USING SIMULATION TO IMPROVE ROOT CAUSE ANALYSIS OF ADVERSE OUTCOMES: A PILOT STUDY

Garstka ME*, Korndorffer JR*, Rennie KV*, Slakey DP*

*Department of Surgery, Tulane University School of Medicine, New Orleans, Louisiana

Simulation is commonly used for root cause analysis in high performance industries, but has not been described for analyzing adverse medical outcomes. Determining root causes of adverse medical outcomes could substantially improve safety. We developed a simulation method for root cause analysis of adverse surgical outcomes. 631 closed surgical claims of a major medical malpractice insurance corporation were reviewed. All records (medical and legal) for the selected claims were analyzed. These included expert plaintiff and defense expert opinions. A single case of delayed recognition of a post-operative complication resulting in death was chosen as a pilot case. Essential data were abstracted and a paper and electronic medical record developed, appropriate participants were chosen, and the simulation scripted. In the simulation center an environment was chosen to model the actual events. The scenario was tested 4 times. Not all closed case claims contained enough data to model in a simulation environment. Certain presumed root causes such as communication errors and medical decision paradigms are most appropriate for simulation. The presumed root cause in the closed case claim simulated in this study was lack of communication of a critical laboratory value. Two of the four simulations we performed duplicated the adverse event; in the other two, participants responded to the scenario in a way that may have avoided the adverse event. Review of the simulation revealed the root cause was not the lack of communication and discovery of the abnormal laboratory value as initially postulated, but rather was determined to be individual judgement of the meaning of and response to the abnormal value. This study demonstrates that simulation can be used for root cause analysis of adverse surgical outcomes. Interestingly, our study concluded a root cause different from that presumed in the closed claim files. Corrective measures based on root cause simulation can be developed and implemented to minimize the potential risk for recurrence and improve patient safety.

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