FROM THE JOURNALS

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Viral gastroenteritis - a danger to the patient, a danger to the staff.

Appelboam R, Hammond E Anaesthesia 2004;59:293-5

A previously well 74 year-old lady was admitted in shock, with an acute abdomen. This was initially thought to be a ruptured abdominal aortic aneurysm. After resuscitation, a laparotomy was performed. No intra-abdominal pathology was revealed. Further review of X-rays and the clinical presentation lead to the discovery of an oesophageal rupture which was thought to be due to vomiting (Boerhaave's syndrome). She subsequently underwent a thoracotomy and sub-total oesophagectomy. Intra-operative time was eight hours (involving at least one change of theatre, anaesthetic and surgical staff). Over the following two days, 18 personnel, all involved in the patients care, became unwell with a rapid-onset acute illness. This was characterised by severe epigastric pain, nausea, vomiting and diarrhoea. In total 90 man-days were lost due to absences of ill staff members.

The probable cause of the patient's illness was thought to be a small round-structured virus (SRSV). Subsequent enquiries by the hospital's Public Health Department revealed a direct correlation between exposure to the patient and development of symptoms.

This case highlights the importance of using universal barrier precautions (gloves, fluid resistant mask, face shield and gown) when dealing with infective patients. Although all staff wore gloves, the other precautions were not strictly adhered to. (The routine wearing of face-masks in the operating theatre by anaesthetists in the UK is thought to be about 32.5%). Moreover, the high turnover of staff during this case probably contributed to the numbers of infected personnel. This case-report serves to underline the importance of basic hygiene procedures in the technology-rich environment of the operating theatre.

Forehead SpO_2 monitoring compared to finger SpO_2 recording in emergency. transport.

Nuhr M, Hoerouf K, Joldzo A et al Anaesthesia 2004;59:390-3

This is a short paper looking at a new oxygen saturation monitor, and comparing it with a standard finger probe for use during emergency transport. The latest pulse oximetry technology has been adapted to cope with motion and cold ambient temperatures. The new pulse oximeter incorporates an adhesive forehead sensor. (Nellcor / Tyco Healthcare, Vienna, Austria). The authors tested the hypothesis that this new technology is superior to conventional finger pulse oximetry in an emergency care and transport setting.

53 patients, all of whom were mildly hypothermic (less than 36∞C; mean 35.6°C) and had suffered minor trauma (Injury Severity Score ISS <10) were enrolled. All patient's had both finger and forehead oximetry performed. The forehead technique malfunctioned (i.e. alarm incorrectly going off) on significantly fewer occasions than the standard oximeter. The duration of these malfunctions was also shorter than those seen with traditional finger pulse oximetry.

The authors conclude that the new technology provides better monitoring quality in emergency care, and as such provides an important contribution to patient safety. They also point out that the distractions to attendants from frequent 'malfunction' alerts are reduced. This enables care to be enhanced in other areas.

Whilst not directly applicable to less resource-rich medical systems, this study shows what technological advances will be available in time.

Muscle weakness after muscle relaxants: an audit of clinical practice.

Alkhazrajy W, Khorasanee AD, Russell WJ Anaesthesia and Intensive Care 2004;32:256-9.

The extent of residual muscle weakness after general anaesthesia was measured by measuring handgrip strength with a dynamometer preoperatively, one hour postoperatively and 24 hr after surgery. Three groups of patients were compared. The first group did not receive a relaxant, the second had vecuronium and the third rocuronium in dosages that were considered adequate for the surgical procedure by an independent, experienced anaesthesiologist. All patients who received a relaxant were reversed with neostigmine.

The study showed that there was no effect on handgrip strength one hour postoperatively by the patients' age, length of operation or preoperative physical condition of the patient. However,

females showed significantly reduced handgrip strength at one hour, although they had received similar absolute doses compared to men. This difference was highly significant (p=0.0002). At 24 hours postoperatively full recovery had taken place.

The authors conclude that women are significantly more sensitive to relaxants than men (requiring 22% less drug on a per kilogram basis, according to another study), and that this leads to a higher risk of the effects of muscular weakness in the immediate postoperative period.

Oral ketamine or midazolam or low dose combination premedication in children.

Darlong V, Shende D, Subramanyam MS, Sunders R, Naik A Anaesthesia and Intensive Care 2004;32:246-9.

Ketamine 6mg/kg orally or midazolam 0.5mg/kg orally were compared to a premedication of a combination of both (ketamine 3mg/kg plus midazolam 0.25mg/kg orally) in healthy children undergoing ophthalmic surgery. The drugs had been prepared in solution with glucose 50% to give a volume of 0.3ml/kg. The time for achieving satisfactory sedation, good conditions for separation from the parent, tolerance to the face mask, behaviour during emergence and time to reach a sufficient Aldrete recovery score were compared.

At 20 minutes after administration, more than 50% of the children receiving the combination were sufficiently sedated (p=0.008). At 30 minutes no significant differences were noted. Parental separation was easy after 19 minutes in the combined midazolam/ketamine group, but only after 28 and 29 minutes following midazolam or ketamine respectively (p=0.001).

Recovery time was 22 minutes in the combination group and 36 and 38 minutes with midazolam and ketamine alone respectively. PONV occurred in all three groups with a similar rate. Excessive salivation occurred in 50% of the ketamine only group.

The study showed that a combination of low doses of midazolam plus ketamine had a faster onset, better efficiency and more rapid recovery than the administration of the single drugs in a higher dose.

Practical Note: to prepare a solution as described, mix 9ml ketamine 5% (50mg/ml) with 7.5ml midazolam (5mg/ml) and add 28.5ml Glucose 50% to make 45ml of the solution. This will last for "150kg of children", receiving 0.3ml/kg

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Full scale computer simulators in anaesthesia training and evaluation.

Wong AK Canadian Journal of Anesthesia 2003;4:392-7

Medical education is changing. The shift to a competency-based curriculum and the demand for public accountability places increased emphasis on more objective, performance-orientated tests of clinical competence. This article reviews the current role of full-scale computer simulators in anaesthetic training and evaluation.

The use of simulators in anaesthesia has increased significantly over the last decade. They allow for repeated practice of managing problems that occur infrequently but require expert intervention for a successful outcome, for practising leadership and communication skills in a team-orientated approach and for experiential learning in a realistic, safe, controlled environment that does not expose patients to harm. Direct feedback, videotape recording, the option of stopping and restarting, predictability, reproducibility and standardisation are all additional advantages.

However, despite the increasing use of full-scale simulators in anaesthesia, definitive studies evaluating their cost-effectiveness, efficacy compared to traditional training methods or their impact on patient outcome are still pending. Some preliminary evidence of reliability and validity in using the simulator to evaluate clinical competence has been found, but not enough to justify its use in formal summative evaluation of competence in anaesthesia.

There is no doubt that a variety of teaching modalities and assessment techniques are required in medical training and evaluation of competency. Computer simulators certainly have exciting potential as an adjunct and not a replacement for experiential learning and evaluation. However, a better understanding of their strengths and limitations is required. This interesting article leaves one pondering the future of simulator technology in anaesthesia education.

Labor analgesia and Cesarean delivery: an individual patient meta-analysis of nulliparous women.

Sharma SK, McIntire DD, Wiley J, Leveno KJ. Anesthesiology 2004;100:142-8

In this study the authors perfon individual patient meta-analysis of 2703 nulliparous women who were randomised using computer designed sequences to either epidural analgesia or intravenous meperdine (pethidine) for pain relief during labour.

Patients were obtained from five trials conducted between 1993 and 2000 at Parkland Hospital, and those eligible included uncomplicated pregnancies and women with pregnancy-induced hypertension, at 36 or more weeks gestation. Obstetric management was according to a written protocol, which involved intravenous fluid administration; fetal heart rate surveillance for 30 minutes after commencement of analgesia; continuous heart rate monitoring in those with meconium stained amniotic fluid, auscultated fetal heart rate decelerations or inadequate progress of labour; and 2 hourly pelvic examinations. Cervical change of less than 1cm/hr with hypotonic uterine contractions resulted in augmentation of labour with oxytocin.

Indications for use of forceps were limited to inadequate voluntary pushing or fetal heart rate abnormalities. Epidural analgesia was initiated with either epidural bupivacaine or intrathecal sufentanil, and maintained with various concentrations of bupivacaine and fentanyl. Analgesia was maintained throughout the first stage of labour. Inadequate progress in the second stage after 1 hour resulted in halving or discontinuing the infusion to restore expulsive efforts. Additional boluses of bupivacaine and/or fentanyl were given for inadequate analgesia. All women randomised to meperidine (pethidine) were given an initial bolus of 50mg followed by either boluses or patient controlled analgesia for maintenance.

All tests of significance were performed using two-tailed tests and analysed according to intention-to-treat analysis. Having data available for the individual patients allowed the incorporation of general statistical methods adjusting for the individual studies. 1339 were allocated to epidural analgesia and 1364 to intravenous meperidine (pethidine). 19% were diagnosed with pregnancy-induced hypertension. 18% in the epidural group and 13% in the intravenous group did not receive allocated analgesia. The reasons were either rapid delivery, analgesia refused, randomisation error or received meperidine (pethidine) or epidural respectively. 12% in the intravenous group crossed over to epidural analgesia because of ineffective analgesia. There were no significant differences in maternal demographics, cervical dilatation at time of analgesia or number with pregnancy-induced hypertension between the two groups.

Epidural analgesia was significantly associated with prolongation of the first ($p<0.011$) and second ($p<0.001$) stages of labour, the need for labour augmentation ($p<0.001$), maternal fever ($p<0.001$), and increased rate of forceps delivery (adjusted OR 1.86; 95% CI 1.43-2.40 $p<0.001$). There was no significant difference in the caesarean delivery rate between epidural analgesia (10.5%) and intravenous meperidine (pethidine, 10.3%). The caesarean delivery rate was similar among the different methods of epidural analgesia used. One and five minute Apgar scores less than 7 were significantly increased in the intravenous meperidine (pethidine) group. Analysis of the protocol compliant groups showed similar results. The caesarean delivery rate was significantly increased in those who crossed from meperidine to epidural analgesia compared to those who did not ($p<0.001$). 95% of women who received epidural analgesia rated their satisfaction as excellent compared to 69% who received intravenous meperidine (pethidine).