Effect of NPO Status on Aspiration Risk in Pediatric Patients Undergoing Procedural Sedation

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INTRODUCTION

American Society of Anesthesiology (ASA) recommends that patients complete preoperative fasting prior to surgeries requiring sedation. Preoperative fasting, also known as nil per os (NPO) is defined as no food or fluids by mouth before a procedure.[1] Pulmonary aspiration is defined as aspirating the contents of the stomach after administration of anesthesia, during the surgical procedure, or the period immediately following the procedure.[1] ASA' current guidelines for elective surgery requiring sedation suggest a minimum NPO status of two hours from clear fluids and six hours for solid foods.[1,2] Risks of prolonged fasting include: increased risk of electrolyte imbalances, insulin resistance, dehydration, and patient discomfort.[2] Risks of pulmonary aspiration include pneumonia, hypoxia, death and more.[3] Despite studies that contradict the need for prolonged fasting, surgeons still continue to recommend an NPO status greater than the current preoperative fasting guidelines of, two hours for clear liquids and six hours for food.[4]

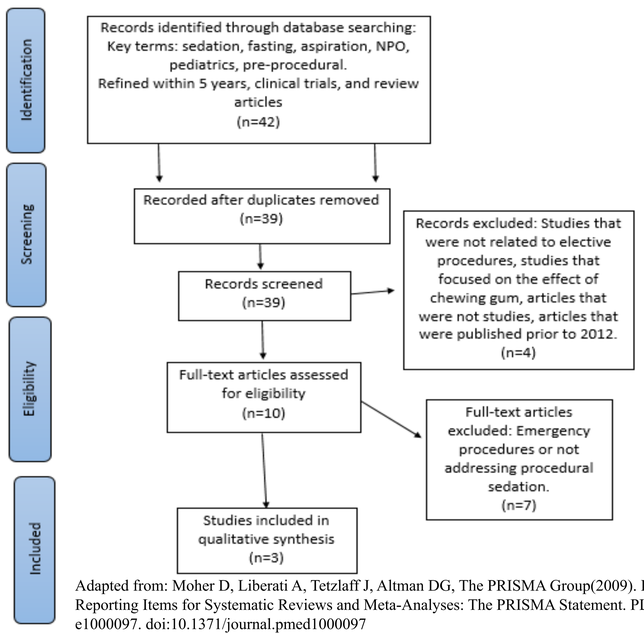
PICO

P	Population	Pediatric patients requiring sedation for elective procedures.
I	Intervention	NPO less than 6 hours
C	Comparison	NPO greater than 6 hours
O	Outcome	Aspiration during sedation

Clinical Question: Among patients requiring procedural sedation does an NPO status of less than 6 hours as compared to an NPO status greater than 6 hours reduce the risk of aspiration during sedation?

METHODS

PRISMA 2009 Flow Diagram



Adapted from: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group(2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

RESULTS

Study 1: The risk of shorter fasting time for pediatric deep sedation[5]

Objective: To identify an association between various fasting time and procedural sedation and analgesia (PSA) related complications when conducted outside and operating theatre.[5]

Results: Listed in Table 1.

Table 1. Results of Clark et al.[5]

	P-Value	Confidence Interval 95%	Odds Ratio
Minor Airway	0.109	0.563-1.060	0.773
Major Airway	0.808	0.411-3.133	1.135

Critique: Pulmonary aspiration is a rare incidence, therefore the sample size in this study, 2,487 patients, may not be large enough to extrapolate the findings to the larger population. Specifics regarding patient's diets prior to sedation were unknown.

Study 2: Major Adverse Events and Relationship to Nil per Os Status in Pediatric Sedation/Anesthesia Outside the Operating Room: A Report of the Pediatric Sedation Research Consortium[6]

Objective: To investigate the link between patient procedure factors and adverse pulmonary outcomes that occur during procedural sedation.[6]

Results: There is no statistical significance between NPO status and pulmonary aspiration.[6]

Table 2. Results of Beach et al.[6]

	P-Value	Confidence Interval 95%	Odds Ratio
Minor Airway	0.79	0.08-4.08	0.36
Major Airway	0.88	0.55-1.93	1.06

Critique: Their sample size was large and diverse enough to assess the risk of pulmonary aspiration. Pulmonary aspiration was not defined. Specifics regarding patient's diets prior to sedation were unknown.

Study 3: Low incidence of pulmonary aspiration in children allowed intake of clear fluids until called to the operating suite[7]

Objective: To determine the incidence of pulmonary aspiration in pediatric patients undergoing general anesthesia for elective procedures with unlimited intake of clear fluids prior to the operating suite.[7]

Results: Listed in Table 3.

Critique: The sample size was large and had instances of pulmonary aspiration. Due to the limited research on shortened fasting times in pediatric patients, this study reviewed patients undergoing general anesthesia. The amount of liquid patients consumed prior to being called to the operating room is unknown. This study compared their results to other studies, not a control group.[7]

Table 3. Comparison of Studies

	Clark et al.[5]	Beach et al.[6]	Andersson et al.[7]
Study Type	Prospective observational study	Prospective observational study	Retrospective review
Population Size	2,487	139,142	10,015
Age of Subjects	2 months to 18 years	0 months -18 years old	10 months and 23 years old
NPO > 6 hours	1,480	82,546	All patients were on a strict NPO > 6 hours for solids
Not NPO	NPO 4-6 hours: 1,007	Solids: 23,817 Non-clears: 899 Liquids: 685	All patients were allowed to consume clear liquids until called to the operating suite.
Aspiration	0	10	3
NPO Complications (n=)	Minor Airway: 89 Major airway: 10	Aspiration: 8 Major complication:46	Aspiration: 3 Suspected Aspiration: 14
Not NPO Complications (n=)	Minor airway: 77 Major Airway: 6	Aspiration: 2 Major Complications: 15	NA

CONCLUSIONS

Clark et al.[5] and Beach et al.[6] concluded there was no statistically significant difference between an NPO status less than 6 hours, compared to greater than 6 hours, and the risk of aspiration during procedural sedation in pediatric patients. Andersson et al.[7] concluded a shortened fast for clear liquids, prior to general anesthesia, does not increase the incidence of aspiration. Research is currently insufficient to make a recommendation. Due to the rarity of aspiration, larger sample sizes are needed to adequately determine the risk during procedural sedation in pediatric patients. Future studies should also include the timing, amount, and quality of oral intake and complications that occur before, during, and after procedures requiring procedural sedation.

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