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## Situational Awareness Errors in Anesthesia Malpractice Claims: Errors of Perception, Comprehension and Projection Leading to Catastrophic Outcomes

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### Introduction:

Inadequate or untimely perception, comprehension and projection of changing clinical situations (situational awareness [SA] error) may result in high severity injuries, especially in complex and dynamic domains such as intra-operative anesthesia. <sup>1,2,3</sup> We previously found that SA error contributed directly to the outcome in 78% of anesthesia malpractice claims for death or brain damage, with anesthesia payment in 83%. <sup>4</sup> The current study analyzes *levels* of SA error in catastrophic anesthesia malpractice claims.

### Methods:

We developed a detailed protocol to classify the level of SA errors, <sup>1</sup> e.g. *perception* ("What is the information?"), *comprehension* ("What does it mean?") and *projection* ("What is likely to occur?") modeled after Singh. <sup>5</sup> A sample of 198 anesthesia malpractice claims with intra-operative anesthesia SA errors leading to death or severe brain damage in 2002-2013 from the Anesthesia Closed Claims Project database of 10,546 claims was analyzed. Obstetric anesthesia claims were excluded. Two anesthesiologists (CS, AB) independently evaluated claim narratives using the protocol to identify the *level* of SA errors that contributed to the death or brain damage. Inter-rater reliability was measured by Cohen's kappa. For final classification, discussion or a third author (KBD) resolved disagreements.

### Results

Among 198 SA error claims, errors of *perception* (failure to monitor, inadequate or missing preoperative evaluation) were most common (n=83, 42%). Errors of *comprehension* (failure to diagnose; n=58, 29%) and *projection* (failure to anticipate or plan; n=57, 29%) were relatively less common. Reliability of error classification was  $\kappa=0.53$ .

More than half (60%) of the 83 *perception* errors involved respiratory system events, most often inadequate respiratory monitoring resulting in inadequate oxygenation and/or ventilation (n=37). Errors of *comprehension* (n=58) were equally divided between respiratory and cardiovascular events (n=23 each). Inadequate oxygenation or ventilation, intubation failure, bronchospasm, and pulmonary aspiration were the most common respiratory events with late, missed, or failed diagnosis. Half (n=11) of the cardiovascular system events with comprehension errors involved hemorrhage. *Projection* errors (n=57) most commonly involved failure to anticipate or plan for difficult airway management (n=15) and pulmonary aspiration (n=11), which together accounted for approximately half of the *projection* errors. *Projection* errors also included attempting anesthetics for routine procedures in patients with severe comorbidities in surgery centers or offices. Other *projection* errors involved failure to address fire prevention in high risk cases (cautery in proximity to open oxygen).

### Discussion:

Acceptable reliability of SA error classification can be achieved with a protocol that includes detailed

anesthesia-relevant examples. Levels of SA error in these US

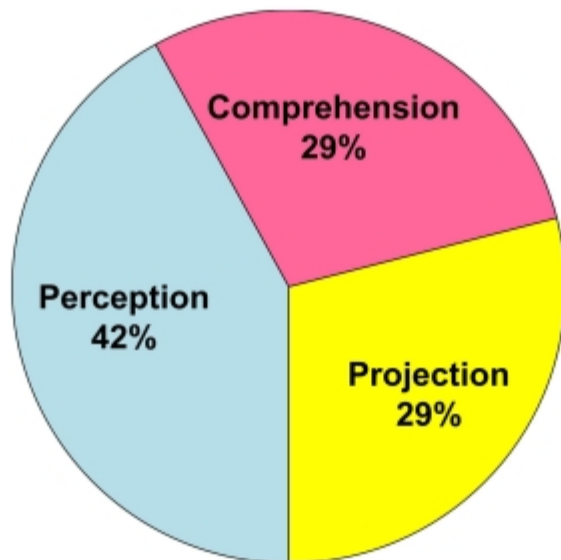
catastrophic anesthesia malpractice claims were fairly consistent with those reported to the German Critical Incident Reporting System.<sup>6</sup> While anesthesia-related death and permanent brain damage malpractice claims have declined,<sup>7</sup> further improvement may be possible by implementing systems and educational programs to improve intra-operative SA.

#### References:

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**Figure 1**

## Anesthesia Situational Awareness Errors



**Figure: Levels of anesthesia situational awareness errors leading to death and permanent brain damage in anesthesia malpractice claims.**

**Filename:** C:/ASA/content/asaabstracts/2016/PATIENT SAFETY, PRACTICE MANAGEMENT/abs\_a4658.htm