Assessment of QT interval changes in vascular surgery

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Acquired long QT syndrome may cause fatal ventricular tachyarrhythmias. The aim of the study was to assess QT interval abnormalities in vascular surgery.

We studied two groups: 14 patients undergoing repair of abdominal aortic aneurysms and 24 patients with iliac/femoral artery stenosis treated by prosthesis implantation. Except for the standard monitoring, 7-electrode ECG was recorded to observe appearance of arrhythmias and changes in the corrected QT interval (QTc) with arterial blood gas and electrolyte analyses, invasive arterial blood pressure measurements in every minute for 10 minutes after vascular clamping or lower limb reperfusion.

Mean value of the QTc after aortic cross-clamping was 465 ms ± 37, 487 ms ± 43 after the reperfusion with its subsequent increase, reaching the maximal value in the 8th minute following the procedure (501 ms ± 50, 452 – 638 ms). QT dispersion throughout the aneurysmectomy was 88 ms ± 29. Duration of complete aortic occlusion was 40 minutes ± 19. Aortic clamping time (acute lower limb ischaemia), was directly related to the length of QTc intervals and QT dispersion. No arrhythmias were observed. After reperfusion following iliac/femoral artery clamping QTc interval was 456 ms ± 24 and 462 ms ± 25. QT dispersion was 53 ms ± 20. One episode of non-sustained ventricular tachycardia was noticed during iliac artery repair. Changes in the systolic and diastolic blood pressure did not influence length of QT intervals. After both procedures elevation of serum lactate levels was noticed.

Conclusive finding was that increase in the length of QT intervals and predisposition to severe arrhythmias is related to acidosis and acute ischaemia, but not to changes in blood pressure.

Can an aerobic exercise training programme improve fitness in patients awaiting aortic surgery?

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Patients undergoing aortic surgery have increased risk of cardiorespiratory complications. Outcome improvement initiatives have predominantly focused on medical optimisation with limited attention to pre-operative fitness initiatives. Anaerobic threshold (AT), measured using cardiopulmonary exercise testing (CPX), is a well documented measure of fitness prior to major surgery. Our aim was to determine if a short, supervised exercise programme could improve pre-operative fitness in subjects with abdominal aortic aneurysms (AAA), as judged using AT measurement.

We conducted a prospective, randomised, pilot study in subjects with a AAA under surveillance. Following sample size estimation, 30 subjects were recruited (allowing for 20% attrition) and allocated to receive: exercise intervention (n = 20) or no exercise intervention (control, n = 10). The exercise group completed a cycle-based supervised programme over 6 weeks (weeks 1–6). Exercise intensity was graded using Borg’s Scale of Rate of Perceived Exertion. All subjects had AT measurements at weeks 0 and 7 (AT1 and 2). The primary end-point was improvement in fitness between weeks 0 and 7 (AT2 – AT1).

Demographics similar for both groups. 25 patients completed the study. Mean (SD) AT (ml/kg/min) results shown in table:

<table>
<thead>
<tr>
<th>Group</th>
<th>Exercise (n = 17)</th>
<th>Control (n = 8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT1</td>
<td>10.94 (1.96)</td>
<td>11.18 (2.21)</td>
</tr>
<tr>
<td>AT2</td>
<td>12.17 (2.21)</td>
<td>12.2 (2.31)</td>
</tr>
<tr>
<td>AT2 – AT1</td>
<td>1.23</td>
<td>1.02</td>
</tr>
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The mean intervention effect was 0.21 ml/kg/min (95% CI -0.88 to 1.26 ml/kg/min, p = 0.72).

No fitness improvement was demonstrated with exercise training. This may be explained by the volume of exercise prescribed being insufficient. Alternatively “interval training” exercise may have more beneficial effects in this population. Furthermore this elderly, high-risk patient population may simply be difficult to train to higher levels of fitness.

1. Older Chest 1999
Carotid endarterectomy and gender: differences in health-related quality of life perception.

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Evidence supports carotid endarterectomy (CE) as being able to reduce risk of embolic stroke but few studies have examined how it affects patients’ view of their quality of life. The purpose of this study was to evaluate determinants of quality of life in patients submitted to CE with emphasis on identifying differences between men and women.

Between February 2006 and February 2007 data from 53 patients admitted in a Post Anaesthesia Care Unit after CE was collected prospectively. Six months after discharge patients were contacted to complete the Short Form – 36 questionnaire (SF-36) and have their dependency in activities of daily living (ADL) evaluated. Non parametric tests and chi-square tests were used to compare groups.

At six months patients had worse SF-36 scores in all the domains but bodily pain, when compared with population normal values. The Lawton Instrumental Activities of ADL Scale and the Katz Index of ADL demonstrated higher dependency scores (6.3 ± 1.8 versus 4.7 ± 2.4 and 0.2 ± 0.7 versus 0.5 ± 0.9, p = 0.005 and p = 0.039). Fifty-eight percent and 26% of patients were dependent in at least one activity in instrumental and personal ADL, respectively, and 58% reported having a better general health. Male patients (74%) had higher body mass index (27.4 ± 6.8 versus 23.0 ± 2.6, p = 0.003), suffered more frequently from coronary heart disease (45% versus 1%, p = 0.011), were less dependent in instrumental ADL (Lawton score of 5.1 ± 2.2 versus 3.4 ± 2.7, p = 0.047) and showed higher scores in the SF-36 domain of perception of general health (55.0 ± 24.5 versus 34.9 ± 24.2, p = 0.032). There were no differences in mortality and hospital LOS according to gender.

Patients perceive improved quality of life and overall health after CE. Male patients were more likely to have better perception of their health in general and were less dependent in ADL than female patients, despite having more frequent coronary heart disease.

Dexmedetomidine infusion vs magnesium infusion as an adjuvant in total intravenous anaesthesia for patients undergoing femoro-popliteal bypass surgery

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Continuous intravenous dexmedetomidine infusion during surgery provides effective intraoperative and postoperative analgesia. In addition, this alpha 2 – agonist can be a safe and effective sedative agent. Dexmedetomidine has been also shown to provide good peroperative haemodynamic stability, and thus may be a suitable anaesthetic adjuvant. Similarly, it has been suggested that magnesium sulphate infusion has the potential to treat and prevent pain by acting as an antagonist at the N-methyl-D aspartate (NMDA) receptors. It also decreases the amount of acetylcholine released from the motor nerve terminal, thus potentiating neuromuscular blockade.

75 patients, ASA physical status I-III, undergoing femoro-popliteal bypass surgery were randomly classified into three groups. Group A (n = 25) received magnesium sulphate infusion, Group B (n = 25) received dexmedetomidine infusion, and Group C (n = 25) received an equal volume of isotonic saline infusion. In all groups, total intravenous general anaesthesia was then conducted using fentanyl, propofol, and rocuronium bromide. Depth of anaesthesia was monitored using the Bispectral index (BIS), while the muscle relaxation status was monitored with train-of-four (TOF). Patients were intubated and mechanically ventilated using 50% nitrous oxide in oxygen so that ETCO2 was maintained between “30-35” mmHg.

There were no significant differences between the two groups in the demographic and haemodynamic data. Both groups A and B showed a significant decrease in the anaesthetic drug consumption than the control group C. Furthermore, the time needed for induction of anaesthesia and muscle relaxation was significantly longer in group C, while the recovery time for both of them was significantly longer in groups A and B.

The present study demonstrated that the use of dexmedetomidine or magnesium sulphate infusion as an adjuvant to general anaesthesia results in a significant decrease in the anaesthetic drug requirements because of potentiating anaesthetic, analgesic and muscle relaxant effects, with no significant differences between the two drugs.
Influence of anaesthesia type on outcome after thoracic endovascular aneurysm repair

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Endovascular repair (EVAR) is arguably preferred for aortic aneurysm repair.1 Besides avoiding general anaesthesia (GA) in this population, there is the potential benefit of being able to detect spinal cord ischaemia under regional anaesthesia (RA). We examined our experience.

Data was prospectively collected in 188 consecutive patients who underwent thoracic EVAR over 9 years from 1997 to 2006 under either GA or RA. Baseline and surgical data were noted and outcome variables were analysed for elective and emergency patients.

128 (68%) were under RA, 56 (30%) GA, and 4 LA. ELECTIVE (128 patients) - RA vs GA. There was no difference in operating time (mins) mean (SD) - 107 (21.5) vs 142 (15), blood loss (mls) median (IQR) - 300 (200-500) vs 300 (200-700), hospital stay (days) mean (SD) 6.33 (6.7) vs 5.28 (5.3). But GA had non-significantly higher chest infection (6.9% vs 2%), 30 d mortality (10.34% vs 5.05 %) and 3 month mortality (10.34% vs 7.07 %) rates. The overall stroke rate was 5% and stroke related mortality was 2%. The paraplegia rate was 3.72% (all in RA group), 43% were delayed onset (comparable with published literature).2 CSF drainage provided complete neurological reversal in 4 and partial reversal in 2.

Our findings suggest that regional anaesthesia is a safe option for the management of these patients, as with abdominal aneurysms.3 It offers the additional benefit of being able to monitor limb motor function after graft deployment. The incidence of cord ischaemia highlights the importance of peri-operative haemodynamic stability, the conduct of regional anaesthesia (ie. avoiding excessive motor block), and the readiness to use CSF drains.


Ultrasound evaluation of the anatomical characteristics of the internal jugular vein and carotid artery: For facilitation of internal jugular vein cannulation

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Using ultrasound, this study was performed to examine the right IJV and CA characteristics and their location relative to each other in the neck. It evaluated cannulation of IJV by use of ultrasound-guidance versus ultrasound-localisation.

Patients (n = 100) were randomly assigned to either ultrasound-guided cannulation or ultrasound-localised technique. A Site-Rite II ultrasound machine was used at the apex of the clavicle-sternocleidomastoid triangle at level of the cricoid cartilage to guide or localise the site of the IJV cannulation. Location of the IJV relative to CA was classified over a scale of 0-posterolateral to 5-total overlap.

Mean IJV anterior-posterior (A-P) depth from the skin, its A-P diameter and CA A-P diameter were estimated at 15.0 ± 3.6mm and 14.1 ± 4mm, and 7.4 ± 1.4mm, respectively. With ultrasound transducer positioned perpendicular to the floor, the IJV was in the lateral location relative to the CA in 51% of the patients. On positioning the transducer perpendicular to the skin, IJV relative to the CA showed a higher extent of anterolateral and anterior locations (77%). IJV relative locations to the CA were significantly different between the two positions of the transducer (p < 0.001). There was no significant difference in number of attempts or average access time between patients using ultrasound-guided and localised blind techniques. Compared to successful IJV cannulations, aborted cases (6%) were characterised by a significantly smaller IJV A-P size (10.3 mm vs 14.3mm, p-value = 0.035) and were significantly more likely to include subjects with anterolateral and anterior IJV locations relative to CA (p-value = 0.046).

Although the two techniques were similar in access time, success time, number of passes, and incidence of difficulties, abortion was more likely to occur in cases characterised by a relatively small IJV size and unsafe IJV location relative to the CA.