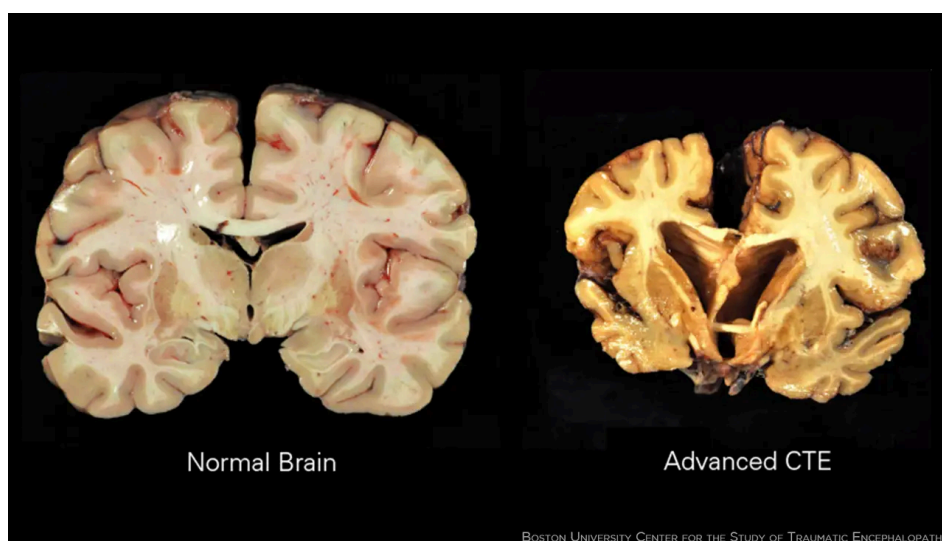


Evidence of CTE Rare in Military Personnel — Limited number of cases preclude causal conclusions

by [Michal Ruprecht](#), Editorial Intern, MedPage Today

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Evidence of chronic traumatic encephalopathy (CTE) was found in a small percentage of brains of deceased military personnel, researchers reported.

Among 225 consecutive brains from a brain bank of deceased service members, investigators found signs of CTE in 4.4% (n=10), said Daniel Perl, MD, of the Uniformed Services University in Bethesda, Maryland, and colleagues.

Half of the military personnel diagnosed with CTE (n=5) had only one CTE-related lesion, the researchers wrote in the *New England Journal of Medicine*. All decedents with CTE had a history of participation in contact sports.

"Evidence of CTE was infrequently found in a series of brains from military personnel and was usually reflected by minimal neuropathologic changes," Perl and co-authors wrote.

"Risk ratios for CTE were numerically higher among decedents who had contact sports exposure and other exposures to TBI [traumatic brain injury] in civilian life than among those who had blast exposure or other military TBI, but the small number of CTE cases and wide confidence intervals preclude causal conclusions," they added.

The findings could mean that most military service members are not at risk for developing CTE because they may not have sufficient exposure to repetitive head impacts through military service, noted Robert Stern, PhD, director of Clinical Research for the Boston University CTE Center, who was not involved with the study.

"This suggests that a significant percentage of military service members join the military having already developed CTE from contact sports or, perhaps are at increased risk for developing CTE from subsequent repetitive head impact exposure from military service," Stern told *MedPage Today*.

"Considering how many veterans receive lifetime medical care through the VA system, this has significant implications for future clinical care of veterans in the VA system," he continued. "The new study is inconclusive regarding the risk for CTE among specific military roles, such as Special Forces operators or breachers who have the most exposure to repetitive head impacts."

"For the time being, it will be helpful for clinicians to ask patients about prior history of participation in contact sports," Stern added. "CTE should be included in the differential diagnosis of individuals with progressive

memory or executive functioning impairments in those patients with substantial exposure to repetitive head impacts, such as American football, boxing, and others."

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Persistent neuropsychiatric sequelae, including post-traumatic stress disorder (PTSD), may develop in military personnel exposed to combat, Perl and co-authors noted; in some cases, these sequelae have been attributed to CTE. Military service, including that involving blast exposure, has been incorporated into the National Institute of Neurological Disorders and Stroke (NINDS) diagnostic criteria for [traumatic encephalopathy syndrome](#), which is the proposed clinical diagnosis that corresponds with CTE.

In this study, there is not enough evidence to establish a basis for the functional difficulties of PTSD or other psychological disorders, observed Rebecca Folkerth, MD, of the New York City Office of the Chief Medical Examiner and New York University Grossman School of Medicine, in an [accompanying editorial](#).

"We are forced to face the possibility that the pathognomonic neuropathologic features of CTE either are unrelated to the neurocognitive entity of PTSD (or for that matter, traumatic encephalopathy syndrome) or are neither necessary nor sufficient to produce it," Folkerth

wrote, noting that the study represents "by far the largest group of military service members ever systematically studied in this respect."

"Remarkably, this low level of CTE-related neuropathologic change [in military personnel] stands in contrast to the large proportion of high levels of CTE-related neuropathologic features in a [curated group of elite American football players](#)," she continued. "This discordance begs the question of what fundamental differences exist between these study populations."

In the study by Perl and colleagues, all service members who had evidence of CTE had participated in contact sports, the most common being American football and combat sports. Three of 45 people who had a history of blast exposure had CTE, compared with seven of 180 people who did not have a history of blast exposure (RR 1.71, 95% CI 0.46-6.37).

CTE also was seen in eight of 44 people who had non-sports-related TBI in civilian life, compared with two of 181 who did not have that exposure in civilian life (RR 16.45, 95% CI 3.62-74.79).


Overall, 88 decedents (39.1%) had a reported history of at least one psychiatric disorder, most commonly PTSD (52 people), depression (44 people), or anxiety (25 people). Of the 10 decedents with CTE, six (60%) had received at least one diagnosis of a psychiatric disorder, compared with 82 (38%) decedents without CTE. In both groups, PTSD was the most common diagnosis.

Most deaths in the study (124) were from natural causes; there were also 49 suicides and 40 accidental deaths, including 12 deaths due to drug overdose. Among the 10 individuals with CTE, four died by suicide.

For their research, Perl and colleagues used specimens from the Department of Defense Uniformed Services University [Brain Tissue Repository](#). The study included 217 men and eight women who were retired or active duty military members; the median age was 49. Twenty decedents had served in the Special Forces; 13 had been Navy SEALs. More than 170 were white, 15 were Black, and eight were Hispanic.

Study limitations, the researchers said, included its small sample size and wide confidence intervals. The nature of the study also required family members and others to recall events, which may have been inaccurate, they acknowledged.



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Disclosures

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Folkerth disclosed relationships (fees, grant support, or other) with the NIH.

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