Welcome to the ninth issue of Anaesthesia and Pain Management Research Review.

This issue begins with US research suggesting that both MBSR (mindfulness-based stress reduction) and CBT (cognitive-behavioural therapy) are associated with greater improvements in LBP (lower back pain) and functional limitations when compared with usual care. A meta-analysis of studies comparing NSAIDs or paracetamol with placebo for osteoarthritis pain found that diclofenac was the most effective NSAID, while paracetamol (acetaminophen) had no apparent role. Researchers from France have reported that patient-controlled oral analgesia following caesarean section was not inferior to nurse-administered parenteral analgesia. This issue concludes with a paper from an Italian research group reporting faster onset of ultrasound-guided popliteal sciatic nerve block and a higher success rate using intraneural injections of ropivacaine rather than subparaneural injections, but with subclinical reductions in sciatic action potential amplitudes 5 weeks later, and cautioning against extending these findings to other approaches.

We do hope you find the papers in this issue useful in your practice, and we welcome your comments and suggestions.

Kind regards,

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Effect of mindfulness-based stress reduction vs cognitive behavioral therapy or usual care on back pain and functional limitations in adults with chronic low back pain

Authors: Cherkin DC et al.

Summary: This RCT compared the effectiveness of MBSR with that of CBT or usual care in chronic LBP. Adults with chronic low back pain (n=342) were randomised to MBSR, CBT or usual care. CBT and MBSR were delivered in 8 weekly 2-hour groups. In intent-to-treat analyses at 26 weeks, the proportions of participants with clinically meaningful improvement on the modified Roland Disability Questionnaire were higher for MBSR and CBT than for usual care (60.5% and 57.7%, respectively vs. 44.1%), and the proportions of participants with clinically meaningful improvement in pain bothersomeness at 26 weeks were 43.6%, 44.9% and 26.6% in the respective groups. There was little change with MBSR in either outcome at 52 weeks.

Comment (GL): MBSR is the new thing. Having said that, it’s not so new, so I was surprised that this was only the second RCT involving MBSR in people with chronic LBP. It was a large trial, well run, and it showed moderate beneficial effects of both MBSR and CBT. What was notable was that these effects were achieved with only 51% of those allocated to the MBSR group attending at least six of the eight sessions. Would the results have been even stronger if participants had attended more of the sessions? Potentially not. A previous review has shown that the number of class hours does not impact outcomes from MBSR, at least in terms of psychological distress. I’d propose that with a modified (shortened) programme, more people would be willing to sign up and give MBSR a go, so I think it’s worthwhile trialling modified MBSR programmes in chronic pain populations.

Reference: JAMA 2016;315(12):1240–9

Abstract

Independent commentary by Gwyn Lewis

Assoc Prof Gwyn Lewis works in the Health and Rehabilitation Research Institute at Auckland University of Technology. She is a neuroscientist and is an active pain researcher and educator. For full bio CLICK HERE

Independent commentary by Dr John Barnard

Dr John Barnard works as an anaesthetist at Waikato Hospital with a part time academic component. In addition to his role in the operating theatres, four years ago he became the Clinical Director of the Hospital Pharmacy and Chairman of the hospital’s Medicines and Therapeutics Committee. For full bio CLICK HERE

Abbreviations used in this issue

CCT = cognitive-behavioural therapy
LBP = lower back pain
LSCS = lower (uterine) segment caesarean section
MAP = mean arterial pressure
MBSR = mindfulness-based stress reduction
NSAID = nonsteroidal anti-inflammatory drug
PCA = patient-controlled analgesia
RCT = randomised clinical trial
SBAR = situation, background, assessment, recommendation

Intraneural vs. subparaneural popliteal sciatic nerve block
New Zealand Health Survey 2012/13: characteristics of medicinal cannabis users

Authors: Pledger MJ et al.

Summary: These authors analysed and reported New Zealand Health Survey 2012/2013 data on self-reported cannabis use, stratified as nonuse, prior use, nonmedicinal use within the prior year and medicinal use within the prior year. Among 13,009 respondents aged ≥15 years, medicinal cannabis use was reported by 4.6%, with males, and younger, less well-educated and relatively poor respondents more likely to be users (for medicinal purposes). Māori had the highest prevalence of medicinal cannabis use, but European NZ and others comprised 67.9% of medicinal cannabis users. Medicinal cannabis use was associated with reportedly typically hard-to-manage conditions such as pain, anxiety/’nerves’ and depression. Users of medicinal cannabis were more likely to report chronic pain and pain interfering moderately or more with housework and other work.

Comment (GL): The medicinal use of cannabis is a hot topic in both NZ and Australia. The most common reason specified for use in this study was pain, which follows findings of medicinal cannabis use in the US. The Faculty of Pain Medicine (ANZCPA) released a statement in 2015 indicating they do not support medicinal use of cannabis for chronic noncancer pain (excluding palliative care and spasticity in multiple sclerosis) due to a lack of supporting data. Meta-analyses have found an unclear modest therapeutic benefit for chronic noncancer pain, which is generally offset by numerous side effects. Another interesting point raised by this paper is that 69% of people who reported medicinal use of cannabis also reported nonmedicinal use, suggesting there may be some blurring of the lines in regards to what they are really using cannabis for.


Abstract

Effectiveness of non-steroidal anti-inflammatory drugs for the treatment of pain in knee and hip osteoarthritis

Authors: da Costa BR et al.

Summary: This was a network meta-analysis of 74 randomised trials (n=58,556) of NSAIDs or paracetamol versus placebo for osteoarthritis pain. Compared with placebo, paracetamol and all NSAID preparations were associated with improvements in pain symptoms. For diclofenac 150 mg/day, etoricoxib 30–90 mg/day and rofecoxib 25–50 mg/day, the probability of a pain reduction effect size of >0.37 relative to placebo was >95%, with probabilities of 100% for the maximal approved daily doses of diclofenac and etoricoxib. Although a positive relationship between treatment effect and increasing dose was evident, tests for linear dose effects only reached significance for celecoxib, diclofenac and naproxen. The estimated effects were not significantly altered in sensitivity analyses accounting for methodological quality.

Comment (GL): I will not pretend that I understood all of the analyses performed in this meta-analysis, but I think I get the general gist of it. Basically, the analyses enabled the effect of different doses of NSAIDs to be determined in relation to each other or to placebo. With a massive 74 trials of at least 100 participants in each group, the meta-analysis did not suffer from lack of data. Of note, pretty much all preparations (regardless of dose) showed significant beneficial effect sizes for pain and function. In fact, a typical osteoarthritis patient without other significant comorbidities was shown to have 100% probability of a clinically relevant improvement in pain for some of the drug/dose combinations. The notable exception was paracetamol, which was not recommended in any dose. Given the considerable side effects of NSAIDs, the fundamental advice was to use them in short- to mid-term doses as required, rather than long-term, fixed doses.


Abstract

Anaesthesia and Pain Management Research Review

References: 1. www.pharmac.govt.nz/MedicalOnline. 2. Simdax® Data Sheet 2010. Please Review the full Data Sheet at www.medsafe.govt.nz before prescribing Simdax®. Simdax® (levosimendan) 2.5mg/mL injection concentrate. Approved indications: Simdax® is indicated for the short-term treatment of acutely decompensated chronic heart failure (ADHF) in situations where conventional therapy is not sufficient, and in cases where inotropic support is considered appropriate. Dosage & Administration: Only for single IV use in hospital. Dose and duration of treatment should be individualized according to the patients’ clinical condition and response. Contraindications, precautions & side effects; Hypersensitivity to Simdax® or to any of the excipients. Severe hypotension and tachycardia. Significant mechanical obstructions affecting ventricular filling or outflow or both. Severe renal impairment (creatinine clearance <30 mL/min) and severe hepatic impairment. History of Torsades de Pointes. Use with caution in patients with ischaemic cardiovascular disease, concurrent anaemia, tachycardia, atrial fibrillation, arrhythmias, coronary ischaemia and long QTc interval. Possible side effects are tachycardia, hypotension, headache, atrial fibrillation, ventricular extrasystoles and fibrillation. Simdax® is a prescription medicine available on the HML, Aspen Pharmacare c/o Healthcare Logistics, Auckland, NZ. www.aspenpharma.co.nz; TAPS P8661-15(J).

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Clinical practice guidelines for the management of neuropathic pain

Authors: Deng Y et al.

Summary: This was a systematic review of 16 clinical practice guidelines for the management of neuropathic pain, with independent assessments of their quality. An evidence-based approach was used for the development of 13 of the guidelines, with the remainder produced by consensus panels. None of the guidelines scored >50% in all six AGREE (Appraisal of Guidelines Research and Evaluation)-II instrument domains, due mainly to poor performance in the ‘applicability’ domain. The clinical practice guidelines scored highest for the ‘clarity and presentation’ domain, followed by the ‘scope and purpose’ and ‘editorial independence’ domains. Most of the recommendations from the clinical practice guidelines on neuropathic pain management were relatively consistent, particularly with respect to stepwise treatment with medication.

Comment (GL): I was excited by the title of this paper and was looking forward to reading the latest recommendations for the management of neuropathic pain. After reading the paper, I was left disappointed and with no clue as to what the consensus recommendations are. It is not until I was well into the review that I realised that only guidelines pertaining to pharmacological management were included. I was also unsure why diagnostic/screening and management guidelines were included together, the presentation of the guideline recommendations was confusing, and I couldn’t even figure out from the reference list what articles were included in the review. And while I support critiquing guidelines, I think some limitations of the AGREE II tool became evident. Guidelines can score fairly well if they look pretty, read well and fess up to all potential conflicts of interest. There is only one domain in the AGREE II instrument that assesses the rigour of development, which is surely one of the more important aspects.

Reference: BMC Anesthesiol 2016;16:12

Abstract

Estimating the risk of chronic pain: development and validation of a prognostic model (PICKUP) for patients with acute low back pain

Authors: Traeger AC et al.

Summary: These authors used data from 1230 Australian primary care patients with acute LBP to develop a prognostic model to estimate chronic LBP risk, which was externally validated in another 1528 patients. Chronic LBP, defined as ongoing pain at 3 months, (primary outcome) was present in 30% and 19% of the development and validation cohorts, respectively. The performance of the primary model (PICKUP) for identifying the development of chronic LBP in the validation cohort was acceptable (AUC 0.66 [95% CI 0.63, 0.69]). Although acceptable model calibration was evident in the validation cohort (intercept –0.55; slope 0.89), some miscalibration was seen in high-risk cohort (intercept –0.55; slope 0.89), some miscalibration was seen in high-risk performance of the primary model (PICKUP) for identifying the development of chronic LBP to develop a prognostic model to estimate chronic

Comment (GL): The ability to predict the development of chronic LBP is almost as beneficial as the ability to treat it. This was a statistically complex paper but did very well at explaining the various outcomes and their interpretation. I liked the fact that they developed separate models for different outcomes (pain and disability), but wonder if there may be some key predictors that are missing given they were restricted to those included in the previous studies. The authors mentioned structural imaging, but wondered if there may be some key predictors that are missing given they were restricted to those included in the previous studies. The authors mentioned structural imaging, but wondered if there may be some key predictors that are missing given they were restricted to those included in the previous studies.


Abstract

Pressure-dependent changes in haematocrit and plasma volume during anaesthesia

Authors: Damien T et al.

Summary: In this RCT, 24 patients scheduled for cardiac surgery received either noradrenaline (norepinephrine) at a dose needed to maintain MAP at pre-anaesthesia levels after induction or vasopressors if MAP fell <60mm Hg, without fluids in both groups. Compared with controls, noradrenaline recipients had a smaller decrease in haematocrit 10 minutes after anaesthesia induction (1.2% vs. 5.0%), with a corresponding smaller increase in plasma volume (85 vs. 310mL), and a smaller decrease in MAP (69 vs. 92mm Hg), which was maintained throughout the 70-minute intervention period.

Comment (JB): In anaesthesia simulation, a trainer will implore participants to ‘suspend disbelief’, asking them to actively ignore the unreal aspects of the simulation environment. For the clinician reading an academic journal, there is an equivalent benefit in imploring the reader to ‘suspend so what’. If ‘so what’ is too active, the reader looks no further than the abstract and misses the joy of a well-written discussion. This paper is a great example. After a standard induction with modest hypotension, the haematocrit fell 5% and this change was largely prevented by maintaining a normal MAP with low-dose noradrenaline. In the discussion, the authors initially use the traditional Starling model of capillary fluid movement to explain the concept of fluid movement. Then they extend the scope to include a more modern concept of this fluid movement noting the role of the luminal glycocalyx in determining how the capillary plasma behaves. Also discussed was the performance of the Masimo Rainbow pulse oximeter-based continuous measurement of haemoglobin level (spHb) compared with the arterial blood gas analyser Hb (artHb). The spHb was 10–15g/L lower than the artHb. I would like to have seen simultaneous venous and capillary measurements of haemoglobin to get a clearer picture of the whole of the circulation.


Abstract

Patient-controlled oral analgesia versus nurse-controlled parenteral analgesia after caesarean section

Authors: Bonnal A et al.

Summary: In this noninferiority RCT, women undergoing elective caesarean section received postoperative paracetamol, ketoprofen and morphine analgesia via parenteral administration according to routine practice (n=39) or as oral PCA provided as four pillboxes containing tablets and instructions for self-medication (the first at 7 hours after the spinal injection and then three more at 12-hour intervals; n=38). Compared with standard parenteral analgesia, oral PCA was associated with significantly lower verbal rating scale pain scores at rest and on movement at 2 hours and at 6-hour intervals for 48 hours, with the criterion for noninferiority met, and a higher rate of morphine use (58% vs. 23% [p=0.002]), with a greater median number of doses (2 vs. 1 [p=0.006]). Five women in the oral PCA group had minor drug errors or omissions. Pruritus was the only adverse event seen more frequently in the oral PCA arm (37% vs. 15% [p=0.03]), and maternal satisfaction was similar between the groups.

Comment (JB): It is not just the number and relative uniformity of the operations performed that make LSCS a useful postoperative analgesia research model. The authors quoted a study that ranks LSCS the ninth most painful operation out of a list of 179 surgical procedures, so most patients will need strong analgesics, at least for the first couple of days, and the source of the pain will be both visceral and somatic. The majority of these patients are well, able to give a good account of their symptoms, and highly motivated to mobilise. It is the last point that makes LSCS a target for enhanced recovery projects. While intravenous PCA opioid is no doubt effective, there is concern that this technique discourages early mobilisation. Many contemporary post-LSCS units rely on multimodal oral analgesia (plus or minus some form of regional analgesia). Ordinarily, oral opioids come with a significant administrative burden based on the need for two staff members to sign each dose out from a drug safe, and often two staff members to actually administer each dose. This creates a barrier to rapid titration of dose to effect and the classic description of p.r.n. as ‘perhaps really never’, rather than pro re nata. In this study the patients were given pill boxes and self-administered their own analgesics. The boxes were replaced each 6 hours, and each box contained p.r.n. morphine doses plus any regular analgesics that were due that 6 hours. Pain relief in the experimental group was noninferior to the comparator group, and more patients in the experimental group actually used some morphine. This last point reinforces the need to ring the bell and ask the attending nurse or midwife for analgesia creates a relative barrier to analgesia, even in the ideal practice world of RCTs.


Abstract
An analysis of 1505 consecutive patients receiving continuous interscalene analgesia at home

Authors: Fredrickson MJ et al.

Summary: This was a prospective safety study of 1505 consecutive patients who had undergone shoulder surgery and received continuous interscalene analgesia at home; the patients removed their catheters on postoperative days 2-5. No major complications were reported, but mild dyspnoea, hoarseness and dysphagia were reported by 27%, 13% and 7% of patients, respectively. Medical advice was sought by 12% of the patients. Technical issues with the pump or tubing, which were reported by 2% of the patients, were associated with patient age, body weight, use of ultrasound or concomitant nerve stimulation as the endpoint for final needle tip position, local anaesthetic placement via the catheter or needle, whether a catheter-related intervention for pain relief was required in the recovery area and ambulatory pump type.

Comment (JB): The primary author of this paper has published widely on the use of regional analgesia after shoulder surgery. He and the four other anaesthetists taking part in this prospective study are experts at continuous interscalene block, and are convinced that this form of analgesia is the best on offer. They were willing to push the envelope to create a clinical trial built on continuing the regional analgesia for up to 4 days after discharge (including having the patient pull out their own interscalene catheter). Of the 1527 patients offered the option of taking part in this prospective safety study, 1505 took up the opportunity. The authors must be both persuasive and confident. The majority of patients used no opioids postoperatively and their pain scores were low. Any remaining question marks are concerned with generalisability and safety, rather than with effectiveness. In the discussion, the arguments addressing generalisability are framed around the expertise of the operators doing the blocks and the careful patient follow-up processes.

To my mind, the safety question is an ‘eye of the beholder’ issue. There were no severe complications out of 1505 patients. Using the 3% rule for zero numerators, this means that the true incidence of severe complications is unlikely to be more than 3/1505 (i.e. not more common than 1 in 500). That is possibly an acceptable number. Less severe side effects were quite common: a 27% rate of dyspnoea, a 13% incidence of hoarseness, and an 8.5% incidence of redness, swelling or pain at the interscalene catheter site. Neurological symptoms potentially related to the regional analgesia and persisting for >4 weeks occurred in 7.3%, and in 3.2% these symptoms lasted for >3 months. Whether these statistics amount to a safety issue is a matter of opinion. Likewise, whether the picture painted by these numbers is more concerning than the corresponding picture seen with systemic analgesia will depend on who the critic is. The use of a drop of tissue glue at the catheter entry site to seal the spot and reduce catheter movement may be a practice point that would translate well to other catheter techniques.


Abstract

The ‘go-between’ study: a simulation study comparing the ‘Traffic Lights’ and ‘SBAR’ tools as a means of communication between anaesthetic staff

Authors: MacDougall-Davis SR et al.

Summary: The currently recommended SBAR (situation, background, assessment, recommendation) and a new Traffic Lights (‘red alert’, ‘amber assist’ and ‘green query’) tools were compared in this simulation study of 12 validated clinical scenarios of varying urgency. Compared with SBAR, the Traffic Lights tool was used more consistently (94% vs. 69%), was better at transferring 2–3 pieces of information correctly (85% vs. 44%) and was deemed to have greater clarity (p<0.0001 for all), with a reduced median message delivery time (20.5 vs. 45.5 seconds (p<0.001)). The Traffic Lights tool was regarded as significantly more useful by users, with 90% preferring it over the SBAR.

Comment (JB): Simulation is a great environment to experiment with communication tools. The common element in each of the scenarios used here was that the attending trainee anaesthetist needed to use a ‘go-between’ person to find a senior anaesthetist to help. The scenarios were carefully constructed to fit in to one of three bands of urgency or criticality. The Traffic Lights tool was used to identify the speed of response needed from the supervising specialist anaesthetist: red alert equals immediate response, amber assist equals response within a few minutes, and green query equals nonurgent assistance required. The Traffic Lights tool markedly outperformed the institution’s SBAR tool, and was rated as much more useful by the participants. The ‘go-betweens’ in the study were attendants and healthcare assistants, i.e. real life ‘go-betweens’. The authors came up with a novel twist to the study design by running through the trial twice. The first time through, the ‘go-betweens’ were not given any training about the Traffic Lights tool. They then received some training and a second set of scenarios were run with the same anaesthetist staff in attendance. Training did not improve the performance of the tool, suggesting that it was easy to use and highly intuitive. For the scenarios there was a >60m walk between the simulated theatre and where the supervising specialist was waiting. The SBAR tool meant that the ‘go-betweens’ had more information to try to remember and then convey, and their walk time was over double as long (20.5 vs. 45.5 seconds).

Reference: Anaesthesia 2016;71(7):764–72

Abstract

Effects of the intraneural and subparaneural ultrasound-guided popliteal sciatic nerve block

Authors: Cappelleri G et al.

Summary: In this clinical and electrophysiological comparison study, patients requiring ultrasound-guided popliteal sciatic nerve block were randomised to receive this with intraneural (n=44) or subparaneural (n=44) injections of 1% ropivacaine 15mL. Compared with subparaneural injections, intraneural injections significantly decreased the median onset time for successful sciatic nerve block (10 vs. 25 minutes [p<0.001]) with a higher success rate (95.3% vs. 62.5% [p<0.001]), with no significant difference for block duration. Electrophysiological assessments at 5 weeks (n=53) revealed subclinical, significant reductions in action potential amplitude, with no between-group difference. No clinical neurological complications had been reported at 6 months.

Comment (JB): The onset of anaesthesia when the sciatic nerve is blocked at the popliteal fossa can be frustratingly slow. Many anaesthetists would choose either to do a spinal or a general anaesthesia with an analgesic block at this level, rather than invest the extra time and effort in trying to achieve a dense sciatic nerve block. Predictably if the local anaesthetic is placed under the epineurium (intrafascial), mean onset time is reduced compared with placing the local anaesthetic outside the nerve but under the perineurium (subparaneural; 10 vs. 25 minutes). Overall block success rates were high in both groups. A radiologist reviewed all the images with an independent anaesthetist, and identified that 7 of the 43 patients in the intraneural group actually had a subparaneural injection and 9 of the 40 patients in the subparaneural group actually had an intraneural injection. This led to the study results being analysed twice, firstly by allocated group and secondly by effective group (i.e. where the local anaesthetically went). The authors briefly explain the ultrasound scan features of subepineural spread (nerve expands, fascicles become more separated) and subparaneural (nerve size unchanged and fluid pools between tubal and common peroneal components or circumferentially around the sciatic nerve). No patient complained of pain or paraesthesia during the injection (1% ropivacaine 15mL). Worryingly, electrophysiological studies (preblock and 5 weeks after surgery) demonstrated a >20% loss of action potential amplitude in all patients who had the postoperative nerve conduction study completed (about two-thirds of the subjects). The authors considered that this change was caused by subclinical axonal damage, and there was no difference in the magnitude of the amplitude reduction comparing the two groups. Ideally there would have been a third group of patients who received a general anaesthesia and no block to see if any amplitude changes occurred just as a consequence of the surgery. Eight-percent of the patients had some postoperative neurological symptoms, e.g. paraesthesia, tingling, numbness. Statistically there was no difference in the incidence between the two groups (5/45 intraneural; 2/38 paraneural, actual p value not given), but the study was not adequately powered to define this difference. No symptoms persisted >6 months postoperatively. There was no injectate pressure monitoring or nerve stimulation. All in all this is interesting, but not very reassuring.


Abstract