

ABSTRACTS OF SOCIETIES

Royal Medico-Chirurgical Society of Glasgow

ORAL PRESENTATIONS

Greater than the sum of its parts: C-reactive protein and the Calculated Ion Gap together are superior in predicting mortality in critically ill patients.

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Introduction: Inadequate tissue perfusion (determined by an increased concentration of unmeasured anions) and an uncontrolled systemic inflammatory response (measured by CRP) are associated with poor outcome in critically ill patients. Our aim was to assess the relationship between these factors, and their ability in combination to predict outcome. **Methods:** In a prospective study we evaluated 108 consecutive patients admitted to a Surgical HDU. Regional Ethics approval was obtained. Routine serum biochemistry and CRP were measured on admission and day 1. We derived the Calculated Ion Gap (CIG), our version of a corrected Anion Gap, using a simplified modification of the Stewart-Figge equations. **Results:** Based on previous work, thresholds of 10mmol/l for CIG and 100 mg/l for CRP were used to categorise patients (for table refer to www.smj.org.uk). Patients with high CRP and high CIG have 36-fold odds-ratio for death compared to those with low CRP and low CIG ($p < 0.0001$, Chi-square). Furthermore, in patients with a CRP > 100 on admission the CIG discriminates survivors ($p = 0.042$, Fisher's Exact Test). **Conclusion:** In previous work we demonstrated that CRP on admission to HDU predicts mortality ($p < 0.0001$, Chi-square). The combination of CRP and the Calculated Ion Gap, as markers of inflammation and inadequate tissue perfusion respectively, is a powerful predictor of mortality in the critically ill surgical patient. We propose that the CIG may be of similar value in acutely unwell medical patients with evidence of SIRS, particularly in identifying those who may benefit from further resuscitation or investigation.

Endothelial function in patients undergoing coronary artery by-pass grafting is improved in patients in 2006 compared to 2003

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Introduction: Hypercholesterolemia is a major risk factor for cardiovascular disease. We have previously shown an inverse association between LDL-cholesterol and endothelium-dependent vasorelaxation in patients with coronary artery disease (CAD). Current guidelines now recommend lower LDL targets for patients with CAD. **Methods:** We compared levels of LDL-cholesterol, endothelial function and oxidative stress in 20 patients undergoing coronary artery bypass graft surgery (CABG) since October 2006 with 20 age and sex matched individuals who underwent surgery in 2002-2003. Vasorelaxation of saphenous veins to calcium ionophore was examined in organ bath studies. Nitric oxide (NO) bioavailability expressed as the increase in pressor responses to phenylephrine in the presence of NO synthase blockade, and superoxide production (lucigenin chemiluminescence) were also measured. **Results:** 19/20 patients in the current group were prescribed statins compared to 13/20 from the previous cohort and LDL-cholesterol was lower (1.8 ± 0.2 vs 3.3 ± 0.2 mmol/L, $P < 0.001$). History of hypertension and smoking habits were similar but the prevalence of diabetes was higher in the current subjects (11/20 vs 3/20). The negative correlation between LDL-cholesterol and vasorelaxation to calcium ionophore was maintained ($P = 0.039$). Maximum relaxation was greater in the latest group ($35 \pm 5\%$ vs $25 \pm 3\%$, $P = 0.017$). Nitric oxide bioavailability did not correlate with LDL-cholesterol and no reduction in superoxide production was observed in the current CABG group (0.85 ± 0.05 vs 0.89 ± 0.1 nmol/mg/min). **Conclusion:** More rigorous cholesterol lowering therapy has resulted in an improvement in calcium-dependent, endothelium-dependent relaxation. However oxidative stress remains high in patients with coronary artery disease, possibly due to environmental and genetic factors and the higher incidence of diabetes in the present patient cohort.

Early ligation of the inferior mesenteric vein in rectal cancer surgery reduces the intra-operative systemic release of pro-inflammatory cytokines and post-operative inflammatory and stress response.

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Introduction: Intra-operative release of pro-inflammatory cytokines is thought to be responsible for the post-operative systemic inflammatory response (SIR), as measured by C-reactive protein. Historically, early ligation of the inferior mesenteric vein (IMV) was performed as in theory it prevented the release of cancer cells into the peripheral circulation. However the effect of this manoeuvre on circulating cytokine levels has not been studied before. This study examines the effect of early vs late ligation of the IMV on the SIR. **Methods:** Elective colorectal cancer patients were randomised prospectively to early ligation ($n = 11$) of the IMV before mobilisation or late ligation ($n = 10$) of IMV after full mobilisation. Peripheral venous and IMV blood samples were taken at induction, prior to and after full mobilisation, on completion of surgery and at 24 and 48 hours post operatively for IL1 β , IL6, TNF α , CRP and Cortisol. Samples were analysed using ELISA. Results are expressed as a median (interquartile range). Statistical analysis was carried out using the Chi square test for paired samples and considered significant at $p < 0.05$.

Results: There was no difference in circulating peripheral blood levels of measured cytokines between both study groups at induction. There was no rise in peripheral levels of IL1 β , IL6, and TNFa prior to mobilisation of the colon. The rise in circulating IL1 β , IL6, and TNFa in peripheral venous blood on completion of surgery was significantly lower in the early ligation group when compared to those having late ligation of the IMV 5 (3.25:7.0) vs 8 (7:11.5); 179.5 (127:253.8) vs 283 (111-584.5) and 7 (3.5:15) vs 18 (16:21.25) pg/ml respectively, $p < 0.001$. Levels of IL1 β , and IL6 rose in the ligated IMV remnant during the course of surgery 8 (7:8) vs 10 (7.75:10.75) and 0 (0:93) vs 224 (106.5:370.5) pg/ml respectively, $p < 0.001$. C-reactive protein levels at 24 and 48 hours post surgery increased dramatically in both groups but maximum values were lower in the early ligation group, 113 (74.5:132.25) vs 129 (84:145) mg/ml (24 hours) and 141 (111.5:159.5) vs 152.5 (117.5:176.5) mg/ml (48 hours) $p < 0.001$ at each time frames. Cortisol levels at 48 hours were significantly higher in the late ligation group, 434 (388:562) vs 562 (312:585), $p < 0.001$. **Conclusion:** Pro-inflammatory cytokines rise in response to tissue handling during mobilisation of the colon. The main source of this rise seems to be from the colon, through the drainage of the inferior mesenteric vein. Early ligation of this vein at the start of surgery reduces the circulating levels of these cytokines and impacts on the systemic inflammatory response, as measured by C-reactive protein. In addition the postoperative stress reaction, as measured by serum Cortisol levels is reduced.

Utility of Brain Natriuretic Peptide Measurements in Patients with Pulmonary Arterial Hypertension.

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Introduction: In small studies, measurements of brain natriuretic peptide (BNP) and its precursor, NT-proBNP, have been shown to correlate with disease severity and haemodynamic variables, and to predict survival, in patients with pulmonary arterial hypertension (PAH). The utility of serial measurements is, however, unproven. **Methods:** Serum [BNP] (Abbot) and [NT-proBNP] (Roche) were measured at the time of diagnostic assessment in patients with pre-capillary pulmonary hypertension, and correlated with clinical and haemodynamic variables (55 patients). A baseline sample on patients attending for follow up was obtained in an additional 89 patients. 65 serial samples (from 50 patients), taken at follow up visits > 3 months apart, were available for correlation with 6 minute walk distance. **Results:** [BNP] and [NT-proBNP] correlated strongly with all prognostic baseline parameters, with both tests performing equivalently. [BNP] of > 270 pg/ml or [NT-proBNP] of > 1000 pg/ml had a 100% sensitivity and 64% specificity for predicting early disease-related mortality (AUC 0.9, $p < 0.0001$). Though there are important outliers, there was a tight correlation between change in brain natriuretic peptide concentration and change in 6 minute walk distance, in patients who had no comorbidity limiting their exercise performance (for graph refer to www.smj.org.uk). **Conclusions:** Measurement of brain natriuretic peptides can identify PAH with advanced disease and predict early mortality. BNP and NT-BNP measurements appear to be interchangeable. The data obtained support the use of serial brain natriuretic peptide measurements in the monitoring of the 40% of PAH patients who are unable to reliably perform 6 minute walk tests.

Poster Presentations

Refer to www.smj.org.uk for full text of poster presentations.

Audit of CTPA in suspected pulmonary embolism - Experiences of a new diagnostic technique

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Metabolic Syndrome in patients with type 1 diabetes: A big problem

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Identification of a physiological high pressure zone in a modified Brooke Ileostomy – Justification for retaining the ileocolic sphincter

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