

Demographic Predictors of NPO Violations in Elective Pediatric Surgery

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Purpose: *The parents of pediatric patients are routinely instructed to abstain from food and liquids before elective surgeries. Our objectives were to determine if demographic factors were associated with fasting violations and to identify reasons for noncompliance.*

Design: *This was a matched case-control pilot study.*

Methods: *A total of 63 patients who violated fasting guidelines were identified and matched to three controls within the same surgical service. Demographic and clinical variables were evaluated as predictors of noncompliance in a multivariate regression model. Qualitative data were coded into the most commonly identified reasons for non per os (Latin)—nothing by mouth violations.*

Findings: *Parents of children who did not comply commonly reported that they did not receive or did not understand the fasting guidelines. Noncompliant patients were significantly more likely to experience surgical delays and cancellations. None of the demographic and clinical variables assessed were significantly associated with non per os (Latin)—nothing by mouth violations in this pilot study.*

Conclusions: *Quality improvement actions may be necessary to ensure that parents receive and understand fasting guidelines for their children. This might include use of teach-back methods, modification of instructional materials, or providing follow-up information after the initial encounter.*

Keywords: *anesthesia, preoperative period, child behavior, communication, perianesthesia nursing, research.*

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Conflicts of Interest: None to report.

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FASTING BEFORE SURGERY IS intended to reduce the volume and acidity of the stomach contents.¹ Because general anesthesia inhibits the body's protective reflexes that prevent stomach contents from regurgitation, patients are asked not to consume solids or liquids for a specified amount of time before surgery in an effort to avoid the risk of regurgitation and aspiration when undergoing sedation and/or general anesthesia.² Serious complications from aspiration include pneumonia and even death.¹ Although most anesthesia providers agree with published national guidelines that state healthy children should be NPO (non per os in Latin, nothing by mouth) except for clear liquids 2 hours before surgery; breast milk 4 hours before surgery; formula,

milk, and light nonfat meal 6 hours before surgery; and fatty meals 8 hours before surgery,³ there is not uniform preoperative instruction for the parents of pediatric patients in the United States and Canada. Many practitioners continue to counsel parents to keep children NPO after midnight, whereas others give instructions more closely aligned with the current 2-4-6-8 hour guidelines. Numerous studies have analyzed if adherence to these guidelines actually minimizes the risk of adverse events such as postoperative respiratory complications and death,⁴⁻⁹ but little work has been done to investigate why some parents of pediatric patients have not followed the guidelines before elective surgeries.

In addition to the medical risks associated with NPO violations, there is also the potential for surgery cancellation. At Children's Hospital Boston, noncompliance with NPO guidelines was the third leading cause of elective surgery cancellation for a 6-month period during 2008, with 4.5% of elective surgeries canceled for NPO violations and other cases delayed because of NPO violations.¹⁰ A study from Tulane University Medical Center in 2009 estimated that total hospital revenue losses for canceled elective surgeries averaged \$4,550 per case, with 24% of these cancellations due to patient failure to comply with preoperative instructions.¹¹ Thus, there is a financial incentive for hospitals to investigate why NPO violations occur within their patient populations. Pediatric surgery cancellations can also have a negative economic impact for parents. Tait et al¹² found that cancellations of pediatric surgeries on arrival at an outpatient surgery clinic resulted in 38.5% of mothers and 50% of fathers missing a day of work, with approximately half of those mothers and fathers receiving no pay for the day of work they missed.

At Vanderbilt University, the pediatric preoperative evaluation clinic and surgical schedulers instruct patients and their families or caretakers about the nationally accepted NPO guidelines. In spite of verbal and written instructions and telephone reminders, a significant number of pediatric patients arrive on the day of elective scheduled surgery having not followed these instructions. As part of a quality improvement project, NPO violations were tracked as a standard of care on all patients who presented for elective surgery at Vanderbilt Children's Hospital

(VCH) between December 1, 2010 and December 31, 2011. We planned to investigate the relationship between demographic and clinical factors and NPO violations. In addition, we aimed to use narrative text from the patients' medical records to identify common reasons for not complying with the NPO guidelines. We hypothesized patients with a low socioeconomic status, patients with parents who do not speak English as a primary language, and patients who had no or few prior surgeries would be more likely to violate NPO instructions.

Materials and Methods

Our study was approved by the Vanderbilt Institutional Review Board. We obtained information on a sample of 63 patients who were scheduled to receive general anesthesia during elective surgery at VCH and did not comply with NPO guidelines. We then used our perioperative data warehouse to identify patients without NPO violations. Each NPO violation case was matched to three controls who were scheduled to receive general anesthesia during elective surgery between December 1, 2010 and December 31, 2011, yielding a total of 189 control patients. Cases were matched to controls within the same surgical service (ie, general surgery, otolaryngology surgery, orthopaedic surgery). The preoperative nursing records of all controls were manually reviewed to ensure that each had complied with fasting guidelines. In most cases, the patients NPO time was documented in the nursing comments.

All statistical analyses were conducted using SAS, version 9.4 (SAS Institute, Inc., Cary, NC). Results were considered significant when the *p* value was less than .05. Private health insurance or Medicaid coverage was used as a proxy for socioeconomic status. We constructed a multivariate conditional logistic regression model with the patients' age, race, sex, number of prior surgeries performed at VCH, American Society of Anesthesiologists physical status classification, health insurance type, and parents' primary language as predictors, stratified by surgical service to account for matching. We calculated Cochran-Mantel-Haenszel statistics to compare the rate of delays and cancellations between those who violated NPO guidelines and those who did not. Additionally, reasons for an NPO violation were

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