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Adherence to the Pediatric Preinduction Checklist Is Improved When Parents Are Engaged in Performing the Checklist[☆]

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ABSTRACT

Background: The World Health Organization recommends including the parents in completion of the pediatric surgical safety checklist. At our hospital, the preinduction surgical safety checklist is conducted in the preoperative holding with anesthesia, nursing, and often with the parents of children undergoing an operative procedure. We hypothesized that adherence to the preinduction checklist is better when parents are engaged in surgical safety checklist performance.

Methods: An observational study of adherence to the preinduction checklist for nonemergent pediatric operations was performed (2016–2017). Adherence was defined as verbalization of checkpoints. Only checkpoints (patient identification, procedure, site marking, weight, allergies, and NPO status) relevant to parental knowledge were evaluated. Parental engagement was based on: positive body language, eye contact, lack of distractions, and understanding of checkpoints.

Results: 484 preinduction surgical safety checklists were observed (interrater reliability >0.7). Partial completion occurred in 55% cases; only 41% checklists were fully completed. Parents were present for 81% of checklists, and more checkpoints were performed when parents were present (5, IQR 4–6) versus absent (2, IQR 1–3, $P < .001$). Increased preinduction adherence was associated with increased parent engagement by linear regression analysis (1.20, 95%CI 1.05–1.33). Staff confirmed more checkpoints with engaged parents (28–78%) versus when parents were not engaged (1–9%, $P < .001$ for all checkpoints).

Conclusion: Overall preinduction surgical safety checklist performance was poor (less than half of checklists fully completed). In contrast, checklist adherence improved with parental presence and engagement during performance of the checklist.

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Introduction

The surgical safety checklist (SSC) is a patient safety tool promoted by the World Health Organization (WHO) to improve communication among surgical providers and to prevent adverse events.^{1,2} Three phases of surgical care are incorporated into the 3-part checklist: preoperative (preinduction), intraoperative (preincision or “time out”), and postoperative (“debriefing”). In the

preinduction checklist, clinical details, such as patient identity, procedure, surgical site, and anesthesia plans, are reviewed and confirmed. The WHO recommends that the preinduction SSC be conducted in the preoperative area between the circulating nurse and anesthesia provider and in the presence of adult patients or a parent or guardian for pediatric patients.¹

Recent studies demonstrate that increasing the level of patient and parent engagement can improve health care adherence and outcomes.^{3–7} For example, Davison et al achieved decreased rates of childhood obesity through a family-centered intervention that empowered and engaged parents to increase their child's physical activity and help make healthier dietary choices.⁵ No data have been published evaluating parent engagement in the SSC checklist.

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At our institution, a 3-phase, pediatric-specific SSC was developed by health care stakeholders, including perioperative nurses, anesthesia providers, and surgeons.^{8,9} Involvement of the circulating nurse and anesthesia provider in the preinduction portion is mandatory while involvement of parents or guardians is voluntary but encouraged. This practice creates an opportunity to study whether parent engagement improves process measures such as adherence to the checklist. We hypothesized that preinduction checklist adherence would be better with engaged parents compared to nonengaged parents.

Methods

A prospective, observational study was conducted at Children's Memorial Hermann Hospital (CMHH) between June 2016 and August 2017 to evaluate performance of the preinduction SSC. This study was considered quality improvement and deemed exempt by the University of Texas Health Science Center at Houston Institutional Review Board (HSC-MS-15-0634). CMHH is a 234-bed academic children's hospital within the tertiary Memorial Hermann Hospital-Texas Medical Center, offering pediatric surgical services in 14 subspecialties. A standard SSC was implemented at our institution in 2009; however, initial audits demonstrated poor adherence.⁸ To improve checklist performance, a rigorous, iterative, stakeholder-driven approach was used for the development and implementation of a pediatric-specific SSC at our institution in 2011.⁹

Audits of SSCs on convenience samples of nonemergent, pediatric surgery procedures were performed during 2 independent 8-week periods. Five student observers in each time period were trained by members of the Operating Room Safety Council (KT, KTA, MBK.) to evaluate checklist performance. The observers underwent multifaceted training simultaneously, which included watching a video of ideal checklist performance and thorough review of each checkpoint. A standardized form was utilized to assess adherence to the preinduction checklist (Table 1). Each group of students audited several checklist performances until interrater reliability exceeded a kappa statistic of 0.7. Data collection began after this benchmark was achieved. Adherence was defined as verbalization of each checkpoint by the circulating nurse and anesthesia provider. Surgeons are not required to be present for the preinduction checklist. There were a total of 15 checkpoints in the checklist, of which we focused on 6 relevant to parent knowledge. Six of the checkpoints (patient identification, procedure, surgical site marked, weight, allergies and NPO status) containing information relevant to parental knowledge were evaluated for staff confirmation with parents and parent engagement. Patient weight was obtained (in kilograms) in the preoperative holding area, and this

value was confirmed during the checklist. If parents confirmed the weight in pounds, then a standard conversion chart was used to convert that value back to kilograms.

Evidence of parent engagement included: positive body language, eye contact, lack of distraction (such as by cell phones and other children), and understanding of checkpoints. Parents were given 1 point for each preinduction checkpoint in which the observer deemed they were engaged. None of the behaviors was an absolute qualifier or disqualifier. A composite parent engagement score was determined utilizing the number of checkpoints in which the parent was engaged. Students observed as many cases as possible throughout the day. Only cases in which the student observed the entire preinduction checklist were included in this study.

The primary outcome was the overall adherence to the preinduction checklist. Staff confirmation of checkpoints with parents, which was considered meaningful completion, was the secondary outcome. Descriptive statistics, Wilcoxon Rank-Sum, and Pearson chi-square tests were utilized to evaluate checklist and checkpoint adherence. Linear regression was used to determine whether an association between parent engagement and checklist adherence existed. Cohen's kappa was used to determine interrater reliability. A *P*-value of <.05 was used for significance. Stata 14 (College Station, TX) was used for statistical analysis.

Results

Over the study period, 484 preinduction checklists were observed with an interrater reliability for the observers of 0.85 (95%CI 0.79–0.88) in 2016 and 0.70 (95%CI 0.68–0.72) in 2017. There were a total of 15 checkpoints in the checklist, of which we focused on 6 relevant to parent knowledge. The median number of checkpoints completed for both periods combined was 5 (IQR 3–6). Partial completion of the checklist occurred in 55% of cases; however, full completion of the preinduction checklist was only observed in 41% of cases (*n* = 484). Parents were present for 81% of checklists and amongst those, at least 1 checkpoint was completed in 97% of checklists (*n* = 433).

Staff adherence (meaning verbalization by the circulating nurse and anesthesiologist) was greatest to confirmation of patient identity (95%). Discussion of NPO status (86%), patient allergies (85%), and confirmation of the procedure (73%) were the checkpoints with the next greatest staff adherence. Confirmation of patient weight and surgical site marking were the checkpoints with the worst staff adherence (56% and 58% respectively, Fig. 1).

Adherence to the preinduction SSC was better across all checkpoints when parents were present (*P* < .001). In addition, a greater number of median checkpoints were performed when parents were present (5, IQR 4–6) compared to when absent (2, IQR 1–3, *P* < .001). Parental presence had the greatest effect on adherence to confirmation of procedure (80% vs 16%), surgical site (63% vs 14%), and patient weight (61% vs 16%, Fig. 2). Fully completed preinduction checklists only occurred when parents were present.

Parents were present for 433 preinduction checklists (81%), and parent engagement was observed during a median of 4 checkpoints (IQR 2–5). Parents were most engaged for patient identification (87%), discussion of NPO status (71%), and confirmation of allergies (70%) and were least engaged for confirmation of weight (29%) and surgical site identification (35%). Adherence to the preinduction SSC was greater with engaged parents compared to parents who were not engaged (*P* < .001 for all checkpoints, Fig. 3). Linear regression demonstrated a 1.20 (95%CI 1.05–1.33) increase in preinduction adherence for every checkpoint for which parents were engaged (Fig. 4).

Staff confirmed a median of 3 checkpoints (IQR 1–4) with parents and at least 1 checkpoint in 82% of cases (*n* = 433). Staff

Table 1
Summary of preinduction checkpoints. Checkpoints pertinent to parent knowledge denoted by an asterisk.

Checkpoint	Provider
Identify patient (2 identifiers)*	Circulating nurse
Procedure confirmed with consent*	Circulating nurse
Site marked and visualized*	Circulating nurse
Anesthesia/surgery consent completed	Circulating nurse
Preoperative worksheet completed	Circulating nurse
Weight verified*	Circulating nurse
Allergies verified*	Circulating nurse
Anesthesia safety check completed	Anesthesia
NPO status verified*	Anesthesia
Anticipated critical events reviewed	Anesthesia
Plan for extubation discussed	Anesthesia
Prophylactic antibiotics/medications reviewed	Anesthesia
Patient positioning discussed	Anesthesia
Fire risk score assessed	Anesthesia

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