Pain medicine: advances in basic sciences and clinical practice

The meeting from which this issue stems celebrates advances made in ‘pain science’ translating to practice in man and the birth of The Faculty of Pain Medicine of The Royal College of Anaesthetists. With some imagination, it could be argued that the programme for a meeting such as this was set almost 350 yr ago by the philosopher and mathematician Rene’ Descartes who described human pain as ‘Fast moving particles of fire ... the disturbance passes along the nerve filament until it reaches the brain ... Descartes (1664).’ The 2008 meeting contained some excellent presentations covering: the sensing of pain (fast moving particles of fire), spinal processing/neuropathic pain (disturbance passes along the nerve filament), central processing (reaches the brain), and pain medicine/management (an extension of which Descartes would no doubt approve).

Pain causes significant suffering and distress, is feared by patients, is often poorly understood, and hence poorly managed by clinicians. Acute pain is the most common reason for a medical consult and >50% of the population will make this consult during their life. A survey for The British Pain Society (2005) of 975 people reported that 21% experienced pain every day or most days. This equates to 10 million across GB! In terms of chronic pain, the picture is no much better with figures for incidence of chronic pain being very variable. For example, in 1999, Elliott and colleagues surveyed 29 GP practices (3605 questionnaires covering 5036 patients) in the Grampian region of the UK and described an age-related increase in the self-reporting of chronic pain with an incidence of approximately one-third in 25–34 yr olds and a little less than two-thirds in those over 75 yr old. In March this year, Rivara and colleagues surveyed more than 3000 trauma patients in 69 USA hospitals and found that ~63% still reported pain 12 months after injury.

Pain is one of the most common symptoms associated with cancer. The prevalence of cancer pain is approximately 30–50% among patients with cancer who are undergoing active treatment for a solid tumour and 70–90% among those with advanced disease. Eighty-eight per cent of cancer patients in the last year of their life are in pain and 47% of those treated for pain by their GPs said their treatment only partially controlled their pain. Certain types of cancer pain can be particularly challenging to control, such as neuropathic pain and cancer-induced bone pain. Current treatments may have limited efficacy and there is a need for developing new strategies for managing cancer pain.

Chronic pain, in particular, is a major socioeconomic drain. One example is chronic back pain that has been estimated to cost >£4 billion in terms of healthcare and social costs, including lost production costs. A recent study of the prevalence of back pain in Germany found a lifetime prevalence of 85.5% with 18.2% having severe pain. Musculoskeletal pain in general is common, with ~20% of people reporting widespread pain, and up to 50% reporting back pain in a 1 month period. Population factors such as education and socioeconomic variables and individual factors (smoking, diet, etc.) may all contribute to chronic musculoskeletal pain. Disappointingly, community-based psychosocial interventions, although superficially attractive, have not been of major benefit, although there are some examples of population-based interventions that may positively alter attitudes to back pain. Neuropathic pain, which is particularly challenging to treat effectively, is found in similar patient groups as those affected by back pain, with a prevalence of ~8%. It is clear that we need to improve our understanding of modifiable risk factors that predispose to developing chronic pain, in order that we can structure our services to prevent chronic pain developing or target it early in its course.

Adequate and appropriate pain assessment in the clinic is an important prerequisite in formulating a pain management plan, although there is considerable evidence that this is often not done outside the specialist setting. Both the importance of pain assessment tools and their
role in designing clinical trials are reviewed by Breivik and colleagues.\textsuperscript{23} in this issue. Also of relevance in assessing any analgesic is the design of the trial—in particular, the techniques for comparing efficacy of analgesics. Both Breivik and colleagues\textsuperscript{23} and McQuay and colleagues\textsuperscript{24} discuss the potential erroneous conclusions that may be reached by such problems in trial design.

The importance of psychological factors in the development of chronic pain cannot be underestimated. In his lecture, Prof. Morley\textsuperscript{25} elegantly discussed the dynamic processes that lead to psychological morbidity, with pain interrupting normal function and interaction with other people. This leads to interference and development of fear-avoidance, culminating in loss of identity.\textsuperscript{26–28}

Since the seminal description of the spinal gate control theory for pain by Melzack and Wall,\textsuperscript{29} the spinal cord has remained a core target in blocking nociceptive transmission and, as indicated in D’Mello and Dickenson,\textsuperscript{30} is a rich source of potential novel targets for, in particular, chronic pain. Linking our understanding of the neurobiology of pain with the clinical setting has been significantly advanced by modern neuroimaging techniques, as exemplified in the Pat Wall Lecture, given by Prof. Tracey.\textsuperscript{31} She introduced the fascinating concept of chronic pain being not just a symptom, but also a neurodegenerative disorder with long-term consequences.\textsuperscript{32, 33} The potential role of functional magnetic imaging in teasing out the different aspects of pain perception may have major implications in developing new therapies.\textsuperscript{34–37}

It is exactly 10 yr since the British Journal of Anaesthesia published a post-graduate issue entitled ‘Recent advances in opioid pharmacology’\textsuperscript{38} where the cloning of the classical (μ-MOP, δ-DOP, and κ-KOP) and non-classical (Nociceptin/Orphanin FQ-NOP) opioid receptors were reviewed adding a new sense of vigour to pain-related research. From a basic sciences perspective, the intervening decade has seen some fascinating developments and several new drugs reaching the clinic including gabapentin/pregabalin,\textsuperscript{39, 40} these were described and added to the bigger picture of a relatively advanced pharmaceutical pipeline for neuropathic pain by Dray.\textsuperscript{41} There have also been several advances in the understanding of the wider (non-Na-channel) effects of local anaesthetics in the periphery and spinal cord\textsuperscript{42} and Hosking and Zajicek\textsuperscript{43} covered the exciting new information on the use of cannabis in pain. The group of Prof. Stein\textsuperscript{44, 45} in Berlin have described a neuroimmune axis in which peripheral inflammation up-regulates opioid receptors on peripheral nerves at the inflammatory site and infiltrating white cells release opioid peptides to activate these receptors and produce a degree of peripheral analgesia. So what for the next decade? New opioids with reduced side-effect profiles; like tolerance? New non-opioid-based therapies? Understanding the genetics of pain and using genomic technology to provide patients with individually tailored therapy?

Perhaps the link between acute and chronic pain is most apparent when studying persistent post-surgical pain. The evidence for this actually being a significant problem has been around for some time now,\textsuperscript{46, 47} but it remains a significant clinical problem, which is not yet fully understood. What is clear is that the one definite risk factor for developing this challenging chronic pain syndrome is surgery—and perhaps the need for any surgical intervention requires more careful evaluation.\textsuperscript{48} Pain in particular subgroups, ranging from children to the elderly, may need a more specialized approach or support for non-specialists. The plasticity of the nervous system at birth and in early years is in contrast to the constrained ability of elderly patients to respond to pain and analgesia.\textsuperscript{49, 50} In veterinary practice, there may be some lag time before clinical practice changes, but at least pain is now acknowledged to be a problem not only in companion animals, but also in laboratory and agricultural settings. Once again, as in the human setting, basic assessment of pain remains a problem.\textsuperscript{51}

The menace of chronic pain continues to evade effective and reproducible treatment. Pain medicine may be one of the areas of medicine where true translational research may yield direct clinical benefits to patients in the near future.\textsuperscript{52, 53} This may be achieved by interplay between those in the laboratory and members of the new Faculty of Pain Medicine in the clinic.

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Editorial II

The Faculty of Pain Medicine of the Royal College of Anaesthetists

Those who deny progress have many things in their favour. The collective amnesia of how things were in the past is the most powerful. . . . And then there is a tendency, when thinking about whether progress has been made, to compare how things are with how they should be or how we would like them to be, rather than with how they once were.

Hippocratic Oaths Raymond Tallis 2004.

The establishment of a Faculty of Pain Medicine by the Royal College of Anaesthetists (RCoA) in April 2007 represented the passing of another major waypoint in the development of pain medicine, and it helped to demonstrate the distance travelled by the specialty in the last 50 yr. Pain medicine describes the work of specially qualified medical practitioners who undertake the comprehensive management of patients with acute, chronic, and cancer pain using physical, pharmacological, interventional, and psychological techniques in a multidisciplinary setting. The whole multidisciplinary care package is pain management; what the medical specialists do is pain medicine.

John Bonica sowed the seeds of the specialty 50 yr ago. In 1956, he wrote The Management of Pain—more than 1800 pages by a single author. At the same time, technological advances and powerful intellects allowed people such as Patrick Wall to bring new skills and ingenuity to research into pain mechanisms. Along with Ron Melzack, he described the gate control theory in 1965. In 1974, he was the founding editor of the journal Pain. When Wall and Melzack planned their Textbook of Pain (first published in 1984), publishers rejected the scheme by saying that ‘pain was not a subject’. The Intractable Pain Society (the forbear of the British Pain Society) was formally established in 1974, although the group had been meeting annually since 1967. The International Association for the Study of Pain (IASP) was established in 1975. Since these beginnings, the advances in the understanding of pain have been remarkable. John Bonica and Patrick Wall would have rejoiced at the exciting progress evidenced by the contents of this Postgraduate issue of the British Journal of Anaesthesia.

For patients, the management of cancer pain was probably the first great clinical success. In 1962, Cecily Saunders described the use of oral morphine for cancer pain and then St Christopher’s Hospice opened in 1967, heralding the birth of the hospice. The WHO published Cancer Pain Relief in 1986—a small book with a massive clinical impact. Acute pain management has been another major success story, albeit more recent, with significant improvement after publications such as Pain after Surgery in 1990 right through to the 2nd edition of Acute Pain Management: Scientific Evidence in 2005. The management of pain in infants and children has been transformed in 25 yr with sophisticated analgesic techniques now used for the smallest babies. As an example of progress in the world of chronic pain, there has been a veritable revolution in the management of back pain.

The rate of progress has been greater in some parts of the world. Australia and New Zealand have had a Faculty of Pain Medicine since 1998 and in Australia recently, pain medicine has been recognized by the Federal Government as a separate specialty.

Despite all this apparent progress, education in pain has appeared to lag behind in certain quarters. Surveys and guidelines often include exhortations to improve education in pain management for healthcare professionals at all levels. For example, the CSAG report on Services for Patients with Pain recommended that Professional Bodies ‘Ensure that teaching and training at all levels adequately covers pain management’.

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