From the journals

Louise Finch* and Erica Dubb-Fuller
*Correspondence Email: louise.finch@doctors.org.uk

Effects of staff training on the care of mechanically ventilated patients: a prospective cohort study.

Bloos F, Muller S, Harz A, Gugel M, Geil D, Egerland K, Reinhart K, Marx G. *British Journal of Anaesthesia* 2009; **103**: 232-7

Treatment bundles are a method of ensuring multiple interventions are utilised in a specific set of patients. Low tidal volumes ventilation for patients with Acute Lung Injury, stress-ulcer prophylaxis and deep vein thrombosis prophylaxis (DVTP) are currently recommended in patients being mechanically ventilated.

This study assessed the effects of training and teaching of nurses and junior medical staff on the use of ventilator care bundles. The bundle they used, a modification of that of the Institute of Health Care Improvement, consisted of the three interventions mentioned above as well as semirecumbent positioning (i.e. lying with the patient's head up 30 degrees).

The study involved monitoring compliance with the bundle over 3 consecutive months (133 patients) then, for 2 months, staff were taught the background and technique of the bundle on a daily basis, with a further 2 months reinforcing teaching with individual staff who were not correctly applying the bundle. Bundle adherence was then re-monitored for a further 2 months (141 patients).

Overall, compliance with bundle usage increased from 15 to 33.8% ($p<0.01$), semirecumbent positioning and DVTP were both significantly increased, ulcer prophylaxis was high throughout (>90%) but mean tidal volume remained unchanged. Days on mechanical ventilation were significantly reduced by 2 days; ICU length-of-stay, ICU mortality and rate of ventilator-associated pneumonia (VAP) remained unchanged. In patients with VAP, median length of ICU stay was reduced by 9 days but their ICU mortality remained unchanged.

Prospective randomized controlled multi-centre trial of cuffed or uncuffed endotracheal tubes in small children

Weiss M, Dullenkopf A, Fischer JE, Keller C, Gerber AC and the European Paediatric Endotracheal Intubation Study Group. *British Journal of Anaesthesia* 2009; **103**: 867-73

Traditionally, airway management in chidren under 8-10 years has involved uncuffed tubes due to fears about mucosal injury. This study looked at the use of a new, high volume-low pressure cuffed tracheal tube (Microcuff PET, Kimberly Clark) with a cuff pressure release valve.

2246 children under the age of 5 years, requiring anaesthesia and tracheal intubation, were randomised to either a cuffed or uncuffed tube.

Endpoints considered were incidence of post-extubation stridor, the number of tube changes required to find an appropriate-sized tube and, for cuffed tubes, the minimal cuff pressure required to seal the airway.

The post-extubation stridor rates were not significantly different between the groups but tube exchange rate was 2.1% in the cuffed and 30.8% in the uncuffed groups ($P<0.0001$), with a significant reduction in the requirement for throat packs. A reliable capnography trace was gained significantly more frequently with the cuffed tubes. Minimal cuff pressure to seal the airway was 10.6cmH_2O.

The authors state that their findings indicate no increase in post-extubation stridor with these cuffed endotracheal tubes, but that alternatively designed cuffs or those without cuff pressure control can cause airway damage and their results should not be extrapolated to other cuffed paediatric tubes.

Louise Finch
Specialist Trainee
Department of Anaesthesia
Royal Devon and Exeter NHS Foundation Trust
Exeter
EX2 5DE
UK

Erica Dubb-Fuller
Fellow
Department of Anaesthesia
Southampton general Hospital
Tremona Road
Southampton
Hampshire
SO16 6YD
UK

Regional techniques and outcome: what is the evidence?

Hanna MN, Murphy JD, Kumar K, Wu CL. *Current Opinion in Anaesthesiology* 2009; **22**: 672-7

This article reviews the use of regional anaesthesia and analgesia with regards to both the benefits and risks inherent in their use. Regional anaesthesia can provide superior analgesia and, by blunting the stress response invoked by pain, improve outcomes, particularly in those patients with decreased physiological reserves. The largest meta-analysis of RCTs comparing neuraxial to general anaesthesia found a significant decrease in mortality but smaller, procedure-specific meta-analyses have not found any mortality difference. Database analyses have found postoperative epidural analgesia to be associated with significantly lower 7 and 30-day mortality for patients undergoing high-risk procedures e.g. colectomy and lung resection, but not lower risk procedures. However, the overall evidence for reduction of mortality with epidural analgesia is inconsistent.

The effect on individual systems was considered:

- There is consistent evidence that the use of thoracic epidural analgesia (TEA) may reduce the risk of cardiovascular morbidity in high-risk patients undergoing higher risk surgical procedures.
- There is some evidence for reduction in post-operative pulmonary morbidity in patients undergoing thoracic and abdominal surgery, that the authors feel is limited to high risk patients and procedures.
- TEA with local anaesthetic is associated with faster recovery of bowel function, reduced pain and duration of ileus compared to systemic or neuraxial opioids. The effects when used with laparoscopic surgery or on other outcomes are unclear.
- For thoracic procedures the incidence of hypotension, urinary retention and pruritis is lower with paravertebral analgesia compared to TEA.
- There is some evidence that surgery suppresses antimetastatic cell-mediated immunity and that regional anaesthesia/analgesia may diminish this response with a lower risk of recurrence with regional techniques (e.g. in surgery for breast cancer).
- Neurological complications and toxicity from local anaesthetia can occur. The use of ultrasound to guide needle placement has been associated with an increase in the success rate of nerve blocks but its effects on safety and adverse outcome rates remain unclear.

In conclusion, the use of regional anaesthesia and analgesia may improve perioperative cardiac, pulmonary and gastrointestinal outcomes, but the benefits are limited to higher risk patients undergoing higher risk procedures.

Risk of pulmonary aspiration with laryngeal mask airway and tracheal tube: analysis on 65712 procedures with positive pressure ventilation

Bernardini A, Natalini G. *Anaesthesia* 2009; **64**: 1289-94

This was a retrospective analysis of records from an anaesthesia database in one hospital over 11 years. The database consists of prospectively collected data from cards completed by anaesthetists for each procedure they undertake. Information collected included anaesthetic procedure (airway type, anaesthesia and ventilation modalities); the type, speciality, length and nature of surgery (unplanned/elective-defined as booked >12h pre-operatively); patient demographics and ASA; any major complications. Cases that involved general anaesthesia and positive pressure ventilation via either an LMA (classic only) or tracheal tube were studied.

LMAs are contraindicated in this hospital in non-fasted patients (<6h from food, <2h from fluid), pregnancy, intestinal obstruction, unplanned surgery with fasting time <12h, airway surgery and the prone position. In 98% of these cases a tracheal tube was used leading to significant variability in the baseline characteristics (e.g. weight, ASA, nature of surgery) of the different airway groups. 65712 general anaesthetic procedures were analysed with adjustments for this variability. 10 cases of pulmonary aspiration occurred – 4 during elective surgery (2 with LMA) and 6 during unplanned surgery (1 with LMA). Adjusted analysis showed the LMA to have an OR of 1.06 (95% CI 0.2-5.6 p=0.9). The main factor associated with pulmonary aspiration was emergency surgery, with male sex also being a risk factor.

The authors comment on the low incidence of pulmonary aspiration and of associated morbidity (2 ICU admissions) and mortality (no cases), in keeping with previous studies and making it difficult to power studies sufficiently. They also note the institution's contraindications to LMA use resulted in the comparison groups being significantly different, but conclude that the use of an LMA in properly selected patients was not associated with pulmonary complications.

Blood transfusions: more is not necessarily better

Clark V, Waters JH. *International Journal of Obstetric Anaesthesia* 2009; **18**:299-301

Two recent retrospective audits (one from the USA, one from the UK) have shown that many parturients were transfused before transfusion triggers were met and to levels greater than $10g.dl^{-1}$. This editorial questions whether current blood transfusion practice is doing good or causing harm.

The risks of blood transfusion have the potential to impact on the lives of this young subset of the population, namely by causing immunosuppression, alloimmunization, cancer, and viral transmission. Allogeneic blood transfusions have killed more patients in the UK between 1996 to 2002 than major obstetric haemorrhage.

The only major prospective RCT of transfusion triggers (TRICC) was based on ICU patients and the youngest subset was less than 55 years. They found worse outcomes with aggressive transfusion practice.

Techniques to minimise anaemia include; optimisation of iron stores prior to delivery with either oral or intravenous haematinics, appropriate and early use of uterotonics intrapartum, cell salvage and interventional radiology in high risk cases, compression sutures and a timely hysterectomy by an experienced obstetrician. Blood transfusion should be guided by point of care testing (e.g. Haemocue®), with reassessment prior to administration of further products. Post-partum use of iron supplements is encouraged.

The authors endorse timely use of plasma and platelets, and establishment of transfusion guidelines and algorithms - treat the patient (i.e. their symptoms) and not the numbers.

Pandemic (H1N1) 2009 influenza

Patel M, Dennis A, Flutter C, Khan Z. *British Journal of Anaesthesia* 2010; **104 (2)**:128-42

This is an informative review article covering the background, presentation, diagnosis, treatment and management of pandemic (H1N1) 2009 influenza, collating information from different centres worldwide. By October 2009 over 375,000 laboratory confirmed cases were reported from 191 countries and territories with more than 4500 deaths. In severe cases, the clinical picture is markedly different to cases of seasonal influenza, as many previously healthy young people were affected. During a pandemic wave, it is estimated that 12-30% of the population will develop clinical symptoms with 4% requiring hospital admission, with 1 in 5 needing ICU care.

Transmission is human to human from respiratory droplets or contaminated surfaces. It has higher transmissibility than seasonal influenza and all bodily fluids/ secretions of infected patients are potentially infectious.

Patients are usually symptomatic within a week of exposure. Critically ill patients can rapidly progress to respiratory failure and ARDS with refractory hypoxaemia. Secondary bacterial infections, septic shock and multi-organ dysfunction are frequently seen.

Diagnostic tests are considered in hospitalised patients or patients in whom diagnosis will influence management. They should not delay treatment. The rapid influenza diagnostic test (RIDT) and direct immunofluorescence assays (DFA) are available and fast to process but lack sensitivity and specificity. Viral culture and nucleic acid amplification tests (rRT-PCR) have limited availability and lengthy processing times but are used to confirm cases of pandemic (H1N1) 2009 virus.

Treatment is with antiviral neuraminidase inhibitor drugs; oseltamivir (Tamiflu) and zanamivir (Relenza). Cases of resistence to oseltamivir have been identified. The WHO does not recommend use of antivirals for prophylaxis, rather, early treatment based on signs and symptoms is advised. Healthy patients with mild or moderate uncomplicated illness do not require treatment. High risk patients or those with signs of severe/ progressive illness require antiviral treatment, ideally within 48 hours of onset.

Vaccination is effective in reducing morbidity and mortality. It is effective 14 days after administration and can prevent 50-80% of influenza illness in healthy people. Vaccination is recommended for all healthcare workers, current seasonal influenza at risk groups, household contacts of immunocompromised people and in pregnancy (where there is a greater risk of developing complications secondary to immunosuppression).

Exceptional demands could be placed on healthcare resources with a further resurgence; predictions include a 4-fold increase in emergency admissions, reduced staffing levels by up to 50% and huge demand for ICU beds and ventilators. The WHO and other agencies have published guidelines on providing the greatest good for most patients with triage protocols, patient cohorting, adherence to infection control policies and effective use of personnel protective equipment.

Disease severity has the potential to change, especially if there is viral mutation. As clinicians we must be prepared for further pandemics.

Further reading

- World Health Organization (WHO). Preparing for the second wave: lessons from current outbreaks. Available at: http://www.who.int/csr/disease/swineflunotes/h1n1_second_wave_220090828/en/index.html