Anaesthesia, critical care, and pain in the 21st century: the first decade

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In this post-graduate issue of the British Journal of Anaesthesia, which is based around the Festschrift meeting of former Editor-in-Chief and Editorial Board Chairman, Professor Jennie Hunter, a panel of leading experts cover a wide range of topical issues relating to anaesthesia, pain management, and critical care that have seen important developments in the 21st century.

In this issue, we present cutting edge reviews in eclectic, but highly pertinent areas. Rather than try to tie these areas together thematically, we will, in this editorial, direct the reader to some of the most important aspects. We have included reviews covering the following areas: (i) pain/analgesia, (ii) toxicity/adverse events associated with anaesthesia, (iii) patient management, and (iv) pharmacokinetics. All these areas have seen recent and significant development.

In the field of analgesia, the cloning of the opioid receptor family produced some major problems in classification as single genes for the classical \( \mu \) (MOP), \( \delta \) (DOP), and \( \kappa \) (KOP) have been described; however, the anaesthetic literature is peppered with reference to \( \mu_1-3, \delta_1-2, \) and \( \kappa_1-3. \) Despite the relatively rapid advances in molecular pharmacology of one of our most important receptor classes, clinical development, as described by Power, has been slow. However, the advent of significant new molecules such as tapentadol and the reuse of old drugs in combination (e.g. morphine/oxycodeone and oxycodone/naloxone) are already in the clinic. The effective use of new (and old) drugs clearly relies on accurate diagnosis and Niraj and Rowbotham provide an overview of where we are currently and reinforce the advice that (i) severe postoperative pain is associated with persistent pain, and (ii) early management of persistent postoperative pain may reduce its longevity and severity.

Drug-related adverse events are covered in some detail by Mahajan, Hudson and Hemmings, and Hopkins, who deal with drug errors, central nervous system (CNS) toxicity, and malignant hyperthermia (MH) triggering, respectively. Mahajan highlights the slow uptake of mechanisms to prevent human error in the high-risk and high-pressure environment of anaesthesia and ends his review with the clear warning ‘Society will be justified in making harsh judgments if we allow continuing inertia to delay the implementation of measures to prevent drug errors and improve patient safety’. Hudson and Hemmings, in their review of CNS toxicity, emphasize the potential for adverse effects, especially at extremes of age, despite the apparently neuroprotective abilities of xenon; however, they caution that the much-needed prospective clinical trials will be a challenge to design, especially in standardizing exposure and measuring outcome. In his review of the triggering of MH, Hopkins debunks the commonly held view that modern volatile agents may be safe to use in patients susceptible to MH and argues that suxamethonium may not be the potent triggering agent previously assumed.

Moving away from volatile agents, Struys and colleagues demonstrate in their review that the application of pharmacokinetic and pharmacodynamic concepts to i.v. drug administration can improve the use of anaesthetic agents. Whether the avoidance of volatile agents represents the future remains to be seen, but Struys and colleagues’ well-argued and scientifically based review makes compelling reading.
Systemic illness is considered by several authors in this issue; Nicholson and Hall,\textsuperscript{3} in their review of modern diabetes management, alert the reader to the growing prevalence of diabetes and detail the promising innovations in pharmacotherapy for this important disease. Priebe\textsuperscript{10} discusses the preoperative assessment and preparation of patients with significant cardiovascular impairment; he calls for a personalized approach to risk assessment and optimization. Two articles deal specifically with intensive care management: Galley\textsuperscript{11} describes in innovative approach of targeting antioxidants to the mitochondria as a useful adjunct in the treatment of sepsis, while Stewart and colleagues\textsuperscript{12} review the exciting new possibilities that may offer safer and more effective ventilatory support.

Shafer\textsuperscript{13} (presently, editor-in-chief of \textit{Anesthesia & Analgesia}) details the remarkable life and works of T. Cecil Gray, a true pioneer in anaesthesia. In a tale of daring, dogged persistence, inspiration, remarkable graft, and some practices that we might consider ethically ‘interesting’ in the modern day, Shafer provides an intriguing and inspiring biography of this giant in the field of anaesthesia.

In the research strategy report\textsuperscript{14} commissioned by the Royal College of Anaesthetists (RCoA) in 2005, Pandit audited and described in some detail the decline of anaesthesia-related research and made a number of detailed proposals and a vision for how this decline might be reversed. One of these recommendations was the setting up of the National Institute for Academic Anaesthesia (NIAA) which formally came into being in March 2008. Since inception, the NIAA now co-ordinates (i) funding applications for a wide range of anaesthetic speciality groups with several attaining NIHR partner status, (ii) research training from clinical trainees, and (iii) is the home of the very new Health Services Research Centre. The last decade has also seen the birth of the Faculty of Pain Medicine and the Faculty of Intensive Care Medicine within the RCoA. Nightingale\textsuperscript{15} (presently, President of the Royal College of Anaesthetists) describes the tortuous course that was plotted to reach the momentous inception of the Faculty of Intensive Care Medicine.

The end of the 20th century has been considered by some to have encompassed difficult times with anaesthesia-related research a little gloomy, but what has emerged in the first decade of this new century is a strong, vibrant speciality better equipped for the significant research challenges of the next decade and beyond. Novel directions such as less invasive monitoring,\textsuperscript{16} in silico investigation,\textsuperscript{17} genomics,\textsuperscript{18} human factors,\textsuperscript{19} and novel drugs\textsuperscript{20} offer exciting possibilities for improving the care we offer our patients. The future is bright.

Conflict of interest

D.G.L. is an editorial board member and director of the \textit{British Journal of Anaesthesia}. Work on opioids in Leicester is funded by HOPE Foundation for Cancer Research (www.hfcr.org), \textit{British Journal of Anaesthesia}/Royal College of Anaesthetists. D.G.L. has collaborative links with University of Ferrara Peptides (UFPeptides) that is involved in the development of opioid ligands. D.G.L. holds a consultancy with Grunenthal GmbH. J.G.H. is an editor and editorial board member of the \textit{British Journal of Anaesthesia}. His research work is funded by the Engineering and Physical Sciences Research Council. J.G.H. has accepted fees for the provision of opinions in legal cases (civil and criminal), acting on the instructions of the Claimant, the Defendant, and the NHSLA.

References