Editorial

MACRA, Stress, Brain Atrophy, and the End of Fee-for-Service Medicine

Lawrence R. Huntoon, M.D., Ph.D.

Modern medicine creates a lot of physician stress, and government is responsible for the vast majority of it. More than half of physicians who remain in the government system report that they are burned out.

One of the goals of the Patient Protection and Affordable Care Act (ACA or "ObamaCare") and the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) was to eliminate independent fee-for-service medicine. Another goal was to eliminate solo and small-group practices. It is far easier for government to control a relatively small number of entities (Accountable Care Organizations/Alternative Payment Models) compared to a relatively large number of independent physicians.

MACRA's Goal to Force Solo and Small Group Practices into Larger Groups

Many physicians who lived under the stress and uncertainty of threatened fee cuts under the sustainable growth rate (SGR) formula now face certain fee cuts under MACRA. The strategy under MACRA is to beat solo physicians into submission using the Merit-Based Incentive Payment System (MIPS) with progressive cuts in fees for non-compliance up to 9% by 2022.[1] Compliance with MIPS for solo physicians was designed to be extremely difficult. Under the MIPS payment model, CMS predicts that 87% of solo physicians and 70% of physicians in small groups of two to nine physicians will face financial punishment.[2]

Once physicians have been financially flogged under the MIPS model, most will look to join larger physician groups or become employees of hospitals. A recent survey reported that one-third of physicians in small group practices will likely merge into larger group practices as a result of MACRA.[3]

The transition from solo and small group practices into larger groups or hospital-employed positions will be accompanied by a transition from the MIPS model to the Alternative Payment Model (APM) based on pay for performance, or P4P. However, P4P really represents pay for compliance, based on CMS-developed quality metrics. CMS predicts that overall, irrespective of group size, 46% of physicians will not receive a positive adjustment in fees under MACRA.[2]

Physicians who believe that these larger groups or hospital-employed positions will provide them with bargaining clout, security, and safety in numbers will soon learn that they will be subject to even tighter control and micro-management under the APM. Non-compete clauses in hospital-physician contracts will strongly deter hospital-employed physicians from leaving an intolerable practice situation.

Effects of Chronic Stress on the Brain and Body

Activation of the sympathetic nervous system and subsequent outpouring of epinephrine is designed to help humans to respond to acute threats—the fight-or-flight reaction. But, chronic stress can have deleterious effects on the brain and body. Chronic stress can negatively impact the immune system and lead to disease. Chronically increased heart rate and blood pressure can also have very deleterious effects on the cardiovascular system. Increased circulating catecholamines also increase the production of pro-inflammatory cytokines, which may increase risk of heart attack and stroke. The consequences of chronic stress include increased anxiety and depression; alterations in ghrelin and leptin hormones that lead to a tendency to eat high-caloric foods that are not good for us; cognitive impairment; memory impairment; and harmful behaviors involving smoking, drinking, drug abuse, and decreased physical exercise, to name just a few.

The neurochemistry of the brain is altered by chronic stress. Chronic stress is associated with decreased turnover of hypothalamic, epinephrine and norepinephrine and decreased turnover of norepinephrine in the hippocampus.[4] The absolute concentration of epinephrine and norepinephrine in these respective brain structures was found to be increased.[4] Chronic stress also increases oxidative stress in the hippocampus.[5]

The structure of the brain is also altered due to stress. The hippocampus, a brain structure prominently involved in short-term memory, undergoes atrophy as a result of stress. The prefrontal cortex, an area of the brain intimately involved in attention and executive function, also undergoes atrophy due to stress. The amygdala, an area of the brain involved in emotional reactions of anxiety, fear and aggression, initially hypertrophies due to stress and later undergoes atrophy.[5]

Neural Networks Involved in Coping and Maladaptive Responses to Stress

A recent functional MRI study has identified neural networks involved in stress adaptation or maladaptive

responses to stress.[6] Researchers identified a stress processing and reactivity neural network that showed stress-specific increased neural activation in the amygdala, striatum, hypothalamus, midbrain, right insula, and right dorsolateral prefrontal cortex. They also identified a stress adaptation response neural network that showed increased activation followed by decreased activation in the ventrolateral prefrontal cortex, dorsal anterior cingulate cortex, left dorsolateral prefrontal cortex, hippocampus, and left insula. The most important finding was the identification of an emotional and behavioral control network that showed different patterns of activation associated with positive vs. negative coping behaviors.

The ventromedial prefrontal cortex was identified as an area of paramount importance in determining how well an individual copes with stressful situations. Those who coped well with stressful situations showed an initial decrease in activation of the ventromedial prefrontal cortex followed by an increase in activation. In contrast, those who exhibited maladaptive responses to stressful situations did not show this dynamic neuro-flexibility.

Implications for Physicians Suffering from Chronic Burnout and Stress

Physicians who are in the Medicare system who are experiencing difficulty sleeping, weight gain, increased anxiety and worry about what will happen to their practice under MACRA, memory difficulties, increased difficulty making decisions, increased irritability, and depression over what the future will hold for them may be harming their brains by remaining in the Medicare system. Structural changes in the brains of excessively stressed physicians, including hippocampal atrophy and amygdala hypertrophy, may explain some of these underlying symptoms of chronic stress.

If one complains of severe headaches because one is repeatedly hitting his head against a wall, the obvious cure is to stop hitting one's head against the wall.

The cure for brain atrophy and all of the symptoms that accompany chronic stress is to remove the causative stress from one's environment. Medicare physicians have the opportunity to do that by opting out of Medicare.

A recent survey revealed that 40 percent of physicians in solo and small-group practices are considering the healthy brain choice of leaving their abuser, Medicare.[3] Given the punishing penalties of MACRA, more physicians are beginning to recognize that the only way to win is to not play the government's game.

Lawrence R. Huntoon, M.D., Ph.D., is a practicing neurologist and editor-in-chief of the *Journal of American Physicians and Surgeons*. Contact: editor@jpands.org.

REFERENCES

1. CMS. The Medicare Access & CHIP Reauthorization Act of 2015: Path to Value. Available at: https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/MACRA-LAN-PPT.pdf. Accessed Aug 11, 2016.
2. CMS. Table 64: MIPS proposed rule estimated impact on total allowed charges by practice size. Medicare program; Merit-Based Incentive Payment System (MIPS) and Alternative Payment Model (APM) incentive under the physician fee schedule, and criteria for physician focused payment models. *Federal Register* 2016;81(89): 28371. Available at: https://www.gpo.gov/fdsys/pkg/FR-2016-05-09/pdf/2016-10032.pdf. Accessed Aug 11, 2016.
3. Lowes R. Many physicians predict mass exodus from Medicare over MACRA. *Medscape*, Jun 30, 2016. Available at: http://www.medscape.com/viewarticle/865288. Accessed Aug 11, 2016.
4. Roth KA, Mefford IM, Barchas D. Epinephrine, norepinephrine, dopamine and serotonin: differential effects of acute and chronic stress on regional brain amines. *Brain Research* 1982;239(2):417-424. Available at: http://www.sciencedirect.com/science/article/pii/0006899382905194. Accessed Aug 11, 2016.
5. McEwen BS. Protective and damaging effects of stress mediators: a central role of the brain. *Dialogues Clin Neurosci* 2006;8:367-381. Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3181832/pdf/DialoguesClinNeurosci-8-367.pdf. Accessed Aug 11, 2016.
6. Sinha R, Lacadie CM, Constable RT, Seo D. Dynamic neural activity during stress signals resilient coping. PNAS USA 2016;113(31):8837-8842. Available at: http://www.pnas.org/content/113/31/8837.abstract. Accessed Aug 11, 2016.