Case 2015-2: Table for One

During a general anesthetic with the patient in the supine position and arms extended 90 degrees and secured to the boards with taped towels, the right-sided arm board detached from the bed with the arm still secured on it. When the surgical drapes were removed at the end of this 2 hour case, the arm was found hanging towards the floor and supporting the full weight of the arm board. No deficit was noted in the postanesthesia recovery unit or on subsequent follow-up. The occurrence was disclosed to the patient and he was given contact information for follow-up if needed.

Discussion

Perioperative positioning injuries most commonly attract scholarly attention when a neuropathy results, but near misses can be just as instructive. Ulnar neuropathy is the most common positioning injury although most cases of this neuropathy do not involve clear problems of positioning. Studies of this condition have led to measurement of pressure on the ulnar groove and neuromonitoring to detect impending injuries while still reversible.

In the present case, it would be easy to dismiss the occurrence once it is established that the patient is uninjured, but the risk of harm was clearly present and a mature quality improvement system should seek the opportunity to prevent this from happening again. In reviewing the case, one should consider both the immediate technical failures and the human factors that may have contributed more distantly.

A typical arm board that connects to an operating table is installed by rotating it down onto a rail from an elevated angle until a latch fully catches. Such arm boards typically contain a gear lock mechanism to allow positioning of the arm at varying angles relative to the table. While the position of this mechanism should be separate from that connecting the board to the table, on several models the arm board cannot be latched fully to the table unless the gear is locked near the “90 degree” position...
(after latching to the table it may be rotated to a different angle). This latch and gear system is metal-on-metal and bears weight, and thus undergoes wear. Further, it is easy for bed sheets or other materials to get caught in the latching mechanism and prevent complete engagement. Nearly every anesthesia professional has faced difficulties getting an arm board to latch properly. One principal of human factors engineering holds that if the operation of something is not obvious on its face, or there is a failure of the device to work properly, we must hold the design accountable, not the user.\(^5\)

The following conditions may have contributed to the potential injury in this case:

1. The locking mechanism, (arm board to table rail) can give the impression that it is locked when the latch has not in fact fully engaged. In such a case the arm board can be easily dislodged.
2. It may be difficult to detect this accident because the area was (as is typical) covered with drapes.
3. The arm board can be dislodged by many normal movements of personnel or equipment (e.g. fluoroscopy equipment, robot components, etc.).
4. The arm was secured to the arm board following induction. While this is often done for various reasons in this case it added to the potential for injury by adding weight on top of the arm.
5. Initial and ongoing checks for proper locking of the arm board are not part of common checklists or routine inspections.

Based on this analysis, we suggest that certain measures be considered, both at the local level and more globally.

1. Presentation of the case and contributing factors at the local Morbidity and Mortality conference, to increase awareness that such events can happen.
2. Incorporation of a check of the position of the arm(s) on the board(s) as part of a regular scan, much as checks for pressure on the eye are included for prone position patients. Automated anesthesia record keeping systems might provide periodic reminders for these checks.
3. Presentation outside the anesthesia department, especially for surgical and nursing personnel.
4. Incorporation of routine re-check of arm position into all personnel's mental checklist as part of repositioning any equipment near the OR table. This would be especially useful in robotic and fluoroscopy cases.
5. Presentation of the case at the national level (as in this report) and aggregation with similar events from other institutions.
6. Sharing of adverse events and near misses with manufacturers, to inform redesign of the locking mechanism and rotation feature of arm boards.
7. Commitment to ongoing data collection and quality improvement.

One solution that is not likely to work is to urge the providers generally to “be more careful.” Humans are inherently limited in their attentiveness and ability to perform rote tasks without occasional variation.\(^6\) The solution to this “knowing-doing gap” may incorporate some as yet unknown measures in addition to familiar ones, in 2 categories: those aimed at using technology to protect patients when we don’t get it right; and those aimed at strengthening humans against making defects. We should create a professional culture that encourages reporting adverse events and near misses, something that AIRS is intended to accomplish, and we should use simulation to model both unusual complications and proactive, safety-oriented procedures to mitigate them. At the same time, we should recognize that the real world is a complicated place. We expect new arm board designs to be easier to use, harder to disconnect, and contain built-in safeguards. But ongoing vigilance will still be required to assure that the solution does not create new and larger problems.

References: