Identifying and Preventing Delirium in Elderly Veterans

By Joe Murphy, APR, NCPS public affairs officer

The VISN 1 Patient Safety Center of Inquiry (PSCI) is developing a delirium prevention and monitoring program that has the potential to significantly enhance care provided to a high-risk group of elderly Veterans.

“The mortality rate for delirium is about equivalent to that of heart attacks in hospitals,” said James Rudolph, M.D., S.M., a physician at the VA Boston Healthcare System who is leading the PSCI’s effort to identify and treat the problem. “Many of us familiar with this condition consider delirium to be acute brain failure, much like heart or liver or kidney failure.”

The possibility that an elderly patient may suffer from delirium, however, often remains concealed beneath other health issues. “For instance, a patient admitted for a urinary tract infection or pneumonia didn’t come to the hospital for delirium but is at increased risk,” he said. “The prognostic significance of this is great because delirium can develop very quickly.”

The rapid onset and lack of awareness of a patient’s potential for delirium can create a number of issues for patient safety and nursing staff. “Patients with delirium can soak up time and resources,” Dr. Rudolph noted. “They need more attention and supervision. When you talk about who is going to be your most frustrating patient – the one most likely to hit you or to fall – it’s the delirious patient.”

Dr. Rudolph said a key issue for his PCSI is to help others better identify and treat the problem, which he believes has been under recognized. “My hope is that our PSCI will advance this field forward and really make a difference. The problem may be complex, but our goal is simple – enhance care for our Veterans by keeping them safe when they come into the hospital.”

The toolbox

Before the PSCI was established, the facility had developed a delirium prevention program called the “Delirium Toolbox.” Interventions using the toolbox indicated that length of stay could be reduced, as well as use of restraints.

“What is really interesting about the toolbox is that it’s not based on medications or fancy imaging like MRI scans,” said Dr. Rudolph. “It’s based on good old-fashioned care.”

The toolbox contains such things as reading glasses, hearing amplifiers and stress balls. “We offer crossword puzzles and jigsaw puzzles and other types of things to help keep patients cognitively stimulated during the day,” he continued, “and we give them ear plugs and eye masks to help them get a good night’s sleep.”

Many patients at risk of delirium are cognitively impaired simply due to aging. “Even when we see an 80-year-old and say, ‘She is sharp as a tack,’ we know that some cognitive decline is still happening with age,” said Dr. Rudolph. “It doesn’t usually interfere with what they want to do on a day-to-day basis, but reduces the threshold for delirium. For example, a cognitively intact brain can withstand multiple insults before delirium sets in – infection, dehydration, medications, sleep deprivation, etc. But with cognitive decline, the patient may develop delirium with an infection and dehydration.”

Add such medical conditions to aging and other factors, and the number of those at risk of delirium while hospitalized is substantial.

Studies have shown that delirium can occur in 10 to 60 percent of the older hospitalized population and in 60 to 80 percent of patients in the intensive care units, yet goes unrecognized by the managing physicians and nurses in 32 to 66 percent of the cases. “So we are targeting a very large high-risk group of people,” he said.

Delirium also creates a financial burden for medical systems. Cost estimates attributable to delirium range from approximately $16,000 to $64,400 per patient, implying that the national burden of delirium on health care systems ranges from $38 billion to $152 billion each year.
Patient Safety: It's the Simple Things That Matter Most — Avoiding the Technology Trap

By Gary Sculli, M.S.N., A.T.P., NCPS director of team training and program manager; Ted E. Dushane, Ph.D., M.D., NCPS patient safety fellow; and Amanda M. Fore, R.N., M.S., NCPS nurse coordinator and program analyst. Gary Sculli served as a Captain and First Officer on turboprop and turbojet aircraft at the Regional and Major/Global Airline level. He also has experience as an aircrew instructor and FAA certified Line Check Airman. His last position as pilot was flying the DC-9 for Northwest Airlines.

A mishap

On July 10, 2013 Asiana Airlines Flight 214 was cleared for a visual approach at San Francisco International Airport; it had departed Incheon South Korea roughly 10 hours earlier. The weather was clear; light winds and excellent visibility.

The aircraft was a captain, although completing his initial qualification in the Boeing 777, had much experience flying other large jets. In the right seat, monitoring him was a second captain who had flown in the Korean Air Force and was a qualified instructor. In the jump seat sat an experienced first officer, also monitoring the crew.

This would seem like the ingredients for a routine landing and taxi to the gate; however, that is not how the story ends. On final approach, the Boeing 777 hit a seawall extending into San Francisco Bay well short of the runway. The tail section and both engines separated from the aircraft; the fuselage continued to skid forward coming to rest alongside the runway with the wings still intact. Some passengers were ejected from the passenger compartment, some egressed when the aircraft stopped, and others required rescue. A fire soon erupted. Two 16-year-old girls died on scene and a 15-year-old girl died several days later; scores of injuries occurred, 12 critical in nature.

How could this happen? It is too early to draw firm conclusions, and there is much analysis to be done by the National Transportation Safety Board, but preliminary briefings by spokeswoman Debbie Hersman offer enough to generate a relevant topic for discussion — in both aviation and health care. Let’s first discuss this from an aviation perspective.

Today’s passenger jets are highly automated systems that, in most cases, fly with a precision better than any human can hope to achieve. When pilots train to fly a particular aircraft, in addition to managing aircraft systems during abnormal or emergency conditions, much of the time in the simulator is spent learning, setting up and managing automation. Hand flying the aircraft in visual conditions in the simulator may be practiced, but to a much lesser degree.

In daily operations, many airlines mandate that pilots use the auto pilot to fly when visibility is low. When doing this, the pilot locks or “couples” the auto flight system to electronic beams produced by transmitters located next to the runway providing lateral and vertical guidance. One reality of airline flying is that even in visual conditions when the sky is clear and visibility unlimited, pilots will still “couple” the approach rather than hand fly the aircraft. If this habit is continued over time, basic flying skills decay as automation complacency sets in.

Concerning Flight 214’s final approach, we know that from 500 feet down the aircraft was well below its targeted final approach speed of 137 knots, at one point falling to 103 knots before impact. This is a critical finding — the tolerance for a target approach speed is plus some number (depending on wind gusts the presence of ice on the aircraft) and minus zero. If the aircraft is even one knot below the target speed or trending negatively, corrective action must be taken immediately.

We know that the glide slope transmitter for runway 28 Left was inoperative, which means the pilots did not have the option to couple the auto pilot during the approach for vertical guidance. Instead, they had to manually fly the approach using visual cues outside the cockpit to determine the proper glide path to the runway. The auto thrust system, for whatever reason, also did not do its job, meaning airspeed would then have to be monitored frequently and maintained by manual inputs from the pilot.

While this may sound difficult to a layman, for a pilot this is basic airmanship; fundamental flying skills. Manual manipulation of flight controls to maintain proper descent rate and glide angle to the runway and using thrust levers to maintain target air speed are rudimentary: All pilots have to do manually. Fly the cockpit.

Could it be that the pilots of Flight 214 had become so automation dependent that their ability to go back to basics on a clear day actually created a hazardous situation? Could it be that as the aircraft’s speed bled dangerously low, the pilots were unaware believing the auto thrust was engaged?

These questions will be answered in time; however, it is likely that had the weather been poor and visibility low, the pilots would have been forced to choose a different runway with all components of the landing system operative. The approach would have been executed using full automation and this accident would not have happened. If we find that these pilots were unable to execute basic skills, we cannot say that this alone caused the accident; rather, it is the starting point for investigating a system that struggles with automation management.

The questions of automation complacency arising from Flight 214 have application to health care. Operating rooms, intensive care units, and medical surgical wards are replete with technology and automated systems that complete tasks, monitor or obtain information once done manually.

For many reasons, automation can make things safer; however, when automation and technology supplant the ability to perform essential and fundamental skills required in an operational setting — including the act of critical thought and proper monitoring — a perilous failure mode can take shape.

Automation induced complacency — back to basics

As clinicians repeatedly use equipment and deem it reliable, motivation and desire to question functionality is diminished. When other factors are added, such as task load and fatigue, the desire to confirm automated data is further reduced. Perceived reliability of technology also reduces the time spent monitoring and cross-checking automated information. The result is an over reliance on automated systems, an erroneous belief that these systems won’t fail, and a lack of motivation to confirm the information presented.

One clinical area at risk for automation induced complacency is the ICU; nurses being the clinical group most at risk. Consider a patient in an ICU with blood pressure monitoring via an arterial line transducer. If the patient’s blood pressure changes rapidly, common in this
setting, and a nurse believes the equipment to be reliable, the patient will be treated based on that information.

Multiple reasons can cause erroneous arterial pressure readouts, such as transducer failure; or, partial line occlusion, in which the monitor readout is correct but the value is not reflective of true pressure. In this case, taking a manual blood pressure to validate the findings may be a logical step, but it is time consuming and may not always be done. In the past, anesthesia providers took manual blood pressures on all patients without a working arterial line. In doing so, several capabilities were developed: competence with sphygmomanometer and stethoscope, as well as familiarity with alternative techniques, especially palpating a pulse and measuring at what pressure the pulse is occluded. Not only is this technique a more accurate measurement of systolic pressure than can be obtained with a stethoscope, the anesthesia provider also frequently keeps a finger on the patient’s pulse, an important but underutilized indicator of hemodynamic status.

In today’s OR, non-invasive blood pressure cuffs (NIBPs) are used almost exclusively in place of the sphygmomanometer and stethoscope. If a NIBP fails and the anesthesia provider obtains a manual blood pressure, it may be the first manual pressure that the provider has taken in months. In addition, many hospitals no longer stock manual blood pressure cuffs in ORs – an institutional over reliance on technology. The mindset of automation dependence can be demonstrated clearly when, in the face of a non-functioning NIBP, practitioners waste valuable time calling for another NIBP.

Reducing levels of technology

Between 2005 and 2010, The FDA’s Manufacturer and User Facility Device Experience database reported 566 alarm-related patient deaths, a figure believed to under represent the problem. From January 2009 to June 2012, the Joint Commission Sentinel Event database reported 98 alarm-related events, 88 percent resulting in death. In 2002, the Joint Commission reviewed 23 reports of deaths or injuries related to long-term ventilation. None were related to ventilator malfunction. Sixty-five percent resulted from malfunction or misuse of an alarm. In essence, it’s the management of technology that makes the difference.

When confusion exists or automated information conflicts with what one expects or observes clinically, it’s best to simplify: reduce the level of technology or temporarily remove it altogether. In such cases, a visual and hands-on physical assessment may be required to discern the correct information. For example, when troubleshooting a mechanical ventilator alarm, it’s recommended that responses be patient-centric, not technology-centric. The assessment should start by determining the severity of a patient’s problem, rather than trying to make sense of a ventilator’s display; or, changing the settings, which may only substitute a temporary technical fix for appropriate therapy. Removing the ventilator from the equation, while bag-ventilating the patient, assures that ventilatory integrity is maintained while the technology is evaluated. If a patient responds well to manual ventilation, then ventilator logic, tubing or settings are suspect. If manual inflation does not improve the situation, the endotracheal tube may be occluded; or, a more serious problem may exist with the patient’s airway requiring immediate evaluation. Whatever the cause, going back to basics – assessing the patient and manually ventilating – can in many cases resolve the problem.

Up until about 15 years ago, anesthesia providers ventilated patients under a general anesthesia with a bag and mask for entire cases. This experience involved a direct feel of the patient’s ventilatory status – breath by breath. Introduction of the laryngeal mask airway (LMA) has changed this practice. The LMA makes ventilating a patient, even with a difficult airway, quite easy; however, because a significant group of difficult airway circumstances are amenable to experienced bag and mask ventilation but not amenable to the LMA, management of this scenario can make a big difference for the patient – if a return to basics does not occur. The bag-mask technique could buy valuable time for appropriate interventions; but, in the modern scenario, instrumentation and/or a surgical airway procedure may be performed in haste – a setup for airway damage and a host of other complications.

Verifying pump logic

The ECRI Institute published its top 10 technology hazards in patient care for 2013. Listed second is medication administration hazards using infusion pumps. Programming infusion pumps can involve the following: typing values, such as milligrams, milliliters; typing weight units, such as kilograms; and, adding a time value, such as minutes or hours. Once infusion starts, a patient can receive appropriate therapy provided the inputs were correct.

Drip rates and volumes for intravenous delivery were once figured manually by setting up mathematical proportions with pen and paper. With the advent of smart pumps and dose error-reduction systems, the ability to double-check pump logic by manually setting up proportions of volume to weight to time, a basic function, can be lost.

It’s also important to note that if a nurse views a particular infusion pump as reliable, it’s possible that regular volume checks of the syringe may occur infrequently or not at all, as it’s assumed the syringe driver is performing as programmed. This is a simple action; yet, as time constraints and workload increase, implicitly trusting the technology can become the preferred option.

Summary

Automated systems and their associated alarms are not as important as human responses to that information, since those responses are a reflection of the collective attitude toward technology management within a system. Though automated processes and devices are being introduced to free-up time for nurses and physicians, these processes and devices come with a new set of problems. When they fail, practitioners are frequently less practiced at simpler/manual processes that have been replaced. Training time is often devoted to fully understanding newer, complex automated processes at the expense of maintaining familiarity with the basics. Because all automated processes and devices will ultimately fail, if expert competence with the simpler processes is lost, the substrate for error is firmly established.

References

Identifying and Preventing Delirium in Elderly Veterans

Continued from page 1

identifying high-risk patients correctly,” said Dr. Rudolph, “and to confirm if they are actually at risk of delirium.”

The PSCI proposed to recruit 150 patients for the study and has recruited 140 to date, each being recruited within 24 hours of admission.

“We do a ‘blinded’ approach,” he said. “One member of our staff does an electronic medical record review to see if any delirium risk factors can be identified. Then another does an in-person assessment. We follow this up by having an expert come to the facility to assess whether the patient actually developed delirium during the hospital stay.”

The PSCI’s secondary goal is to provide data showing that the interventions the staff conduct, based on the assessments, result in fewer patients developing delirium.

Raising awareness

Another major goal of the PSCI is to raise awareness about delirium recognition and numerous factors that intensify the likelihood of it occurring among elderly hospitalized patients.

“We have elderly patients who are starved for cognitive input when they are in the hospital,” Dr. Rudolph stated. “The hospital generally smells very sterile. Hospital food can often be very bland.”

He further noted that many older patients who wear glasses often leave them at home when concentrating on the urgency of getting to the hospital. Many patients also suffer from hearing loss.

“And then we confine these people to a bed,” he continued. “Altogether we reduce smell, taste, vision, hearing and touch, and we have to further isolate some patients because of concerns with infection. After all of this, there is little left to provide significant cognitive input.”

An often relatively rapid onset of delirium can result, as a patient becomes confused and disorientated, though the condition can also fluctuate in intensity.

“This is why spreading the word that an assessment of high-risk patients is vital,” Dr. Rudolph said, “and combining that with a meaningful intervention, which can be as simple as providing a patient with reading glasses and a book to read.”

Having been previously funded to begin local dissemination of the toolbox, the PSCI has developed a pilot at three VA facilities: West Haven, Conn., Togus, Maine, and Providence, R.I.

“The pilot sites are starting out much like we did. One ward. A targeted intervention group,” he noted. “Our hope is that once we develop a strong business case for the toolbox, we can easily expand the program at these centers.”

The PSCI’s national goal is to create practical ways for patient safety managers to promote recognition and reduction of delirium. Methods to deal with the problem, such as the toolbox, could then be effectively added to other patient safety initiatives that promote better care for elderly Veterans.

A delirium quality measure

The PSCI has been working with the VA Office of Quality and Performance (OQP) to develop and validate a standardized delirium prevention and monitoring program.

“OQP has been very supportive of our efforts and we really appreciate their cooperation,” said Dr. Rudolph. “We have been working with VA’s External Peer Review Program, too, since 2010 to develop a nationally recognized delirium pilot quality measure.”

The VA Delirium Field Advisory Committee has also been involved, reviewing the progress of the initiative. The committee is comprised of a group of VA professionals and is part of the VA Office of Geriatrics and Extended Care.

One of the major goals of this work is to make data collected available electronically. “If we can do this electronically, every nurse manager can get a daily list and know who their high-risk patients are,” he said. “It doesn’t mean each of them will develop delirium, but this extra bit of assessment and attention can pay big dividends.”

Looking ahead

“One of the leading causes of delirium in inpatients is medications, so this is something we really need to deal with,” said Dr. Rudolph. “We are giving medications to patients who are at an incredibly high risk for side effects, and delirium is one of those side effects.”

He also believes that current efforts to deal with delirium are reminiscent of previous efforts with other medical problems.

“It reminds me of efforts to treat cancer or heart attacks before numerous interventions were developed,” he said. “Our goal is to bring quality improvement principles to the fore to change this.”

The key to bring about change, he believes, is being proactive and patient-centered through the development of clear standards for delirium prevention. “We have to capture people at their high-risk times to really make a difference, just as is being done with other serious medical conditions,” Dr. Rudolph concluded.

References

1. NCPS manages the centers, which develop, disseminate and, most importantly, implement clinically relevant innovations that can improve patient safety at VA medical facilities.

2. The Veterans Health Administration is divided into 23 areas called VISNs, Veterans Integrated Service Networks, which consist of hospitals, out-patient clinics and other health services located in a specific region of the nation.

