Percutaneous peripheral nerve stimulation therapy may provide enduring clinically significant pain relief and improve disability in patients with chronic neuropathic post-amputation pain according to the findings of a recent US study. Following on, we investigate a retroclavicular approach for regional anaesthesia for upper limb surgery and discover some interesting results. Other topics covered in this issue include chronic tramadol use after an acute pain episode, intra-operative dexmedetomidine and cognitive decline, postoperative morphine-sparing effects of non-opioid analgesics and high-flow versus standard nasal cannulae in morbidly obese patients undergoing colonoscopy.

I wish you an enjoyable reading experience of our selected literature.

Kind Regards,

Professor André van Zundert
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Percutaneous peripheral nerve stimulation for the treatment of chronic neuropathic postamputation pain: a multicenter, randomized, placebo-controlled trial

Authors: Gilmore C et al.

Summary: This multicentre, double-blinded, randomised, placebo-controlled study investigated the safety and effectiveness of percutaneous peripheral nerve stimulation (PNS) for chronic neuropathic pain following amputation in 29 lower extremity amputees with post-amputation pain. Following ultrasound-guided implantation of percutaneous PNS leads; subjects were randomised to receive PNS (n = 12) or placebo (n = 14) for 4 weeks. At the end of 4 weeks, the placebo group crossed over and all subjects received PNS for 4 additional weeks. During weeks 1 to 4, significantly more PNS recipients demonstrated ≥50% reductions in average post-amputation pain (primary endpoint; 58% vs 14%; p = 0.037). After 8 weeks of therapy, significantly greater proportions of PNS subjects reported ≥50% reductions in pain (67% vs 14%; p = 0.014) and pain interference (80% vs 15%; p = 0.003). Four out of 5 PNS recipients completing 12-month’s follow-up reported ≥50% pain relief.

Comment: (Prof. André van Zundert) Residual post-amputation pain in the lower limb and phantom limb pain occurs in about 75% of amputee patients. This can result in physical and psychological pain, a decrease in function and quality of life, and an increased risk of post-amputation depression. Many therapies have been practised to treat this complex and challenging condition including: a) opioid/non-opioid analgesics; b) physical/psychological therapies; and c) nerve block/spinal cord stimulation techniques. PNS leads used to be positioned close to nerves, although the invasive technique was complex and costly with risks of failure, nerve damage and lead migration. The authors described in detail their technique, whereby ultrasonic landmarks were applied to identify nerves, muscles, bones and arteries. A monopolar electrode was inserted to within 0.5-3 cm of the targeted femoral/sciatic nerve trunk. Test stimulations confirmed comfortable stimulation-evoked sensations in the regions that covered the pain and the functionality of the inserted fine-wire coiled leads, which were then connected to external, wearable pulse generators. They were then programmed to evoke the same waveform sensations as the test stimulation, allowing the patients to adjust the stimulation intensity.

Subjects were seen in the clinic on a weekly basis during the 8-week therapy period. After 4 weeks, subjects received the crossover technique. The primary efficacy outcome evaluated the proportions of patients in the PNS therapy and placebo control groups that were responders (>50% reduction in pain). Average reduction in pain interference was 4 or more points on a 0-10 rating scale. The authors concluded that percutaneous PNS is a viable, minimally invasive, effective pain relief method that significantly reduces post-amputation pain in individuals with chronic neuropathic pain, with additional benefits such as greater function of the limb and return to activities of daily living. This is the first article that has published the promising results on the effectiveness of a minimally invasive, fully reversible percutaneous PNS system, based on activating inhibitory mechanisms in the spinal cord. Previous methods were all invasive, thus requiring complex implantation surgery. Disability and quality of life are seriously impacted in most amputees. PNS stimulation combines the aims of CNS plasticity of residual and phantom limb pain by: a) modulating painful signals from the periphery directly at the level of the gating mechanism in the spinal cord to obtain pain relief; b) at the level of the gating mechanisms on the spinal cord level to reduce pain sensations and enable reversal of maladaptive cortical changes; and c) by generating non-nociceptive sensory input to the cerebral cortex. Further studies are needed to do a 12-month or longer follow-up of the technique, demonstrating durable pain relief using PNS stimulation therapy. This reviewer also questions the additional validity of pre-amputation local anaesthetic infiltration of the sciatic nerve before full amputation occurs.


Abstract

In this issue:

> Nerve stimulation for chronic post-amputation pain
> Retroclavicular vs supraclavicular brachial plexus block for limb surgery
> Chronic tramadol use after acute pain episode
> Breast cancer surgery: post-op US-guided serratus plane block
> Intra-operative dexmedetomidine and cognitive decline
> Postoperative morphine-sparing effects of non-opioid analgesics
> Erector spinae plane block for multiple rib fractures
> High-flow vs standard nasal cannulae in morbidly obese patients undergoing colonoscopy

Abbreviations used in this issue:

ASA = American Society of Anaesthesiologists; CI = confidence interval; CVA = cerebrovascular accident; FIG = fraction of inspired oxygen; FRC = functional residual capacity; GA = general anaesthesia; IRR = incidence rate ratio; IV = intravenous; LMA = laryngeal mask airway; MOCA = Montreal Cognitive Assessment; NRS = Numerical Rating Scale; PCA = patient-controlled analgesia; PONV = post-operative nausea and vomiting; PPV = positive pressure ventilation; RCT = randomised controlled trial; TCI = target-controlled infusion; TIVA = total intravenous anaesthesia; US = ultrasound.

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Abstract
**Retroclavicular vs supraclavicular brachial plexus block for distal upper limb surgery: a randomised, controlled, single-blinded trial**

**Authors:** Grape S et al.

**Summary:** The hypothesis that the retroclavicular approach, when compared with the supraclavicular approach, would increase the success rate of regional anaesthesia for upper limb surgery was tested in this randomised, controlled single-blinded trial involving 120 twenty ASA physical status 1-3 patients. Using a single-injection technique without needle tip repositioning, patients received either an ultrasound-guided retroclavicular or supraclavicular brachial plexus block with 30 mL of a 1:1 mixture of mepivacaine 1% and ropivacaine 0.5%. Block success rates 30 min after local anaesthetic injection (primary endpoint), defined as a composite score of 14 of 16 points, inclusive of sensory and motor components, were 98.3% (95% CI 90.8-99.9%) in the supraclavicular group and 98.3% (95% CI 90.9-99.9%) in the retroclavicular group (p = 0.99). Mean needling time (secondary outcome) was shortened for the supraclavicular group compared with the retroclavicular group (5 min vs 6.0 min; p = 0.006). Other secondary outcomes including mean time to first opioid request, oxycodone consumption, and pain scores (numeric rating scale, 0–10) at 24 hours postoperatively were similar between the supraclavicular and retroclavicular groups; 439 min vs 447 min (p = 0.19), 10.0 mg vs 7.9 mg (p = 0.80) and 1.2 vs 1.5 (p = 0.09), respectively.

**Comment:** (Dr Tommy Tseng) The retroclavicular brachial plexus block is a novel approach described in recent years, with increasing interest into its efficacy as a viable alternative to current accepted approaches. In this study, the authors compared ultrasound-guided retroclavicular and supraclavicular brachial plexus blocks as regional anaesthesia for elective forearm or hand surgery. Patients were placed in a semi-sitting position, with ipsilateral arm adducted. Primary outcome was block success rate 30 min after local anaesthetic injection, with a successful block deemed by a pre-defined composite score of sensory and motor testing of related dermatomes/myotomes. Success rates were 98.3% (95% CI 90.8-99.9%) and 98.3% (95% CI 90.9-99.9%) in the supraclavicular and retroclavicular groups, respectively (p = 0.99), with no statistically significant difference observed between the groups based on this primary outcome. Secondary outcomes, which included block-related and pain-related outcomes, were also similar, with statistically different outcomes only noted in a subset of measured block-related outcomes – being needling time, procedure time, and duration of motor blockade (with comment that these times had minimal clinical relevance). Although results are promising, the retroclavicular approach is without identified disadvantages. Visualisation of the needle path behind the clavicle has been noted to not be possible due to the acoustic shadow created, placing neurovascular structures at risk of being punctured. In this article, two patients in the retroclavicular group were observed to have a vascular puncture, compared to none in the supraclavicular group (p = 0.16). Concerns have also been raised with regards to ineffective block of musculocutaneous nerves – although this was not seen in this article. Overall, it remains to be seen whether the retroclavicular approach can become a suitable alternative to currently accepted practices. So far, there has been research indicating it may be a viable alternative compared to other infracavicular approaches. It will be intriguing to see what develops in this space.


**Abstract**

**Chronic use of tramadol after acute pain episode: cohort study**

**Authors:** Thiels CA et al.

**Summary:** The risk of prolonged opioid use in patients receiving tramadol compared with other short-acting opioids was investigated in this observational study of data from the United States commercial and Medicare Advantage insurance claims database (OptumLabs Data Warehouse) on opioid-naïve patients undergoing elective surgery between January 1, 2009 and June 30, 2016. Among 444,764 patients who met the inclusion criteria, 357,884 filled a discharge prescription for one or more opioids; hydrocodone was the most commonly prescribed post-surgery opioid (53.0% of those filling a single opioid), followed by short-acting oxycodone (37.5%) and tramadol (4%). The unadjusted risk of prolonged opioid use after surgery was 7.1% (n = 31,431) with additional opioid use (defined as at least one opioid fill 90-180 days after surgery), 1.0% (n = 4457) with persistent opioid use (any span of opioid use starting in the 180 days after surgery and lasting ≥90 days), and 0.5% (n = 2027) meeting the CONSORT definition (an opioid use episode starting in the 180 days after surgery that spans ≥90 days and includes either >10 opioid fills or >120 days’ supply of opioids). A 6% increase in the risk of additional opioid use was seen in patients receiving tramadol alone compared with those receiving other short-acting opioids (95% CI 1.00-1.13; risk difference 0.5 percentage points; p = 0.049), a 47% increase in the adjusted risk of persistent opioid use (95% CI 1.25-1.69; risk difference 0.5 percentage points; p < 0.001), and a 41% increase in the adjusted risk of a CONSORT chronic opioid use episode (95% CI 1.08-1.75; 0.2 percentage points; p = 0.013).

**Comment:** (Dr Matthew Bright) The misuse of and addiction to opioids is a serious crisis that affects the social and economic welfare with an estimated cost in the United States of more than $500 billion. There have been a number of strategies employed to reduce the transition to chronic opioid use, including the increasing use of tramadol. This retrospective observational study investigated the prolonged use of tramadol compared with other short-acting opiates in 444,764 opioid-naïve individuals undergoing an elective procedure. Data were collected through ‘Medicare’ insurance for procedures and post-operative analgesia claims. Opioid use post-operatively was split into additional use (90-180 days), persistent use (>180 days) and the CONSORT definition for heavy opioid use >180 days. There were 357,884 discharge scripts filled for one or more opioids, including a short-acting opioid (74.9%), tramadol alone (3.0%) and tramadol with another short-acting opioid (1.2%). Tramadol was found to have a similar or greater risk of patients transitioning to prolonged use compared with other short-acting opioids. Despite the low rate of tramadol prescription in this study, its use post-operatively is only increasing, likely due to the perceived benefits of being a safer, less addictive short-acting opioid. In patients with additional opioid use from 90-180 days post-operatively, nearly two-thirds of them had no ongoing opioid use in the 30-90 days post-procedure. The additional use of opioids may be explained by patient’s use of remaining post-operative opioids for pain unrelated to their initial procedure. The authors suggest that there may also be pharmacologic and neural mechanisms for misuse due to the variable metabolism of tramadol into an active metabolite (desmethyltramadol), which partly contributes to the opioid effect. Irrespective of opioid choice, larger discharge prescriptions (using morphine milligram equivalents) were associated with a higher unadjusted risk of prolonged opioid use across all 3 definitions of prolonged use. The choice of analgesia post-operatively remains dependent on patient/peri-operative factors and prescriber preference. Simple measures to reduce the rate of prolonged opioid use are still essential and include patient education, limiting the number of pills prescribed, maximising multi-modal analgesia, and non-opioid-based pain control.

**Reference:** BMJ. 2019;365:i1849

**Abstract**

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PALEXIA® IR provides:

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*Analgesia not solely derived from opioid agonism. \(^*\)S8 analgesic.
†Non-inferior efficacy (5-day sum of pain intensity difference) and significantly lower incidence of constipation, nausea and vomiting (nominal p<0.001 for all events); PALEXIA® IR 50mg vs. oxycodone IR 10mg. Secondary endpoint. Primary endpoint was met.

MINIMUM PRODUCT INFORMATION: PALEXIA® IR (tapentadol hydrochloride) INDICATION: Moderate to severe pain. CONTRAINDICATIONS: Known hypersensitivity to tapentadol or any component of PALEXIA IR; conditions in which mu-opioid receptor agonist activity is contraindicated e.g. significant respiratory depression and acute or severe bronchial asthma or hypersensitivity confirmed or suspected paraesthesia, severe acute intracranial, intracerebral or intraspinal pressure, impaired consciousness, coma and severe renal or severe hepatic impairment, caution in patients with impaired respiratory function, patients with head injury, brain tumours, a history of seizures or any condition that increases risk of seizures, severe renal impairment, moderate or severe hepatic impairment or biliary tract disease, including acute pancreatitis. Use in pregnancy (Category C). Should not be used during breastfeeding. Not recommended for children <18 years old. May impair ability to drive or operate machinery. INTERACTIONS: Care should be taken when combining with mixed opioid agonist/antagonists or partial mu-opioid agonists, other CNS depressants with concomitant administration of other mu-opioid receptor agonist analgesics, general anaesthetics, hypnotics or other CNS depressants (including alcohol and ILD drugs), reduction of dose of one or both agents should be considered, concomitantly in patients who are receiving MAO inhibitors who have taken them within the last 14 days; isolated case reports of serotonin syndrome when used in combination with serotonergic drugs (see full PI). ADVERSE EFFECTS: Very common (≥1/10): dizziness, somnolence, headache, nausea, vomiting; Common (≥1/100 to <1/10): Decreased appetite, anxiety, confusional state, hallucination, sleep disorder, abnormal dreams, tremor, flushing, constipation, diarrhoea, dyspepsia, dry mouth, pruritus, hyperhidrosis, rash, muscle spasms, asthenia, fatigue, feeling of body temperature change. In patients with impaired respiratory function, patients with head injury, brain tumours, a history of seizures or any condition that increases risk of seizures, severe renal impairment, moderate or severe hepatic impairment or biliary tract disease, including acute pancreatitis. Use in pregnancy (Category C). Should not be used during breastfeeding. Not recommended for children <18 years old. May impair ability to drive or operate machinery. INTERACTIONS: Care should be taken when combining with mixed opioid agonist/antagonists or partial mu-opioid agonists, other CNS depressants (including alcohol and ILD drugs), reduction of dose of one or both agents should be considered, concomitantly in patients who are receiving MAO inhibitors who have taken them within the last 14 days; isolated case reports of serotonin syndrome when used in combination with serotonergic drugs (see full PI). ADVERSE EFFECTS: Very common (≥1/10): dizziness, somnolence, headache, nausea, vomiting; Common (≥1/100 to <1/10): Decreased appetite, anxiety, confusional state, hallucination, sleep disorder, abnormal dreams, tremor, flushing, constipation, diarrhoea, dyspepsia, dry mouth, pruritus, hyperhidrosis, rash, muscle spasms, asthenia, fatigue, feeling of body temperature change. DOSAGE AND ADMINISTRATION: To be taken orally, whole with sufficient liquid, approximately every 4 to 6 hours, with or without food. Usual recommended dose 50 to 100 mg every 4 to 6 hours and should be adjusted to maintain adequate analgesia with acceptable tolerability. Total daily dose >600 mg not recommended. Discontinuation of treatment: taper dose gradually to prevent symptoms of withdrawal. Renal impairment: not recommended in severe renal impairment. Hepatic impairment: not recommended in severe hepatic impairment. Elderly patients more likely to have decreased renal and hepatic function – care in dose selection. Not recommended for use in children <18 years old. Based on approved Product Information dated 27 March 2017. References: 1. PALEXIA® IR Approved Product Information. Seqirus ANZCA Bulletin 2018. Not all opioids are the same. 2. Raffa RB. Clin Ther 2009; 31(2):260–271. 3. Mattick RP. Curr Med Res Opin 2014; 30(12):2579–2584. 4. Pergolizzi J. J Clin Med Res 2014; 6(5):459–468. 5. Schug S. ANZCA Bulletin 2018. Not all opioids are the same.
Ultrasound-guided serratus plane block enhances pain relief and quality of recovery after breast cancer surgery: A randomised controlled trial

Authors Yao Y et al.

Summary: It is well recognised that multi-modal analgesia is effective in managing post-operative pain and improves patient outcomes. This double-blind RCT in China tested the hypothesis that pre-operative ultrasound-guided serratus plane block (SPB) improved pain and quality of recovery following breast cancer surgery. 72 patients undergoing breast cancer surgery were randomised 1:1 ratio to either receive SPB or saline. Using a 40-item Quality of Recovery questionnaire (QoR 40) 24 hours post-operatively, they found that the global median score was significantly higher in the SPB group compared to the control group (158 vs 141; p < 0.001), with a median difference of 15 (95% CI 13-17; p < 0.001). Other secondary outcome measures also supported the finding that pre-operative SPB improved the quality of recovery in breast cancer surgery patients.

Comment: (Dr Jimin Kang) Although breast cancer surgeries have become less invasive in nature, post-operative pain is still a real issue that impedes recovery and may even delay discharge. This double-blind RCT found that the intervention group that received SPB with 25 mL of ropivacaine 0.5% had significantly higher QoR-40 scores as well as decreased opioid consumption and subsequently less PONV and dizziness, lower post-operative visual analogue scale (VAS) scores, shorter stay in PACU and higher satisfaction scores compared to the control group who received SPB with saline. The participants consisted of 72 women of ASA classes I/II who were scheduled for elective unilateral breast cancer surgeries including wide local excision with sentinel lymph node biopsy (SLNB) or axillary lymph node dissection (ALND) and mastectomy with SLNB or ALND. They were randomised 1:1 into intervention and control groups so it is unknown whether or not the distribution of surgeries was equal in each group, however, to minimise variability, a single anaesthetist performed all ultrasound-guided SPBs for all participants, and they were all given the same GA with TIVA and LMA, and post-operative analgesia with PCA. Both primary and secondary outcome measures used in this study were good objective measures of the quality of recovery post-operatively, and yielded statistically significant results that supported the use of SPB to enhance recovery in patients after breast cancer surgery. Perhaps there could be potential in conducting similar studies but for different regional anaesthetics and relevant surgeries to further promote the use of regional anaesthetics.


A multicentre randomised controlled trial of the effect of intra-operative dexmedetomidine on cognitive decline after surgery

Authors: Cheng XQ et al.

Summary: A multicentre prospective RCT examining the effect on cognition of dexmedetomidine at multiple time points up to 6 months post-operatively. It also examined the association with changes in serum concentrations of brain-derived neurotrophic factor (BDNF). A total of 535 patients ≥65 years old who were undergoing scheduled gastrointestinal laparotomy were included. 269 patients in the treatment group received dexmedetomidine 0.5 µg/kg bolus and 0.4 µg/kg/hr infusion, while 266 patients received placebo. Dexmedetomidine was shown to statistically significantly reduce the rate of cognitive decline on post-operative day 3 (40/269 vs 65/266; p = 0.006), on post-operative day 7 (31/269 vs 49/266; p = 0.03) and at 1 month post-operatively (42/250 vs 61/248; p = 0.04). There were also statistically significant changes in BDNF concentrations on the third and seventh post-operative days associated with cognitive impairment at 7 days post-operatively; area under the receiver operating characteristic curve 0.63; p < 0.001 and 0.58; p = 0.016, respectively.

Comment: (Dr Kell Auer) This was a multicentre trial utilising 10 sites across China between 2014 and 2017. The study expanded on previous research demonstrating a link between dexmedetomidine use and decreased rates of post-operative cognitive dysfunction (POCD). This was demonstrated at 7 days post-operatively (primary endpoint) and up to 1 month post-operatively, however, no difference was seen at 3 and 6 months post operatively. Specifically, the cognitive assessment tests showed that dexmedetomidine decreased post-operative impairment of attention. Other positive findings in the trial included decreased rates of delirium in recovery (5% vs 10%; p = 0.03), CVASs (1% vs 3%; p = 0.04) and new arrhythmias (3% vs 7%; p = 0.02). However, given that 20 secondary endpoints were assessed, there is a significant risk of false positives when adhering to a p-value cut-off of 0.05. Failure of previous similar studies to show a decrease in CVAs and pneumonia rates further suggests these may be false positives. A correlation between dexmedetomidine use, BDNF and post-operative cognitive dysfunction was also demonstrated. The authors postulate that the improvement in POCD associated with dexmedetomidine use may be secondary to its effect on BDNF. Strengths of this trial included appropriate exclusion criteria, a reasonable sample size and uniform anaesthetic and post-operative analgesic and anesthetic protocols. The protocol uniformity helped to minimise confounding. Potential weaknesses included numerous secondary endpoints without adjusting p-value cut-offs, narrow inclusion criteria limiting external validity (age ≥65, having elective laparotomy, and MOCA >20) and high loss to follow-up rates (20%). This trial supports current evidence that dexmedetomidine use in certain patient populations may decrease delirium and short-term POCD.


Multicentre, prospective, double-blind, randomised controlled clinical trial comparing different non-opioid analgesic combinations with morphine for postoperative analgesia: the OCTOPUS study

Authors: Belello H et al.

Summary/Comment: (Dr Kate Taylor) Over the past two decades, there has been an unprecedented global increase in prescribed opioid use, misuse and opioid-related harms. In light of this crisis, anaesthetists are seeking alternative analgesic strategies to provide safe, balanced pain control in patients. This multicentre, randomised, double-blind controlled trial involving 237 patients undergoing a major surgical procedure, compared the morphine-sparing effects of different combinations of 3 IV non-opioid analgesics (NOA); paracetamol (P), nefopam (N) and ketoprofen (K) post-operatively. Participants were assigned randomly to one of eight groups; control (C) received saline as placebo, P, N, K, PN, PK, NK, and PNK; in the first 48 post-operative hours, these agents were administered 4 times per day. Morphine was used as a rescue medication only when a patient’s pain score was greater than or equal to 3/10. The results indicate a combination of all 3 NOAs with morphine results in significant morphine sparing for 48 hours post-operation and is associated with superior analgesia for 24 hours post-operation when compared with morphine alone (PNK group median 24 hour morphine consumption 5 mg vs controls 27 mg, and vs N group 21 mg, all p < 0.05). However, an inadequate sample size limits the power of this study to draw conclusions. During the collection of data for this study, pain management changed significantly across the 10 study centres as ketamine and lidocaine infusions were more frequently used intraoperatively. Consequently, further research is needed to define optimal post-operative NOAs and opioid combinations in conjunction with intraoperative infusions of ketamine and lidocaine. The incidence of morphine-related side effects in these differing combinations should also be evaluated. This study is important because it produces a novel approach toward attaining analgesia with non-addictive medication, which may also have a potential treatment alternative for persons addicted to opioids.


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The effect of erector spine plane block on respiratory and analgesic outcomes in multiple rib fractures: a retrospective cohort study

Authors: Adhikary SD et al.

Summary: Through a retrospective review of electronic medical records, the effectiveness of the erector spine plane (ESP) block was examined in 79 patients with multiple rib fractures. The primary outcome measures were incentive spirometry volume, maximum numerical rating scale for static pain scores, 12-hour opioid consumption in intravenous medicine valent, and mean arterial blood pressure. These outcomes were measured pre and post block for up to 72 hours after blockade; 77% of patients received continuous ESP block for a mean of 3.7 days. There were improvements in incentive spirometry volumes from a mean of 784 mL to 1375 mL (p < 0.01) during the first 24 hours following ESP blockade. Maximum NRS pain scores were reduced from an average of 7.7 to 4.7 in the first 3 hours (p < 0.01). Reductions in opioid consumption did not achieve statistical significance. Overall, the improvements in outcome measures were largely sustained for 72 hours.

Comment: (Dr Tegan Burgess) To date, there has been much excitement over the ESP block, with very little in the way of high-level evidence. This is particularly the case for the use of the ESP in the treatment of rib fractures, where over time, common practice has moved away from thoracic epidurals, first to paravertebral blocks, and now is trending towards the ESP. This is the first article to quantify the efficacy of the block in this area and does so by examining the electronic medical records of 79 patients who were admitted to a level 1 trauma hospital from Jan 2016 to July 2017. It is assumed all patients who received such a block, (single shot or continuous catheter infusion) over this period were included, as no specific exclusion criteria is reported. The intervention was performed by one of six specialist anaesthetists as part of a dedicated regional anaesthesia service. The initial load was 20 mL 0.5% ropivacaine and if a catheter was placed, an ongoing infusion was prescribed with 0.2% ropivacaine at 6-10 mL/h. The patients were prescribed simple analgesics as well as opioids as necessary. For the first 24 hours following erector spine plane blockade, there was a mean increase in incentive spirometry volumes of 545 mL (95% CI 319-770). Improvements were sustained for up to 72 hours. Maximum NRS pain scores were significantly reduced from baseline following erector spine plane blockade. The maximal reduction was in the first 3 hours (39%), with a gradual rise after this point. This suggests the initial bolus (at higher concentration and higher volume) was more effective than the subsequent infusion prescribed. Mean arterial blood pressure did not significantly change from baseline following erector spine plane blockade. Four elderly patients (>80 yrs) died within 2 weeks of receiving the ESP and were reported to have suffered multisystem trauma (no further analysis or comment was provided regarding these deaths).

Important conclusions in addition to the above were drawn by the authors. After the first 8 months, where 72% only received a single shot ESP block, the standard practice was moved to all patients receiving ongoing infusions via catheters. This seems common sense, as the pain from rib fractures does not subside after 24 hours. Further, after the conclusion of the study the authors' practice has changed to prescribe an ongoing regime of at least 25 mL every 3 hours (rather than the 6-10 mL/h infusion studied in the analysis). This supports both anecdotal and published evidence that fascial plane blocks require a relatively large volume in order to spread sufficiently to cover target nerves. It will be interesting to see if the authors again analyse the outcome measures of interest in this study after a period of using this new ongoing prescription.

The authors conclude that ESP blocks were associated with improved inspiratory capacity and analgesic outcomes following rib fracture, without haemodynamic instability. Importantly, their final conclusion is that ESP blocks “should be considered to be a viable alternative to other regional anaesthetic techniques when these are not feasible”. This last innocuous statement reminds us that although this study has proven some efficacy and safety of the ESP, no one has yet compared it to previously established standards of paravertebral blocks or thoracic epidurals. Overall, this is a well-constructed retrospective cohort study and the authors are to be commended on providing the first piece of evidence (beyond case reports) to demonstrate the efficacy and haemodynamic stability of the ESP in treating patients with rib fractures.

Reference: Anaesthesia 2019;74(5):585-93

High-flow versus standard nasal cannula in morbidly obese patients during colonoscopy: A prospective, randomised clinical trial

Authors: Riccio CA et al.

Summary: This pragmatic, prospective, randomised clinical trial was conducted at one hospital (Texas, USA). They hypothesised that high-flow nasal cannulae (HFNC) would result in positive pressure generation to all airway structures and consequently a lower incidence of desaturation (SpO2 <90%) episodes during colonoscopy in a morbidly obese population, compared to standard nasal cannulae (SNC). HFNC delivered 60 L/min with an FiO2 of 0.36-0.40. SNC delivered 2 L/min. The authors found that at similar FiO2, (0.4), HFNC was not significantly different from SNC for prevention of arterial oxygen desaturation in this patient population (39.3% and 45.2% respectively; p = 0.79).

Comment: (Dr Scott Popham) This study examines the application of HFNC (a reasonably new addition to an anaesthetist’s armamentarium) in a specific and challenging patient population, undergoing a common procedure, making this study relevant to all anaesthetists. The authors acknowledge that work done with HFNC in the paediatric population demonstrates the ability to overcome upper airway collapse, and that this didn’t translate in this study to the morbidly obese having sedation in the left lateral position. Airway obstruction in this patient population is a consequence of relaxation of the skeletal muscles, which normally hold the tongue and splint open the pharynx, resulting in a Starling resistor effect. Obstruction was only managed when desaturation in these patients reached <90%, by airway manoeuvres, adjuncts, PPV and/or alteration of propofol infusion rate. Use of these interventions wasn’t permitted until the desaturation event had occurred. The most common airway interventions were chin lift, jaw thrust and nasal airway (similar in both groups).

The patients had oxygen applied for 5 minutes prior to sedation commencement in both groups, permitting wash-in of supplementary oxygen to the FRC to act as an oxygen reservoir. The sedation technique was standardised, involving solely lidocaine and propofol, although the Appendix containing the details is inaccessible. All patients spontaneously ventilated during the procedure as evidenced by end-tidal CO2 measurements. It is presumed that obstruction was the cause of hypoxaemia. It wasn’t clear whether these were diagnostic or interventional colonoscopies. Often the degree of obstruction correlates to how easily the proceduralist is able to snare polyps – this could have been another secondary measure, since in clinical practice there is often a request for “less diaphragmatic movement” in this patient population, most easily rectified by insertion of an oropharyngeal airway.

This is a useful and well-conducted study in that it compared HFNC to a standard, and minimised variables between the two groups. Limitations of the study: the authors did not analyse: a) desaturation events associated with type of anaesthesia provider; b) proceduralist satisfaction with operating conditions; c) whether the interventions were diagnostic or interventional colonoscopies; d) oral airway wasn’t documented as an intervention for any of the patients who desaturated; and e) it is unclear whether dosing of lidocaine and propofol as an infusion was in mL/h/tCi. Obstructed breathing, especially in obese patients, tends to result in a seesaw pattern of breathing that makes snaring polyps more challenging. Future research could examine whether different HFNC settings or different techniques to overcome obstruction reduce desaturation events in this patient population.


Abstract

Independent commentary has been provided by Drs Keil Auer, Tegan Burgess, Matthew Bright, Jinmin Kang, Scott Popham, Kate Taylor, Tommy Tseng, and Professor André van Zundert.