Section: Anaesthesia

Review Article

PREOPERATIVE FASTING: FROM TRADITION TO EVIDENCE-BASED PRACTICE

Harmeet Gulati[1]

[1]Princess Alexandra Hospital, Harlow, CM20 1QX United Kingdom.

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Corresponding Author:
Dr. Harmeet Gulati,
Email: drgulati13888@gmail.com

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ABSTRACT

Preoperative fasting is an age-old procedure to reduce the risk of pulmonary aspiration under anesthesia. Traditionally, a "nil per os" (NPO) after midnight rule was the standard. Gradually, recommendations changed, allowing clear liquids within two hours and solids within six hours of surgery. More recently, the UK's NHS has rolled out a patient-centric strategy with the "Sip Till Send" policy, encouraging hydration and comfort without risks to safety. This review discusses the evolution from strict traditional fasting to evidence-based, patient-centered protocols, highlighting clinical outcomes, patient satisfaction, and worldwide trends.

INTRODUCTION

Preoperative fasting, a foundational principle of anesthesia safety, aims to minimize the risk of pulmonary aspiration during induction. Historically entrenched in the "nil per os" (NPO) after midnight approach, this practice often caused unnecessary discomfort and physiologic stress for patients without a corresponding decrease in perioperative complications.[1,2] Over the past two decades, growing evidence has challenged the rigid fasting mandates, promoting a shift towards more patient-centered, evidence-based strategies.[3]

The implications of prolonged fasting are far-reaching. Besides contributing to dehydration, electrolyte imbalances, and hypoglycemia, especially in vulnerable groups like children and diabetics, these outdated protocols also increase perioperative anxiety and reduce patient satisfaction.[4,5] Institutions worldwide have adopted revised fasting guidelines to align with Enhanced Recovery After Surgery (ERAS) programs, thereby improving outcomes and operational efficiency.[6,7]

This review chronicles the evolution of preoperative fasting practices—from their conservative roots to modern, evidence-backed strategies—and evaluates emerging global practices like the NHS (UK)'s "Sip Till Send" protocol, which epitomizes this shift.

Historical Perspective

The origins of prolonged preoperative fasting stem from the 1946 publication by Mendelson, who linked aspiration of gastric contents during obstetric anesthesia with significant morbidity and mortality.[8] This led to the widespread adoption of the "NPO after midnight" rule—a practice that endured for decades despite limited empirical support.[9]

This approach was based more on theoretical concerns than concrete evidence. Over time, however, studies began to reveal that prolonged fasting did not significantly reduce gastric volume or acidity. On the contrary, it often led to hypovolemia, delayed gastric emptying, and worsened metabolic stress—particularly in pediatric and geriatric patients.[10,11]

It was not until the 1990s that major anesthesia societies began systematically revising fasting protocols in light of new data. The evolution from rigid fasting to risk-adjusted and patient-tailored fasting regimens marks a turning point in perioperative care.

Evolution of Guidelines

Over the last 30 years, anesthesiology societies across the globe have introduced evidence-based updates to fasting protocols:

- **American Society of Anesthesiologists (ASA)**: Since 1999, allows clear liquids up to 2 hours and solids up to 6 hours prior to elective surgery in healthy patients.[12]
- **European Society of Anaesthesiology and Intensive Care (ESAIC)**: Supports similar standards with additional focus on paediatric and diabetic patient safety.[13]
- **Royal College of Anaesthetists (RCoA), UK**: Promotes the "Sip Till Send" strategy, focused on hydration and patient comfort.[14]

These evolving guidelines are grounded in studies confirming that more liberal fasting policies are not linked to increased risk of aspiration and are associated with improved physiological and psychological outcomes.

"Sip Till Send" – A New Paradigm

The UK's National Health Service introduced the "Sip Till Send" (STS) initiative as part of its broader

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strategy to improve perioperative care through evidence-based liberalization of fasting guidelines.[14,17] The STS protocol permits patients to continue drinking clear fluids until the time they are transferred to the operating room—a radical departure from the traditional fasting models.

This policy rests on robust physiological understanding. Clear fluids generally leave the stomach within 60–90 minutes, and their intake does not significantly increase aspiration risk when anesthesia is administered properly using cuffed endotracheal tubes and other modern safety protocols.[18,19] Several NHS audits have demonstrated that STS contributes to improved hydration, reduced need for intraoperative fluids, and better patient-reported outcomes.[20,21]

Importantly, this approach has not been associated with increased adverse events, which makes it a safe and practical model for global adaptation. The success of STS has implications not only for general surgical patients but also for paediatric, obstetric, and elderly populations who stand to benefit most from comfort-optimized care.

Physiological Considerations

Gastric emptying is influenced by the type of intake and various patient factors. Clear fluids typically leave the stomach within 90 minutes, while solids may take 6–8 hours.[22] Conditions such as diabetes, obesity, pregnancy, and use of opioids can delay gastric emptying.[23]

The risk of aspiration has significantly decreased with modern anesthetic techniques such as cuffed endotracheal tubes and rapid sequence induction. In elective surgeries, under controlled environments, the risk is negligible in healthy individuals.[24]

Special Considerations for Paediatric Patients

Preoperative fasting guidelines for children require a more nuanced approach due to their unique physiology and psychological needs. Prolonged fasting in paediatrics is not only distressing but also associated with risks such as hypoglycemia, dehydration, irritability, and metabolic acidosis.[25,26]

Current guidelines recommend:

- 2 hours for clear fluids
- 4 hours for breast milk
- 6 hours for solids or infant formula.[13]

Because of their smaller glycogen stores and higher metabolic rates, children are particularly vulnerable to hypoglycemia. Studies have shown that allowing clear fluids closer to surgery reduces perioperative anxiety and improves cooperation without increasing risks.[26,27]

Types of Liquids Suitable for Paediatric Patients

Permissible clear fluids before surgery include:

- Water
- Pulp-free juices (e.g., apple juice)
- Oral rehydration solutions
- Electrolyte beverages
- Tea without milk.[11,28]

Carbohydrate-rich drinks like apple juice or specially formulated pediatric rehydration fluids help maintain glucose levels and comfort. These fluids should be administered up to 2 hours before anesthesia to minimize risk while maximizing hydration and metabolic stability.[26,29]

Special Considerations for Diabetic Patients

Diabetic patients require careful preoperative planning due to altered gastric motility (gastroparesis), variable glycemic control, and risk of hypoglycemia or ketoacidosis.[5,30]

Key recommendations include:

- Tailoring fasting duration based on glycemic control and treatment type
- Avoiding prolonged fasting to prevent hypoglycemia, especially in insulin-dependent patients
- Frequent preoperative blood glucose monitoring
- Use of IV fluids if necessary to maintain hydration and euglycemia.[31,32]

Gastric ultrasound can be used preoperatively in high-risk diabetic patients to determine residual gastric volume and guide the timing of induction.[27,33]

Benefits of Liberal Fasting

1. **Enhanced Patient Comfort**: Reduced thirst, hunger, irritability, and emotional distress.
2. **Improved Hemodynamic Stability**: Better maintenance of intravascular volume and reduced intraoperative fluid requirement.[18]
3. **Enhanced Recovery After Surgery (ERAS)**: Supports early feeding, mobilization, and shorter hospital stays.[6,23]
4. **Higher Patient Satisfaction**: Liberal policies enhance patient autonomy and trust in healthcare systems.[34]

Challenges and Implementation Barriers

Despite evidence and international guideline revisions, barriers to implementation persist:

- Cultural inertia: Traditional practices remain entrenched.[35]
- Lack of awareness among staff and patients
- Concerns about high-risk patients: Emergency, obstetric, or GI surgery still warrant individual assessments

Institutional resistance: Requires updated protocols, training, and consensus.[36]

Global Trends and Comparison

Country/Region	Fasting Policy	Notable Features
USA	ASA Guidelines	2hr clear liquids, 6hr solids
UK	Sip Till Send	Clear fluids allowed until transfer
India	ASA-like, variable	Conservative in rural hospitals
Australia/NZ	Liberal Fasting	Aligned with ERAS protocols

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Future Directions

- **Personalized fasting protocols** using gastric ultrasound, BMI, age, comorbidities
- **Digital education tools:** EMR integration, automated fasting reminders
- **Global standardization:** Across institutions and countries
- **Special focus on high-risk patients** using risk stratification tools.[7,25,27]

CONCLUSION

The journey of preoperative fasting from tradition to evidence-based practice underscores the importance of aligning clinical protocols with current science. While the "NPO after midnight" dogma once ruled perioperative care, modern anesthesia practices demand a more nuanced, patient-focused approach. Policies like the "Sip Till Send" initiative in the UK and the flexible ASA and ESAIC guidelines are clear indicators that liberalized fasting is both safe and beneficial. Special populations—such as pediatric and diabetic patients—require particular attention, and emerging tools like gastric ultrasound enable tailored approaches that prioritize both safety and comfort.[7,25,27]

For optimal perioperative outcomes, these evidence-based practices must be integrated across all surgical disciplines. This includes training of personnel, development of institutional policies, and global standardization efforts. Preoperative fasting, once a rigid rule, is now a dynamic field of study guided by evolving evidence and patient needs.

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