# 2024 ANZCA ASM Prize session abstract examples

## Pharmacokinetics of lidocaine administered by intravenous infusion in patients with class I-III obesity

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Intraoperative lidocaine infusions have been demonstrated to improve perioperative outcomes.[1] Evidence to support dosing regimens in obesity is lacking, risking underdosing or toxicity in these patients. We aim to perform detailed pharmacokinetic (PK) analysis of lidocaine concentrations from plasma samples obtained during a fixed weight-based intravenous lidocaine dosing regimen in obese patients.

Methods
Ethics approval and informed consent was obtained (HREC/2018/QPCH/43981) and the study registered (ACTRN12618001658202p). A standardised intravenous lidocaine infusion regimen was administered to patients with a body mass index (BMI) >30kg/m2 undergoing elective laparoscopic abdominal surgery. Based on lean body weight,[2] 1.5mg/kg bolus over 10 mins (max 100mg) starting prior to skin incision, followed immediately by a continuous infusion of 1.5mg/kg/h until the completion of surgery was administered. Frequent arterial blood sampling at t=0, 15, 30, 60, 90, 120 and 180 mins was conducted. At completion of the infusion, samples at 5, 30 and 120 mins were obtained post-surgery. Plasma concentrations of lidocaine and monoethylglycinexylidide (MEGX) were measured using liquid chromatography-mass spectrometry. Patient characteristics and baseline biochemistry data were collected.

Non-compartmental analysis of plasma concentrations of total and unbound lidocaine and MEGX was performed using PKanalix 2021R2 (Lixoft SAS, a Simulations Plus company). Cmax was determined as the maximum observed concentration on the individual plasma concentration vs time plots. Area under the plasma concentration versus time plot from the time of dosing to the last measurable positive concentration (AUClast) was determined by

the log-linear trapezoidal method. Statistical analysis was performed using GraphPad Prism 9. PK parameters of different groups were compared using one-way ANOVA.

Results

Plasma samples from thirty patients were included; 10 with class I obesity (BMI 30-34.9kg/m2), 10 with class II obesity (BMI 35-39.5kg/m2), and 10 with class III obesity (BMI ≥40kg/m2). The median (interquartile range (IQR)) age was 50.5 (43.5-60.8) years and 21 (70%) were female. The median (range) total body weight was 107 (80.0-189.0) kg, and median (range) BMI was 37.7 (30.2-58.4) kg/m2. Median (IQR) serum albumin was 39 (36-42) g/l and creatinine 64.5 (58.3-84.0) umol/l.

The total and unbound plasma concentrations of lidocaine, MEGX and GX have been previously reported. For class I, II and III obesity groups, the median (range) unbound lidocaine fraction was 25.1% (12.0-50.0), 25.6% (12.6-48.8) and 21.3% (7.7-53.6) respectively; the median (range) unbound fraction of MEGX was 77.2% (59.0-101), 71.1% (54.0-148) and 72.2% (58.9-95.1); the median (range) AUClast total lidocaine concentration was 2.8 (1.6-7.0) mcg/ml.h, 3.5 (2.1-6.9) mcg/ml.h and 3.5 (2.2-5.5) mcg/ml.h; the median (range) Cmax total lidocaine concentration was 1.9 (1.1-2.6) mcg/ml, 1.8 (1.6-2.6) mcg/ml and 1.8 (1.4-2.3) mcg/ml.

Discussion

The median unbound fraction of lidocaine in this obese cohort is consistent with results previously published in the literature for the non-obese population (20-40%). According to non-compartmental analysis results, there was no difference in lidocaine and MEGX PK parameters between groups. Detailed PK modelling and dosing simulations will allow development of a safe and effective dosing regimen for patients with obesity.

We have no conflicts of interest

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LIMITLESS
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# Does the use of postoperative ketamine lengthen hospital stay in patients having spinal surgery?

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Pain following spinal surgery can be difficult to treat and is often associated with significant opioid requirements [1]. With increasingly complex patients, opioid regimes may be inadequate to control postoperative pain and carry significant risks such as opioid induced hypoventilation. Ketamine, a non-opioid analgesic can reduce opioid-related adverse effects (AEs) postoperatively [2]. However, AEs of ketamine, such as hallucinations and nausea, may impact patient discharge. Despite the strong evidence for ketamine use intraoperatively, there is a paucity of literature describing the clinical utility of postoperative ketamine. This audit aims to evaluate the length of stay (LOS) in patients who had a postoperative ketamine infusion after spinal surgery at a tertiary hospital in Melbourne.

## Methods

The Acute Pain Service (APS) and surgical databases at St Vincent's Hospital Melbourne (SVHM) were reviewed to identify patients who had postoperative ketamine infusions following spinal surgery between 1st January 2022 and 1st October 2023. Inclusion criteria included all spinal surgery procedures for all ages, all comorbidities, and all degrees of opioid tolerance. Exclusion criteria included not receiving postoperative ketamine as an infusion and patients enrolled in trials where it was unclear whether ketamine or placebo was administered. Primary data relating to the postoperative ketamine infusion parameters were collected, including reasons for commencement and discontinuation, ketamine infusion duration and rate, AEs, concurrent analgesia and pain efficacy scores. Additional data included time to mobilisation, LOS, operative location, preoperative medications and patient comorbidities.

## Results

Of the 671 spinal surgeries between 1st January 2022 and 1st October 2023, 42 patients across 43 surgeries (6.4%) had postoperative ketamine infusions. Patients receiving ketamine had longer operation times (109 versus 93 minutes, $p<0.001$). After commencing postoperative ketamine infusions, two (4.8%) patients had no change in their pain scores, two (4.8%) had an unclear effect, and 38 (90.5%) had improved pain control. The mean duration of ketamine infusion was 3.0 days. 34 (81%) patients were taking regular opioids or atypical analgesia for neuropathic pain prior to admission. Mild AEs of ketamine infusions occurred in 11 patients (26.2%) varying from light headedness to hallucinations, often resulting in a reduction of the ketamine infusion dose. The average hospital LOS was 8.1 days, versus those who underwent spinal surgery without postoperative ketamine of 6.4 days (Mann-Whitney; $z=-3.516$, $p<0.001$).

**Discussion**

Our data shows that postoperative ketamine infusions following spinal surgery are a safe and effective method to minimise opiate use, particularly in patients with complex pain management requirements. AEs were mild, and occurred at rates similar to those reported in the literature. Importantly, no patient required cessation of their postoperative ketamine infusion due to AEs. The mean LOS for patients following spinal surgery who did not have postoperative ketamine was 1.6 days less than those who did. This may be attributed to longer procedures and complex preoperative pain, warranting the use of a postoperative ketamine infusion. In conclusion, this audit demonstrates the safety and efficacy of postoperative ketamine infusions following spinal surgery.

**Acknowledgements**

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Completed in accordance with SVHM QA requirements (Ref: 23040). The authors declare no conflicts of interest.

LIMITLESS
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# The implementation of a daily preoperative team huddle to improve patient safety and efficiency in operating theatres: a prospective study

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**Background**
Effective teamwork and communication are essential components in the delivery of safe perioperative care [1]. A preoperative team huddle is a brief meeting conducted before the commencement of a surgical list to facilitate planning, communication, and the discussion of potential patient safety issues that may arise during the list. The goal of this project was to implement a routine preoperative team huddle in all Prince of Wales Hospital and adjoining Sydney Children's Hospital theatres, and to evaluate its impact on the safety culture and teamwork among theatre staff.

**Methods**
To establish a systematic process for the huddle, we sought multidisciplinary input and developed a protocol and checklist. Theatre staff were then educated about the huddle during meetings and teaching sessions, supported by an educational video and poster. Pre and post implementation data was collected over a one month period to track the frequency of and attendance at team huddles. The primary outcome measured was the frequency of huddles with full multidisciplinary attendance. Staff attitudes towards patient safety and teamwork were assessed before and after intervention using the Safety Attitudes Questionnaire form [2], distributed as a survey. Additionally, post implementation, staff were surveyed about their experience of the team huddle and any perceived barriers to its completion. A statistical analysis was performed using R software.

**Results**
Complete theatre team attendance at the daily huddle improved from 0% (0 out of 197) instances to 81% (220 out of 274) following the intervention. The survey response rate was estimated at 26% pre-intervention and 20% post-intervention. Of the 88 post-intervention respondents, 74 (85.0%) agreed that it improved awareness of other team members, 73 (83.9%) agreed there was an improvement in communication, 65 (74.7%) agreed it improved sourcing/planning of equipment and 62 (71.2%) agreed it improved list planning and efficiency. SAQ scores showed a statistically significant (p=0.035) decrease from 76.6 pre implementation to 72.2 post implementation on the 100 point scale score. Open responses identified that the primary barrier to team huddle completion was some members of the theatre team being absent at the nominated start time.

**Discussion**
The implementation of a preoperative team huddle in this study achieved a successful compliance rate of 81% post intervention. The team huddle received a strongly positive

response for improving teamwork, communication and efficiency. However, SAQ form results demonstrated a small but statistically significant reduction in staff attitudes towards safety and teamwork. The low survey response rate affects result interpretability, however, authors postulate that this new practice may have raised theatre staff's awareness of existing system issues. Future quality improvement cycles could build on this by examining and addressing system-level barriers to efficient completion of the team huddle and commencement of the theatre list.

**Declaration of Interests**

Authors have no conflicts related to this study.

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