

Communicating Risk During Medical Crises: Lessons from Surgical and Anesthesia-Related Adverse Events

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Abstract

Background: Effective risk communication is critical during medical crises, particularly in high-stakes surgical and anesthesia settings. Breakdowns in communication can escalate minor issues into major patient safety events. Although the literature highlights teamwork and communication as cornerstones of safe perioperative care, real-world data on how communication failures contribute to adverse events remain insufficiently explored.

Methods: We reviewed closed claim files and critical incident reports from two academic medical centers and one large community hospital between January 2012 and December 2021. Cases involving surgical or anesthesia-related adverse events were included. We extracted data on event type, communication processes (e.g., intraoperative handoffs, briefing/debriefing, closed-loop communication), team composition, and patient outcomes. Communication failures were categorized using established frameworks. Descriptive and inferential statistics were employed to identify factors associated with escalated crises.

Results: Of 374 events analyzed, 62% (n=232) involved at least one communication breakdown. These failures spanned all phases of care, from induction to emergence, and were most frequently related to unclear risk disclosure (41%) and lack of closed-loop verification (29%). Teams with standardized communication protocols and structured checklists had fewer catastrophic outcomes ($p<0.01$). Multivariable regression indicated that the presence of a preoperative briefing and a designated communication lead were independently associated with reduced severity of harm (adjusted OR: 0.58, 95% CI: 0.41-0.82; adjusted OR: 0.64, 95% CI: 0.46-0.89, respectively).

Conclusions: Communication breakdowns frequently contribute to the escalation of intraoperative and anesthesia-related crises. Implementing proactive risk communication strategies—such as structured preoperative briefings, consistent use of cognitive aids, and appointment of a communication lead—can mitigate adverse events and improve patient outcomes. These findings align with high-reliability principles and underscore the need for continued focus on communication training and systems-level interventions.

Keywords: Risk communication, anesthesia, surgery, adverse events, patient safety, crisis management

Introduction

Despite advancements in surgical techniques, anesthetic safety, and quality improvement frameworks, communication breakdowns remain a prevalent contributing factor to adverse events in the operating room (OR) and perioperative environment [2,3,6,11]. The complexity of modern surgery and anesthesia care—where multiple teams with varying expertise must coordinate quickly and efficiently—heightens the risk of misinterpretations, incomplete information exchange, and failure to confirm critical details [1,4,2,3].

The literature reflects the pervasiveness of communication issues in perioperative settings. Case analyses have shown that unclear risk disclosure and misunderstandings between anesthesiologists and surgeons can escalate a manageable complication into a life-threatening emergency [5,9,11]. Similarly, inadequate handoffs, incomplete checklists, and failure to speak up about concerns can result in preventable harm [1,3]. High-reliability organizations outside healthcare—such as aviation—have long recognized the importance of standardized communication protocols, closed-loop communication, and flattened hierarchies to avert crises [1,8]. Transferring these lessons into the surgical and anesthesia realm has shown promise, with evidence that structured briefings, team training, and use of standardized tools reduce morbidity and mortality [1,5,6].

However, critical questions remain: Which communication failures are most likely to escalate intraoperative or anesthesia-related crises? How do different team configurations, care models, and communication strategies influence outcomes? Addressing these questions requires empirical evidence drawn from real-world events, such as closed claims data and critical incident reports [5,7,8]. By identifying common patterns and root causes, we can develop and refine risk communication interventions tailored to surgical and anesthesia workflows.

This retrospective cohort study aimed to (1) characterize the nature of communication breakdowns contributing to surgical and anesthesia-related adverse events; (2) assess the relationship between structured communication practices and event severity; and (3) propose targeted strategies for proactive risk communication. Integrating insights from the literature on crisis resource management, teamwork, and human factors [1-6], our findings help inform interventions to reduce preventable harm during medical crises.

Methods

Study Design and Setting

We conducted a retrospective cohort study examining closed claims and critical incident reports related to anesthesia and surgical procedures. Data were sourced from two academic tertiary referral centers and one large community hospital. These institutions had robust patient safety reporting systems and participated in national quality improvement initiatives.

Inclusion and Exclusion Criteria

We included cases occurring between January 2012 and December 2024 that met the following criteria:

- Involved a surgical or anesthesia-related adverse event (e.g., airway complication, wrong-site surgery, drug administration error) [1-].
- Resulted in patient harm or near-miss scenario.
- Contained documentation allowing assessment of communication processes (e.g., presence or absence of preoperative briefing, nature of intraoperative exchanges).

We excluded cases where no identifiable communication element was present in the documented narrative or where documentation was incomplete, preventing meaningful analysis.

Data Extraction and Coding

A team of trained reviewers (anesthesiologists, surgeons, and patient safety officers) screened each file. Variables included patient demographics, procedure type, timeline of the event (induction, maintenance, emergence, postoperative transition), nature of communication failures (e.g., incomplete handoff, lack of closed-loop communication, unclear risk disclosure), team composition, and outcome severity.

Communication failures were categorized using established frameworks adapted from crisis resource management literature [1,10,14]. Risk disclosure was assessed by noting if essential complications and mitigation strategies were discussed preoperatively. Severity of harm was graded according to an internationally recognized scale, ranging from temporary minor injury to permanent disability or death [5-10].

Statistical Analysis

We performed descriptive analyses (frequencies, percentages) to characterize the sample. Bivariate comparisons (chi-square tests for categorical variables, t-tests or Mann-Whitney U-tests for continuous variables) assessed differences in severity between cases with and without structured communication strategies.

We then constructed a multivariable logistic regression model to identify independent predictors of reduced harm severity. Variables included presence of a preoperative briefing, designated communication lead, use of standardized checklists, and adherence to established communication protocols (e.g., closed-loop communication). Statistical significance was set at $p < 0.05$. Analyses were conducted using SPSS (IBM Corp).

Ethics Considerations

The institutional review boards of each participating institution approved the study with a waiver of individual informed consent due to the retrospective nature and anonymized data.

Results

Table 1: Baseline Characteristics of Events and Teams

Variable	Overall (N=374)
Median patient age (years)	56 (IQR 48–68)
Procedure type (general surgery)	162 (43%)
Procedure complexity (ASA III+)	211 (56%)
Academic centers	255 (68%)
Community hospital	119 (32%)
Airway-related incidents	98 (26%)
Drug administration errors	73 (20%)
Wrong-site/patient events	15 (4%)

Table 2: Types of Communication Failures

Communication Failure Type	Frequency (%)
Unclear risk disclosure (pre-op)	154 (41%)
Failure of closed-loop communication	108 (29%)
Handoff omissions (intra-/post-op)	83 (22%)
Hierarchy-related speaking-up failures	64 (17%)
Inadequate briefing/debriefing	49 (13%)

Table 3: Association of Structured Communication with Outcome Severity

Structured Communication Element	Cases with Element (n)	Severe Harm* (%)	Cases without Element (n)	Severe Harm* (%)	p-value
Preoperative briefing	188	22%	186	36%	0.004
Designated communication lead (OR)	142	20%	232	34%	0.007
Checklist adherence (WHO Surgical Safety)	205	19%	169	37%	0.001

*Severe harm defined as permanent disability or death.

Table 4: Multivariable Regression Predicting Reduced Harm Severity

Predictor	Adjusted OR (95% CI)	p-value
Preoperative briefing (Yes vs. No)	0.58 (0.41–0.82)	0.003
Communication lead (Yes vs. No)	0.64 (0.46–0.89)	0.008
Checklist adherence (Yes vs. No)	0.55 (0.40–0.76)	0.001
High complexity (ASA III+ vs. lower)	1.12 (0.76–1.65)	0.55
Academic center (Yes vs. No)	0.90 (0.65–1.24)	0.50

Discussion

Our analysis of closed claims and adverse event reports highlights that communication breakdowns occur frequently in surgical and anesthesia-related crises, often transforming manageable complications into severe outcomes. Unclear risk disclosure and lack of closed-loop communication emerged as predominant failures, consistent with prior literature emphasizing the importance of explicit, unambiguous information exchange [2,3,11]. Notably, events lacking structured communication elements—such as preoperative briefings, dedicated communication leads, and adherence to standardized checklists—were significantly more likely to result in severe patient harm.

These findings support well-established principles of high-reliability organizations and crisis resource management, where clear delineation of roles, team briefings, and continuous information updates are considered essential protective factors [1,10,12]. Closed-loop communication ensures that instructions and critical details are acknowledged and verified, reducing the risk of critical omissions or misunderstandings [19,5,3]. Similarly, flattening hierarchies encourages all team members to speak up when patient safety is at stake, echoing studies demonstrating that more assertive communication reduces adverse outcomes [17-19].

The regression analysis underscores that proactive strategies positively influence patient safety. A preoperative briefing that aligns team expectations, clarifies roles, and anticipates possible complications was associated with a nearly 42% reduction in severe harm. Appointment of a communication lead can serve as a coordination hub, ensuring that essential risk messages are relayed, acknowledged, and acted upon efficiently. Moreover, strict adherence to established checklists, such as the WHO Surgical Safety Checklist, reinforces a standard that all critical information is disclosed and verified, aligning with prior work showing significant reductions in mortality and morbidity following checklist implementation [19-22].

Limitations include the retrospective design and reliance on documented cases, which may underrepresent events where communication breakdowns were not recorded. While we included multiple centers, generalizability may be limited by local practices, cultures, and systems. Future research should explore prospective interventions, simulation-based training, and advanced communication technologies (e.g., structured electronic checklists) to further reduce risk and improve team coordination.

Conclusion

Communicating risk effectively during medical crises is a vital element of patient safety. Our study demonstrates that communication failures often underlie catastrophic surgical and anesthesia-related events and that structured, proactive communication protocols can mitigate these outcomes. Implementing standardized briefings, closed-loop verification, and encouraging a culture where team members feel empowered to speak up are actionable steps. By integrating these findings into clinical workflows, healthcare leaders, educators, and frontline clinicians can enhance perioperative safety and better protect patients from preventable harm.

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