complications has been extensively validated in prospective studies. A meta-analysis of vascular surgical patients found that NP elevation above the optimal discriminatory threshold was significantly associated with 30-day cardiac mortality, nonfatal myocardial infarction and the composite of cardiac death and MI, which persisted at 180 days postoperatively [7]. The addition of a preoperative BNP to the Revised Cardiac Risk Index (RCRI) provided incremental value by significantly improving the RCRI's prediction of major adverse cardiac events (i.e., myocardial injury and death).[8] An individual patient data meta-analysis of vascular surgical patients[9] has shown that BNP was associated with a net reclassification improvement (NRI) of 58% for the entire cohort, and 84% ($p<0.000001$) for patients

preoperatively classified as intermediate risk as per the AHA/ACC guidelines for perioperative cardiovascular evaluation.[10]

These findings suggest the integrating NPs into the preoperative risk stratification models has clinical utility as significantly more patients are correctly classified prior to surgery. These papers suggest that patients in low risk categories could proceed to surgery without further intervention, while those in the higher risk category may benefit from further risk investigation. In a vascular surgical dataset, neither the number of RCRI risk factors, nor specific RCRI risk factors could improve on NP based preoperative risk stratification ENREF 22 ENREF 23[11].

The thresholds and associated these outcomes for preoperative NP taken from these recent individual patient data meta-analyses are shown in the Table.

Table. Preoperative natriuretic peptides thresholds for predicting the composite outcome of 30 day mortality and nonfatal myocardial infarction in vascular surgery[12]

Type of NP	NP level (pg/ml)	MACE % (95% CI)	Likelihood ratio
BNP	0-29	1.2% (0.3-2)	0.11
	30-115	6.5% (4.6-8.4)	1.69
	116-371	20.9% (17.7-24.1)	3.6
	≥372	36.7% (32.9-40.5)	6.4

There is little published data on the role of NPs in aortic surgery. However, based on extraction of data from the individual patient data meta-analyses,[9 13] the optimal cut points for open AAA are 50pg/ml for BNP and 195.5pg/ml for NT-proBNP respectively [unpublished data]. When compared to the Glasgow Aneurysm Score and the RCRI, only the preoperative NPs were independently associated with postoperative MACE in elective AAA in this analysis [unpublished data].

Cardiopulmonary exercise testing

A recent systematic review found little evidence to support preoperative CPET for major vascular surgery.[14] Despite this fact, CPET risk stratification for vascular surgery is commonly practiced in the United Kingdom with 78% of respondents suggesting that they are using CPET for vascular surgical risk stratification.[15] Further analysis of the data from Young et al's systematic review and the inclusion of other studies[16] suggests that a 'good test result' for preoperative CPET risk stratification for AAA is associated with decreased early mortality (odds ratio 0.21, 95% CI 0.12-0.38, P<0.00001, I^2=0%) and intermediate term mortality (odds ratio 0.27, 95% CI 0.09-0.80, P=0.02, I^2=66%) [unpublished data]. Unfortunately, a number of studies contributing to these data are retrospective or only published in abstract form, and a

number of different CPET variables have been used for risk stratification. There is little data on i) the performance of preoperative CPET and its association with postoperative MACE, and ii) the performance of preoperative CPET risk stratification for vascular surgeries other than AAA.

Conclusion

Although both preoperative NPs and CPET risk stratification appear to have potential in vascular surgery further research is urgently needed. The current evidence suggests that CPET may be best suited for mortality prediction in major supra-inguinal vascular surgery, while NPs risk stratification may have a broader role in risk stratification for MACE across all vascular surgeries. An approach to integrating these two risk stratification tools is needed.

References

1. Devereaux PJ, Chan MT, Alonso-Coello P, Walsh M, Berwanger O, Villar JC, et al. Association between postoperative troponin levels and 30-day mortality among patients undergoing noncardiac surgery. *JAMA* 2012;307(21):2295-304.

2. Chaikof EL, Brewster DC, Dalman RL, Makaroun MS, Illig KA, Sicard GA, et al. The care of patients with an abdominal aortic aneurysm: the Society for Vascular Surgery practice guidelines. *J Vasc Surg* 2009;50(4 Suppl):S2-49.

3. Poldermans D, Bax JJ, Boersma E, De Hert S, Eeckhout E, Fowkes G, et al. Guidelines for pre-operative cardiac risk assessment and perioperative cardiac management in non-cardiac surgery: the Task Force for Preoperative Cardiac Risk Assessment and Perioperative Cardiac Management in Non-cardiac Surgery of the European Society of Cardiology (ESC) and endorsed by the European Society of Anaesthesiology (ESA). *Eur Heart J* 2009;30(22):2769-812.

4. Fleisher LA, Fleischmann KE, Auerbach AD, Barnason SA, Beckman JA, Bozkurt B, et al. 2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol* 2014.

5. Moll FL, Powell JT, Fraedrich G, Verzini F, Haulon S, Waltham M, et al. Management of abdominal aortic aneurysms clinical practice guidelines of the European society for vascular surgery. *Eur J Vasc Endovasc Surg* 2011;41 Suppl 1:S1-S58.

6. Patterson BO, Holt PJ, Hinchliffe R, Loftus IM, Thompson MM. Predicting risk in elective abdominal aortic aneurysm repair: a systematic review of current evidence. *Eur J Vasc Endovasc Surg* 2008;36(6):637-45.

7. Rodseth RN, Padayachee L, Biccard BM. A meta-analysis of the utility of pre-operative brain natriuretic peptide in predicting early and intermediate-term mortality and major adverse cardiac events in vascular surgical patients. *Anaesthesia* 2008;63(11):1226-33.

8. Biccard BM, Naidoo P. The role of brain natriuretic peptide in prognostication and reclassification of risk in patients undergoing vascular surgery. *Anaesthesia* 2011;66(5):379-85.

9. Rodseth RN, Lurati Buse GA, Bolliger D, Burkhart CS, Cuthbertson BH, Gibson SC, et al. The predictive ability of pre-operative B-type natriuretic peptide in vascular patients for major adverse cardiac events: an individual patient data meta-analysis. *J Am Coll Cardiol* 2011;58(5):522-9.

10. Fleisher LA, Beckman JA, Brown KA, Calkins H, Chaikof E, Fleischmann KE, et al. ACC/AHA 2007 Guidelines on Perioperative Cardiovascular Evaluation and Care for Noncardiac Surgery: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery): Developed in Collaboration With the American Society of Echocardiography, American Society of Nuclear Cardiology, Heart Rhythm Society, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, and Society for Vascular Surgery. *Circulation* 2007;116(17):1971-96.

11. Biccard BM, Lurati Buse GA, Burkhart C, Cuthbertson BH, Filipovic M, Gibson SC, et al. The influence of clinical risk factors on pre-operative B-type natriuretic peptide risk stratification of vascular surgical patients. *Anaesthesia* 2012;67(1):55-9.

12. Biccard BM, Devereaux PJ, Rodseth RN. Cardiac biomarkers in the prediction of risk in the non-cardiac surgery setting. *Anaesthesia* 2014;69(5):484-93.

13. Rodseth RN, Biccard BM, Le Manach Y, Sessler DI, Lurati Buse GA, Thabane L, et al. The prognostic value of pre-operative and post-operative B-type natriuretic peptides in patients undergoing noncardiac surgery: B-type natriuretic peptide and N-terminal fragment of pro-B-type natriuretic peptide: a systematic review and individual patient data meta-analysis. *J Am Coll Cardiol* 2014;63(2):170-80.

14. Young EL, Karthikesalingam A, Huddart S, Pearse RM, Hinchliffe RJ, Loftus IM, et al. A systematic review of the role of cardiopulmonary exercise testing in vascular surgery. *Eur J Vasc Endovasc Surg* 2012;44(1):64-71.

15. Huddart S, Young EL, Smith RL, Holt PJ, Prabhu PK. Preoperative cardiopulmonary exercise testing in England - a national survey. *Perioper Med (Lond)* 2013;2(1):4.

16. Goodyear SJ, Yow H, Saedon M, Shakespeare J, Hill CE, Watson D, et al. Risk stratification by pre-operative cardiopulmonary exercise testing improves outcomes following elective abdominal aortic aneurysm surgery: a cohort study. *Perioper Med (Lond)* 2013;2(1):10.

Ischaemic Pre-conditioning

Ronelle Mouton, Consultant Anaesthetist, Department of Anaesthesia, Southmead Hospital, Bristol, BS10 5NB, Ronelle.Mouton@nbt.nhs.uk

Today's presentation is an overview of ischaemic preconditioning from laboratory concept to the first proof-of-concept clinical studies, larger clinical trials and the possible application for vascular surgery.

How the concept evolved: *Ischaemic conditioning* describes an endogenous phenomenon where short episodes of sublethal ischaemia and reperfusion provide protection against a subsequent prolonged ischaemic event.[1] Despite numerous supporting laboratory studies, the complex physiology of disease in humans and difficulty of access to patients before an unexpected acute ischaemic event, have limited the use of ischaemic preconditioning in clinical practice.[2,3]

An alternative and more amenable approach is to apply a transient preconditioning stimulus to a specific accessible remote tissue (e.g. limb muscle) to provide systemic protection against cellular injury during a subsequent prolonged ischaemic episode in a distant organ or tissue. The concept of *remote ischaemic preconditioning (RIC)* was first described by Przyklenk and co-workers in 1993.[4] RIC utilises a powerful innate mechanism whereby effector substances are released into the circulation to protect essential organs against reperfusion injury. The mechanisms involve mediators (e.g. adenosine, bradykinin,opioids) that are generated during ischaemia, a cascade of second messengers and target organ effectors.[5] *RIC* elicted by limb ischaemia is non-invasive and non-pharmacological. It consists of repeated short cycles of limb ischaemia through inflating a cuff on the arm or leg of a patient.

Ischaemic preconditioning as it was first described required advanced warning of an ischaemic event. In patients who experience an unpredictable ischaemic insult such as myocardial infarction, stroke or cardiac arrest, the window of opportunity for preconditioning has usually passed. However, we now know that the conditioning stimulus can be also be applied during or immediately after the ischaemic event – this is called ischaemic *postconditioning* and might provide a more feasible strategy.[6] The term ischaemic postconditioning, which initially referred to serial intervals of reperfusion has been broadened to include different interventions e.g., reperfusion, drugs and hypothermia, applied during ischaemia or at the onset of reperfusion.[7]

Clinical Evidence: Initial proof-of-concept studies have shown that RIC might provide myocardial protection in patients undergoing cardiac surgery.[8,9] Following this, several small and one large RCT (n=329) provided preliminary data to show that RIC is protective in patients with acute MI and those undergoing cardiac surgery or percutaneous coronary intervention.[10,11] Significant decreases in troponin-T release were seen and the larger trial showed a reduced risk of MI and all-cause death. [11]In the acute setting 251 patients with STEMI were randomised in the ambulance to receive RIC via four cycles of 5 min arm ischaemia or control – the intervention significantly reduced myocardial infarct size.[12]

Elucidation of the underlying mechanisms of ischaemic conditioning identified pharmacological agents with potential for cardioprotection, but so far clinical studies were not convincing.

Larger Trials: Although several proof-of-concept studies have been published, mostly in cardiac surgery, whether RIC could impact on clinical outcomes and improve healthcare for patients is still unknown. At this stage adequately powered, multicentre RCTs, with blinded care providers and outcome assessors are needed to determine whether RIC can improve real clinical endpoints in various clinical settings. Two recent large multicentre trials, REPAIR[13] and ERICCA, [14] examined RIC in renal transplant and cardiac surgery. In the REPAIR trial kidney donors and recipients were randomised to receive RIC or sham intervention pre-transplant. The primary endpoint was glomerular filtration rate 12 months after transplantation. The ERICCA trial is a large multicentre RCT investigating the effect of RIC in patients undergoing cardiac surgery. The primary outcome is major adverse cardiac and cerebral events (MACCE) one year after surgery. MACCE include cardiovascular death, myocardial infarction, revascularisation and stroke.

RIC in vascular surgery: Four small RCTs evaluated RIC in vascular surgery. The majority of RCTs were small, at risk of bias, often single centre and underpowered for clinical outcomes. They focused on biomarkers (creatinine or troponin) and lacked patient-centred clinical outcomes.
Vascular surgery has undergone change in recent years, with increasing use of endovascular (EVAR) interventions instead of open surgery and the movement towards the centralisation of vascular surgery. The AAA Quality Improvement Programme supported more emphasis on patient-centred care and an improved patient pathway. In this context we applied for grant funding and were advised that in view of the changing environment in vascular surgery it was not clear that a large adequately powered multi-centre RCT of RIC, with blinded care providers and outcome assessors, was possible and that a pilot feasibility study was needed to inform a future large multi-centre RCT. We subsequently received funding from the UK National Institute for Health Research (NIHR) Research for Patient Benefit programme (PB-PG-0609-18150). Consecutive patients presenting for elective AAA repair using an endovascular (EVAR) or open procedure, in Southmead Hospital, Bristol, were assessed for trial eligibility. Patients who consented to participate were randomized to receive RIC (three cycles of 5 min ischaemia and 5 min reperfusion in the upper arm immediately before surgery) or a sham procedure. Patients were followed up for six months. We assessed patient eligibility and consent, the logistics of RIC implementation, randomization, blinding, data capture, patient and staff opinion, and variability and frequency of clinical outcome measures (acute kidney injury an cardiac complications). (ISRCTN 19332276). The formal report from this study is in press and we have applied for HTA funding to carry out a large multi-centre RCT.

Conclusion: There are on-going endeavours to minimise post-operative morbidities in vascular surgery patients and one of interest is the role of ischaemic preconditioning. We know from our feasibility study and other studies that the RIC intervention is acceptable, safe and that it can be incorporated into the clinical setting without affecting anaesthetic or surgical operating times. Multicentre randomised clinical trials with patient-centred endpoints are now underway to test whether this emerging protective strategy can improve clinical outcomes for patients undergoing cardiac, transplant or vascular surgery. This intervention also has potential benefit in other clinical areas e.g. neurosurgery, stroke, cardio pulmonary resuscitation.

References:

1. Murray CE, Reimer KA. Preconditioning with ischemia: a delay of lethal cell injury in ischemic myocardium. *Circulation* 1986; 74: 1124-36.
2. Hausenloy DJ, Yellon DM. The therapeutic potential of ischemic conditioning: an update. *Nature Reviews Cardiology* 2011; 8:619-629.
3. Kharbanda RK, Nielson TT, Redington AN. Translation of remote ischaemic preconditioning into clinical practice. *Lancet* 2009; 374: 1557-65.
4. Przyklenk K, Bauer B, Ovize M et al., *Circulation* 1993; 87: 893-9.
5. Hausenloy DJ, Yellon DM. Remote ischaemic preconditioning: underlying mechanisms and clinical application. *Cardiovasc Res* 2008; 79: 377-86.
6. Zhao ZQ, Corvera JS, Halkos ME et al., Inhibition of myocardial injury by ischemic postconditioning during reperfusion: comparison with ischemic-preconditioning. *Am J Physiol Heart Circ Physiol* 2003; 285: H579-88.
7. Mouton R, Abella BS, Soar J. Is there a role for remote ischaemic postconditioning in cardiopulmonary resuscitation. *Resuscitation* 2010; 81, Issue 11: 1476-1478.
8. Cheung MM, Kharbanda RK, Konstantinov IE et al. Randomized controlled trial of the effects of remote ischemic preconditioning on children undergoing cardiac surgery: first clinical application in humans. *Journal of the American College of Cardiology* 2006; 47:2277-82.
9. Hausenloy DJ, Mwamure PK, Venugopal V et al. Effect of remote ischemic preconditioning on myocardial injury in patients undergoing coronary artery bypass graft surgery: a randomised controlled trial. *Lancet* 2007;370:575-9.
10. Hausenloy DJ, Yellon DM. The therapeutic potential of ischemic conditioning: an update. *Nature Reviews: Cardiology* 2011; 8: 619-629.
11. Thielmann M, Kottenberg E, Kleinbongard P, Wendt D, Gedik N, Pasa S et al., Cardioprotective effects of remote ischaeemic preconditioning in patients undergoing coronary artery bypass surgery: a single-centre randomised, double-blind, controlled trial. *The Lancet* 2013; 382: 597-604.
12. Botker HE, Kharbanda R, Schmidt MR et al., Remote ischaemic conditioning before hospital admission, as a complement to angioplasty, and effect on myocardial salvage in patients with acute myocardial infarction: a randomised trial. *The Lancet* 2010; 375: 727-734.
13. http://repair.lshtm.ac.uk/index.html
14. http://www.:\EriccaTrial\ERICCA-StudyDetail

The Troponin Story: 30 Day Mortality in Non-Cardiac Surgery
Dr Michael Stewart
No abstract submitted

SESSION 2 – Metabolic Syndrome and Diabetes: The Known Unknowns

Metabolic Syndrome and Vascular Patients
Professor Naveed A Sattar
No abstract submitted

New Diabetic Drugs
Dr Andrew Gallagher
No abstract submitted

Implementation of New Peri-Operative Diabetes Guidelines
Dr Johann Harten
No abstract submitted

SESSION 3 – Deprivation and Health

Deprivation and Health Inequalities: Co-morbidities that Affect the Vascular Patient
Professor Phil Hanlon
No abstract submitted

SESSION 4 – The IMPROVE Trial

The IMPROVE Trial
Mr Robert Hinchliffe
No abstract submitted

The IMPROVE Trial: Implications for Interventional Radiology
Dr Iain Robertson
No abstract submitted

The IMPROVE Trial: Implications for Vascular Anaesthesia
Dr Simon Howell
No abstract submitted

SESSION 5 – FREE PAPERS

Reliability of test-retest arm-crank cardiopulmonary exercise testing in patients with small abdominal aortic aneurysms

J Durrand[1], K Wagstaff[1], L Cawthorne[1], A Kasim[2], G Danjoux[1], E Kothmann[1]

1. Department of academic anaesthesia, James Cook University Hospital.

2. Wolfson institute for health and wellbeing, University of Durham.

Cardiopulmonary exercise testing (CPET) represents the current gold standard assessment of functional capacity prior to abdominal aortic aneurysm (AAA) repair [1,2]. A proportion of vascular patients cannot undertake standard leg-bike testing, with arm-crank ergometry a proposed alternative. However, serial reliability of arm-crank measured physiological parameters is unproven in this population. We therefore undertook a validation study of the test-retest reliability of arm-crank CPET in patients with small aneurysms. The primary outcome was to determine the reproducibility of anaerobic threshold (AT) and peak oxygen consumption (VO2 peak).

Following full ethical approval, patients with small aortic aneurysms (<5.5cm) were recruited from local surveillance registers. Participants undertook two maximal arm-crank tests. A medical statistician was consulted prior to analysis. Mean values for measured physiological variables were compared and correlation determined between measured parameters across test 1 and 2. The capacity of arm-crank CPET to discriminate between individual patients was assessed by intra-class correlation analysis (ICC).

21 patients were recruited to the study. One patient was female. Median age was 69 years with mean aneurysm size (SD) 3.7cm (0.68cm). Mean AT and VO2 peak are presented in table 1. There was no statistically significant difference in mean VO2 AT or VO2 peak between tests. There was strong correlation (0.87) between test 1 and 2 for VO2 peak with moderate but statistically significant (0.5) correlation for VO2 AT. There was also a high discrimination between the patients with test-retest reliability (ICC) of 0.76 for VO2 peak and 0.59 for AT.

Our data demonstrate that key physiological parameters measured during arm-crank CPET are reliably reproduced during repeat testing. This is a crucial first step towards permitting incorporation of arm-crank CPET into routine pre-operative assessment and decision-making prior to major aortic surgery. Further research is however required to demarcate specific risk thresholds to predict morbidity and mortality.

References

1. Hennis PJ, Meale PM, Grocott MP. Cardiopulmonary exercise testing for the evaluation of perioperative risk in non-cardiopulmonary surgery. PMJ 2011; 87: 550–7
2. Hartley RA, Pichel AC, Grant SW, et al. Preoperative cardiopulmonary exercise testing and risk of early mortality following abdominal aortic aneurysm repair. Br J Surg 2012; 99

Mortality after surgery to obtain vascular access for haemodialysis: A retrospective observational study.

Jorna T, Mouton R, Bushnell J, Weale A, Mitchell D, Beavis P, Ravanan R, Southmead Hospital, North Bristol Trust, UK.

INTRODUCTION:

Renal Association guidelines state patients with end-stage renal failure (ESRF) known to nephrology services should commence haemodialysis (HD) using established access such as an arterio-venous fistula or graft. Patients with ESRF by their very nature will have significant morbidity that will increase perioperative risk. There is a dearth of data on mortality, and factors affecting mortality for patients with ESRF undergoing vascular access surgery in preparation for HD.

AIMS:

To establish the 30-day mortality for patients undergoing vascular access surgery. To investigate for variation in mortality by different types of vascular access and by mode of anaesthesia.

METHODS:

Our analysis included 1483 consecutive vascular access procedures performed at the Bristol Renal Unit from 05/04/2008 – 04/04/2013. Electronic notes from our large institutional database were reviewed for patient demographics, co-morbidities, type of access created, mode of anaesthesia and 30-day mortality.

RESULTS:

Table 1 shows baseline characteristics for all vascular access procedures. Thirty-day mortality for all access surgery was 1.08%; for upper limb fistulae this was 0.729%; for upper limb grafts was 2.55% and for all lower limb access was 3.85%. Univariate analysis showed procedures performed under GA were associated with a significantly higher 30-day mortality than those done under LA ($p=0.003$). Upper limb grafts were associated with a significantly higher mortality than upper limb fistulae ($p=0.002$). Cox regression analysis of open-ended survival showed significantly increased mortality for those patients already on RRT (HR 2.12, $p=0.03$) and for those who had a graft as opposed to a fistula (HR 1.52, $p=0.003$).

DISCUSSION:

These results show that vascular access surgery for HD, although often thought of as relatively low risk, is associated with mortality comparable to that of other forms of more invasive arterial surgery such as open AAA repair. Mortality risk varies significantly between fistulae and grafts and the mode of anaesthesia used. These variations in part maybe a reflection of increased time on dialysis which would be associated with increased cardiovascular co-morbidity and the need for multiple, ever more complex access procedures requiring GA. This study gives valuable information to guide nephrologists, surgeons, anaesthetists and patients undergoing vascular access surgery to be able to estimate mortality risk associated with access operations and enable planning for type of access and anaesthesia accordingly.

Variable	Alive, n=1467	Died, n=16	p value
Age at Surgery, median [IQR]	65yr [50-75]	72.3 [66-79.5]	0.0207 (MWU)
Gender M:F (% male)	888:579 (60)	11:5 (68.8)	0.503 (chi^2)
Hypertension (%) **Diabetes (%)** **Smoker (%)*** **PVD (%)** **IHD (%)** **CVD (%)** **Malignancy (%)**	1262 (86) 528 (36) 381 (26) 264 (18) 484 (33) 220 (15) 293 (20)	13 (81) 7 (44) 5 (29) 2 (13) 4 (25) 3 (19) 4 (25)	0.579 0.520 0.856 0.584 0.509 0.658 0.612 (chi^2)
Total Co-Morbidity, median [IQR]	2 [1-3]	2 [2-3]	0.940 (MWU)
Dx Status, Wait:Acute:ESRF	636:17:814	6:0:10	0.798 (chi^2)
RRT Type, None:PD:HD:Tx	653:59:726:29	6:0:10:0	0.643 (chi^2)
RRT Time, median days [IQR]	486 [119-1570]	743 [122-1326]	0.930 (MWU)
Upper Limb Fistulae **Upper Limb Grafts (vs fistulae)** **First Access (vs second/subsequent)** **GA (vs LA)** **All Lower Limb (vs all lower limb)**	1233 184 885 462 50	9 5 5 11 2	 0.002 0.018 0.003 0.049 (chi^2)
***Incomplete data**			

Table 1. Baseline characteristics for 30-day mortality post HD vascular access surgery.

A pilot observational study of peri-operative renin-aldosterone-angiotensin system (RAAS) antagonist related nephropathy in the hybrid endovascular operating theatre at St Thomas' Hospital, London.

A Skorko, H Bidd, S Bahlool, L Boss, K Rizkallah, ***D Dragnea***

Guy's and St Thomas' Hospital NHS Foundation trust, Westminster Bridge Road, London SE1 7EH

Perioperative renin-aldosterone-angiotensin system antagonist (RAASA) therapy remains an area of speculation. Recent NICE guidance suggests omission of RAASAs prior to surgery[1]. RAASAs are known to exacerbate the hypotensive effects of anaesthesia and impair physiological mechanisms and so organ perfusion. There is a paucity of data as to whether RAASA therapy should be withheld preoperatively, and current practice varies throughout vascular centres.

Data collected since the opening of a hybrid (interventional/surgical) theatre in our hospital in 2013 shows 12% of patients undergoing an endovascular procedure have had a rise in creatinine sufficient to classify them as 'Stage 1 Acute Kidney Injury'[2].

To help rationalise perioperative RAASA use we are undertaking a pilot observational study examining the incidence of acute kidney injury (AKI) in patients undergoing endovascular procedures in our unit. We aim to investigate the relative incidence of AKI in two study groups; patients who continue RAASAs and those who discontinue treatment at least 24 hours pre-operatively. Local R&D approval was gained. We plan to use the data from this pilot study to inform the design of a randomised control trial.

All patients taking a RAASA and undergoing an infra-renal procedure were included. Exclusions: patients on regular diuretics or procedures proximal to or involving the renal arteries. Patients requiring further contrast during their stay were excluded. Demographic data, vascular-POSSUM score, length of procedure and dose of contrast were recorded. Creatinine levels were documented preoperatively and until discharge.

Data collected for 30 patients between April 2013 and June 2014 has been analysed. 13% had stopped their RAASA prior to surgery. A mean increase in Creatinine of 9% has been found in patients who stopped RAASA pre-operatively, compared with a 14% rise in patients who continued RAASA. This constitutes a 5% excess rise in Creatinine for patients who continued their RAASA.

In our small cohort, we demonstrate a 5% excess Creatinine rise in those who continue RAASA. Although this result may not be not clinically significant we continue to collect data and anticipate it will help identify a sample size required to power a future randomized control trial.

References

1.NICE. Acute kidney injury. Clinical guideline CG169. March 2013.

2.Acute Kidney Injury Work Group. Kidney inter, Suppl. 2012; 2: 1–138.

Is functional capacity related to deprivation?

S C V Paravastu, Michaels J A, Kerr K, Northern General Hospital, Sheffield

Introduction

Cardiopulmonary exercise testing (CPET) is the gold standard for assessing functional capacity prior to surgical intervention. Studies have shown that a reduced functional capacity can be predictive of poorer outcome following abdominal aortic aneurysm repair (1). The aim of this project was to determine whether there is any association between deprivation status and functional capacity.

Methods

All patients undergoing major vascular surgery at Sheffield Vascular Institute undergo CPET. A retrospective analysis linking Index of multiple deprivation (IMD) to functional capacity was performed. IMD is derived from postcode of patients' residence and is reported in 10 strata (least deprived 10% to most deprived 10%).

Patients with anaerobic threshold (AT) of <11ml/kg/min or ventilatory equivalent for carbon dioxide (Ve/VCo2) ≥42 were considered high-risk (2, 3) and patients considered to be high-risk based on both together were classified as combined high-risk. IMD was further stratified into 5 quintiles for analysis (most-deprived=quintile 1; least-deprived=quintile 5).

Results

A total of 946 patients underwent CPET between November 2005 and December 2014 of which, results of 898 patients (175 women; 720 men; mean age 72.4yrs) could be linked to their IMD. 50% of the patients belonged to the lower two quintiles and only 10% were in the highest quintile of deprivation.

Based upon AT alone (mean 10.9; range 4.4 to 22.4) and Ve/VCo2 alone (mean 35.45; range 21 to 70) or both together, the proportion at high-risk were 52%, 15.7% and 11.2% respectively.

There were significantly higher numbers of high-risk patients in older age groups with 6.2% high-risk patients aged <70yrs and 13.7% high-risk patients aged >70yrs (R^2=0.92; p=0.01). Significantly higher numbers of patients considered high-risk based on Ve/VCo2 were noted in lower quintiles (R^2=0.82; p<0.05). However, when combined risk was considered, there was only a trend towards higher percentage of high-risk patients in the lower quintiles of IMD without any statistical significance (18.3% high-risk patients in quintile 1 versus 10.6% in quintile 5; R^2=0.26).

Conclusion

There appears to be a significant correlation between deprivation index, based upon postcode, and Ve/VCo2. There is no significant association between deprivation index, and combined functional capacity.

References

1. Hartley R.A, Pichel A.C, Grant S.W, *et al.* Preoperative cardiopulmonary exercise testing and risk of early mortality following abdominal aortic aneurysm repair. *Br J Surg.* 2012; 99(11):1539-46

2. Hennis PJ, Meale PM, Grocott MP.Cardiopulmonary exercise testing for the evaluation of perioperative risk in non-cardiopulmonary surgery. Postgrad Med J. 2011; 87(1030):550-7.

3. Carlisle J, Swart M. Mid-term survival after abdominal aortic aneurysm surgery predicted by cardiopulmonary exercise testing. Br J Surg 2007;94:966e9.

SESSION 6 – VASCULAR ANAESTHESIA CPD

Anaesthesia for Emergency EVAR

Dr Natalie Courtois

No anstract submitted

ANAESTHESIA FOR LOWER LIMB PERIPHERAL VASCULAR REVASCULARISATION SURGERY

Indran Raju, Consultant Anaesthetist, Western Infirmary and Glasgow Royal Infirmary, NHS Greater Glasgow and Clyde.

Peripheral arterial disease (PAD) is defined as atherosclerosis that leads to arterial stenosis and occlusion in the major vessels supplying the extremities. The prevalence of PAD is estimated to be 10% worldwide and rising up to 20% in those over the age of 70 years. The 5-year survival for patients with critical limb ischaemia (CLI) is 50% – 60% and the one-year all cause perioperative mortality rate has been quoted to be as high as 17%. Peripheral vascular revascularisation (PVR) remains the mainstay of treatment if patients are fit enough and those with irreversible limb ischaemia should be treated with primary amputation or palliation.

Intermittent claudication is described as an aching muscle pain brought on by exercise and often relieved by rest. The underlying cause is a reduction in tissue oxygen delivery due to decreased blood flow and an increase in tissue oxygen demand during exercise. Ischaemic rest pain and tissue loss (ulcers or gangrene) are key signs of CLI and intervention should be considered when conservative measures have failed and when symptoms have become debilitating and lifestyle restricting. PVR is the mainstay of treatment for patients in whom the arterial anatomy is not suitable for endovascular intervention however endovascular intervention may still be beneficial for patients considered too high risk for surgery.

PVR is high-risk surgery with a combined cardiac death and non-fatal myocardial infarction at > 5%. Many of the patients are elderly but it is not uncommon to see patients in their fifth decade of life presenting for PVR. The increase in morbidity and mortality in patients undergoing PVR can mainly be attributed to pre-existing coronary artery disease. A thorough history and assessment is prudent in trying to elicit cardio-respiratory symptoms, functional capacity and modifiable risk factors. All patients must have a full blood count, coagulation, urea, electrolytes, glucose, HbA1C if indicated, CXR and an ECG preoperatively. Echocardiogram, non-invasive cardiac evaluation and pulmonary function tests are requested based on clinical findings and functional assessment. Patients often have multiple comorbidities and they should be medically optimised to reduce the perioperative and long-term risks but this must be balanced against the impending danger of CLI. Surgery should only be deferred if concurrent comorbidities can be corrected or stabilized.

PVR can be performed either under general anaesthesia or regional anaesthesia and both techniques have been used successfully for PVR. Irrespective of anaesthetic technique, good postoperative outcomes are most likely to be influenced by the meticulous management of oxygenation, haemodynamic stability, fluids, temperature and analgesia. Myocardial infarction is the most common cause of death after vascular surgery and an isolated Troponin leak is strongly associated with an increase in 30-day mortality. Respiratory complications are a significant cause of morbidity and are associated with elderly patients, smoking and chronic lung disease. The vast majority of patients undergoing PVR can be looked after in a vascular ward with the appropriate level of monitoring and nursing care.

Patients at an increased risk of cardiorespiratory complications should be looked after in a critical care environment to allow for early recognition and treatment of postoperative complications.

	Target
Glycaemic control	**HbA1C < 7% (ADA) or < 6.5% (EASD) in patients without cardiovascular disease** **HbA1C 7 – 7.5% in patients with cardiovascular disease or life expectancy < 10 years**
LDL - cholesterol	**< 1.8mmol/L**
Smoking	**Complete nicotine cessation**
Blood pressure	**<130/80mmHg**
Antiplatelets	**Aspirin or clopidogrel**

Treatment goals for modifiable risk factors in patients with diabetes and peripheral vascular disease. (Adapted from the American Diabetes Association and European Association for the Study of Diabetes guidelines)

Management of Chronic Neuropathic Pain in Vascular Patients
Dr Michael Serpell
No abstract submitted

Management of Patients with Pacemakers and ICD
Dr Martin Bewsher
No abstract submitted

POSTER PRESENTATIONS

The Current Practise of Consent in Elective Aortic Aneurysm Repairs at the Freeman Hospital, Newcastle Upon Tyne. *Claire Livsey, Christopher Johnson*

Freeman Hospital, Newcastle Upon Tyne.

In all cases of aortic aneurysm repairs, the decision about whether and when to repair an asymptomatic aneurysm is based upon the risks associated with the aneurysm itself and the risks associated with the repair (1). We are continually striving to achieve shared decision making with our patients and it is therefore vital that we provide up to date and accurate information regarding their individual risks during informed consent. To evaluate whether the information we are providing is valid, we looked at the current practise of the consent process in aortic aneurysm repairs, paying particular attention to whether specific mortality risks were discussed.

There are no current gold standards for consent in aortic aneurysm repairs. However, The Vascular Society (2) has published some patient information leaflets which provide a useful guide which we used, along with the General Medical Council (GMC) guidelines (3) on Consent as our standard.

We included all patients who had an elective aortic aneurysm repairs at the Freeman Hospital, Newcastle Upon Tyne (n=68) between January 9th – September 30th 2013 and retrospectively analysed the consent forms and operation notes from all the available patients notes (n=55).

One benefit was listed on 84% of consent forms; “to prevent the risk of rupture”. Most consent forms were completed on the day of surgery (71%). The number of risks listed ranged from 6-19 and the mean number of risks quoted was 12. More than half of the forms failed to mention chest infections, further surgery, stroke, graft infection, sexual problems and wound problems as risks. A total of 16% of the forms were illegible and 71% of consenters used abbreviations. Death was listed as a risk in 87% of consent forms and 31% of these quoted a figure. The specific mortality risks quoted ranged between 1% and 10% with the most frequent mortality risk quoted as 5%.

Some suggestions to improve consent in high risk procedures include the adoption of a standardised consent form which already stipulates the risks necessary to discuss with every patient. Alternatively we could provide patients with information leaflet and specify on the consent form whether the patient has read the information as this would also concur with the GMC's guidelines which encourage the use of providing written information.

References:

1. Chaikof EL, Brewster DC, Dalman RL et al. J Vasc Surg. 2009 Oct; 50 (4 Suppl): S2-49.
2. CirculationFoundation.org.uk [Internet]. London: The Vascular Society; [Cited 2014 Jul 01]. Available from: http://www.circulationfoundation.org.uk/help-advice/abdominal-aortic-aneurysm/
3. Gmc-uk.org.uk [Internet]. London: Good Medical Practice; Consent guidance; [Cited 2014 Jul 01]. Available from: http://www.gmc-uk.org/guidance/ethical_guidance/consent_guidance_index.asp

Haemoglobin levels and transfusion practices in lower limb amputations: a review of practice in our centre

Susan Halliday[1], John McKenna[1], Indran Raju [1, 2]

Western Infirmary[1] and Glasgow Royal Infirmary[2], Glasgow UK

Anaemia is common in patients with critical limb ischaemia due to chronic inflammation, infection and iron deficiency from poor nutrition. Low pre and post-operative haemoglobin (Hb) levels in vascular patients have been associated with post-operative cardiovascular events and mortality[1, 2]. Trends towards lower morbidity and mortality has however been seen with lower transfusion thresholds[3]. We sought to determine transfusion practices for patients undergoing a lower limb amputation in our tertiary vascular centre and evaluate the effect of Hb levels on 30-day outcomes and duration of hospital stay.

A retrospective case note review of 29 lower limb amputation patients over 3 months was conducted. Data was collected on pre and post-operative Hb levels, transfusion of packed red cells (PRC), 30-day outcomes and duration of hospital stay.

The mean pre-operative Hb was 109 g/L (range 79-147 g/L). Thirteen patients had a Hb less than 100 g/L pre-operatively. Five patients (Hb 58-98 g/L) received pre-operative PRCs and three patients (Hb 79-98 g/L) received PRCs intra-operatively. The mean post-operative Hb was 99 g/L (range 66-143 g/L). Eight patients (Hb 66-90 g/L) received PRCs post-operatively. The mean post-operative hospital stay was 28 for those with a Hb < 100g/L and 25 days for those with a Hb > 100 g/L. Three patients with a pre-operative Hb < 100 g/L had adverse outcomes: 1 wound infection with conversion to above knee amputation (AKA); 1 wound breakdown and revision; 1 wound infection. Six patients with a pre-operative Hb > 100 g/L had adverse outcomes: 1 cerebrovascular accident; 3 wound infections with 1 conversion to AKA; 2 chest infections; 1 pulmonary embolus; 1 acute kidney injury.

This audit highlights a wide range of transfusion practices for patients undergoing major lower limb amputations in our centre. Given the ambiguity in current literature and our failure to correlate Hb levels with adverse outcomes this is not surprising and transfusion decisions are likely to remain with the reviewing clinician until further evidence is provided.

References

1. Oshin OA, Torella F. Vasc Endovascular Surg 2013; 47: 449-453

2. Valentijn T, Heoks S, Martienus K et al. Eur J Anaesthesiol 2013; 30: 664-670

3. Patel MS, Carson JL. Med Clin North Am 2009; 93: 1095-1104

Evaluation of the accuracy of the Hemochron Signature Elite point of care micro coagulation instrument compared with laboratory assay.

C. Ferguson, G. Morrison, T. Housden, E. Best.

Royal Infirmary of Edinburgh, 51 Little France Crescent, Edinburgh, EH16 4SA

Central Neuraxial Blockade (CNB) is commonly used in anaesthetics. It has several advantages over a general anaesthetic however contraindications include coagulopathy. Guidelines suggest a CNB should not be undertaken with an INR of 1.5 or greater. A common cause of an elevated INR is warfarin therapy.

Typically warfarin is stopped 3-7 days prior to elective surgery. The INR is checked on the day of surgery to ensure it has fallen to an acceptable level. The decision to proceed with any planned CNB is often based on this result.

On occasions, a point of care (POC) device is used as an alternative to a formal laboratory INR. Anecdotally there appears to be a difference between the 'expected' and actual INR when a POC device is used. Concern exists that patients may be denied the potential benefits of CNB if a POC device provides a falsely high result, or conversely we may be proceeding with CNB in patients with an unacceptably high INR if POC provides a falsely low result.

The Hemochron Signature Elite is a portable micro coagulation system that can be used for POC anticoagulation monitoring. Marketing is focussed on its accuracy, convenience and efficiency in delivering a coagulation result.

The aim of the research study is to evaluate the accuracy of the Hemochron Signature Elite micro-coagulation device. This device will be compared to the current gold standard laboratory assay.

It is a prospective study which includes adult patients presenting for elective surgery who have stopped their warfarin therapy within the last 7 days.

Patients presenting for elective surgery who have recently discontinued warfarin routinely have a blood sample taken on the morning of surgery for the purpose of measuring a laboratory INR. Study participants in addition will have a POC INR measured at the same time.

The primary outcome is the absolute difference in the results obtained from the gold standard laboratory assay and the Hemochron Signature Elite instrument.

In all but one of the patients tested the POC device was shown to over read the INR compared with the laboratory assay. In only one patient were both INR calculations identical.

These results support the concerns regarding the accuracy of this POC device. Further research may provide a correction factor which may eliminate this inaccuracy.

Malnutrition Universal Screening Tool (MUST): Scoring of patients undergoing lower limb amputation in our tertiary vascular centre

Susan Halliday[1], John McKenna[1], Indran Raju[1, 2]

Western Infirmary[1] and Glasgow Royal Infirmary[2], Glasgow, UK

Malnutrition is prevalent in inpatients, with one study revealing malnutrition in 61% of elective vascular admissions[1]. Malnourishment contributes to post-operative morbidity, delayed wound healing, increased infection and prolonged hospital stay. The Promoting Good Nutrition Strategy recommends all adult patients be screened using MUST, which categorises patients into low, intermediate or high risk of malnutrition[2]. We sought to determine MUST scoring for patients undergoing a lower limb amputation in our tertiary vascular centre and evaluate if MUST scores correlate with outcomes and duration of hospital stay.

A retrospective case note review of 29 lower limb amputation patients over a 3-month period was undertaken. Data was collected on MUST scores, days in hospital pre- and post- amputation, and 30-day vascular surgery outcomes.

The MUST score was available for 21 patients. Seventeen (80%) patients had a score of 0, 1 patient (5%) had a score of 1, 2 patients (10%) had a score of 3 and 1 patient (5%) had a score of 4. The duration of hospital stay is shown in table 1. Analysing 30-day outcomes in those with a MUST score of 0, 2 patients required conversion from a below to an above knee amputation (AKA), 1 patient a wound revision, 1 patient antibiotics for infection and 1 patient had a cerebrovascular accident. The patient with a MUST score of 1 had a wound infection and 1 patient with MUST score of 3 had a conversion to an AKA.

MUST score (Number of patients)	Duration in hospital pre-amputation Mean days (range)	Duration in hospital post-amputation Mean days (range)
0 (17)	8.4 (1-25)	31.2 (10-79)
1 (1)	1	8
3 (2)	14 (8-20)	29.5 (23-26)
4 (1)	1	10

Table 1; Duration of hospital stay shown by MUST score.

The majority of patients undergoing a lower limb amputation in our unit were scored as a low malnutrition risk. This differs from reports on elective vascular[1] and critical limb ischaemia admissions[3], which may be explained by the different screening tools and illness criteria used. This audit has highlighted that we do not score our patients undergoing an amputation as having an acute illness, which would give a minimum MUST score of 2, indicating a high risk of malnutrition. Readjusting the scores will place more of our patients in the high-risk category. Therefore we are failing to detect 'at risk' patients indicating a need to re-evaluate current practice so that patients get proper nutritional support on admission and in the peri-operative period. There was no correlation between MUST scores and 30-day outcomes however the numbers are too small to make a definitive conclusion.

References

1. De Waele E, Moerman L, Van Bael K, et al. J Transl Intern Med 2014; 2: 32-35

2. Department of Health, Social Services & Public Safety. Promoting good nutrition. Guidance and resources to support the use of 'MUST' across all care settings. Available from http://www.dhsspsni.gov.uk/pgn-must.pdf (accessed 30 June 2014)

3. Shah M, Martin A, Myers B, MacSweeney S , Richards T. Ann R Coll Surg Engl 2010; 92: 495-498

Survey on management of spinal drains in thoraco-abdominal aortic aneurysm repair.

V Jain*, J Griffiths*, M Stoneham*, R Kukreja**.*

**Oxford University Hospitals NHS Trust, **Southampton General Hospital*

Spinal cord ischemia (SCI) is a potentially devastating complication of repair of thoracic aortic pathology. Cerebrospinal fluid (CSF) drainage has been found to be beneficial to prevent SCI, however, it is associated with potentially serious complications.

We sent out a questionnaire to all UK cardiac and major vascular units asking cardiothoracic and vascular anaesthetists about their current practice for management of spinal drain in thoraco-abdominal aortic aneurysm repair in UK.

138 anaesthetists responded, of which 78 had inserted a spinal drain in a patient undergoing TAAA/TEVAR. Seventy seven per cent of respondents had vascular anaesthesia as their main area of interest. For nearly half of the respondents, there were no reported departmental policy/protocols in place to guide the management of spinal drains inserted for TAAA/TEVAR repair. Sixty eight per cent of respondents had inserted a spinal drain fewer than 3 times in previous 12 months. High-risk aneurysmal pathology and surgeons request were the main indications for inserting a spinal drain. The procedure was done in awake patients as common as in asleep patients. CSF pressure monitoring was the most common method of managing the spinal drain with the drain either on free drainage to maintain CSF pressure less than 10 mmHg or a limited amount of CSF (10-15 mls) drained every hour. On average, spinal drains were left in-situ for 2-3 days and were managed either in a high dependency or intensive care unit. Complications were not commonly observed but there were serious complications reported including intracranial haemorrhage and spinal haematoma.

This survey clearly demonstrates that at the current time there is little general consensus on how to best manage a spinal drain inserted for a TEVAR/TAAA procedure. As these procedures are sometimes performed as an emergency, a specialist anaesthetist with experience in spinal drain management may not be available, leaving a less experienced anaesthetist to undertake an unfamiliar procedure. We suggest the development of local, and even national guidelines pertaining to the indications, insertion and management of spinal drains in elective and emergency TEVAR/TAAA repair as one way of standardising approach and minimising risk related to this evolving procedure.

An audit of perioperative mortality rates after major amputation surgery in Hairmyres Hospital

Michael Burns MBChB Med Student, James Horton MBChB Med Student, Dr Bryce Renwick Vascular Fellow, Dr Susanne Farrell Cons Anaesthetist

Hairmyres Hospital, East Kilbride

The perioperative mortality rate following major amputation surgery has been reported as ranging from 9-17% [1]. In 2010, the VSGBI Council published a Quality Improvement Framework with the aim of achieving a perioperative mortality rate of below 5% after major amputations by 2015 [1]. It also recommended a ratio of Below Knee Amputation (BKA) : Above Knee Amputation (AKA) of greater than 1.

We aimed for our hospital, Hairmyres in 2013:

1. to determine the perioperative mortality rate for all patients who underwent major amputation surgery
2. to ascertain the ratio of below Knee Amputations (BKA) : Above Knee Amputations (AKA).

Patients were identified by interrogating ORMIS theatre database for all major amputations in 2013.The databases Trakcare and Clinical Portal were used to determine whether the patients had survived 30 days following their amputation. If they had died, the causes of death were reviewed.

82 major amputations were carried out in 2013. Data were obtained for 80. There were 5 deaths within 30 days of their operation, resulting in a mortality rate of 6.25%.
32 BKAs and 50 AKAs were carried out, giving a BKA:AKA ratio of 0.64
Of the patients who died within 30 days of their amputation, 3 were post AKA (mortality rate: 6%) and 2 were post BKA (mortality rate: 6.25%).

One patient died 28 days after their operation and had they survived for another few days, the mortality rate would have been 5%.
BKAs favour rehabilitation, as the remaining joint allows for more chance that the patient will be able to walk again. However, AKAs are often chosen by the surgeon as they are quicker operations with less haemorrhage and therefore less morbidity for the frail patient.
To improve mortality rates, it would be necessary to discover how patients actually died, and then decide how we can prevent this. This audit was too small for this purpose, but providing causes of death in all future audits may point to patterns in mortalities and aid in improving patient care.

This audit allows anaesthetists and surgeons to better inform patients of the risks involved in these operations.
Our data on BKA: AKA ratio suggests there is room for discussion between the surgical and anaesthetic teams regarding patient fitness before a final decision is made, such that BKA may be offered to a greater proportion of patients.

References

1. Vascular Society of Great Britain and Ireland (VSGBI). Quality Improvement Framework for Major Limb Amputation [Internet]. London. VSGBI; 2012.

Reduction of contrast induced nephropathy (CIN) following endovascular aortic aneurysm repair (EVAAR).

Dr.Chandra Vaidyanath[1], Dr.T.Saran[2], Dr.M.Patteril[2]

1- ST7 Anaesthetic Registrar, 2- Consultant Anaesthetist, University Hospitals Coventry & Warwickshire

Background:

Patients undergoing EVAAR are at a risk of CIN. The severity of renal injury depends on a number of factors. CIN is defined as defined as an absolute increase in serum creatinine of 44 mmol/L or a relative increase of 25% from baseline, provided other causes of renal dysfunction are excluded (1). Patients with clinical risk factors like chronic renal impairment, diabetes, perioperative dehydration, advanced age, perioperative use of nephrotoxic drugs and contrast used are more likely to suffer significant renal insult due to reduced safety margin (2).

Objectives:

Over the years a number of strategies have been proposed (3). The aim of all the techniques is to reduce the extent of renal insult irrespective of the associated co-morbidities. Our aim was to find out what was the current practice amongst all the vascular anaesthetists in Great Britain & Ireland.

Material & Methods:

A questionnaire was comprised using the survey monkey tool. The main focus of this questionnaire was based on three strategies that were most commonly used across the globe. They were primarily hydration therapy, use of N-acetyl cysteine (NAC) and sodium bicarbonate (4-7). We also wanted to find out what was the strategy used in post-operative fluid management in these cases.

Results:

The survey was made up of eight questions directly focused on the three strategies used. 83% of the respondents preferred using hydration therapy in their unit prior to contrast injection compared to N-acetyl cysteine and sodium bicarbonate. 86% preferred Hartmann's solution to 0.9% saline. 58% suggested they would prefer giving 10ml/kg of crystalloid prior to contrast injection in theatre. If given the choice of administration of sodium bicarbonate, 74% chose 1.26% polyfusor over 8.4% NaHCO3 in a one litre bag. The most preferred dose was either 1ml/kg or 3ml/kg while only 20% chose a dose of 2ml/kg. While administering NAC, 64% preferred to give it intravenously in a dose of 150mg/kg bolus.

Conclusion:

Thus the consensus is around use of perioperative hydration therapy using Hartmann's solution upto 10ml/kg prior to contrast injection in theatre as the most preferred technique. The current practice regarding post-operative fluid management prior to the patient eating and drinking comprised of 1000 mls of crystalloid given over a period of 6 to 8 hours.

Acknowledgement:

We are grateful to VASGBI for approval and circulation of this survey amongst all its members.

References:

1. Stevens MA, McCullough PA, Tobin KJ et al. *J Am Coll Cardiol* 1999;403–411.
2. Wong GTC, Irwin MG. British journal of anaesthesia 2007;474-483.
3. Sterling KA, Tehrani T, Rudnick MR. Curr Opin Nephrol Hypertens 2008;616–623.
4. Weisbord SD, Palevsky PM. Clin J Am Soc Nephrol 2008;273–280.
5. Sun Z, Fu Q, Cao L, Jin W et al. PLoS ONE 8(1) 2013;e55124.
6. Vasheghani-Farahani et al. American Journal of Kidney Diseases 2009;610-618.
7. Kasipandian V, Pichel AC. CEACCP 2012;312-316.

'Improving the Out Of Hours Perioperative Care of Patients With Leaking or Ruptured Abdominal Aortic Aneurysms' – A service improvement project -

Sewell D, Bidd H and Boss L,

Guys and St Thomas NHS Foundation Trust

Guys and St Thomas' NHS Foundation Trust (GSTT) is now the tertiary referral centre for South East Thames Vascular Network and thus provides the care for patients with leaking or ruptured abdominal aortic aneurysms (AAAs) who live in South East London and Kent. This responsibility has come with an increase in the volume but also the complexity of our vascular caseload.

GSTT has a large anaesthetic department with a general on-call rota comprising 22 consultant anaesthetists. Many of these consultants do not cover a regular elective vascular surgical list but they are often called upon to cover emergency cases out of hours. The most challenging vascular cases to manage are the leaking or ruptured AAA that require either an open procedure or endovascular repair.

The vascular anaesthetic consultants observed an increase in the number of enquiries from their colleagues seeking advice about how to best manage this cohort of patients. The decision was made to conduct a service improvement project that would help the out-of-hours on-call general anaesthetic team deliver improved patient care.

The stakeholders involved in the management of these patients were identified and approached for their opinions on where the current deficiencies lay and what they thought they might help them.

Table 1 offers a summary of the key ideas and suggestions from the main stakeholders.

We decided to produce a set of easily accessible guidelines that offered simple but practical advice based on the current best evidence [1,2]. We quality assured the documents by asking experts in the field to critique them before re-editing and publishing them on the Trust Intranet. We also offered anaesthetists and nursing staff drop-in theatre sessions so they could observe elective vascular procedures, ask questions and discuss different techniques with their colleagues.

We surveyed the general anaesthetic consultants and nursing staff to see if the guidelines were a useful tool to help them care for these complex surgical patients. All respondents reported that they felt better prepared for these emergency cases and where they could seek further advice if needed.

Although difficult to interpret any immediate improvements in outcome, our aim is to review surgical outcome data to try to ascertain whether we have objectively improved patient care.

References

1. IMPROVE trialists. Endovascular or open repair strategy for ruptured abdominal aortic aneurysm: 30 day outcomes from IMPROVE randomised trial. BMJ 2014; **348**:f7661
2. Moll F, Powell J, Fraedrich G et al. Management of abdominal aortic aneurysms clinical practice guidelines of the European society for Vascular Surgery. Eur J Vasc Endovasc Surg Vol 41 S1-S58

Table 1

STAKEHOLDER	**THOUGHTS & SUGGESTIONS**
Vascular anaesthetic consultants	Multi-disciplinary environment Communication is the key Occult blood loss IMPACT trial
General anaesthetic consultants	1-2 page documents Little tips and tricks please No waffle Recipe Different documents for EVAR and Open Best evidence vs best practice
Consultant vascular surgeons	IMPACT trial Contact us early We have over arching responsibility Senior anaesthetist present even if procedure performed under local Which anaesthetist makes a difference Continuous dialogue very important
Consultant interventional radiologists	Early warning of arrival Still patient

General theatre nursing staff	Warning of what equipment is required Clear leadership Delegation of tasks Information as early as possible Booked ICU/OIR bed
Vascular theatre nursing staff	Bloods sent in ED All consultants discuss plan Use WHO checklist
Radiographers	Time to warm machine up Clear instructions Dialogue about where patient is placed on the table
Anaesthetic trainees	Not what is in textbooks Recipe please
Vascular surgical trainees	Simple flow diagram Early communication Early extrication from ED

Cervical plexus block for Carotid Endarterectomy – assessment of accuracy and safety under ultrasound

Dr W Thomas and Dr J Paul

Russells Hall Hospital, Dudley.

Carotid endarterectomy (CE) is often performed by blocking the deep and superficial components of the cervical plexus (CP). Traditional landmark approach can sometimes result in unpredictable block, block failure, direct vascular-puncture or neurological complications. These complications are more likely in the neck where there is a close proximity of vascular and nerve structures. Ultrasound (US) imaging will allow clear identification of the target nerve and other vital structures, needle progression and the local anaesthetic (LA) spread allowing us to improve the accuracy and safety of nerve blockade. We aim to evaluate the efficacy and safety of US guided CP block.

We identified 37 patients who underwent CE under US guided CP block between January 2010 to May 2014. The superficial plexus was identified as hyper-echoic shadows between the sternomastoid and scalenus medius muscle and the block was performed by depositing 12 ml of 0.5% Chirocaine at the mid, upper third and middle third of sternomastoid. Deep cervical block was performed by depositing 15ml 0.5% Chirocaine at C_4, C_3, C_2 transverse processes. Data collected include the volume of LA used, diaphragm movement, patient comfort levels using Gloucester Comfort Score and complications of the block. Also noted the additional LA used by the surgeon and where it is used.

Average total volume of LA used was 25 ml and the average additional LA used by surgeon was 3.24 ml (lignocaine 0.5%). 15 (41%) patients didn't required any additional LA. 13 (35%) patients need additional LA when carotid sheath was approached. 22 (60%) patients had minimal discomfort when carotid sheath approached. All the patients have bilateral diaphragmatic movement on US. There were no complications and all patients had an uneventful recovery.

In this series of 37 patients who had CP blocks, there were no complications and the analgesia was effective and supplemental LA requirement was minimal. However, being a small series and a single experienced anaesthetist was involved no conclusion can be drawn regarding safety of the procedure. We believe this study improved the awareness and encourage the use of US guided CP block among the colleagues. More importantly, US guided block reduced the technique-related complication rate.

Reference:

Roessel T, Wiessner D, Heller A et al. High-Resolution Ultrasound-Guided High Interscalene Plexus Block for Carotid Endarterectomy. Reg Anesth Pain Med. 2007; 32 (3): 247–253.

Priming exercise and fasting prior to cardiopulmonary exercise testing may have significant effects on anaerobic threshold and risk stratification

Michael Holland[1], Suet Lua[2], Ravi Shankar[2]

[1] CT2 Anaesthetics, Bedford Hospital

[2] Consultant Anaesthetists, Bedford Hospital

Cardiopulmonary exercise (CPEX) testing has been shown to be effective for identifying patients at high risk for major surgery. Peak oxygen uptake (VO_{2p}) and the anaerobic threshold (AT) can be accurate predictors of post-operative morbidity and mortality.[1] However, consideration should be given to the subjects' pre-test fasting and fatigued states to ensure accurate values are obtained. We present three cases where subjects attended for CPEX studies having undergone heavy exercise immediately prior to the testing or having fasted.

A 65 year old man took a CPEX test prior to abdominal aortic aneurysm (AAA) surgery. AT was 8 mL/kg/min and VO_{2p} 18 mL/kg/min. He cycled at home prior to the appointment and was not rested when he took the test. The test was repeated a week later without prior exercise. Repeat testing showed an AT of 11 mL/kg/min and VO_{2p} of 16 mL/kg/min (*case 1: table 1*).

A healthy 68 year old male volunteer undertook CPEX testing. His AT was 15 mL/kg/min and maximum oxygen uptake (VO_{2m}) was 34 mL/kg/min. He had walked briskly for about 4 miles before the CPEX test. He rested for 45 minutes following which the testing was repeated. On the second test he achieved an AT of 25 mL/kg/min and VO_{2m} of 38 ml/kg/min (*case 2: table 1*).

A 62 year old woman due to have AAA repair, attended a morning session for CPEX testing having fasted overnight. Her AT and VO_{2p} were 11 mL/kg/min. The test was repeated one hour following a light breakfast and demonstrated an AT of 13 mL/kg/min and VO_{2p} of 16 mL/kg/min (*case 3: table 1*).

Case 1	AT (ml/kg/min)	$VO_{2\ peak}$ (ml/kg/min)
First test	8	18
Second test	11	16
Case 2	AT (ml/kg/min)	$VO_{2\ max}$ (ml/kg/min)
First test	15	34
Second test	25	38
Case 3	AT (ml/kg/min)	$VO_{2\ peak}$ (ml/kg/min)
First test	11	11
Second test	13	16

Table 1

The effect of priming exercise on the pattern of VO_2 during secondary exercise has been described, although there is evidence to suggest it has little effect on VO_{2m}.[2] The length of time intervening between priming and secondary exercise is likely to be significant in achieving accurate values for AT during the secondary exercise and it has been recommended that 45 minutes rest is adequate before the start of testing.[3] Patients who are not appropriately rested or who are fasted may give highly misleading CPEX results leading to a significant difference in their perioperative management and predicted level of risk.

References

1. Smith TB, Stonell C, Purkayastha S, Paraskevas P, Anaesthesia 2009; 64: 883–893

2. Ferguson C, Whipp BJ, Cathcart AJ, Rossiter HB, Turner AP, Ward SA, J Appl Physiol 2007; 103: 812–822

3. Burnley M, Doust JH, Jones AM, J Appl Physiol 2006; 101:1320-1327

ULTRASOUND-GUIDED ILIO-INGUINAL AND FEMORAL NERVE BLOCKADE TO FACILITATE THORACIC ENDOVASCULAR ANEURYSM REPAIR (TEVAR).

Dr Douglas Bomford, ST5 Anaesthetics, Dr Michael Holland, CT2 Anaesthetics, Dr Anwar Rashid, Consultant Anaesthetist, Dr Gagan Kohli, Consultant Anaesthetist, Department of Anaesthesia, Bedford Hospital, Bedford MK42 9DJ, UK

Background and Aims

TEVAR is a minimally invasive therapeutic option for dilatation of the thoracic aorta which confers less perioperative patient morbidity and mortality compared to an open procedure. Spinal cord ischaemia is a dreaded complication of TEVAR. Neuraxial anaesthesia has less pulmonary morbidity compared to general anaesthesia, but confounds neurological assessment to monitor spinal cord ischaemia. We report the use of ultrasound-guided peripheral nerve blocks (PNB) to facilitate TEVAR.

Methods

A 66 year old male noted to have a 7cm thoracic aortic aneurysm (TAA) on routine surveillance, was listed for elective TEVAR. After attaching routine monitoring, intra-venous access and intra-arterial blood pressure monitoring, a lumbar drain was sited at L3/4 interspace. Epidural was then sited at L2/3, with a test dose (5ml) of 1% lignocaine to confirm efficacy.

The patient was then placed supine. Under ultrasound guidance, bilateral ilio-inguinal and femoral nerve blocks were sited. Sedation using propofol and remifentanil target controlled infusion (TCI) was administered, with verbal contact maintained throughout. Surgical duration was 202 minutes and proceeded uneventfully.

Results

Successful surgical anaesthesia was achieved with PNBs and analgesic supplementation with remifentanil TCI. The epidural which was inserted as a backup in case of failed PNB was not used.

Conclusions

Ultrasound-guided PNBs together with remifentanil TCI can be a suitable alternative anaesthetic technique for TEVAR. It facilitates neurological assessment for monitoring spinal cord ischaemia without the confounding effects of epidural anaesthesia. Potential for exceeding total recommended dose of local anaesthetic is a concern when using this technique.

Trainee-led Severn Region Major Lower Limb Amputation Quality Improvement Project

Dr Gemma Nickols, Dr Christopher Newell, Dr Ronelle Mouton, Southmead Hospital, North Bristol NHS Trust

Following the publication of the Quality Improvement Framework (QIF) for major amputation surgery (1), practice was audited across the Severn region through a retrospective single centre and prospective multicentre audit. The results were combined to identify deficient areas of care relating to these patients. As vascular services in our region are being centralised, this is an ideal opportunity to carry out a quality improvement project at North Bristol NHS Trust (NBT).

The multicentre audit was performed for two months in four centres by the Severn Trainees Anaesthetic Research (STAR) group, a collaborative network of anaesthetists from the Bristol School of Anaesthesia. Intraoperative care was good, however pre-operative care was lacking, particularly the absence of V-POSSUM risk scoring. The single centre retrospective audit (2), carried out at the University Hospitals Bristol NHS Foundation Trust, also demonstrated a lack of pre-operative risk scoring. Overall mortality was 11.5%. Both studies demonstrated a wide variety of anaesthetic techniques from general anaesthesia to regional in the form of spinals and epidurals, with sporadic use of nerve infusion catheters. Post-operative acute pain and physiotherapy team reviews were lacking for some patients. The results of these audits are summarised in table 1.

There is room for improvement, especially in pre and post-operative care. Proposed changes aimed at reducing morbidity and mortality in these patients include two pathways. For patients undergoing elective lower limb amputations, inclusion in a vascular lower limb surgery enhanced recovery programme (ERP) currently in discussion at NBT. For emergency inpatients, the use of a major lower limb amputation checklist ensuring all key aspects of the QIF are addressed and managed appropriately. Reducing the variance in anaesthetic practice by instituting a standardised protocol is being discussed. Educating staff in the use of these pathways is essential. We will allow six months for full implementation before evaluating quality improvement, by assessing compliance with the ERP and QIF, and measuring mortality. Throughout the process we will seek to engage patients and obtain their feedback.

References

1.Vascular society of Great Britain & Ireland 2010. http://www.vascularsociety.org.uk/doc-catgory/audit-qi/ (accessed 22 july 2014)

2.Nickols G. *Anaesthesia* 2014; 69: 1-55.

Table 1:

	Retrospective Audit	Prospective Audit
Data collection period	01/03/12 – 29/02/13	01/07/13 – 31/08/13
Number of patients for whom data collected	26	26
Male: Female ratio	14 : 12	19 : 7
ASA III	23	16
ASA IV	3	9
Pre-operative V-POSSUM risk scoring	4%	15%
Pre-operative optimisation	92%	95%
Pre-operative consultant anaesthetist review	65%	68%
Amputation performed within working hours	92%	92%
Surgeon regularly performing amputations	92%	92%
Nerve infusion catheter used	62%	43%
Acute pain team review day 1	42%	70%
Physiotherapy review day 1	50%	45%

'Predicting outcome from open aortic surgery- a risky business'

Dr Marie Davidson, Dr Susanne Farrell, Dr Andrew Mitchell

Anaesthetic Department, Hairmyres Hospital, East Kilbride

Risk stratification in major vascular surgery presents a significant challenge for the anaesthetist. Elective open abdominal aortic aneurysm (AAA) surgery carries a mortality risk, which at 7.9% in the UK[(1)], was deemed unacceptably high. This prompted a drive for national quality improvement. The Vascular Society's AAA Quality Improvement Programme (QIP) targeted a reduction in elective AAA repair mortality to 3.5%[(2)].

For elective aortic surgery we aimed to ascertain our mortality figures, length of stay (LOS) and assess usefulness of Cardiopulmonary Exercise Testing (CPET) and Glasgow Aneurysm Score (GAS) in risk predication.

Data were collated from an anaesthetic led database for all elective open aortic surgeries between January 2010 and December 2013. Ward Watcher and Trak system were used to obtain follow-up data.

Over the 4-year period, 48 elective open aortic surgeries were carried out in our centre (18 occlusive disease and 30 AAA repairs). Three patients died within 30 days, equating to a mean unadjusted 30-day mortality for all open aortic surgery of 6.3% and for open AAA alone of 3.3%. Mean 1-year mortality rates for all open aortic surgeries and open AAA alone were 7.3% and 3.7% respectively. Critical Care LOS ranged from 2-23 days (median 5 days). Total hospital LOS range was 5-71 days (median 9 days).

Anaerobic threshold (AT) as derived by CPET testing was available for 9 open aortic surgery patients. AT ranged from 9.2–15.1 ml/kg/min. 1 of the patients who died within 30-days underwent CPET. They had an AT of 12.2ml/kg/min and GAS of 84. A further 7 patients with AT ranging from 7.0-10.8ml/kg/min were deemed too high risk for surgery.

Our mean mortality figures for open AAA surgery are within AAAQIP target and represent only 1 death at 30-days. CPET did not reliably predict mortality risk in our small cohort or correlate with LOS as an indirect marker of in-hospital morbidity.

We are using CPET more and more to help inform our decision-making. This audit however shows that predicting risk in this relatively infrequent surgery is fraught with difficulty. We owe it to our patients to be open about this.

References

1.ESVS. Second Vascular Surgery Database Report 2008. Available at http://www.esvs.org (Accessed June 2014)

2.VSGBI. Delivering a National Quality Improvement Programme for Patients with Abdominal Aortic Aneurysms 2012. Available at http://www.aaaqip.com (Accessed June 2014)

Analgesia following lower limb amputation: A novel approach using a dual lumen peripheral nerve catheter

R. Hackett, E Kothmann

James Cook University Hospital, Marton Road, Middlesborough, TS4 3BW

Analgesia following lower limb amputation is a challenging area and there is little robust evidence to show a superior technique. A previous audit in our department demonstrated that sciatic nerve catheters improved post-operative pain scores. We hypothesized that further improvement could be achieved with the novel use of a new double lumen nerve catheter device to infiltrate both the sciatic nerve and stump wound.

We introduced this technique in March 2014 and present 4 months of data. Prior to wound closure a Painkwell® dual lumen catheter was sited to both the sciatic nerve sheath and the distal stump by the surgeon. An initial precalculated loading dose of 0.25% chirocaine was bolused via the catheters, followed by a continuous infusion of 0.1% bupivicaine at 4mls/hr via a single use elastomeric pump, for up to 72 hours. Pre-operative clinical details, total analgesic requirements and pain scores (0-10 verbal score) were prospectively collected for each patient. Results were compared to our previous audit data of 32 patients who received a single lumen sciatic nerve catheter.

Twelve patients had a dual lumen catheter device within this period (male 9, female 3. median age 72, range 51 – 89yrs) 7 patients underwent below knee and 5 above knee amputations. Mean pain scores (and range) at 12, 24 and 48 hours were 2.4 (0-8), 2.7 (0-10) and 1.8 (0-7) respectively. Seven of the patients did not record a pain score of more than 4 up to 60 hours post op. Three patients had a reduced need for opiate analgesia compared to their pre-operative requirements, and 2 patients required rescue morphine PCA. Compared to our data from single lumen catheters, mean scores were similar at 24 hours (2.7 vs. 2.5) and improved at 48 hours (2.7 vs. 3.4).

We are continuing to collect data in this series; however these limited results show promise that this novel technique using a dual lumen catheter may improve pain relief in this complex group of patients. Feedback from surgeons highlighted some initial difficulties with the logistics of introducing a new technique, however this had improved within a small number of cases and we plan to continue to evaluate this technique.

Comparison: Subjective vs objective METS in evaluating pre-operative fitness

Dr Arystarch Makowski MD, PhD; Dr Dineth Seneviratna; Ms Katharine Richardson, Clinical Exercise Physiologist

Background

Functional capacity is a pivotal step in pre-operative risk assessment. Metabolic equivalent of task (MET) is a simple, practical and easily understood physiological measure which expresses the energy cost of physical activities. It is defined as the ratio of metabolic rate during a specific physical activity to a reference metabolic rate, set by convention to 3.5 ml O2 kg min or equivalently. According to the European guidelines for cardiac patients having non-cardiac surgery METs is classed as moderate to excellent functional capacity and non-invasive cardiac testing is not a pre-requisite for high risk surgery, whereas those patients with <4 METs require non-invasive cardiac testing prior to surgery.

Methods

We performed a retrospective analysis of 33 elective abdominal aortic aneurysm (AAA) patients aged 74¡À6 years (94% males), that were pre-assessed for elective abdominal aortic aneurysm (AAA) repair. All patients underwent a cardiopulmonary exercise test (CPET) on a stationary bike, whereby METS were taken at peak oxygen consumption (VO_2) (Objective METs). Patients also attended a pre-assessment clinic on a separate day, where METS were subjectively assessed by a pre-assessment nurse using ranked METS values corresponding to patients' opinions of their maximal everyday physical activities (Subjective METs). Paired T-tests were calculated using SPSS v20 (Table 1).

Results

	N	Mean±SD	Paired 95% Confidence Upper	t	Sig.(2-tailed)
Objective METs	33	4.64±1.3	-0.108	-2.451	0.02
Subjective METs	33	5.28±0.9			

Table 1. Comparison of objective and subjective METS preoperatively

Conclusion

Patients tend to overestimate their physical ability in pre-assessment, which highlights the importance of utilising CPET in patients having elective AAA repair.

We therefore need to emphasise the importance of carefully assessing METS to the pre-assessment team. Future research should ascertain the accuracy of subjective METs in other surgical populations.

References

1.Polderman D, Bax J,Boersma E et al. Guidelines for pre-operative cardiac risk assessment and perioperative cardiac management in non-cardiac surgery.

European Heart Journal 2009 **30**, 2769¨C2812

A Local Review of Anaesthetic Practices in Carotid Endarterectomy

I Okonkwo[1], R Shivalingum[2], M Hulgur[3]

1. Speciality Trainee in Anaesthesia
2. Associate Specialist in Vascular Surgery
3. Consultant in Anaesthesia

Wrightington Wigan and Leigh NHS Foundation Trust, Wigan Lane, Wigan, WN1 2NN.

Abstract:

Background

Carotid endarterectomy (CEA) has been performed under both general and local anaesthesia since 1953. Strokes (1.6%) and transient ischaemic attacks (0.5%)[1] are common perioperative complications. Anaesthetists agree that the 'gold standard' in cerebral monitoring is an awake patient, however, the 'GALA Study' and others suggest that no anaesthetic technique is superior to another, with awake surgery under regional anaesthesia conferring few significant benefits.[2] The perception since GALA, is that many anaesthetists are moving away from 'awake CEA'. In light of this we conducted a retrospective review of anaesthesia for CEA within our institution to evaluate the success of current anaesthetic practice.

Methods

Retrospective review of the anaesthetic management of patients requiring carotid endarterectomy between October 2010 and June 2014. We compared our data to results from the UK Carotid Endarterectomy Audit – Round 3 to 5.

Results

146 cases were identified. 37.2% (54 cases) Female; 62.8% (91 cases) Male
Age: Mean; Median (IQR) = 70; 72(65.5-78)

98.6% (144 cases) were performed under local anaesthesia (LA) - 8 cases converted intraoperatively.

Table 1: A Comparison of Local & National data

	WWL NHS Foundation Trust 10/2010 – 06/2014	UK CEA Audit – Rounds 3-5 10/2009-09/2012
Local Anaesthesia	93.79% (136/145)	43.68% (7329/16776)
General Anaesthesia	0.70% (1/145)	54.7% (9178/16776)
Local Converted to GA	5.52% (8/145)	1.59% (266/16776)
Shunt Use	2.74% (4/146)	45.96% (7558/16443)
TIA	2.05% (3/146)	0.53% (88/16774)
Inpatient Stroke	1.37% (2/146)	1.56% (263/16774)

Conclusion

Our institution performs the majority of CEA on awake patients under regional anaesthesia, nationally anaesthetic practice has not changed significantly since GALA,[1] however the GA *vs* RA split is more balanced with an increasing volume of cases utilising GA. Our results mirror those seen within the GALA Study – we had a significantly lower shunt rate and similar incidence of postoperative neurological complications. This would support the school of thought that no anaesthetic technique is superior, however more work is needed and to further evaluate sedation practices and identify any subgroups that might benefit from a particular technique.

References

1. VSQUIP. UK Carotid Endarterectomy Audit Round 5 Report. October 2013.
2. Lewis SC, Warlow CP, Bodenham AR*, et al.* GA *vs LA* for carotid surgery (GALA): a multicentre, randomised controlled trial. *Lancet* 2008; 372:2132-42

An audit of current practice and formulation of a guideline for the post-operative management of carotid endarterectomy

Arani Pillai, Queens Medical Centre, Nottingham

Centralisation of vascular services has increased the numbers of carotid endarterectomies (CEA) performed at the Queens Medical Centre (QMC). High Dependency Unit (HDU) admission for all patients has not been feasible. The Department of Health stroke strategy now recommends CEA within 48 hours of stroke. Locally this has resulted in patients being operated on emergency lists without dedicated vascular anaesthetic cover. There was no local guidance on the peri-operative management of these patients.

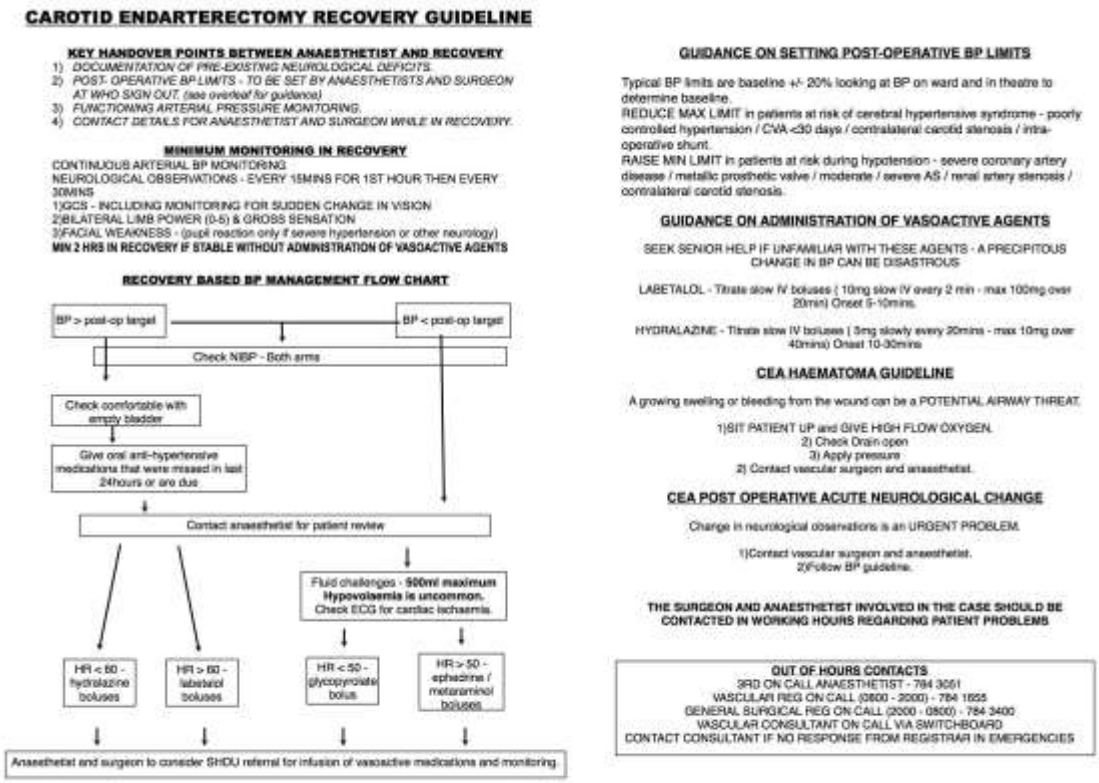
We surveyed the current management of CEA patients in theatre recovery and introduced a guideline for recovery-based care. Patients listed for CEA over the year 2011-2012 (93 patients) were analysed retrospectively from the vascular database set up at QMC and also from case notes. We looked at complication rates and management of blood pressure (BP). An additional questionnaire was sent out to recovery nurses regarding current knowledge and management of patients post CEA.

The results showed that the complication rate in year 2011-2012 was 11% (11 out of 93 patients). 6 patients had bleeding, 2 patients had hypotension, 1 had fast AF and 2 had nerve injuries. 5% of patients had no post-operative BP target documented. Those with documented BP targets were often standardised to targets of systolic BP 100—200mmHg. 35% of patients had disparity between the post-operative BP targets written by the surgeon and the anaesthetist.

22 recovery nurses at QMC were surveyed on CEA practice. 95% of recovery nurses wanted a guideline on the management of CEA patients.

A guideline was created with input from vascular surgeons, vascular anaesthetists and information from other centres (1) This was piloted May - June 2014 in 10 patients. All patients had clear post-operative target BP documented. 4 patients had guideline based interventions given safely in recovery. All the patients went back to the ward with good outcome.

Prior to the trialling of the CEA guideline there was no guidance for recovery staff and anaesthetists unfamiliar with CEA on the management of complications. The introduction of the CEA guideline resulted in better documentation and increased staff satisfaction. Patient interventions in recovery were standardised and safe.



References

1) Stoneham, M, Thompson J. Arterial Pressure Management and Carotid Endarterectomy. Br. J. Anaesth. (2009) doi: 10.1093/bja/aep012