Be Skeptical: Will 99% of NFL Players Really Develop CTE?

By Alex Berezow, PhD — July 25, 2017

A new study in the Journal of the American Medical Association found that 99% of donated brains from people who played in the NFL showed signs of chronic traumatic encephalopathy (CTE), a type of neurodegenerative disease that is thought to result from persistent brain injury from knocks to the head. Signs of CTE were also noted in the brains of 91% of people who played the sport in college and 21% who played in high school.

Predictably, headline writers went crazy:
couldn't be further from the truth for four major reasons.

First, as the authors themselves note, the study is affected by selection bias. CTE has been in the news a lot, and it is extremely likely that family members who had reason to suspect CTE in their deceased former football player were probably likelier to donate brains for the study. The authors write, "[E]stimates of prevalence cannot be concluded or implied from this sample," yet headline writers did precisely that.

Second, the study had no control group. (Frankly, it is amazing that JAMA could publish a study like this with no control group.) The researchers did not examine the brains of everyday people (i.e., non-football players) to determine the baseline prevalence of CTE. It is quite possible that developing CTE-like brain lesions is a normal part of aging. Consider this: If they live long enough, most men will develop prostate cancer [4], even though they probably won't die from it. Perhaps something similar is occurring with CTE.

Third, the authors shed no light whatsoever on some of the large outstanding questions in regard to CTE and football. For instance, why do former NFL players live longer than the general public [5]? And why do the brains of soccer players [6], who endure nothing like the sort of head banging that American football players endure, also show signs of CTE?

Fourth, there is no agreed upon definition of CTE [7]. In fact, it's not entirely clear if CTE should even exist [8] as its own separate diagnosis.

A few years ago, Daniel Engber wrote an excellent article [9] in Slate summarizing the contradictions in the research into CTE and football. In regard to ALS (a different neurodegenerative disease that might or might not have links to football), Mr. Engber wrote: "For every 770 men who play the sport on a professional level, we can expect one extra death from ALS." That's a real, but very small, increase in risk.

Overall, his conclusion concerning football was:

[The NFL] isn't killing its employees. It's not abusing women. It isn't adding to the sum total of human suffering. If you have a chance to play in the NFL, you should probably take it.

Unfortunately, the present study adds little, except more confusion, to the current debate.