

EDITORIALS

Preoperative fasting and prevention of pulmonary aspiration in adults: research feast, quality improvement famine

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Pulmonary aspiration of gastric contents is a rare but catastrophic cause of morbidity and mortality associated with anaesthesia. Several long-standing anaesthetic practices (preoperative patient fasting, rapid sequence induction of general anaesthesia, and the application of cricoid force following induction) owe their origin to the prevention of such an event. Doubt regarding the harm-reducing efficacy of these interventions,¹ together with evidence of unintentional injury when they are used, means the place of these shibboleths in clinical practice is increasingly questioned.² Instructing patients to abstain from food and drink before anaesthesia causes discomfort, anxiety, thirst, hunger, physiological derangement, nausea, and omission of medications.^{3–5} These features are commonly accepted as unfortunate, but necessary side-effects, ultimately worth the pay-off of reduced aspiration risk.

Historically the uncertain relationship between volume, particulate nature, and pH of gastric contents, duration of preoperative fasting, and the likelihood of subsequent

pulmonary aspiration in the context of the available anaesthetic techniques resulted in a form of Pascal's wager.⁶ A universal 'nil by mouth from midnight' axiom was considered a reasonable measure, assuming the possibility of aspiration outweighed any advantage in alternative practice. Research conducted over the past 30 years has improved our understanding of the above relationships and facilitated abandonment (in best-practice guidelines at least) of the 'nil by mouth from midnight' mantra.^{7,8} International standards now make fundamentally the same basic recommendations: adult patients should eat food no closer than 6 hours before anaesthesia and they should be encouraged to drink appropriate fluids until 2 hours before anaesthesia.^{9,10}

Translation of internationally advocated best practice in preoperative fasting to the clinical environment has been poor. Evidence for this comes partly from the authors' personal experience, however perusal of any appropriate anaesthesia conference proceeding or abstract supplement published in the past decade vindicates this opinion. Such supplements are replete with single-centre UK projects undertaken in accordance with the 2012 the Royal College of Anaesthetists 'Preoperative fasting in adults' audit methodology,¹¹ showing that

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patients are fasted for durations hugely in excess of best practice guidelines. It is of little solace that implementation of evidence-based practice guidelines into clinical practice is known to be a slow and challenging process across healthcare specialties.¹² The specific reasons for ongoing disparity between guidelines and clinical reality in preoperative eating and drinking are likely multifarious, but may include: risk aversion on the part of staff and patients that pulmonary aspiration may occur despite following guidance; poor professional and organisational incentivisation to implement and disseminate best practice; and deficits in knowledge among staff and patients. As much as these factors, it seems likely that the involvement of multiple staff groups (often with subtly different immediate agendas) making decisions on when a patient should cease eating and drinking before surgery leads to further prolongation of fasting times. The inherent difficulty of predicting a fixed and highly consequential binary outcome (fasted for 120 minutes or not fasted for 120 minutes) at a mobile and unpredictable future time point (commencement of anaesthesia) undoubtedly leads to further deviation from best practice.

Morrison and colleagues¹³ in their accompanying editorial make a persuasive case that there is no scientific objection to shortening fasting times for appropriate fluids from 120 to 60 minutes. Gastric emptying, in healthy unmedicated individuals, is rapid and exponential,^{14,15} so a shortened time between last drinking and induction of anaesthesia is difficult to challenge for many (but not all) patients presenting for surgery. The nature of scientific enquiry, rightly promoted by the peer-review process and resulting in the publication of academic journals, values the discovery and dissemination of knowledge relevant to a discipline. New, generalisable, hypothesis-driven knowledge relating to the prevention of pulmonary aspiration and the impact of preoperative fasting in adult patients is generated by research. This enquiry has armed our specialty with an understanding of pulmonary and gastric physiology and, in doing so, allowed recommendations to be formulated about what may constitute safe practice. Ongoing interest in the application of ultrasonography to examine the stomach in relation to feeding and anaesthesia is another useful consequence of the inclination of anaesthetists to explore new avenues of scientific endeavour (all the more so when it can involve a novel technology).¹⁶ It is our opinion, however, that shortening fasting recommendations in this manner will have little impact in clinical practice. The most likely outcome is yet more audit projects demonstrating failure to meet the new 60 minutes standard.

Arguing over the precise number of minutes is a classic case of missing the wood for the trees. Who is asking why people are starved unnecessarily? It certainly is not for a lack of guidance. Understanding the drivers and barriers to improvement are where the greatest gains for the greatest number of patients are to be found.

How might such utilitarian gains be realised? By working with key nursing, surgical, administrative, and managerial colleagues to undertake quality improvement.^{17,18} This must be pursued with the same rigour as 'traditional' research,¹⁹ not as an amateur project for a trainee keen to tick their Quality Improvement competency box. Methodologies for such projects are widely available,²⁰ and they may, as a first step, attempt to establish rigorously current performance in relation to fasting guidelines. The more 'local' the setting for this work, the higher the likelihood of identifying relevant deficiencies in organisational and individual performance

and process, to allow subsequent improvements to be instituted, measured, and tracked over time. This work requires skill and determination. Progress is slow, but academic journals are increasingly recognising the interest of their readership in such projects; the *British Journal of Anaesthesia* introduced its own 'Quality and Patient Safety' section in July 2017. We would implore readers to be more Benthamite and seek out local opportunities for improvement in fasting times: this is where the gains are to be made. May we be so bold as to suggest that there should be a moratorium on fasting research until the work of implementing what we already know has been done?

Authors' contributions

Contributed to the drafting, revision, and final approval of the manuscript: both authors

Declarations of interest

IKM is a board member of the *British Journal of Anaesthesia*. The authors have no other conflicts to declare.

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Two hours too long: time to review fasting guidelines for clear fluids

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Making multiple, small, incremental improvements across the whole of the perioperative pathway is likely to be the best way of improving outcomes from elective surgery in the developed world. Reducing the duration of the preoperative fast for clear fluids may be one way to cheaply and easily improve post-operative outcomes, particularly for the older and multi-morbid patients who make up an increasing proportion of patients presenting for elective surgery. Reducing the duration of the preoperative fast may also improve patient satisfaction.

The international consensus for clear fluid fasting for children has recently changed, allowing children to drink up until 1 h before induction of anaesthesia.¹ The rationale for the change was four-fold: firstly, a 2-h fasting rule actually translates into a much longer fasting time; patients fast not for 2 h, but for much longer before operation.² Secondly, prolonged fasting of clear fluids is unnecessary, and results in considerable patient dissatisfaction and discomfort, and potentially causes harm. Thirdly, prolonged

fasting does not reliably result in an empty stomach; having a drink of water may paradoxically reduce residual gastric volumes and increase pH a short time later. Finally, even if regurgitation and aspiration of clear fluid occurs, it is unlikely to result in morbidity. Here we discuss the current evidence with regard to gastric emptying, aspiration risks, and negative sequelae of prolonged fasting in adult patients, and suggest that it is time to align adult and paediatric guidelines for clear fluid fasting.

History of preoperative fasting

In the early days of anaesthesia in the 19th century, drinking fluids was actively encouraged until 3 h before surgery. Patients were specifically advised to drink glucose water, beef tea, or China tea.³ Interestingly, the rationale for this 3-h fast was the prevention of postoperative vomiting rather than a reduction in risk of aspiration during anaesthesia.³ It was only after Mendelson highlighted the risks associated with aspiration of solid gastric contents in obstetric patients that 'nil by mouth after midnight' became the standard recommendation.^{3,4} This recommendation persisted for several decades