SPEAKER NOTES

Post Traumatic Stress Disorder

Summarized by Thomas T. Thomas

At our fourth-Wednesday informational meeting in January, **Kumar Vedantham, MD,** discussed post traumatic stress disorder (PTSD). His interest and work in how traumatic experiences affect the brain are his main focus, but he also works with patients who have attention deficit disorder. Dr. Vedantham has been the PTSD psychiatrist at the VA's Oakland Behavioral Health Clinic since 2000, is a Clinical Associate Professor at UCSF, and has a private practice in Berkeley that includes serving those with chronic serious mental illness and their families. His website is www.sciencewithkindness.com.

Dr. Vedantham divided his talk into three sections: what PTSD is as a diagnosis; what goes on in the brain during an episode of PTSD; and treatments that can help manage the disorder.

First, the definitions. PTSD is not the same as trauma, which many people—as much as 25% of the population—go through and is usually considered as experiencing loss of a loved one, an act of violence, or an on-going situation. Trauma does not always lead to PTSD although it can sometimes cause depression and anxiety.

PTSD has four elements. The first is its **intrusive aspect.** This is the cluster of persistent memories, images, smells, sounds, and other sensations that the person remembers about the trauma.

Second is the **arousal cluster:** a physical stress response as well as a mental fear reaction. The heartbeat and breathing quicken; the person sweats. The person is on edge, on guard, and unable to relax. These responses can lead to high blood pressure and a risk of diabetes.

Third is the **cognitive cluster:** the experience changes the person's beliefs about themselves and the world. A woman who has been assaulted may come to distrust all men, feel that the world is dangerous, or she may come to believe she somehow caused the situation and feel guilt and shame.

And finally, there is the **avoidance cluster:** the person avoids anything that might trigger the PTSD response—and this is the hardest part. They might not leave home or might avoid family members and situations of intimacy. If they are triggered by episodes of road rage, they might avoid driving.

All four elements must be present after a traumatic experience for a diagnosis of PTSD.

What is going on in the brain of a person with this disorder involves three neural circuits connecting different parts of the brain that get stuck in a feedback loop.

The first layer is the **amygdala,** which is part of the emotional response system. It sends a fear response when it is triggered to initiate a fight-or-flight response. The second layer is the **hippocampus,** which deals with memory storage and contains the memories of the trauma. Memories are usually not static, like a photograph, but we add to them and change them each time we recall them. This does not appear to happen with PTSD. The third layer is the **prefrontal cortex,** the brain's executive

function that interprets and evaluates what's going on below. Under normal circumstances, it will interpret the threat and turn off or inhibit the alarm and fear response. For example, although July 4th fireworks may sound like gunshots, the prefrontal cortex will identify them correctly and dismiss them as a danger. If the prefrontal cortex doesn't interpret correctly, the alarm doesn't get shut off and the brain gets stuck.

Treatment of PTSD focuses on the memory of the trauma, the person's beliefs, and avoidance. Physical symptoms like the arousal are hard to change. The heart of the treatment is psychological, not medication.

To change the shape of the memories, the person is asked to remember them in a safe place under the guidance of a therapist. It helps to re-remember the event and understand that "that was then, this is now." In the case of sexual assault, it helps to change the belief that the trauma was the victim's fault. And the goal is to enable the person to process the memory without the alarm.

One medication that is sometimes useful in this therapy is Propranolol, which is used to treat high blood pressure and irregular heartbeat. It reduces the stress response and, given before treatment, helps the person relax. Unlike benzodiazapines like Valium used for antianxiety, it works on the body and not on neurotransmitters in the brain and has no addictive effect.

Selective serotonin reuptake inhibitors (SSRIs) like Prozac, Lexapro, and Zoloft are generally used for depression but are sometimes also used for PTSD. As Dr. Vedantham noted, the use of these medications for brain disorders is not surgical, and we don't always know exactly what's wrong.

There has also been some work done on using psychedelics to treat PTSD. These can change a person's consciousness, change their memories and the sense of who they are, and help them redefine themselves. Ketamine, for example, works on the neurotransmitter glutamate and has dissociative effects, while psilocybin (the active ingredient in "magic mushrooms") alters the senses and lets a person work with them in a more flexible state.

As a final note, Dr. Vedantham said that PTSD never really goes away, but a person can change and manage it. In this way it's not unlike other medical conditions, like chronic pain.

Q. Is Eye Movement Desensitization and Reprocessing (EMDR) or finger clicking effective for PTSD?

A. EMDR used to be a proprietary therapy, and a therapist paid to use it. We still don't know why these therapies are effective. Perhaps it's because eye and finger movements distract the brain while remembering, or they trick the brain into relaxing. It could also be that they engage the brain bilaterally.

Q. Why would some people develop PTSD and others not after having the same experience?

A. Several things are at work here. Childhood experiences and trauma, such as abuse during early brain development, play a huge role. If a person has no developmental damage, they may be more resilient. Gender plays a role, too, as women tend to be more susceptible to PTSD than men. And genetics may be involved—for example, if a person comes from a family with a history of anxiety disorders.

Q. If a person has frightening delusions, as with a psychotic illness like schizophrenia, can they develop PTSD?

A. That' an interesting question. But it would be a diagnostic issue to distinguish the PTSD from the underlying condition. The longer the illness goes untreated, the more difficult it may be to treat. The challenge with psychotic disorders is lack of awareness, and the person is not motivated to get treatment. And psychosis does involve intrusive thoughts.

Q. What physical diseases can be triggered by PTSD?

A. High blood pressure and increased heart rate are obvious changes. The endocrine system that regulates hormones may be involved. For example, high levels of cortisol, which regulates blood sugar, may make the body insensitive to it, leading to diabetes. There is a risk of brain damage, especially in the hippocampus, leading to memory disorders and dementia. And finally, avoidance issues might lead to a person not going to a doctor and getting the treatment they need.