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2025 ANZCA ASM Prize session abstract examples

KETO Study – A prospective observational study evaluating risk factors, prevalence, and sequelae of ketosis in adult fasting surgical population.

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Perioperative starvation ketosis and ketoacidosis in surgical population are under-researched areas, with limited studies reporting a 2–5% prevalence of beta-hydroxybutyrate (BHB) levels exceeding 1 mmol/L in non-diabetic patients. [1, 2] Despite these findings, little is known about the distribution of ketone levels, associated risk factors, and the potential biochemical or clinical sequelae in surgical populations. This has been particularly problematic in the context of euglycaemic ketoacidosis associated with the consumption of SGLT-2 inhibitors, the use of which is expanding rapidly. This study aimed to address these knowledge gaps by investigating the prevalence, risk factors, and outcomes of starvation ketosis and ketoacidosis in mixed elective and emergency surgical populations.

Methods
We conducted a single-centre prospective observational study involving 1,000 fasting surgical patients. After obtaining informed consent, preoperative capillary blood ketone and blood sugar were measured. Biochemical markers were analysed to evaluate the relationship between ketone levels and metabolic acidosis (base excess < -2) or acidaemia (pH < 7.35). Risk factors were assessed using multivariable logistic regression models, examining variables including diabetes status, HbA1c, body weight, fasting duration, surgery type, and SGLT2 inhibitor use. Patients with ketosis were managed by treating team at their discretion. Patient outcome data was collected at day 30 and analysed. The study was registered (ACTRN12619001622190).

Results
1,000 surgical patients were recruited. 2.3% patients had BHB levels exceeding 1.0 mmol/L. Significant, independent risk factors for ketosis included type 1 diabetes (OR 28.9, 95% CI 6.5-127.8), low body weight (OR 1.03 for every kg reduction, 95% CI 1.003-1.056), repeated fasting over consecutive days (OR 5.49, 95% CI 2.08-14.51), and gastrointestinal surgery (OR 4.15, 95% CI 1.39-12.43). SGLT-2 inhibitor use was also associated with an increased point-estimate risk of ketosis, though no statistical significance was found likely limited by a small number of cases (n=51). Among patients with ketone levels >1.0 mmol/L, the risk of metabolic acidosis was 25%, increasing to 50% at 1.5 mmol/L and 100% at 2.2 mmol/L thresholds. Interestingly, acidaemia was not strongly correlated with elevated ketone levels,

suggesting robust physiological buffering capacity. Intraoperative management with insulin and dextrose effectively improved ketone levels in most treated patients, while those left untreated often showed worsening ketosis and metabolic acidosis. No influence on 30-day outcomes was observed.

Discussion

Our study has identified a 2.3% prevalence of starvation ketosis in fasting surgical patients, and this emphasises the clinical importance of perioperative ketone monitoring. Gastrointestinal surgery, repeated fasting, and low body weight were key risk factors, while observed ketosis in patients with Type 1 diabetes likely represented developing diabetic ketoacidosis. The observed association between BHB thresholds and metabolic acidosis supports the continued use of a 1.0 mmol/L threshold [3] for ketosis diagnosis and management. Despite our findings, the study was underpowered to assess the long-term clinical outcomes of ketosis, highlighting the need for larger-scale research to evaluate the impact on patient recovery and surgical outcomes. Implementing routine preoperative ketone screening for high-risk patients and developing standardized intraoperative management protocols could improve patient safety and outcomes.

Acknowledgements

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Reference:

1. Ohkawa, H., et al., Clinical study on intraoperative hyperketonemia in non-diabetic surgical patients under general anesthesia. Masui. The Japanese Journal of Anesthesiology, 1993. 42(12): p. 1803-1807.
2. Burstal, R., J. Reilly, and B. Burstal, Fasting or starving? Measurement of blood ketone levels in 100 fasted elective and emergency adult surgical patients at an Australian tertiary hospital. Anaesthesia and Intensive Care, 2018. 46(5): p. 463-467.
3. Australian Diabetes Society: Periprocedural diabetic ketoacidoss (DKA) with SGLT2 inhibitor use in people with diabetes. 2022; Available from: https://www.diabetessociety.com.au/downloads/20220726%20ADS%20ADEA%20ANZCA%20NZSSD_DKA_SGLT2i_Alert_Ver%20July%202022.pdf.

We declare no conflict of interest.

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Utilising the nominal group technique to develop clinical practice guidance for shared decision-making in surgery

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Shared Decision-Making (SDM) is a collaborative process where clinicians and patients work together to develop an individualised treatment plan based on information provided by clinicians and reflective of patients' values goals and preferences. Globally, increasing comorbidity and rising surgical complexity amplify the need for supported decision-making in the perioperative setting [1]. However, structured SDM for frail and multimorbid patients is not an established component of standard perioperative care [2]. Despite being embraced by the perioperative community, the lack of a standardised operational definition and approach to SDM hinders its widespread adoption and potential for large-scale research. To address this challenge, we aimed to develop clinical practice guidance with the goal of enabling clinicians to consistently implement perioperative SDM across diverse clinical contexts.

Methods:
A modified nominal group technique (NGT) methodology was employed to develop a series of recommendations across three major domains: 1. Definitions and core components; 2. Delivery and systems; 3. Measuring impact and optimising reach. NGT is a structured method of consensus development suited to topics that are complex in nature and where there is limited applicable evidence [3]. This method of determining consensus allows for the quantitative synthesis of qualitative data to achieve convergence of opinion.

In October 2024 an international multidisciplinary group of 25 experts came together for a two-day consensus process. Representation included consumers, perioperative medicine specialties, health-service implementation experts, and academia. Prior to the in-person sessions, the scope of the guidance was clearly defined and an initial systematic search and narrative review of the literature conducted to inform the expert deliberation. The two days involved successive cycles of drafting recommendations in small groups, followed by debate and refinement during combined plenary sessions. Agreement was determined via iterative rounds of anonymous voting on RedCap™. Consensus was defined a priori as over 75% of

participants indicating a level of agreement of six or more on a 9-point Likert scale. All final recommendations were assigned a strength and corresponding grading determined by the available evidence.

Results:
Universal consensus was obtained on 25 bespoke recommendations which together comprise a comprehensive framework for delivering perioperative SDM. Our findings informed key recommendations describing the application of "universal SDM" for all patients contemplating surgery, alongside indications for referring to novel “specialised SDM” services tailored for individuals with higher decisional-support needs.

Other key recommendations emerged delineating the core components and roles necessary for establishing and maintaining an effective perioperative SDM service. These recommendations cover strategies to facilitate high-quality SDM consultations including: preparing and engaging patients for SDM encounters, guidance on the content to be covered, the appropriate use of decision aids, and training for clinicians. Additionally, an approach is outlined for documentation and data collection pertaining to the SDM process and patient-reported outcomes. Ten priority research and development areas were also identified to guide future research endeavours.

Discussion:
This consensus process resulted in the creation of 25 pragmatic recommendations formulated from expert interpretation of available evidence and co-created with consumers. To our knowledge, this is the first consensus practice guidance that has been developed specifically for perioperative SDM. This project represents the culmination of a multipronged research endeavour to understand and develop perioperative SDM models of care. The inclusion of diverse international expert perspectives enhances the overall utility and anticipated impact of the produced guidance. By bridging the theory-practice gap, these outcomes represent a significant milestone in the pursuit of universal access to high-quality SDM for all patients contemplating surgery.

No conflicts of interest to declare

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References:
1. Ubbink. Brit J Surg.2022;109(11)
2. Niburski et al. Health expectations 2020;23(5):1241-1249.
3. McMillan et al. Int.J.Clin.Pharm.38,655–662 (2016).

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Physiological drivers of hypotension after major vascular surgery: a single-centre prospective cohort study.

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Hypotension after major surgery is common and is linked to significant harm, including myocardial and kidney injury, delirium, stroke and death.[1] While there are many causes of hypotension, clinicians categorise them into four main physiological states, specifically vasodilation, pump failure, hypovolaemia and obstruction. Each requires specific supportive treatment while the underlying cause can be corrected.[2] Which of these causes hypotension after major surgery is currently unclear. The study aimed to clarify which physiological states cause hypotension in a high-risk population. We hypothesised that vasodilation would be the most important driver of hypotension in this population.

Methods

We conducted a single-centre prospective cohort study enrolling patients having major vascular surgery with a HEART score of two or more. The Melbourne Health Human Research Ethics Committee approved the study (2022.012, 14/09/2022). All patients provided written informed consent.

Following surgery, we conducted a focused point-of-care ultrasound of the heart and side-stream dark field microscopic examination of the sublingual microcirculation. We defined the primary exposure as the presence of one of five potential physiological disturbances (no change, vasodilation, low cardiac output, hypovolaemia and obstruction) using a pre-defined schema. Patients could exhibit multiple exposures. We followed patients for 24 hours for hypotension (defined as a systolic blood pressure less than 90 mmHg or a new vasopressor infusion documented anywhere in the medical record) as the primary outcome. Secondary outcomes included intensive care unit admission, return to theatre, hospital length of stay, postoperative MET call, postoperative vasopressor infusion, blood transfusion, and in-hospital cardiac arrest.

We constructed a logistic regression model of the relationship between the exposures and outcome adjusting for age, Charlson co-morbidity index, preoperative mean blood pressure, use of two or more antihypertensive medications, and ASA score. We used g-computation to estimate the adjusted marginal risk difference (AMRD). We defined significance as a p-value less than 0.05 and did not correct for multiple comparisons.

Results

We recruited 100 participants to the study and captured complete data for 89 participants. Of the 89 participants in the primary analysis, 30 exhibited vasodilation, while 13 demonstrated low cardiac output, and 20 patients developed hypotension (22.5%), while 69 (77.5%) did not. The AMRD for vasodilation was 30.2% (95% CI: 10.6% to 49.8%), $p = 0.002$ and for pump failure was 62.4% (95% CI: 40.2% to 84.6%), $p < 0.001$. Vasodilation increased the risk of intensive care unit admission (26.5 (95% CI: 7.6% to 45.4%), $p = 0.006$) and vasopressor infusions (21.5% (95% CI: 3.7% to 39.4%), $p = 0.018$). All other secondary outcomes were non-significant ($p > 0.05$).

Discussion

In addition to our hypothesis, both vasodilation and low cardiac output contributed significantly to hypotension. The increased risk of use of vasopressors and intensive care unit admission is consistent with vasodilation driving the majority of hypotension in this population. The majority of patients who became hypotensive demonstrated vasodilation in PACU. While the risk difference was greater for low cardiac output, it was less common than vasodilation, and therefore, we view vasodilation as the more important change to address in future work. However, if low cardiac output is demonstrated, the risk of hypotension is high.

We have no conflicts of interest.

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Conclusion

There was strong evidence that vasodilation and pump failure contribute to the development of hypotension after major vascular surgery and were associated with intensive care unit admission and the use of vasopressor infusions. Future interventions should focus on treating these changes.

References:

1: McEvoy MD et al. BJA. 2019;122(5):575-586.
2: Guarracino F, Bertini P. JAACC. 2022;2(1):17.