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Research Letter

Fasting Before Cardiac Catheterization: Don't Call Me Late for Dinner

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Patients undergoing cardiac catheterization with planned conscious sedation are routinely maintained "nil per os" (NPO) minimally for 6 hours prior to their procedure, despite guidance from the American Society of Anesthesia for less restrictive, 2-hour NPO protocols, preceded by 6 hours of a clear liquid diet.[1] Ionic high-osmolar contrast dye utilized in the past, and associated with nausea and vomiting, has promulgated prolonged NPO protocols that aim to reduce periprocedural aspiration of gastric contents. However, nonionic low-osmolar contrast dye formulations are the mainstay of contemporary cardiac catheterization labs. The 2021 American Heart Association scientific statement on evidence-based recommendations in the cardiac catheterization lab acknowledges the unclear utility of prolonged preprocedural fasting, citing evidence for this being "weak," and highlights a need to further delineate best practices.[2]

In this context, we investigated the incidence of aspiration events in patients presenting with ST-elevation myocardial infarction (STEMI), a patient population without enforced fasting, who underwent emergent or urgent cardiac catheterization with moderate sedation. Utilizing the National Cardiovascular Data Registry's CathPCI Registry, we identified patients presenting with STEMI to 2 sites: a quaternary care center (University of Maryland Medical Center [UMMC]) from 2013 to 2016 and a community-based tertiary care center (University of Maryland St. Joseph Medical Center [UM-SJMC]) from 2015 to 2018.

Identified patients were reviewed for exclusion criteria including the following: patients intubated prior to procedural sedation, patients referred to emergent cardiac surgery within 24 hours of presentation, postcardiac arrest patients, patients receiving no procedural sedation as documented in the procedure note, and patients with documented abnormalities on chest imaging prior to procedural sedation.

Aspiration events were quantified in the remaining group in a 2-step process. In phase 1, patients with 2 of 4 common clinical features of aspiration pneumonia or pneumonitis, observed within 48 hours after catheterization, which could represent sequelae of an aspiration event, including fever, cough, lobar infiltrate on chest radiography, or respiratory decompensation, were identified, as well as any patient with a documented aspiration pneumonitis or pneumonia. In phase 2, this subset of patients was reviewed by 2 independent examiners and classified as having "unlikely aspiration," possible aspiration" and likely aspiration."

The protocol and data collection were approved by the institutional review board at both sites.

Six operators conducted all cases at UMMC and 2 operators conducted cases at UM-SJMC. Agents used for moderate sedation were administered by nursing personnel and typically included midazolam and fentanyl.

After applying exclusion criteria, 446 of 583 patients were reviewed, yielding 15 cases meeting 2 of the 4 defined clinical criteria for inclusion for specific review for an aspiration event. After 2 examiner adjudications, 1 case of "likely aspiration" was identified, representing 0.2% of study patients. Cases adjudicated as "unlikely aspiration" included scenarios where respiratory complaints were resolved with diuresis or without intervention or without documentation of suspected aspiration sequelae. The study protocol and adjudication are diagrammed in Figure 1.

Despite applying broad clinical criteria, some with overlap with post-STEMI sequelae, to comprehensively capture potential aspiration events, our retrospective study identified a single likely aspiration event in a cohort of patients undergoing emergent cardiac catheterization for STEMI, after adjudicating 15 potential cases. Although the use of emergent catheterization was a surrogate for nonfasting state, review of procedure times of the UM-SJMC cohort of 344 patients, showed 59% of patients undergoing their procedure between 12 noon and midnight, timings when a fasting state would be less likely. Further, STEMI patients represent a vulnerable group for aspiration, with high sympathetic tone causing delayed gastric emptying and ongoing nausea and vomiting as a symptom of infarction. Despite these predisposing features, the minimal incidence of observation aspiration suggests a low risk for aspiration despite nonfasting state prior to cardiac catheterization.

In alignment with our findings, a single-center, 520-patient randomized study, comparing a nonfasting vs standard fasting protocol for elective catheterization, found no significant difference in several categories of adverse events, including aspiration pneumonitis.[3] Woods et al[4] randomized 197 patients undergoing elective cardiac catheterization to a heart-healthy diet vs a standard NPO after midnight protocol and also demonstrated no difference in aspiration outcomes between the 2 groups. Our 2-center study comprising over 400 vulnerable patients adds to this limited body of literature.

Keywords: aspiration pneumonia; nil per os; ST-elevation myocardial infarction.

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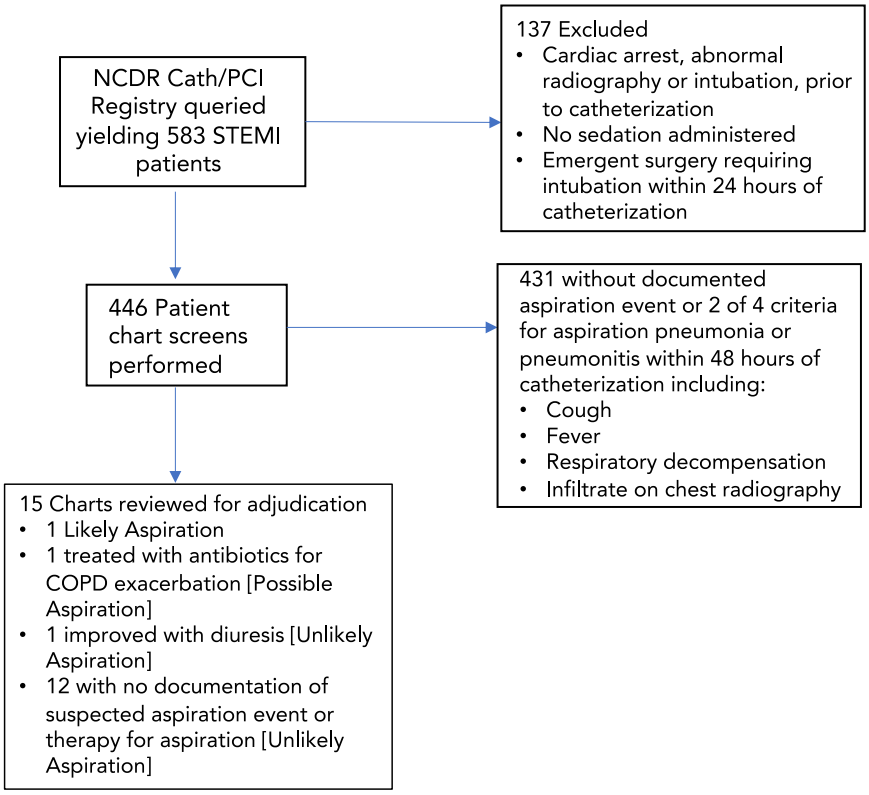

Figure 1.
The study protocol and adjudication diagram.

Deleterious effects of prolonged NPO status have been established, including patient dissatisfaction and disrupted homeostasis, particularly in patients on diabetic medication and individuals with renal insufficiency.[5] Delays or cancellations of procedures are an additional systemic burden, with associated costs, increased hospital length of stay, and implications for hospital patient flow. Consistent with this, Mishra et al[3] noted a lower cost of index hospitalization in their nonfasting group. Additionally, postponed procedures are associated with patient disgruntlement and are challenging for family members who realign schedules to be present for procedures.

Our study limitations include retrospective and observational design, with all included patients derived from 2 sites. Additional considerations are the use of STEMI patients as a surrogate for the nonfasting state without known duration of fasting prior to catheterization and the possibility that STEMI patients were in a semifasting state because they felt unwell.

There is a scarcity of literature on the incidence and true risk of aspiration in cardiac catheterization, yet fasting remains a standard practice at many institutions, with possible detrimental effects for patients and hospitals. We conclude our investigation adds to a growing body of evidence suggesting that cardiac catheterization with conscious sedation can be safely performed with abbreviated fasting intervals.

Declaration of competing interest

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Ethics statement and patient consent

All reported research has adhered to ethical guidelines, with patient consent obtained when needed.

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