81| Neuropsych Bite: Clinical Case 3 – With Dr. John Bellone

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NAVIGATING NEUROPSYCHOLOGY

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Speakers: John Bellone, Ryan Van Patten

Intro Music 00:00

John Bellone 00:17
Welcome, everyone, to Navigating Neuropsychology: A voyage into the depths of the brain and behavior, brought to you by INS. I'm John Bellone...

Ryan Van Patten 00:26
...and I'm Ryan Van Patten. Today we have a Neuropsych Bite in which John will present his second clinical case. There are a few caveats that come along with

these presentations, but we've already listed them in prior episodes and don't want to be redundant. If you'd like to hear the caveats, you can listen to the intros for episodes 77 and 79. And, with that, we give you our Clinical Case #3.

Transition Music 00:51

John Bellone 01:01

Okay, so I have a right-handed, English-speaking, white woman from the US, who is in her early 50s, with 16 years of education. She's married, no children. She works in a management role. She was referred for concerns of cognitive impairment in the context of a recent left anterior thalamic stroke. So, when I saw her, it had been three and a half months since the stroke. Her presenting symptoms included word finding difficulties, forgetfulness, fatigue, and mild apathy - all of which were uncharacteristic for her and new since the stroke. These improved somewhat but still persist to some degree. She is currently on a leave of absence from work - she has about three weeks left before her FMLA leave of absence expires. She has been receiving speech therapy twice per week since the onset of the stroke and will continue to get that for the next few weeks. She is reportedly independent in basic activities of daily living. Her husband manages much of the finances, medications, and household chores. She said that this is due to her fatigue and their role preferences around the house. She feels that she'd be fully capable of handling those activities, if needed, and if the fatigue was lifted. She's independent for driving and does manage some household tasks independently. She has a medical history of hypertension and hyperlipidemia, both of which were controlled prior to the stroke. She denied any history of cardiac issues, seizures, head injuries, or other medical issues. She's on antihypertensive medications and also a statin. She denied any history of formal psychiatric diagnosis or treatment. Her mood is reportedly very good. She sleeps eight hours a night, no evidence of a sleep disorder. Developmental history was unremarkable. She said that she was a very good student - she denied any history of attention problems or learning disorders. She denied any history of problematic substance use. She used tobacco products up until around age 40 or so, and she was smoking up to two packs a day and one point. Family history is unremarkable for neurocognitive decline, with the exception of a couple of strokes that her mother had suffered and had resulted in aphasia. I think that's it for the background at a high level.

Ryan Van Patten 03:24

Yeah. Tell me a little bit about her job before the stroke. You mentioned that she was in a managerial role. Was this a high stress job? More than 40 hours a week? Or not so much?

John Bellone 03:35

Yeah. She said that her job was quite demanding and stressful. And she was working more than 40 hours.

Ryan Van Patten 03:41

Okay. In this early phase, I'm wondering about her return to work. What her feelings are about that, if it came up during the clinical interview. What do you know?

John Bellone 03:50

Yeah, that's a big part of this evaluation. I think that's one of the reasons why the neurologist wanted her evaluated ASAP. Three and a half months post stroke is pretty soon. Usually we see people six months to a year after a stroke for a full neuropsych eval. Obviously, that's variable, but I think the neurologist wanted her tested because she was interested in returning to work as soon as possible. Her medical leave ends in about three weeks and she told me she was interested in returning to work. She feels like she could manage it. Even though she has some remnant symptoms, she feels like they've improved sufficiently.

Ryan Van Patten 04:26

Okay. Why don't we put a pin in that, I'm sure we'll come back to it. I'll let you proceed with behavioral observations and then the test data.

John Bellone 04:34

So, she was on time for my evaluation. She was honest, open, friendly - rapport was easily established. Good sense of humor. I thought she was an accurate historian. She was attentive and alert. Motor functioning was unremarkable. Her rate of speech was somewhat slow, but this was quite subtle. If I didn't know she had had a stroke, I might not have picked up on it. She had a couple of instances of word finding difficulties during the interview. But, again, very mild, and she was able to find her word after a moment. Affect was positive, and she had an appropriate range. On testing, there weren't any observations that were really out of the ordinary. She approached tests in a straightforward fashion, quickly grasped all tasks demands, and seemed to demonstrate adequate mental stamina over the course of testing.

Ryan Van Patten 05:25
Okay, great. Hit us with the test results.

John Bellone 05:28
So, standalone and embedded measures of effort were within normal limits. Her estimated premorbid functioning was high average. She was fully oriented. I gave her the MMSE because the neurologist who sent her to me likes to have that, and she got a 30 out of 30. Attention was average. Processing speed was mixed. Whenever it was a timed motor task, she was within normal limits; but, when there was a verbal timed component, she was below average. So on the D-KEFS Color Naming task, for example, or on word reading, those were below average. Language abilities were also mixed. Confrontation naming was average, but category fluency was below average. Visual spatial skills were average. Executive functions were somewhat mixed. And, again, there was a discrepancy between motor tasks and verbal tasks. So, whenever there was a verbal timed component, she had difficulties - for example, her phonemic fluency was exceptionally low, and the D-KEFS Inhibition and Inhibition/Switching tasks were exceptionally low, but Trail Making Test B and the Wisconsin Card Sorting Test were both within normal limits. In terms of her learning and memory performance, this was mixed. She had difficulties on a word list learning task. I gave her the HVLT and she had a learning curve of: 3 words, then 4 words, then 6 words out of 12 possible words, which was exceptionally low for her age group. Then, after a delay, she recalled 3 out of the 12 words - 50% of what she had learned before, which is again exceptionally low at her age. Recognition was also exceptionally low. But she did much better when the information was presented in context or in the form of stories. On the Logical Memory tests from the WMS, she was average on immediate recall and average on delayed recall and recognition. She also did quite well on a visual learning memory test, both in terms of her ability to learn the information and recall it later. Motor dexterity and speed were high average bilaterally. She did not endorse significant depressive symptoms on the BDI-2.

Ryan Van Patten 07:57
All right. Let me take a stab at summarizing this. Stepping back, big picture: She has a number of areas of strength where her cognitive abilities may have been spared from the stroke. There are two areas in particular that seem to have been significantly affected. One would be - we could call it fluency, articulation, or verbal processing speed, which cut across multiple tests and seem to be a persistent difficulty. You even noticed it in a very mild way during behavioral observations. That's number one. Number two is list learning memory. Her narrative or story

memory was intact, but her list learning verbal memory was impaired. So that's what I take away from this - there are those two areas where she really struggled. I wouldn't classify her as being impaired in executive functions, for example, because it seems like the fluency and verbal processing speed issue cut across different tests and so constrained her scores on some tests of executive functions.

John Bellone 09:04

Right. So even though she was below average or exceptionally low in tests of executive functioning, the low performance wasn't due to poor executive functioning. It was likely due to the processing speed issues.

Ryan Van Patten 09:17

Right, which is why we don't interpret test scores in a vacuum and we look at context. That pattern was very consistent across your battery. Everything else, aside from those two areas, was fairly intact. So, if that's a summary of the results, talk about your impressions and conclusions for her.

John Bellone 09:37

Yeah, so we'll start with the diagnostic considerations. Her performance likely represents a decline from her baseline - from her pre-stroke functioning - but I don't think that her ability to manage instrumental ADLs is sufficiently compromised. She said that her husband was managing aspects of the finances and medications, things like that, and that was due to fatigue and I believed her. I didn't think it was due to her cognitive issues or that she wouldn't be able to manage those activities of daily living. So given some difficulties relative to others her age, but mostly intact instrumental ADLs, I went with a diagnosis of mild cognitive impairment, aka mild neurocognitive disorder.

Ryan Van Patten 10:25

That sounds reasonable to me. I think what will be helpful next, John, is for you to talk about her left anterior thalamic stroke. I know you've read a lot about this. What is the neuroanatomy of a lesion in that location? What sort of cognitive profile would we expect? And how does that map on to her performance?

John Bellone 10:47

First let's talk about just the thalamus a little bit, and then I'll talk specifically about the left anterior thalamic lesion. The thalamus is a large mass of mainly gray matter. It's located subcortically - so, between the cortex and the midbrain - and it has two halves, left and right. It's mostly separated by the third ventricle. And it's made up of

different nuclei, that mostly act as relay centers for many different sensory, motor, and cognitive processes. So, the nerve fibers project out in many directions. You can think of this like a hub, like O'Hare Airport or London Heathrow, which is very densely connected to other airports and, in this case, other neuroanatomical regions. And, as such, you can really get vastly different symptomatology depending on where precisely in the thalamus you impact. And, so, in her case, it was the left anterior nuclei of the thalamus. I didn't have the radiology report and I didn't have the imaging, all I had was the neurologist note saying that, "MRI of brain showed acute/subacute infarct of the anterior left thalamus." So that was all I had to go off of. And, of course, like any good clinician, any good scientist practitioner, I went to the literature and looked at what was available specifically regarding left anterior thalamic lesions. And I found that the profile for my patient fit very nicely with the literature out there. There have been some case studies, some case series, looking at this type of lesion and they typically find verbal learning and memory difficulties, difficulties with fluency, and sometimes also apathy or executive dysfunction. What a constellation. And, like I said, it fits very nicely with my patient. So, why don't I describe a little bit of the anatomy for each of these symptoms?

Ryan Van Patten 12:55
Please. Yes, that was going to be my next question.

John Bellone 12:58
So let's start with the memory component, because I think that's the most prominent in her case. We typically think of the hippocampus as being the structure that is specialized for memory consolidation - for taking information that's coming at us and consolidating it, storing it for long-term recall later on. And that's true, but the hippocampus is part of a circuit and it doesn't function in isolation. So I'll describe one of the circuits that it's involved in, which is called the Papez circuit, or the medial circuit. I hope I'm pronouncing "Papez" right. That's how I've heard it pronounced. [laughs]

Ryan Van Patten 13:39
I think it's "/payps/", not "/pa-PEZ/". [laughs]

John Bellone 13:41
Right. It's probably French. Yeah, [in French] je ne parle pas francais. [laughs] So, it starts with the hippocampus, and the hippocampus relays through the fornix to the mammillary bodies, and from the mammillary bodies through the mammillothalamic tract to the anterior thalamus - which is what's relevant for our case here. From the

anterior thalamus, it relays to the cingulate gyrus, and then back over to the hippocampus proper. So this completes this circuit, and if you disrupt any aspect of this circuit, it's understandable that you would have some memory symptoms, some difficulties.

Ryan Van Patten 14:23

Right. Like a railroad. If you have damage to one part of the pathway, it doesn't matter how intact the rest of it is, that train is not getting to the final destination. So she had a lesion in the anterior thalamus which disrupted that whole Papez circuit.

John Bellone 14:39

Right, right.

Ryan Van Patten 14:41

Well, that was a pretty good review of the Papez circuit, I would say. I think Russ Bauer and Erin Bigler and Steve Correia, some of the neuropsychology gurus of neuroanatomy, would be happy with that.

John Bellone 14:53

I would hope so. Actually, it's funny you mentioned Dr. Russ Bauer - I had to rereview his chapter in the Stuckey et al. Neuropsychology Study Guide and Board Review book because he mentions the dual circuit. So, there's the medial circuit, the Papez circuit, and I should also mention a lateral circuit, which involves the amygdala and another aspect of the thalamus and orbital frontal cortex. So, there are multiple circuits, but the Papez circuit is one major circuit involved in memory consolidation.

Ryan Van Patten 15:26

Yeah, that's a great chapter in his book - I would highly recommend it. And we should also mention Blumenfeld's Neuroanatomy Through Clinical Cases as a great reference for neuroanatomy. So, you mentioned the memory portion of her cognitive profile. Does the neuroanatomy of left anterior thalamus line up with her fluency and articulation deficits as well?

John Bellone 15:53

Yeah, it can. I mean, it's hard to know precisely what's going on here. But again, from looking at the literature - looking at case series with other people with this left anterior thalamic isolated lesion - they have expressive difficulties. And one of the

possibilities of why that's the case is because one of the areas that the left anterior thalamus relays to is the anterior temporal lobe. So you can sometimes get a disconnection, which can lead to language disturbance. And that's likely because the anterior temporal lobe is associated with the integration of lexical and semantic information. So, if you disrupt the inputs to those cortical areas, you're going to have this disconnection that's going to potentially result in some language difficulties.

Ryan Van Patten 16:45
Right.

John Bellone 16:45

And so, again, I'm not positive that's what's going on, but that lined up with the literature. Maybe this is also a good time when we're talking about the disconnection syndromes to introduce the concept of diaschisis - I believe that's how it's pronounced. Ryan, I don't know if you want to give a little overview of that.

Ryan Van Patten 17:06

Just very briefly, essentially, it means that you have a lesion in one part of the brain, and that area, that hub, is highly connected to another part of the brain. The second part can also show effects of the lesion because it's no longer receiving the input and output that it was before. You might think of this as like an off-target effect - there's a lesion in area A, and then a function subserved by area B, which is highly connected to area A, is also negatively impacted. So certainly that could have been going on for her. It can be going on for anyone who has a circumscribed lesion in the brain.

John Bellone 17:41

Yep. So we have to think outside the box. And, you know, if we see memory difficulties on testing, it doesn't just mean that the hippocampus is impacted, or similar with other symptoms.

Ryan Van Patten 17:52

Right. The distributed network of the brain. We always have to think about it that way as opposed to localizing too strongly.

John Bellone 18:00
Right, right. Both are important, right? There are areas that are clearly specialized, and we can localize, but there's also the concept of the connectome and these networks that connect to many different areas of the brain.

Ryan Van Patten 18:13
So, clearly, you and I could get off on a long tangent.. [laughs]

John Bellone 18:16
[laughs] I was going to say...

Ryan Van Patten 18:18
I will rein us in right there for the sake of our listeners.

John Bellone 18:21
Please, please do.

Ryan Van Patten 18:22
There are a few other very clinically relevant aspects of this case that we should talk about. We should talk about fatigue and apathy, and how that's impacting her. We should talk about her return to work, what you think about it, and what you would recommend in that regard. And then the final topic of conversation is the “window of recovery”. So, she was three and a half months out from the stroke when you saw her, and she could still be recovering. But, to what degree? We don't know. Why don't you start there? Talk about her being three and a half months out, what would you say to her in a feedback session about her ability to recover?

John Bellone 19:04
Well, I told her that she is very much in the early stages of recovery. She's still in this so-called "golden period" or "window of recovery". We typically think of post-acute recovery after stroke as reflecting a negatively accelerating curve. There's the greatest degree of recovery soon after the stroke, then it sort of tapers off over time, and eventually leads to an asymptote - a plateau in someone's recovery. The bulk of recovery, though, typically happens within the first 6 to 12 months, more or less. Of course this is variable; this is an oversimplification. But patients want to know what's typical. So we typically say about 6 to 12 months that someone's making the bulk of their recovery and so she still has at least several more months of optimal recovery.

Ryan Van Patten 19:58

Right. You had mentioned at the beginning that she feels like she's ready to return to work. Now that you have the data from neuropsych testing and more context, what do you think about her desire to return to work given her job and its demands? What would you say to her in that regard?

John Bellone 20:16

Yeah, so, like I said earlier, a big part of the evaluation was the assessment of whether she could return to work. And, obviously, our tests aren't designed to specifically measure return to work. But, based on the difficulties, I felt like it would be hard for her to go back to her prior level of functioning. She was working long hours and had a managerial role that was complicated. And now with her memory difficulties, verbal fluency issues, some of the apathy and fatigue, I told her that I was concerned about her returning prematurely. And I think she was receptive to that. So when I presented the data to her, I think she realized that the problem is a bit greater than she had initially thought it was during the interview. So I think the data was really helpful in giving her some more insight into her difficulties.

Ryan Van Patten 21:14

Yeah, I think that sounds fair. As you were talking, I was thinking about mapping her difficulties to different task demands that I can imagine being required in a job like hers. I don't know the specifics of her managerial role, but just thinking about managers, broadly speaking, having apathy, fatigue, verbal memory difficulties, and poor verbal output could really map onto some of the job requirements like being a self-starter, being motivated, being organized, and communicating to other people - giving presentations, holding a lot of information in mind at any one time. Those jobs can be very demanding. She was working a lot, she had a high stress job. So her difficulties, in particular, could constrain her ability to do her job well. And so it seems like it makes sense to hold off on returning to work, or at least maybe using a graded return to work. Is that something that you considered? Did you talk to her about possibly returning part-time and then slowly increasing her time spent at work?

John Bellone 22:21

Yep, definitely. So I can read from one of my recommendations here that, "...she would likely struggle if she returns to work too quickly. Therefore, if possible, she might benefit from an extended leave of absence or gradual increase in time spent at work." So, for example, maybe part time for a while, since she is still in the early recovery stage, and will likely continue to make gains over the next few months.

And then I had some specific compensatory strategies that I thought might be helpful. Again, I made it clear that I thought she shouldn't return to work prematurely and I thought she needs longer than just the three weeks that she has left on her FMLA. But I thought that when she does return to work, she might want to try to engage in important tasks in the morning, before fatigue sets in, or maybe start out just working half days - only working in the mornings. I thought she should allow herself more time to complete tasks, more time to prepare for meetings, more time in meetings - especially given the expressive difficulties. I thought it would be better for her to have a pretty good outline for how to structure meetings, and double checking her work or doing more mental rehearsal of information. Repetition helped her during the evaluation, during the learning aspects of the testing. And also putting information into context - so in the form of a story rather than just a jumbled set of words. So these are just some of the compensatory strategies that I thought would help her, both now and when she returns the work.

Ryan Van Patten 22:25

That sounds great. This is such an important function that we can serve. And so I'm glad you spent a lot of time on it with her. Some people may not be as receptive as she was to this recommendation of holding off, pulling back, and slowly, gradually returning to work, - especially if it's central to their sense of identity and confidence. But you wouldn't want her to return too quickly and then not be able to do her job, get in trouble with her bosses, and take a bigger hit to her confidence. So a slow and careful approach makes a lot of sense. I like your compensatory recommendations and strategies there. One other thing that came to mind, for me, was if she takes her time in returning to work, she would have more time while she's recovering to potentially focus on her own recovery. So you said that she was participating in speech therapy twice a week. I would defer to the speech therapist ultimately, but maybe bumping that up to three or four times a week could help her recover even more. Maybe she could get out and do more exercise or any other sort of rehabilitation activities that would help her recover. What do you think?

John Bellone 24:43

Yeah, yeah. And along those lines, I recommended that she try volunteer opportunities before she starts formal work again - both to build her expressive abilities, but also to build her confidence back up. I know she reported that mood was good, but after going through the testing process, and me delivering the results, I could tell that her confidence was not quite where it was. So I thought some volunteer activities would help build that. Maybe Toastmasters International,

the organization where you practice giving speeches in front of others. I thought those types of activities would be particularly helpful.

Ryan Van Patten 25:04
Yeah, that sounds great to me. Any other recommendations from your list that we haven't covered yet?

John Bellone 25:48
Yeah, one other one. I thought, again, even though her mood was reportedly positive and she denied depressive symptoms, just the fact that she had gone through this major change - you know, she's dealing with this adjustment process and now her confidence is a little bit reduced because of the difficulties on testing, I thought that she might want to consider counseling or therapy. And I thought CBT or ACT modalities might be particularly successful for her.

Ryan Van Patten 26:18
Yeah, it sounds like she initially reported that her mood was good, but with more detailed inquiry - going through this comprehensive process that we go through as psychologists - you uncovered the fact that maybe there is some disruption to mood. Frustration or irritability are some symptoms that could, at least in the future if not currently, be amenable to treatment. So it sounds like a good function that you served there.

John Bellone 26:44
Yeah. And then, of course, other healthy aging recommendations. And also the consideration to repeat testing in 6 to 12 months, after she had more recovery time. I wanted to see her again to see where she might end up after a year of recovery from a cognitive perspective.

Ryan Van Patten 27:05
Did she have good support from her husband and other friends and family?

John Bellone 27:09
Yeah, yeah, she did.

Ryan Van Patten 27:11
Well, obviously that bodes well for her recovery. Okay, great.

Transition Music 27:15

John Bellone 27:19
Well, that does it for today's clinical case. If you are enjoying these episodes, please take a few seconds to leave us a 5-star rating on whatever podcast platform you might be listening to this on. It really helps us out. And, as always, thanks so much for listening and join us next time as we continue to navigate the brain and behavior.

Exit Music 27:38

John Bellone 28:02
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Ryan Van Patten 28:13
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