Today we are speaking with two authors of publications that appear in the September 2019 issue of the journal. With us is Dr. Lori A. Daiello. Dr. Daiello is a lead author of an article titled “Postoperative Delirium and Postoperative Cognitive Dysfunction: Overlap and Divergence.” She is an Associate Professor of Neurology at Brown University Warren Alpert Medical School in Providence, Rhode Island. Welcome, Dr. Daiello.

Dr. Lori A. Daiello: Thanks. It’s great to be here.

Dr. BobbieJean Sweitzer: And joining Dr. Daiello is Dr. Jeffrey N. Browndyke who wrote an accompanying editorial “The Devil is in the Details: Comparison of Postoperative Delirium and Neuropsychological Dysfunction.” Dr. Browndyke is an Associate Professor of Geriatric Behavioral Health and Cardiovascular and Thoracic Surgery in the Departments of Psychiatry and Surgery at Duke University Medical Center, Durham, North Carolina. Welcome, Dr. Browndyke.

Dr. Jeffrey N. Browndyke: It’s a pleasure to be here and thanks for the opportunity to discuss this important topic with the journal readership.

Dr. BobbieJean Sweitzer: So, let’s start with you, Dr. Daiello. Can you tell us a bit about postoperative delirium: how it is defined or how you defined it, at least, for your paper? And what exactly is cognitive dysfunction?

Dr. Lori A. Daiello: Certainly, Bobbie. I’ll start with a very general definition in that postoperative delirium is an acute, transient and fluctuating decline in cognitive functioning with onset in the early postoperative period. And the peak time of onset is around the second postoperative day.

This is in contrast to postoperative cognitive dysfunction, which we also sometimes call POCD, which is a chronic type of cognitive impairment that usually features more subtle declines in certain cognitive domains such as memory, attention and information processing speed that may not appear until several months after surgery and anesthesia. Fortunately, in the majority of cases, POCD resolves markedly over time.

Dr. BobbieJean Sweitzer: So, how do postoperative delirium and cognitive dysfunction differ and how are they similar?

Dr. Lori A. Daiello: Well, there are definitely a lot of places that we could talk about differences and similarities here, but I think that the most notable similarity between postoperative delirium and postoperative cognitive dysfunction is that those conditions are exceedingly and, unfortunately, commonly found in populations of older adults undergoing major surgery. In fact, age is probably the major risk factor for both.

But in addition to the differences in time of onset that I mentioned in the previous question, a very important distinction between the two cognitive disorders that is particularly germane to this study is the difference in how they’re generally identified.

Now, unlike delirium which is an actual clinical diagnosis with standard diagnostic criteria very well-accepted and validated, postoperative cognitive dysfunction is a variably defined research concept that is broadly operationalized as an objective and oftentimes a very subtle decline in cognitive test scores relative to performance on identical tests prior to surgery.

Historically there’s been considerable heterogeneity and methodology across studies of postoperative cognitive dysfunction: differences in the type and number of neuropsychological tests used, testing intervals, the statistical approaches and these differences contribute to the wide variation in the reported incidence rates of this (sounds like: disturbance).

However, there’s some exciting changes afoot in our field that hold promise to help rectify some of these difficult issues that we’ve been struggling with and we’ll be discussing those later in the program.

Dr. BobbieJean Sweitzer: So, these conditions have the same risk factors? And what are those risk factors?

Dr. Jeffrey N. Browndyke: Well, when we talk about risk factors for delirium and postoperative cognitive dysfunction, I think we need to make a distinction between preoperative, perioperative and postoperative risks. As a majority of the shared risk factors for delirium and postoperative cognitive dysfunction are found in the preoperative phases, the research literature is mixed with respect to shared perioperative or postoperative risks between the two conditions.

But among the shared preoperative risk factors, the most notable are advanced age and preoperative cognitive impairment, particularly the presence of impairment in higher-order thinking skills or executive function. And many peer-reviewed studies have identified the late (sounds like: life) preoperative cognitive status as a significant predictor of delirium and POCD, or postoperative cognitive dysfunction, as well as the severity of those conditions.

Now, there are some additional shared preoperative risk factors that include mood dysfunction, particularly major depression, and the presence of greater cerebral vascular disease at the preoperative baseline. And those risk factors reinforce that a patient’s resiliency to delirium and/or POCD is determined in part by the patient’s presurgical cognitive and emotional health and preexisting neurological disease or damage.

Dr. BobbieJean Sweitzer: So, both of you have mentioned age, but no one has said what that age is.

Dr. Jeffrey N. Browndyke: So, I think for most studies when we talk about older life risks within the context of surgery, it’s not a hard and fast rule, but generally you’re talking 65 and up. The incidence in prevalence rates of delirium and postoperative cognitive dysfunction are going to vary as a function of age. So, certainly the older the patient, the greater the risk.

And as Lori was mentioning, the heterogeneous that we see in a lot of our studies may be due in part also to variable age ranges in those studies.

Dr. BobbieJean Sweitzer: So, Dr. Daiello, can you describe the design of your study?

Dr. Lori A. Daiello: What we did was a retrospective cohort study that had two primary objectives: the first was to determine the incidence of postoperative cognitive dysfunction for up to six months after surgery and the second was to evaluate relationships between delirium and subsequent development of postoperative cognitive dysfunction that occurred after hospital discharge.

Dr. BobbieJean Sweitzer: And what population did you enroll?

Dr. Lori A. Daiello: I think it’s important to let the listeners know that this was not a prospective study. We actually utilized data from Dr. Sharon Inouye’s Successful Aging after Elective Surgery Study, which I’ll call SAGES for the remainder of this discussion.

Our source population was an English-speaking group of older adults undergoing major elective, noncardiac surgeries at several Harvard-affiliated hospitals in the Boston area. The primary objective of this study was to examine the changes in short- and long-term cognitive trajectories associated with delirium in a well-characterized group of patients without dementia at baseline.
SAGES enrolled 560 participants age 70 and older who were periodically evaluated with cognitive tests, standardized delirium assessments and assessments of physical function as well as other tests for up to three years after surgery.

Other things that may interest our listeners are some of the other inclusion criteria which included an anticipated length of hospital stay of at least three days and a qualifying surgical procedure that was scheduled: either a total hip or knee replacement, lumbar, cervical or sacral laminectomy, lower extremity arterial bypass surgery, open abdominal aortic aneurism repair and several other major surgeries.

Dr. BobbieJean Sweitzer: So, I’d like to ask you a few questions about the anesthesia. First, did patients all have a general anesthesia? Or if not, what kind of anesthesia did they have? And were the anesthetics controlled, especially regarding avoiding certain medications which we know seem to be associated with postoperative delirium and cognitive dysfunction such as benzodiazepines or anticholinergic agents?

Dr. Lori A. Daiello: This is a very important question and I’ll start out with the type of anesthesia. The majority of patients that participated in the SAGES study underwent surgery under general anesthesia. It was 85% of the cohorts; 14% had spinal anesthesia and just 1% had both techniques.

Unfortunately, there was not a standardized anesthesia protocol in the study and nor were we able to control for medications that you alluded to that are commonly considered to be delieri-agents such as anticholinergic (inaudible). We consider these aspects to be (sounds like: limitations of this work).

Dr. BobbieJean Sweitzer: So, how were the patients assessed for delirium and cognitive dysfunction? You mentioned about, I think, several tests that were done?

Dr. Lori A. Daiello: So, in terms of delirium, the study used a full Confusion Assessment Method, or CAM instrument, that was supplemented with a validated method of reviewing charts for symptoms that would be indicative of delirium. Patients were assessed for delirium daily while hospitalized and if they have scored positive for delirium at least one time during the hospitalization, we categorized them as having in-hospital delirium.

In terms of cognitive function, we assessed that with a battery of 10 standard neuropsychological tests that are generally considered to be sensitive to change across a number of important domains including memory, attention and executive functioning.

To identify postoperative cognitive dysfunction in this cohort, we adapted the approach used in the International Study of Postoperative Cognitive Dysfunction which is widely considered to be a landmark study of postsurgical cognitive change.

Dr. BobbieJean Sweitzer: Dr. Browndyke, I think there are a variety of assessment tools and criteria to evaluate for postoperative delirium and cognitive dysfunction. Can you provide us some context of how this study of Dr. Daiello’s was conducted and the tests that were used as compared with other studies?

Dr. Jeffrey N. Browndyke: Yes. I mean, it’s true: there are a myriad of ways to assess and evaluate postoperative cognitive dysfunction which often makes it difficult to compare across studies. The presence of the condition is heavily dependent on how it’s defined, how it’s detected and what level of change and functioning threshold is used for ascertainment.

One of the bigger distinctions in the quality of delirium and postoperative cognitive decline studies is – can be found in the thoroughness of the sampling of the cognition in the behavior. Often these outcomes studies will rely upon a single screening measure, typically yielding a global cognitive total score variable to define the presence or absence of postoperative cognitive dysfunction.

But those screening tools are blunt instruments: they’re limited in their scope and generally more sensitive to the widest diagnostic discrimination; for instance, screening in or out dimension-level cognitive impairment relative to normal performance.

Now, in the Daiello, study as well as other well-planned outcome studies in the field, they used a battery of standardized cognitive tests to broaden the sampling of cognition in behavior which improves the sensitivity to detect milder changes and allow for examination of both a global cognitive change as well as changes in a particular cognitive domain.

And an additional benefit of using these well-established cognitive tests, like those that were employed in the Daiello study, is the ability to characterize the patient’s samples baseline performance abilities before the surgery relative to normative population estimates.

So, by using these well-designed and normatively standardized tests, one can determine how representative the study sample is to the population as a whole and as a result get a better ability to assess the generalizability of the results.

Dr. BobbieJean Sweitzer: So, Dr. Dailo, I think you mentioned you followed these patients out for three years postoperatively, but at what timepoints were they being assessed?

Dr. Lori A. Daiello: Well, actually although the original SAGES study did follow patients for up to three years after surgery we only had access to data for this study for the assessments that were performed at one, two and six months after surgery.

So, a fairly short-term follow up for this sample of patients, though we evaluated for the prevalence of postoperative cognitive dysfunction at – during those assessments and then also looked at correlations between delirium and postoperative cognitive dysfunction at each of those timepoints to try to understand what the relationship between those two conditions might be.

Dr. BobbieJean Sweitzer: So, Dr. Browndyke, before we get into the results of Dr. Dailo’s study, can you summarize for us what we already know about the incidence of postoperative delirium and cognitive dysfunction?

Dr. Jeffrey N. Browndyke: Well, yes. So, the reported incidence of postoperative delirium and postoperative cognitive dysfunction depends on a few factors, the most notable being distinctions made for whether the surgery was cardiac or vascular or if the surgery was noncardiac, nonvascular. There’s higher incidence rates of both conditions reported in the past in association with cardiac or vascular surgeries which likely reflects an increased risk for perioperative neurological injury and increased surgical inpatient disease complexity.

The cardiac and vascular surgery incidence rate of delirium is generally between 26% and 52% depending on the methodology of ascertainment, but it has been reported as high as 70%; whereas the incidence rate of delirium in noncardiac, nonvascular cases tends to be lower in the 9% to 30% range.

The prevalence of postoperative delirium follows similar ranges, but it’s hopeful to note that both the incidence and prevalence of delirium appears to be declining and I think that’s due in part to increased awareness by studies like the one we’re discussing as well as better surgical and perioperative management and proactive presurgical risk reduction strategies.

Now, with respect to the incidence and prevalence of postoperative cognitive dysfunction, that tends to vary depending on how the condition is assessed and whether it’s defined as a mild or a major change in cognition.

And this is where I believe Dr. Daielo’s study is important in part because they address this impact of severity on condition prevalence in their SAGES cohort by assessing postoperative
cognitive dysfunction using both liberal and conservative change thresholds.

So, put another way, they determine the prevalence of the postoperative cognitive dysfunction, whether it was defined as a mild or greater change from baseline or if it was a severe or greater change from a patient’s baseline and that has an impact.

So, if we define, as they did, postoperative cognitive dysfunction as a milder decline from somebody’s baseline, then the prevalence rates were 60% at one month, 36% at two months and then 27% at six months; whereas if you go with a more liberal or a milder decline from baseline, then those prevalence rates are reduced across the board by approximately 11% to 13% at each one of those timepoints.

Now, in cardiac surgery patients, the incidence and prevalence of postoperative cognitive dysfunction both in mild and major forms would be expected to be slightly higher, but again those estimates are going to be really impacted by the methods by which postoperative cognitive dysfunction is detected and defined.

Dr. BobbieJean Sweitzer: Dr. Daiello, was there a control group in this study that was not having surgery and anesthesia for a comparison?

Dr. Lori A. Daiello: We did have a control group. There were about 120 controls that consisted of patients who were attending medical clinics at one of the institutions where the surgeries were being conducted.

This group had to meet the same inclusion and exclusion criteria, the SAGES surgical sample other than undergoing the major surgery; and then subsequently were assessed with the same neuropsychological test battery that was administered at identical intervals as the surgical sample.

It’s important to note, though, that the way we usually think about how controls are used in clinical trial, they really – when we’re looking at postoperative cognitive dysfunction, controls are used a little bit differently in these studies and that is we want to understand better what the potential learning effect is administering the same test or versions of the same test repeatedly over time.

Generally, there is learning involved and we want to be able to account for that in our analyses and that’s exactly what was done, how this group of controls was utilized in the study.

Dr. BobbieJean Sweitzer: Well, that’s interesting. I guess the more they took the tests they got a little bit better at just answering the questions.

So, Dr. Browndyke, I know you and Dr. Daiello have both discussed around the different techniques of diagnosis or the different testing that can be used and the different criteria which often accounts for the variability among studies.

But if one does pick the right test, I guess, is it pretty straightforward to determine or diagnose postoperative delirium or cognitive dysfunction? Or is it unclear of what we’re even trying to define or trying to find?

Dr. Jeffrey N. Browndyke: Yes. I’m afraid the waters are somewhat muddy. [laughter] So unfortunately not. But I have to say our ability to diagnose both conditions has improved significantly over time, particularly with standardized delirium screening methods like the Confusion Assessment Method that was used in the study and improved screening methods that are sensitized to detect milder deficits in cognitive impairment like the Montreal Cognitive Assessment or MoCA screen.

And those standardized methods and screens are relatively easy to employ but do take some time to master. But unfortunately like all screening methods, they only highlight the probability of a condition’s presence. The diagnosis itself should be based upon careful consideration of the testing data, patient history and clinical presentation.

A good example of this, you could have two core features of postoperative delirium under the Confusion Assessment Method which are inattention and acute change in cognition from baseline. But those are dependent upon an estimate of a patient’s presurgical capacities.

Without having a reasonable understanding of those presurgical capabilities either through a presurgical baseline test data or firm collateral reports from a patient’s family members, it can be easy to misattribute observed postoperative screening results of cognitive impairment as a new symptom of inattention or acute change from baseline.

Now, that being said, there’s recent calls for routine cognitive screening in older adults at the point of contact and primary care settings and that could improve this problem of estimating a patient’s presurgical capabilities as well as highlighting those patients that are increased risk for postoperative delirium and postoperative cognitive dysfunction.

Dr. BobbieJean Sweitzer: So, Dr. Daiello, what did you find with your study?

Dr. Lori A. Daiello: So, just a few of the take-home points from our results, first starting with the incidence in delirium; what we saw was that nearly a quarter of the patients had an episode of delirium at least once while hospitalized after surgery. This particular proportion, 24% of – in the lower end of the rate of delirium that has been observed in other studies noncardiac surgery.

And I think that really speaks to Dr. Browndyke's comment about how we are becoming more skilled at assessing delirium and hopefully preventing some cases by understanding better the preoperative risk factors. So, we have nearly a quarter of patients who experienced delirium.

And the other take-home point was that the only time that we saw a correlation between postoperative cognitive dysfunction and delirium was at the first postoperative month. In general, we saw a decrease across each timepoint, but at two and six months these were not significant correlations. So, that was a very interesting finding. We didn’t really expect that.

Dr. Browndyke talked about the effects of either raising or lowering the bar in terms of how we assessed a threshold for cognitive impairment. With a lower threshold for cognitive impairment, you see a lot more cognitive dysfunction and, as you stated, the first postoperative month there were about 60% of the patients that met that criteria.

One of the other things that the listeners might find interesting is a question that came from one of the reviewers, which I thought was an excellent point. They asked about the proportion of patients who have persistent postoperative cognitive dysfunction throughout the time that we observed these individuals, which is an important point because while patients may be able to deal with and their families may be able to deal with some cognitive dysfunctions in the first month, we really want to know if that’s going to resolve over time or if people are persistently impaired.

And so, we did do a secondary analysis and found, luckily, that the proportion of patients with postoperative cognitive dysfunction throughout month six was very small; so, only about 6% of patients met that criteria.

And also in this case we looked at persistent cognitive impairment. Having delirium in the hospital was only weakly associated with increased risk of persistent postoperative cognitive dysfunction throughout month two but wasn’t associated significantly at all with POCD through month six. So, those were a summary of our findings.

Dr. BobbieJean Sweitzer: Dr. Browndyke, what are the consequences of postoperative delirium and cognitive dysfunction for patients who...
Dr. Jeffrey N. Browndyke: Well, yes. I mean, the consequences of delirium can be quite severe in both the acute and post-acute phase. It certainly increases the risk for return to the hospital within one month of surgery. It’s known that delirium increases the patient’s one-year mortality risk and there’s growing evidence to support that delirium might be a salient risk factor for subsequent longer-term neuropathological kind of decline.

Postoperative cognitive dysfunction making for a similar risk, although the research literature is a bit more equivocal given differences in how postoperative cognitive dysfunction is defined or diagnosed. That being said, the impact of either condition on a patient’s functioning is really going to depend largely on a patient’s presurgical abilities and their social and occupational functioning.

So, for instance, you could have a patient with mild presurgical cognitive impairment that may be more deleteriously affected by even a mild perioperative decline in their cognition than a patient without presurgical cognitive weaknesses.

And the additive effects of those postoperative declines in patients who are already impaired or at risk might mean the difference between discharge home versus discharge to a skilled nursing facility.

And similarly, you could have a mild decline in performance in a patient with a high level of social and occupational complexity that may be more affecting than in patients without that high level of work demand.

So, the functional consequences of delirium and postoperative cognitive dysfunction ultimately rely upon a good understanding of the patient’s presurgical functional capacities, their lifestyle and resilience to even mild declines in performance.

Dr. BobbieJean Sweitzer: So, Dr. Daillo, do your findings of an absence of an association between the postoperative delirium and cognitive dysfunction beyond the first postoperative month contradict our growing appreciation of delirium as an event that can trigger long-term postoperative cognitive dysfunction or this known previous association of mortality at one year?

Dr. Lori A. Daillo: Yes, this is an excellent discussion point and I think it brings up something that I found to be important just for myself in terms of cognitive – long-term cognitive dysfunction and its relationship to delirium.

When I was trained—and I’m going to show my age just by saying this—we were taught that delirium was a fully reversible phenomenon as long as you’re able to actually resolve the precipitating factors of the cause.

And now we know that’s really not the case and there have been multiple studies that have demonstrated that the long-term effects of delirium may not be (inaudible) at all, and certainly predispose patients to a vaster trajectory of cognitive decline or maybe an increased risk for dementia. This work is still being done.

So, in terms of this study, my belief is that postoperative delirium and postoperative cognitive dysfunction both may be implicated in long-term cognitive decline, but they could have different causes and there could be distinct manifestations of neurocognitive deficits triggered by a combination of interactions that we don’t quite understand; things like the type of surgery, anesthesia, some preoperative vulnerabilities.

Dr. Browndyke mentioned preoperative cognitive impairment and that’s a big one because oftentimes patients are going into surgery without knowledge that they have early preoperative cognitive changes.

One of the things that we’re looking into and, in fact, a subject of my new research is, what about the condition of the blood-brain barrier? We know that microvascular disease is common in a lot of illnesses, including diabetes and other inflammatory types of illnesses and if patients enter the surgical environment with a leaky blood-brain barrier, how does that actually play into their risk for delirium or postoperative cognitive dysfunction?

So really, as we expected, this study raised a lot more questions than we were able to answer, but I think that those things need to be considered.

Another consideration for this study—and I thought that this was another interesting aspect of what we did in terms of our methodology to define postoperative cognitive dysfunction—is that our statistician raised the issue that our - both correlations between postoperative delirium and postoperative cognitive dysfunction itself may reflect a statistical phenomenon rather than the absence of an underlying biological association.

And so, there’s quite an involved discussion in the paper about why this is the case and may have a lot to do with the methods that we’ve used to define a postoperative cognitive dysfunction over time and that’s another important question to answer as we try to figure out what is going on here.

Dr. BobbieJean Sweitzer: Dr. Browndyke, I know there’s a new proposed nomenclature to use with perioperative neurocognitive disorders. Can you help us a little bit on how that is defined and contrast that with how we currently perceive and talk about cognitive changes in perioperative patients?

Dr. Jeffrey N. Browndyke: Yes, certainly. So, the newly proposed perioperative neurocognitive disorder nomenclature has been championed by Liz Evered at the University of Melbourne and supported by a host of colleagues and stakeholders from multiple disciplines forming this Nomenclature Consensus Working Group.

And the proposed nomenclature guidelines seek to better characterize and align delirium and postoperative cognitive dysfunction with the neurocognitive disorders that are outlined in the most recent Diagnostic and Statistical Manual of Mental Disorders or the DSM-5.

And then also to have some overlay with the research classification guidelines proposed by the National Institute of Aging and the Alzheimer’s Association or the NIAAA guidelines.

Now, under the proposed nomenclature, both delirium and postoperative cognitive dysfunction fall under a perioperative neurocognitive disorders umbrella and the postoperative cognitive dysfunction is further subdivided into either delayed neurocognitive recovery, postoperative mild or major neurocognitive decline depending on the period of detection, the severity of the impairment and the duration of the dysfunction.

Delirium, under the new proposed guidelines, would gain a postoperative diagnostic label if it occurs in the hospital up to a week post procedure until discharge or in the case of persistent delirium beyond discharge.

The diagnosis of delayed neurocognitive recovery is one of the bigger changes in that proposed nomenclature from current practice as this diagnostic addition is defined as the patient’s subjective complaint of cognitive issues and either a mild or major cognitive dysfunction within 30 days post procedure.

Now, that 30-day window was proposed to allow time for the reasonable resolution of most surgical and postoperative factors affecting cognition and functioning such as resolution of
postoperative pain. And then it also aligns with common 28- to 30-day return quality metrics for surgical outcomes.

Now, beyond that 30-day post procedure, if a patient has subjective complaints that persist and there’s at least a one standard deviation drop in objective test performance, then that patient could be classified as either having a mild or major postoperative neurocognitive disorder. And again, that depends upon the severity of the objective testing deficits.

Now, beyond a year, the patient with the persisting cognitive complaints and objective cognitive decline would revert to just the standard DSM-5 diagnostic definitions for mild and major neurocognitive disorder, but without that postoperative label.

So, this nomenclature structures us a bit more and allows us to have a scaffolding upon which we can label our cases that we’re doing for research and then hopefully aggregate those study results over time and hopefully get to the bottom of what we’re talking about here.

Dr. BobbieJean Sweitzer: Dr. Daiello, what do you think are the most important studies in the future to better sort out this vexing problem of surgery anesthesia and brain functioning?

Dr. Lori A. Daiello: I think I’d like to reemphasize Dr. Browndyke’s point about the need for a scaffolding on which to be able to have a more standardized identification of research cases. I really like the direction that we’re going and particularly the adoption of using the patient’s perception of their cognitive status.

One of the things that we’ve been criticized for in terms of this very complex neuropsychological test-based definition of POCD is that it really doesn’t bring in the patient or family members’ observations about what is happening and I think that’s important also.

So, I think trying to figure out a common language that we can speak and use across studies will give us a much better idea, certainly of the epidemiology of this oftentimes very difficult situation.

But in terms of other studies, I think that we need to go in the direction where I see Alzheimer’s disease research going right now, which is to identify risk factors and look at preventative strategies for staving off cognitive decline and we really don’t understand much about that other than just the obvious risk factors that Dr. Browndyke talked about and I might have alluded to also.

But we need to be able to identify those factors better so we can better risk-stratify patients prior to surgery. And then hopefully identify some ways to manage anesthesia and surgical techniques that may also result in better outcome per our patients.

But certainly there is a huge deal to be explored out there and I’m looking forward to seeing what’s happening over the next ten years.

Dr. BobbieJean Sweitzer: Is having an episode of postoperative cognitive decline a risk factor for a future episode?

Dr. Jeffrey N. Browndyke: So, I would argue that’s probably the case given that we know that presurgical cognitive impairment is a risk factor for subsequent decline. So, having a patient who has experienced a cognitive decline and then still maintaining that decline level and then goes and has another subsequent surgery, then, yes, they would be at greater risk for another stepwise decline.

Now, whether somebody has postoperative cognitive decline and then it resolves over a year or more and then they go back in for another surgery, I don’t think that has yet to be determined.

Dr. BobbieJean Sweitzer: So, Dr. Browndyke, you write in your editorial that perhaps the approach of looking for global decline in cognitive performance is misguided and instead we should be looking at specific functions such as attention, executive functioning and selective memory. Can you help us better understand this?

Dr. Jeffrey N. Browndyke: Yes. So, my editorial comments regarding this overemphasis on global decline were borne largely from my training as a clinical neuropsychologist and cognitive neuroscientist.

And traditionally in my field, clinicians assess all aspects of a patient’s cognitive performance by extensively sampling multiple cognitive domains like attention and language and visual abilities. And then they use that pattern of performance in those domains for patient diagnosis and treatment planning.

But the modern medical practice, we typically have very little time with patients—especially on the screening end—and so there’s this emphasis on single cognitive screening score totals such as those obtained on the MoCA or on the Mini-Mental Status Examination.

And those can be helpful in quickly determining a patient’s level of cognitive dysfunction, but they say very little about the character or type of that cognitive dysfunction and they don’t necessarily communicate dysfunction across multiple cognitive domains, which is what one would be thinking about when considering the presence of a global cognitive decline.

So, for instance, you could have two patients with postoperative delirium or postoperative cognitive dysfunction histories with the same global performance impairment score and yet the errors in the task performance contributing to those identical score totals could be quite different.

In one patient, that change in performance might be selectively accounted for by difficulties in executive functioning tasks, while in the other patient the performance errors that yielded the same total score could be exclusively in the memory recall domain.

And so, those distinctions between patients may have significant diagnostic importance and functional implications and it’s this loss of cognitive domain information by overemphasizing a single global cognitive performance score that prompted my comments as I believe it generally impedes our ability to fully characterize condition subtypes and possibly their underlying pathophysiology.

Now, there’s (sounds like: well designs) like Dr. Daiello’s and they try to address this problem by defining postoperative cognitive dysfunction as either a global reduction and/or a reduction in multiple cognitive domains. And that’s an understandable and traditional compromise that has been throughout the host of POCD research studies, but that still doesn’t adequately address this heterogeneity that we observe in our patient performances and I think that may have diagnostic or pathophysiological importance.

I mean, we’re now in an era of machine learning and artificial intelligence and so I think it behooves us to become more granular in our characterization of delirium and postoperative cognitive dysfunction phenomenology as there may be some hidden kernels of diagnostic significance obscured or paying attention, I guess, to more of the forest than to the exclusion of the trees.

Dr. BobbieJean Sweitzer: Got it. So, Dr. Daiello, you recently had surgery yourself. Would you be willing to share with our audience your experience?

Dr. Lori A. Daiello: Absolutely. It has been an interesting time for me to have had this major orthopedic surgery considering that we were going to be having this discussion. And so, I’ve kind of been paying attention to my own progress.

I’m now three weeks out from my surgery, I’m not yet to that month that Dr. Browndyke mentioned as what we are using as a marker of the sufficient amount of time that a lot of the
different potential impacts of cognitive functioning like pain and drugs and other things.

Hopefully those are resolved by 30 days; I’m almost there. But I am very happy that we didn’t have this discussion, let’s say, even two weeks ago. I was certainly not at my best and my family members and friends could definitely say that that was the case.

Dr. BobbieJean Sweitzer: Thank you. I hope today’s discussion will interest many of our listeners and lead you to read this important article to learn more. Thank you, both Drs. Daiello and Browndyke, for discussing your work with us today. I wish you well as you continue your efforts to enhance the practice of anesthesiology and strive to improve the care of our patients.

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