

Conclusions: The results of this audit show that these therapies are moderately effective in this setting. More than a third of patients responded well. However, compared with published trial results, the responses here are poor. Furthermore, no convincing evidence of a predictor-response relationship was found.

Audit of Anti-TNF Alpha Use in Edinburgh for Inflammatory Rheumatic Diseases.

J Heaney

SpR Western General Hospital, Edinburgh.

Objective: Biologic drugs such as anti-TNF alpha drugs have been shown to be effective in the treatment of rheumatoid arthritis (RA), psoriatic arthritis (PSA), and ankylosing spondylitis (AS) in many clinical trials. We wished to audit the efficacy and safety of these drugs in treating these diseases in routine clinical practice. **Methods:** Patients who had started an anti-TNF alpha drug during a one year period between 2005 and 2006 were identified from prescription records. Data was primarily gathered from an electronic database of clinic letters, any missing data was then collected from case notes. Initial response was recorded after three months of treatment. The first year of treatment was followed for changes in treatment, adverse events and switches between biologic drugs. **Results:** We identified 68 patients with RA who had started an anti-TNF alpha drug in this year. Fifty of these patients (74%) had made a satisfactory response judged by BSR standards. When assessed by EULAR criteria 9% had achieved remission, 15% had a good response, 57% had a moderate response, and 13% were non-responders. Twenty one per cent of patients had adverse events, of which one patient had a significant adverse event (renal carcinoma) that was found coincidentally with starting anti-TNF alpha. Thirty four per cent of those taking NSAIDs were able to stop, and 53% of those taking prednisolone could make a reduction in dose. Twelve patients who had not had a satisfactory response to their first anti-TNF alpha switched to a second. This switch was effective for eight patients. Four patients made a switch to a third biologic drug. After one year 72% were continuing their first anti-TNF alpha drug, and 90% were continuing a biologic treatment. Fourteen patients with AS were identified, all of whom made a satisfactory BASDAI response (mean improvement of 4.89). One adverse event occurred (flare of colitis). All patients were continuing their first anti-TNF alpha drug after one year. Twenty five patients with PSA were identified. Information for one patient was not available. Of the 24 remaining patients all made a satisfactory response and were continuing their first anti-TNF alpha drug after one year. Three minor adverse events occurred. The median tender joint count improved from 16 to 3.5, and the median swollen joint count improved from seven to two. **Conclusion:** Biologic drugs are effective in the treatment of RA, PSA and AS. In routine clinical practice the outcomes reflect those in clinical trials.

ABSTRACTS OF SOCIETIES

Scottish Intensive Care Society

January 22nd and 23rd 2009, Westerwood Hotel, Cumbernauld

Paediatric Resuscitation and the New Scottish Mobile Skills Unit: a Marriage Made in Virtual Heaven.

D Rowney¹, H Blyth¹, S Stark², N Spenceley², M Currer¹, M Davidson², J Scarth², J McCormack¹, F Garvie³, J Stevenson³, J Ker³

¹Royal Hospital for Sick Children, Edinburgh, Scotland

²Royal Hospital for Sick Children, Glasgow, Scotland

³Clinical Skills Managed Educational Network, University of Dundee, Scotland

Every year 200 children become critically ill or injured in remote and rural Scotland and require stabilisation to prevent further injury prior to transfer for specialist paediatric care. It is therefore essential that health care practitioners working in these areas have developed and can maintain the clinical skills required to manage such emergencies safely. The Scottish Clinical Skills Strategy (2007) has been developed to provide a coordinated high standard of multiprofessional skills education to all healthcare practitioners ensuring equity of access across both geographical and professional boundaries. One of the most efficient ways of delivering high quality of standards of simulation-based skills education to remote and rural areas of Scotland is to use a mobile skills unit.

A training needs analysis of 143 Remote and Rural practitioners, and an audit of skills education currently available in Scotland, confirmed the need for a national skills education programme in stabilisation of the critically ill or injured child.

This innovation is a marriage between the Clinical Skills Managed Educational Network, NHS Education for Scotland and the Scottish Paediatric Intensive Care Retrieval Service delivering the added heavenly benefits of bringing together expertise in paediatrics, simulation and education.

The mobile unit is equipped with Laerdal SimBaby, an integrated video debriefing suite (smots™) and a comprehensive range of paediatric equipment including manikins and part-task trainers. This will provide standard facilities for a one-day course which has been developed using Kolb's experiential learning cycle to identify the knowledge, skills and attitudes required by a multiprofessional team to be 'competent' in the clinical assessment, resuscitation and stabilisation of critically ill children prior to the arrival of the intensive care retrieval team. The unit will be driven to locations in Scotland, chosen to enable standard educational skills facilities to be within two hours' driving time of all of mainland Scotland, and some of the Scottish islands including Orkney and Shetland. The Retrieval Service education team will join the unit at each location and deliver the course to local practitioners.

The mobile skills unit was launched on 21st November 2008 for a two year pilot period to assess its efficiency in delivering clinical skills and simulation-based education in remote and rural areas of Scotland.

For References see www.smj.org.uk

Outcome of Patients Admitted to Intensive Care with Traumatic Brain Injury.

GA Morrison, S McLellan, T Hardy, V Sullivan, P Andrews

Intensive Care Unit, Western General Hospital (WGH), Edinburgh, EH4 2XU.

Trauma is the leading cause of death under the age of 45 in the UK and up to a half are due to traumatic brain injury (TBI). Trauma registries provide valuable outcome data following TBI. A large European registry demonstrated a significant reduction in mortality in patients with TBI between 1989 and 1994 but failed to show any further reduction between 1994 and 2003 raising concerns that there has been a lack of continued improvement. Furthermore there is a paucity of outcome data for survivors of TBI. Our aim was to determine the outcome at 12 months of patients admitted to the WGH ICU with a diagnosis of severe TBI.

We searched Wardwatcher for patients admitted to the WGH ICU between January and December 2007 (inclusive) with a diagnosis of severe TBI. Severe TBI was defined as a Glasgow Coma Scale (GCS) less than nine or intubated and ventilated on admission. For each patient we collected demographic data, mechanism of injury, best GCS following resuscitation, pupillary reaction, presence of a major extra-cranial injury and CT findings. Outcome at 12 months was assessed using a standardised questionnaire and categorised using the Glasgow Outcome Scale (GOS). Questionnaires were sent to all survivors; those failing to reply were offered a telephone interview.

We identified 68 patients who were admitted to the WGH ICU in 2007 with a diagnosis of severe TBI. The cohort was predominantly male (72.1%) with a median age of 40 (range 13-78). The majority of head injuries were caused by either a fall (54%) or a road traffic accident (29%). The median GCS at presentation was seven (IQR 5-11). Twenty one patients were known to have died at 12 months (15 died in ICU, five died in-hospital after ICU discharge and one died of lung cancer after hospital discharge). Of the remaining 47 patients, 45 have been sent a questionnaire/telephoned and 43 have responded (96% response rate); two patients have still to be contacted. The patient outcomes at 12 months are shown in the Figure (*see www.smj.org.uk*).

Approximately 50% of patients who sustain a severe TBI have an unfavourable outcome (a composite of death, PVS and severe disability) one year after injury. This is similar to levels observed 10 to 15 years ago.

Variation in Antibiotic Use in Scottish Intensive Care Units

A Timmins

Queen Margaret Hospital, Dunfermline KY12 0SU

Antibiotics are a major part of treatment in many ICU patients, and they can account for as much as 50% of drug expenditure in some units. Recently there has been the realisation that overuse could be harmful, contributing to increasing levels of healthcare associated infections and, in the longer term, producing more resistant organisms.

Issues of antibiotics during 2007 from hospital pharmacies to 11 Scottish ICUs were compared.

The graph shows considerable variation between the units in terms of overall usage levels, with the highest usage being 75% more than the lowest. There are also marked differences in the proportions of different groups of agents used, with Unit 1 using three times as much carbapenems as any of the others.

While there will be many reasons for differences in the patterns of use between units, including patient groups and local resistance patterns, this information could be useful on an ongoing basis in monitoring changes in practice, and possibly in tracking development of resistance problems. Consideration should be given to setting up such monitoring on an ongoing basis.

Acknowledgement: Thanks are due to the ICU pharmacists who provided the usage data, and to unit audit leads and SICSAG for providing the activity data.

Therapeutic Hypothermia after Cardiac Arrest – Are We Succeeding?

S Christie, S Fraser, S Crofts

Department of Anaesthesia and Intensive Care, Ninewells Hospital, Dundee DD1 9SY

Two randomised clinical trials and a meta-analysis showed improved neurological outcome and survival in unconscious patients resuscitated from shockable out-of-hospital cardiac arrest who were rapidly cooled to 33°C for 12-24 hours.^{1,2,3} The recently published ICS clinical guidelines for management after cardiac arrest, recommend therapeutic hypothermia may also be of benefit for patients who have had a non-shockable out-of-hospital cardiac arrest or in-hospital arrest.⁴

In December 2008 Ninewells Hospital ICU introduced guidelines for therapeutic hypothermia post-cardiac arrest. The guideline recommended an initial bolus of 4 °C IV fluid, before commencing on the Arctic Sun™ cooling device to aim for a temperature of 32-34 °C within four hours of Return of Spontaneous Circulation (ROSC). Therapeutic hypothermia is part of a 24 hour package of care which includes coronary reperfusion (if required), control of ventilation, haemodynamic optimisation and blood glucose control.

Data was collected for this 12 month period using 'Ward Watcher'™, review of the medical records, and an audit form completed at the time each patient received therapeutic hypothermia. Eleven patients received the treatment. The mean age was 52 years and mean APACHE score was 29. During the cardiorespiratory arrest, six patients had a shockable rhythm and five were non-shockable. Two patients were in-hospital cardiac arrests. A good outcome was achieved for two patients resulting in hospital discharge to home, the other nine patients died in ICU. The average length of stay in ICU was 2.6 days. Of the two patients that survived, one had an asystolic arrest with prolonged down time, and the other a VF arrest with short down time and good bystander CPR.

Achieving the required temperature within four hours of ROSC proved difficult, only three patients met this target. This was due to a combination of factors, including time spent in the Accident and Emergency department, intra-aortic balloon pump insertion, time in the CT scanner, and delay in the decision to cool. When cooling began it was always rapid and achieved the required temperature when the guideline was followed within two hours. To improve therapeutic hypothermia management of post-cardiac arrest patients, involvement with other departments such as Accident and Emergency and Cardiology is required. Updating our own guideline in-line with the ICS recommendations and further education within the unit is needed to achieve quicker cooling times.

For references www.smj.org.uk

Do Oncology and Haematology Patients Contribute to Excess Mortality in a Teaching Hospital Intensive Care Unit?

J Ng, C Wallis, S McLellan

Intensive Care Unit, Western General Hospital, Crew Road South, Edinburgh. EH4 2XU

The Scottish Intensive Care Society Audit Group (SICSAG) uses final hospital survival status as an outcome measure. This is adjusted for severity of illness and casemix using the Acute Physiology and Chronic Health Evaluation system (APACHE II).¹ This scoring system produces a predicted mortality rate for an Intensive Care Unit (ICU) that can be compared to the observed mortality rate to give a Standardised Mortality Ratio (SMR). In the SICSAG 2007 report² the Western General Hospital ICU SMR was a statistically significant outlier at 1.18 (CI 1.03-1.35) compared to the Scottish mean of 0.94. The unusual case mix of this ICU as a tertiary referral neuroscience centre and regional oncology and haematology centre is a possible explanation. The aim of this study was to determine if oncology and haematology patients contributed to the excess SMR.

Oncology and haematology patients admitted to the Western General Hospital ICU in 2007 were identified from the WardWatcher³ database by searching under specialty, admitting consultants, admission wards and discharge wards. Patient demographics, reason for admission, APACHE II score, predicted hospital mortality, observed unit and hospital outcome and ICU length of stay were recorded.

In 2007, 714 patients were admitted to ICU. The table shows that oncology patients had an SMR above the unit mean but haematology patients had an SMR below the unit mean.

Main oncology underlying diseases were lung cancer (45%), ovarian cancer (21%) and breast cancer (16%). Main haematology underlying diseases were lymphoma (60%), myeloma (17%), and leukaemia (13%). Pneumonia was the most common reason for admission in both groups. All six oncology patients with predicted mortality >80% died, whilst the two haematology patients with this prediction survived. 70% of lung cancer patients died. Mean ICU length of stay in oncology survivors was two days, non-survivors 3.4 days; haematology survivors six days, and non-survivors 4.5 days.

Oncology patients contributed to the excess SMR in 2007 while haematology patients did not and their SMR was close to the Scottish mean. Lung cancer patients requiring ICU admission had poor outcomes.

For references, www.smj.org.uk

Obesity in Intensive Care: An Observational Cohort Study*A Mackay, J Kinsella, MG Booth*

Intensive Care Unit & Glasgow University Section of Anaesthesia, Pain & Critical Care, Glasgow Royal Infirmary, 10 Alexandra Parade, Glasgow G31 2ER

Introduction: Obesity is a common cause of morbidity and mortality in Scotland and has been described as a global epidemic affecting 23% of Scotland's adult population. It is defined as a body mass index (BMI) of greater than 30 kg/m². Recent studies suggest that obesity in the adult intensive care population may confer a survival benefit. In this study we aimed to identify the relationship between obesity and outcome in an intensive care setting and to look at associated factors.

Methods: A mixed retrospective and prospective case note review of 411 consecutive admissions to Glasgow Royal Infirmary Intensive Care Unit (ICU) was undertaken over a 14 month period. Evidence of obesity and other comorbid conditions was sought from the patients' case notes by hand using details of current and previous admissions, clinical letters, results of investigations and correspondence from the patient's general practitioner, using agreed criteria. Demographic, Acute Physiology and Chronic Health Evaluation II (APACHE-II) score and outcome data were retrieved from the Ward Watcher system in the ICU.

Results: Complete data were available for 411 patients. Forty two (10.2%) of these patients were obese. See Table on the SMJ website for all results. All data are expressed as Mean \pm 95% Confidence Interval or Median (Interquartile Range). **Conclusions:** Obesity does not improve outcome in our intensive care population. This may be due to the high incidence of ischaemic heart disease and diabetes mellitus, along with other comorbidities. The incidence of obesity in our population is not reflective of that in the general adult population, which may reflect reluctance to admit obese patients due to these comorbidities.

WINNER OF ORAL PRESENTATION PRIZE**Evaluation of Diagnostic Methodology on the Reported Incidence of Ventilator-Associated Pneumonia.**

AC Morris¹, K Kefala^{1,2}, AJ Simpson¹, TS Wilkinson¹, K Everingham², IF Laurenson³, DG Swann², TS Walsh²

¹Centre for Inflammation Research, University of Edinburgh

²Critical Care, Royal Infirmary of Edinburgh

³Medical Microbiology, Royal Infirmary of Edinburgh

The optimal method for diagnosing ventilator-associated pneumonia (VAP) is controversial and its effect on reported incidence uncertain. This study aimed to model the impact of using either endotracheal aspirate (ETA) or bronchoalveolar lavage (BAL) on the reported incidence of pneumonia, then to test effects suggested from theoretical modelling in clinical practice.

A three-part study was undertaken. First, diagnostic performance of ETA and BAL were compared using paired samples from 53 patients with suspected VAP. Second, infection surveillance data were used to model the potential effect on VAP incidence and antibiotic use of using exclusively ETA or BAL to investigate suspected VAP (643 patients; 110 clinically suspected pneumonia episodes). Third, a practice change initiative was undertaken to increase BAL use; VAP incidence and antibiotic use were compared for the 12 months before and after the change.

ETA over-diagnosed VAP compared to lavage (89% vs. 21% of clinically suspected cases, $p < 0.0001$). Modelling suggested changing from exclusive ETA to BAL diagnosis would decrease reported VAP incidence by 76% (95% CI 67-87%) and antibiotic use by 30% (95% CI: 20-42%). After the practice change initiative, BAL use increased from 37% to 58%. Whilst clinically suspected VAP incidence was unchanged, microbiologically confirmed VAP decreased from 18 to nine cases per 1000 ventilator days ($p = 0.001$; relative risk reduction 0.61 (95% CI 0.46-

0.82)), mean antibiotic use fell from 9.1 to 7.2 antibiotic-days (21% decrease, $P = 0.08$).

Diagnostic technique impacts significantly on reported VAP incidence and potentially on antibiotic use.

Burns and Thermal Injury Patients Admitted to a General Adult Intensive Care Unit - a Retrospective Consecutive Cohort Analysis Showing Improved Outcomes: 1995 - 2005*RA Martynoga, MJ Fried*

St John's Hospital, Howden Road West, Livingston, West Lothian, EH54 6PP

There is little published data on burns patients requiring intensive care in the UK setting,¹ although much exists regarding whole populations of burns patients.^{2,3} We examined all critically ill patients with burns injuries admitted to the intensive care unit (ICU), supporting the South East Scotland Regional Burns Unit, during the period 1995-2005: 100 patients in total. Males outnumbered females (ratio 3:1). Ages ranged from 14 to 87 years. Total burnt surface area (%TBSA) ranged from 0 (inhalational injury only) to 99% (median 16%). Acute physiology and Chronic Health Evaluation II (APACHE II) scores ranged from 7 to 42, (median 16). ICU mortality was 26%; hospital mortality 36%. ICU stay ranged from 0.2 to 87.5 days (mean 11.9, median 5.7 days, inter-quartile range 1.6 to 16.3 days). The data shows a rise in burns admissions to critical care over the timescale examined: 39 patients in the six years prior to 2001; 61 patients from 2001 to 2005 inclusive. Mean duration of ICU stay increased by 3.5 days, from 9.7 to 13.3 days, in the same time-periods. Mortality rates of the cohort improve over this timescale: 46.1% for 1995-2000, to 29.5% for 2001-2005, with similar median severity of injury indices (%TBSA: 21.8% vs. 21.2%) and median age (46yrs vs. 44yrs.). APACHE II scores show more variation: median 17 points pre-2000, compared to 13 points from 2001 onward, raising the possibility that less severely unwell patients, who previously would have been cared for in a ward environment, are now being admitted to critical care. A rising admission rate, increased length of stay and falling mortality figures all suggest an increase in critical care workload and have implications for service planning and provision. We postulate that the outcomes generated by this general ICU with a burns interest are good, and are improving. A comparison with larger volume units would be valuable but no such data is currently available in the literature.

For references and figures, see www.smj.org.uk

Post-ICU Complications in Burns Patients Surviving ICU*FA Wallace, J Kinsella, J Ivison*

West of Scotland Regional Burns Unit, Glasgow Royal Infirmary, Glasgow, G4 0SF

Many burns patients require admission to intensive care. These patients often have associated airway injuries and systemic upset; ICU mortality is very high. Patients who survive to be discharged from ICU may have protracted hospital stays with numerous complications. The aim of this audit was to examine the post-ICU stays of burns patients surviving ICU.

A retrospective analysis of burns patients admitted to ICU at Glasgow Royal Infirmary over a two year period was carried out. Patients were identified using the Ward Watcher programme; information regarding their ICU stay determined using the CareVue programme; and their medical notes were analysed for details of their post-ICU hospital stays.

During this period 45 burns patients were admitted to ICU; 20 (44%) died in ICU. Of the 25 who survived to be discharged from ICU: 21 were discharged from hospital; two are currently inpatients in the burns unit; and two died in hospital. Of the two who died, one had an underlying malignancy which contributed to his death and the other suffered GI complications in ICU.

Patients who survived ICU were generally intubated whilst in ICU (96%) and often received inotropes (67%). A minority (17%) received renal replacement therapy. Average ICU stay was 16.2 days. The average length of post-ICU stay was 32.6 days. Two patients were readmitted to ICU; one died. Complications were common and diverse. Infective complications were most common, affecting 83% of patients. The most common of these were 'sepsis', wound infections and pneumonia. Gastrointestinal complications were also common; in some cases these were attributed to prescribed medication. Musculoskeletal complications affected over a third of patients. Anaemia was the most common cardiovascular complication and patients often received multiple transfusions. Psychiatric complications made up another significant group. Neurological, ophthalmological, dermatological, endocrine and renal complications were also identified.

Although mortality for burns patients requiring ICU care was very high, the majority of patients (84%) who survived ICU were discharged from hospital. However, these patients tended to have prolonged hospital stays with numerous complications. Post-ICU hospital stays varied but averaged 32.6 days. Those remaining as inpatients had hospital stays of 293 and 67 days at the time of writing. The cost of such prolonged hospital stays is significant, both in terms of healthcare provision and long term physical and psychological effects on patients. The main limitations of this audit lie in the small sample size and the potential ambiguity created by carrying out the audit retrospectively from the medical notes.

WINNER OF THE POSTER PRIZE

Confusion Matrices to Refine a Novel Scoring System for Cardiovascular Instability in Intensive Care.

MAB Sim, A Aiken, L Moss, D Sleeman, J Kinsella

Glasgow University Department of Anaesthesia, Level 2, Queen Elizabeth Building, Glasgow Royal Infirmary, 10 Alexandra Parade, Glasgow G31 2ER and University of Aberdeen

Cardiovascular instability is common in intensive care. It can be as a result of the primary disease process or secondary to therapeutic interventions e.g. sedation. It is often described in the literature yet is poorly defined and difficult to quantify. We have devised novel qualitative and quantitative scores for cardiovascular instability.

Charting of clinical information at Glasgow Royal Infirmary is now done electronically. This allows the analysis of significant quantities of physiological data at frequent intervals on a scale which would previously have been impractical. We have devised a numerical rule base which subsequently categorises patients from A (stable) to E (highly unstable) according to the degree of derangement of a range of physiological parameters taking into account the amount of sedation or inotropic support.¹ The parameters include heart rate, mean arterial pressure, central venous pressure, inspired oxygen concentration and oxygen saturation. A computer programme has been designed to interrogate a patient record of parameters and predict a level of stability based on the rule system. Time points are hourly throughout the patient stay in intensive care. Clinicians (without any knowledge of the numerical rules) have been asked to score the same patient record from A to E at the same time points. The results have been incorporated into a confusion matrix which compares the scores given by the clinician with the scores predicted by the computer programme. A diagonal line from top left to bottom right in an example of a matrix (see figure 1) represents complete agreement between the predicted score and the expert clinical opinion. Time points where discrepancy exists are subsequently analysed and if they occur frequently then a refinement is made to the rule base and the data set interrogated again the aim being to produce a rule base which can as accurately as possible predict the expert opinion. When validated this will be able to be used at the bedside to give an indication as to the cardiovascular stability of a patient in intensive care.

For figures and references, www.smj.org.uk