recent use has mainly been confined to assessing lower limb venous haemodynamics. We developed an air plethysmograph with a novel photodiode transducer and in-silico calibrated hand-exercise, and measured right forearm-hand arterial blood-flows in 7 healthy males, mean age 23.7 years (range 19-30) under standard conditions. Each subject was studied at rest on two occasions, and after 1 minute of right forearm-hand exercise, a 3-minute cold pressor test and 800mg sublingual glyceryltrinitrate (GTN) on one occasion.

Between-visit variability at rest was 7% and mean resting blood-flow was 3.31 +/- 0.56ml/min/100ml (mean +/- SEM). Blood-flow increased after exercise (p = 0.01, t = -3.51), with variable maximum post-exercise blood-flows and recovery times:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Resting blood-flow (ml/min/100ml)</th>
<th>Work done (Watts)</th>
<th>Maximal blood-flow (ml/min/100ml)</th>
<th>Recovery time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8.48</td>
<td>0.52</td>
<td>19.09</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>1.07</td>
<td>0.54</td>
<td>17.06</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>3.40</td>
<td>1.20</td>
<td>13.16</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>0.86</td>
<td>1.17</td>
<td>34.44</td>
<td>19</td>
</tr>
<tr>
<td>5</td>
<td>2.26</td>
<td>1.26</td>
<td>60.65</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>3.27</td>
<td>1.26</td>
<td>19.69</td>
<td>35</td>
</tr>
<tr>
<td>7</td>
<td>3.88</td>
<td>0.81</td>
<td>16.77</td>
<td>12</td>
</tr>
</tbody>
</table>

Mean: 3.31 +/- 0.56, 0.97 +/- 0.13, 26.34 +/- 6.19, 13.29 +/- 5.02.

Cold pressor test reduced blood-flow (p = 0.05, t = -2.28) and GTN did not produce a consistent response (p = 0.92, t = 0.10).

Conclusion: post-exercise forearm-hand blood-flow is a sensitive physiological variable, which can be reliably measured using an air plethysmograph. The technique with advantages over the strain-gauge.


M37 HYPOXIA, METABOLIC INHIBITION AND RAT MESENTERIC VASCULAR TONE

D OTTER AND C AUSTIN (INTRODUCTED BY A HEAGERTY)

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Hypoxia is an important determinant of vascular tone. Experimentally a number of different methods are often used to induce i.e. decrease PO2, or mimic hypoxia e.g. metabolic inhibition, although it has been suggested that their effects may differ. The present study examines and compares the effect of hypoxia and metabolic inhibition on the tone of different sized isolated rat mesenteric arteries.

Small segments of rat mesenteric artery were mounted on a wire myograph for measurement of isometric tension and bathed in a Krebs-HEPES solution (pH 7.4, 37 °C), gassed with 100% O2. Vessels were grouped as: small (mean diameter (I.D.)=272 pm) and large (I.D. =835 pm). All vessels were pre-contracted with variable maximum post-exercise blood-flows and recovery times.

Cold pressor test reduced blood-flow (p = 0.05, t = -2.28) and GTN did not produce a consistent response (p = 0.92, t = 0.10).

Conclusion: post-exercise forearm-hand blood-flow is a sensitive physiological variable, which can be reliably measured using an air plethysmograph. The technique with advantages over the strain-gauge.


M38 THE DEVELOPMENT AND USE OF A RISK SCORING SYSTEM IN THE AUDIT OF CARDIAC SURGERY

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INTRODUCTION. Risk stratification in cardiac surgery is commonly based on the Parsonnet score. However, this score does not predict post-operative patient mortality and is therefore not ideal for auditing performance within an individual department. The aim of this study was to develop a simple tool that could estimate hospital mortality during and after cardiac surgery and, secondly, graphical methods that could then allow direct comparisons between surgeons with casesloads of varying risk.

METHODS. We analysed the records of all 4,318 cardiac surgery patients at St. George's Hospital during the years 1992-95. Data investigation focused on suitability of recorded pre-operative variables as predictors for in-hospital mortality. Multivariate techniques were based on 80% of the data. The majority of cases (2,980/4,318) were included in analyses and derive expected mortality and an additive "risk score". Initially this was done using only patients who had undergone isolated CABG surgery as they represented the majority of cases (2,980/4,318). The same technique was then applied to the remaining 1,338 cases. The isolated valve surgery (654/318), before being applied to all procedures. The "risk score" was then validated against the remaining 20% of the data. Computerized graphical display methods were developed, based on the idea of a simple CUSUM.

RESULTS AND CONCLUSIONS. Graphical methods developed were based on locally relevant "risk scores". The computerized tool allows a surgeon's performance to be monitored over time and compared directly with that of other surgeons, independent of the distribution of cases, and hence risk, within the group. Although this is already an informative audit tool, further work is being undertaken to define and incorporate "near miss" clinical events in current cardiac practice.

M39 ANAEROBIC PERFORMANCE AND MATURATION

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Children's physical activity patterns are characterized by short-burst activities fuelled by anaerobic rather than aerobic metabolism. Yet, the development of anaerobic fitness has received much less research attention than the development of aerobic fitness. The purpose of this study was to examine the influence of sex and maturation on anaerobic performance. Tanner's indices of pubic hair and, in boys, salivary testosterone were used as measures of maturation. One hundred boys and 100 girls, aged 12.2±0.4y, had their peak power (PP) and mean power (MP) assessed during a Wingate Anaerobic Test and post exercise blood lactate determined. There was no significant (p>0.05) sex difference in PP (boys, 339.9±82.5 W; girls, 332.6±88.9 W), MP (boys, 267.7±63.9 W; girls, 274.9±65.0 W) or blood lactate (boys, 6.2±1.6 mmol-L-1; girls, 6.0±1.3 mmol-L-1). When the influence of body size was statistically removed from PP and MP using log-linear scaling model there was no significant (p>0.05) difference between boys (321.5 W) and girls (309.5 W). Two-way (sex by maturity) ANCOVA revealed significant (p=0.02) main effects for both sex and maturation and no interaction for PP and MP adjusted for stature and mass. Two-way (sex by maturity) ANCOVA revealed no significant (p=0.50) effects on blood lactate. Testosterone did not produce a significant (p>0.05) correlated with blood lactate. In a multiple regression analysis the addition of testosterone did not produce a significant (p>0.05) additional contribution to the variance in PP and MP explained by stature and mass. It was concluded that...