The UK Medical Students' Association was formed in July 2010 to serve as a centralized organization that could consolidate student resources, unify disparate societies and provide support to students nationwide. It reflects the combined effort of a board of 50 students, doctors, researchers and professors who work tirelessly to support tomorrow's doctors.

On 11 May 2012, the UK Medical Students' Association held its second annual conference at the BT Convention Centre in Liverpool. The event was kindly hosted by and affiliated with the Association of Surgeons of Great Britain and Ireland who themselves run one of the largest surgical congresses in Europe. The conference is the flagship UK Medical Students' Association event in which students are brought together to present their research, network, foster future collaborations and hear from influential speakers. The quality of abstracts this year was exceptional and six have been selected for publication in this issue of *BJHM*.

Prize winners

Karin Duckett – *British Journal of Hospital Medicine* Original Article Prize
Nicola Hudders – AUGIS Best Upper GI Poster Prize
Kristina Lee – ASGBI Best Overall Surgical Poster Prize
Kristijonas Milinis – OnExamination Audit Prize and UK Medical Students' Association Best Overall Medical Poster

Staphylococcus aureus and nursing staffing levels in the neonatal intensive care unit – is there a relationship?

Miss Karin Duckett, Miss Zoe Clayton-Smith, Mr Joe Cox, University of Leeds, Leeds; Dr Lawrence Miall, Dr Kavita Sethi, Leeds Teaching Hospitals, Leeds

Aim: To establish whether there is a correlation between rates of *Staphylococcus aureus* infection and colonization and staffing levels in the Leeds Teaching Hospitals' neonatal intensive care unit.

Methods: A retrospective analysis of meticillin-sensitive *S. aureus* and meticillin-resistant *S. aureus* infections and colonizations and the correlation with staffing levels was undertaken using data from between March 2008 and December 2011. Data collected included:

1. The dates of new *S. aureus* infections and colonizations
2. The number of neonates in the Leeds neonatal intensive care unit per 24-hour period
3. The number of nurses who worked each shift.

The number of nurses was used to create a shift average for each day. The recommended numbers of nurses required to adequately staff the neonatal wards each day were calculated according to the British Association of Perinatal Medicine 2001 standards. A percentage of average nurses per shift in comparison to the advised nurses per shift was then calculated for each day.

A Spearman's rank correlation test was undertaken to assess statistical significance. Monthly and biweekly averages of staffing level percentages were correlated against the total number of infections and colonizations during those periods.

Results: In total 112 *S. aureus* positive cultures occurred in the 1398 days which were studied. A negative correlation was found between *S. aureus* infection and colonization rates and staffing levels when meticillin-resistant *S. aureus* and meticillin-sensitive *S. aureus* were looked at individually and when looked at in combination both on a biweekly and monthly basis.

Results were statistically significant when meticillin-resistant *S. aureus* and meticillin-sensitive *S. aureus* were analysed in combination.

Conclusions: There is a significant association between nursing staffing levels and the rates of *S. aureus* infection and colonization in the Leeds Teaching Hospitals' neonatal intensive care unit.

Relationship between body mass and potential toxicity from therapeutic paracetamol use in patients undergoing liver resection

Miss Kristina Lee, University of Edinburgh, Edinburgh; Professor Steve Wigmore, Royal Infirmary of Edinburgh, Edinburgh

Aim: To investigate the relationship between body mass and functional liver volume with paracetamol-induced hepatotoxicity and relate this to the potential for accidental paracetamol toxicity in patients undergoing hepatic resections. Although considered one of the safest analgesics, paracetamol has a narrow therapeutic window and has potential to cause severe hepatotoxicity. In particular it is thought that those with low body mass and small liver volumes, including patients undergoing liver resections, are at particular risk.

Methods: A retrospective study was conducted involving 100 single time point paracetamol overdoses admitted to the Scottish Liver Transplant Unit, and hepatic dysfunction was correlated with the patient's body mass and estimated liver volume. This relationship was then applied to data from 104 patients undergoing hepatic resections with known liver volumes.

Results: The peak prothrombin time and prothrombin time standardized per gram of paracetamol ingested had a significant negative correlation with body mass and estimated liver volume ($P<0.01$). When related to hepatic resection, a therapeutic dose of paracetamol (4 g) could cause hepatotoxicity in any patient with a liver volume of less than 610 ml.

Conclusions: Low body mass and small functional liver volumes are both risk factors for paracetamol-induced hepatotoxicity. In patients undergoing hepatic resections, small patients or those undergoing large resections are at particular risk and warrant a reduction in paracetamol dose.

Does fracture haemorrhage occur after death?

Miss Louise Christou, Keele Medical School, Keele University, Keele

Aim: To confirm the occurrence of postmortem haemorrhage. Patterns in postmortem haemorrhage were also investigated such as the source of haemorrhage and effects of postmortem interval and fracture type. In medicolegal cases the origin of a fracture is often questioned. The current dogma states that haemorrhage is absent in fractures of postmortem origin; however, literature searches reveal observations of

postmortem fracture haemorrhage, thus indicating the dogma is flawed.

Method: Sixty four female Sprague-Dawley rat femora were fractured using a uniform method consisting of a guillotine ramming system and constant load. Femora were fractured at postmortem intervals of 5, 10, 15, 30, 45, 60, 120, 240 and 480 minutes. Samples were histologically processed and examined for haemorrhage using light microscopy.

Results: Microhaemorrhage was observed in 31.3% of samples. Sources of haemorrhage included central venous sinus and periosteal vessels. There was no sole contributing source of haemorrhage. Fracture type had no effect on haemorrhage. Although results of logistic regression were not significant, the odds ratio indicated that postmortem interval increases the odds of haemorrhage (odds ratio=1.003, P=0.068). No haemorrhage was observed at 30 minutes. Changes in blood viscosity over time as a result of postmortem changes in blood may explain this unexpected relationship.

Conclusions: Findings confirm that the current dogma is flawed which has major implications for the determination of fracture origin in medicolegal cases. Investigation of patterns in haemorrhage provided further insight into postmortem fracture haemorrhage and may be of use in medicolegal cases where fracture haemorrhage is observed.

Inhibition and reversal of cytoadherence in *Plasmodium falciparum* malaria

Miss Megan Whittaker, University of Manchester, Manchester; Mr Khairul Mustafa, Mr Tadge Szestak, Professor Alister Craig, Liverpool School of Tropical Medicine, Liverpool

Aim: To investigate the ability of monoclonal antibodies to endothelial cell receptors to inhibit and reverse cytoadherence. Cytoadherence of erythrocytes infected with *Plasmodium falciparum* to endothelial cells contributes to the pathophysiology of cerebral malaria, the major cause of malaria-associated deaths. Parasite strains with different binding characteristics were used; IgG binding to the endothelial cell receptors ICAM-1 and CD36, C24 binding to CD36 only.

Methods: Fluorescence activated cell sorting analysis was used to show that human dermal microvascular endothelial cells express ICAM-1 and CD36. Static and flow adhesion assays were used to show that both parasite strains adhere to human dermal microvascular endothelial cells. Following this, inhibition and reversal of binding of infected red blood cells to human dermal microvascular endothelial cells by αICAM-1 and αCD36 monoclonal antibodies was assessed under both static and flow conditions. Human dermal microvascular endothelial cells were stimulated with tumour necrosis factor-α for 18 hours before assays, as this upregulated ICAM-1 expression.

Results: Strong inhibition and reversal of binding to human dermal microvascular endothelial cells was achieved. αCD36 significantly reversed binding of C24 to human dermal microvascular endothelial cells under static (85% reversal) and flow (88%) conditions. For ItG under static conditions, αICAM-1 (83% reversal) and αICAM-1+αCD36 (78%) had a similar efficacy when reversing cytoadherence than αCD36 alone (57%). This was also observed under flow conditions.

Conclusions: These results show that adherence of infected red blood cells to endothelial cells can be prevented using monoclonal antibodies, and that adherent cells can be detached. There is a need for adjunct therapies for malaria; the prevention and reversal of cytoadherence to ICAM-1 is particularly relevant, as this has been linked with cerebral malaria.

Assessment of gastric function by non-invasive imaging: clinical studies in health and patients with functional dyspepsia

Ms Nicola Hudders, University of Nottingham, Nottingham; Dr Emily Tucker, Dr Helen Parker, Mrs Caroline Hoad, Professor Mark Fox, Biomedical Research Unit, Queen's Medical Centre, Nottingham

Aim: To assess whether non-invasive tests of gastric function can distinguish patients with functional dyspepsia from healthy volunteers.

Methods: Patients with functional dyspepsia with normal endoscopy and 24-hour pH studies were recruited. The nutrient drink test assessed maximum ingested volume (0.75 kcal/ml at 40 ml/min). Gamma scintigraphy and magnetic resonance imaging assessed gastric function and dyspeptic symptoms after ingestion of 400 ml liquid test (0.75 kcal/ml at 40 ml/min) meal on two separate study days.

Results: Data from patients with functional dyspepsia (n=8, 7 female) were compared to two sex- and age-matched healthy volunteers. Patients with functional dyspepsia had a lower body mass index (P=0.023) and tolerated a smaller maximum ingested volume than healthy volunteers (P=0.026, 95% confidence interval -765.8 ml to -54.3 ml).

With gamma scintigraphy, gastric meal volume immediately after ingestion tended to be lower in patients with functional dyspepsia than healthy volunteers (V0: median 325.9 ml *vs* 346.3 ml; P=0.177) and gastric emptying rate T50 was significantly slower (P=0.009, 95% confidence interval -1.8 ml to -0.3 ml). No difference in gastric emptying half time (T50, the conventional measure) was present. With magnetic resonance imaging, measurements of gastric volume (meal and secretion) were larger than gamma scintigraphy (P<0.010), but there were no differences between groups.

Compared to healthy volunteers, patients with functional dyspepsia scored dyspeptic symptoms higher after the 400 ml meal (nausea (P=0.001), epigastric pain (P=0.002) and bloating (P=0.052)). Normal postprandial sensations were similar (satiety (P=0.163), fullness (P=0.416)) as was heartburn (P=0.292).

Conclusions: Patients with functional dyspepsia can be distinguished from healthy volunteers by objective physiological measurements and reports of dyspeptic symptoms after a standardized 400 ml liquid nutrient test meal. The presence of rapid initial gastric emptying followed by slow later gastric emptying, as assessed by gamma scintigraphy, may be a useful diagnostic marker.

Primary care trust commissioning of varicose vein intervention – is new guidance needed?

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Aim: To assess current primary care trust commissioning for varicose vein intervention in England. Several authors have written of the 'postcode lottery' for surgical treatment of varicose veins. Recently, minimally invasive techniques including endovenous laser therapy have grown in popularity and much has been published about the benefits of treating varicose veins in terms of health status and quality of life.

Methods: Under the Freedom of Information Act, structured email survey responses were requested of 108 primary care trusts. Each was asked whether varicose vein interventions were currently commissioned and whether there were restrictions in access to varicose vein intervention. Trusts were asked how many elective endovenous laser therapy and open procedures were commissioned from 2008–11. The 'qualifying criteria' expressed in each policy were analysed both by individual primary care trust and by geographical region.

Results: Of 108 surveys, 95 (88%) were completed and returned. Of these, 96% stated that varicose vein interventions were actively commissioned. Access was restricted in 97% of primary care trusts that commissioned varicose vein interventions.

A total of 50 895 varicose vein interventions were commissioned from 2008–11; of which 60% were surgical, 21% were endovenous laser therapy, and 19% was made up of other minimally invasive techniques, including sclerotherapy and radiofrequency ablation. However, some primary care trusts provided total numbers of operations performed but were unable to break these down into different types of surgery. London commissioned the highest proportion of surgery (84%) and the Midlands the highest proportion of endovenous laser therapy (28%).

A total of 103 policies were obtained and 1000+ 'commissioning criteria statements' identified. These statements varied considerably between regions; 'active haemorrhage' was mentioned most commonly in policies from London (100%) and the southern primary care trusts, 'superficial thrombophlebitis' in the north (69%) and 'progressive skin changes' in the Midlands (89%).

Conclusions: Access to varicose vein intervention appears to be restricted, with a lack of uniformity across England. This may impact on patient care and surgical training. Those trusts that do commission interventions appear paradoxically to favour surgery over (possibly cheaper) endovenous laser therapy. It is proposed that the National Institute for Health and Clinical Excellence guidelines be reviewed to guide future service commissioning. BJHM

IMAGES IN MEDICINE

Extreme tortuosity of the iliac artery

A 76-year-old woman underwent coronary catheterization via the right femoral artery. Arterial puncture was clean and the sheath was inserted over the wire but difficulty advancing the guide wire necessitated a change to a hydrophilic wire. Under fluoroscopy the wire formed a complete loop in the common iliac artery (*Figure 1*). The left femoral approach was not attempted as a similar problem as anticipated. Contrast computed tomography of the pelvic vessels and aorta showed an unusually tortuous right iliac artery with complete loop formation (*Figure 2*). The left iliac artery was also tortuous. The patient underwent radial coronary angiography.

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Early identification of tortuous iliac arteries is important, as they can lead to kinking and knotting of catheters causing spasm and perforation. Besides complicating vascular procedures, they increase fluoroscopic time and radiation dose, and have been associated with endovascular fibrosis (Lim et al, 2009). Computed tomography is useful in providing an accurate three-dimensional picture to prevent complications. BJHM

Lim CS, Gohel MS, Shepherd AC, Davies AH (2009) Iliac artery compression in cyclists: mechanisms, diagnosis and treatment. *Eur J Vasc Endovasc Surg* **38:** 180–6

Figure 1. Fluoroscopy showed guidance wire forming a complete loop in the common iliac artery.

Figure 2. Contrast computed tomography of pelvic vessels and aorta showed an unusually tortuous right common iliac artery with a complete loop formation.