

From Frontal Lobe Injury to Homelessness: A Case Study of A 63-Year-Old Woman's Suicidality and Homelessness Secondary to Traumatic Brain Injury Sequelae

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Abstract

Background: Executive function impairments are prevalent in patients with a history of Traumatic Brain Injury (TBI) localized in the frontal brain. Global studies have shown a correlation between traumatic brain injuries and poor social and psychiatric outcomes. We present a previously healthy, 63-year-old licensed practical nurse with an unknown history of traumatic brain injury and coma who presented with acute suicidal ideation, severe depressive episode, and confusion in the setting of a two-year period of homelessness.

Aim: This case highlights the further need for clinicians to ensure that traumatic brain injury patients are set up with appropriate follow-up and post-discharge care to prevent this population from falling victim to homelessness and mental health crises.

Method: We conducted a case report investigating our patient's clinical presentation of suicidality and depression and its relationship to an unknown frontal lobe brain injury.

Conclusion: We provide the medical community with a clinical example of the relationship between traumatic brain injuries and poor mental health and social outcomes, initiating the conversation that must be had on preventing homelessness in the traumatic brain injury population.

imperative for life. Impairments of executive function display as a wide range of deficits. Individuals with executive function impairment can present with impulsivity, disinhibition, disorganization, poor memory, and difficulty with future-oriented behavior. Exhibited symptoms of executive function deficits may appear contradictory with positive and negative symptoms. On one hand, patients may be withdrawn and inattentive. On the other hand, they may have heightened excitability [2].

Executive function impairments are prevalent in patients with a history of Traumatic Brain Injury (TBI) localized in the frontal brain. It has been estimated that half the global population is expected to experience a TBI at least once in their lifetime [3]. Although executive function deficits can be hard to diagnose clinically, even mild brain injuries have been shown to present with frontal lobe executive function deficits on sensitive neuropsychological batteries [4].

Given that TBIs correlate with dysfunction of a portion of the brain responsible for basic and complex social functioning, it can be hypothesized that TBIs will influence social determinants of health. TBIs disproportionately impact homeless and marginally housed populations. A meta-analysis of 22 studies by Stubbs et al determined an estimate of 53.1% TBI prevalence of any severity in this population. The prevalence of TBI amongst this population is four times that of the general population (2020).

In addition to TBIs leading to an increased risk of homelessness, TBIs have been associated with higher rates of poor mental health, increased health service use, and suicidality [5]. Here, we study a case representing a clear presentation of homelessness and suicidality that is secondary to a TBI and its resulting executive dysfunction. This case presentation begs a very important question: should providers be ruling out a history of brain injury in patients presenting to the ward with significant psychiatric symptoms and poor social wellbeing?

Introduction

The executive brain, controlled by the frontal lobe, has long been known to encompass high levels of functioning, including thought and intellect, allowing the human brain to be as unique as it is. It permits the development of external stimuli through action, specifically by providing the ability to prepare for these actions by strategizing plans and formulating goals [1]. While being responsible for future-oriented behavior, executive function incorporates vital problem-solving skills that are

Case Presentation

Our patient is a 63-year-old single, divorced female facing homelessness for two years. She was a limited historian, but not quite like other patients we had seen with difficulty providing a history. She had a unique inability to sequentially report the history of her present illness, as well as her own social and medical history. She often confused basic terminology and significant life events, including the timeline of these events.

She was a previously healthy, well-educated licensed practical nurse at a training school for intellectually disabled children for over 20 years. She lost her ability to work due to a work-related injury. Despite history of state employment and a work-related injury, patient lives without a retirement income, social security disability income, and stable housing. It was later discovered that preceding all her social difficulties, she was diagnosed with a traumatic brain injury and subsequent coma for 10 weeks due to an unknown etiology.

She was admitted to the Geriatric Psychiatry Unit at Manchester Memorial Hospital, a community hospital in Connecticut, with a Physician's Emergency Certificate (PEC) for suicidal ideation and depressed mood. This presentation was in the context of tremendous difficulty navigating the system to overcome her social barriers, including a lack of housing, finances, and transportation. She presented with a poor appetite, significant loss of interest, hopelessness, low energy, and limited concentration. Additionally, she endorsed racing thoughts and suicidal thoughts without plan or intent.

Our patient's psychiatric history included an attempted suicide by overdosing on Elavil after losing her home in 2018. She was, then, admitted to an Institute of Living facility after an emergency room admission for suicidal thoughts. At the time of her admission, her psychiatric medications included mirtazapine, buspirone, and venlafaxine.

The patient was alert, fully oriented with appropriate behavior and speech, but tearful throughout our interview. Her affect was depressed. While concentration was intact, reasoning and insight are concrete. Patient lacked abstraction when she was given similarities and proverbs. Her thought content was significantly scattered and non-sequential.

Over the course of the hospital admission, treatment of depression and anxiety was targeted by modulation of pharmacotherapy. Buspirone was increased from 5 mg BID to 10 mg TID leading to an improvement of anxiety. To supplement treatment of anxiety, hydroxyzine 50 mg as needed every 8 hours was initiated. Mirtazapine was increased from 25 mg to 30 mg and Venlafaxine was increased from 175 mg to 225 mg in an attempt to improve depressive symptoms and suicidality. Patient had significant sleep disturbances throughout her admission, for which Zolpidem 5 mg as needed was initiated.

While pharmacotherapy proved to be beneficial in treating psychiatric symptomology, the underlying social factors needed to be addressed for a positive outcome. As neuropsychological testing was not available at our community hospital, it was recommended that patient receive the formal diagnostic evaluation in order to manage executive dysfunction effectively

through appropriate therapeutic services. Along with providing daily psychotherapy, the social work team applied for social security and successfully obtained retirement benefits for the patient. Prior to discharge, patient was established with volunteer conservatorship to allow for a safe discharge and ensure patient is able to acquire safe housing.

Discussion

Traumatic brain injuries do not discriminate. Regardless of economic and social status, TBIs increase the risk of becoming homeless and developing mental health complications, such as in our patient.

Studies around the world have been conducted showing the correlation between TBIs and homelessness. Nikoo and colleagues completed a 3 years study following the homeless and vulnerably housed in three Canadian cities, determining that a TBI was reported in 37.2% of the participants at least once (2017). In a UK study in 2012, [6]. Report a higher number of homeless participants (48%) with a history of TBI than control participants (21%). While the prevalence of TBIs amongst this population is quite clear, the association between TBIs and homelessness begs one to investigate whether one precedes the other. TBIs are both a cause and consequence of homelessness [7]. The functional sequelae of TBI challenge one's ability to navigate the social system. On the other hand, a dose-dependent relationship between duration of homelessness and occurrence of TBI also exists [8].

Corrigan et al investigated select social and health outcomes for U.S. adults who were 5 years post-TBI and received inpatient rehabilitation. Their findings raised serious concerns for the morbidity and mortality of these patients, as 1 in 5 of the patients had expired by 5 years (2014). There is increasing evidence that the rate of death by suicide is greater in individuals with TBIs [9]. Our patient, admitted for significant depression and suicidality, is one example of a post-TBI patient at risk for morbidity and mortality.

TBI patients also experience an alteration in mono aminergic signaling, as a result of their injury. For instance, dopaminergic pharmacotherapy has been reported to enhance cognitive function in TBI patients [10]. Additionally, TBIs have led to altered pharmacokinetics. Given this significant change in dopamine, norepinephrine, and serotonin pathways, psychiatric pharmacology that target mono aminergic signaling may need to be altered [11]. Recognizing these differences in psychiatric patients with TBIs from other psychiatric patients is vital to understand as it can significantly change a clinician's treatment plan.

If there exists consistent data associating TBIs, homelessness, and mental and physical health consequences, there is a critical role that clinicians may need to play prior to discharging patients after traumatic brain injuries. In our case, a patient with an unclear history of brain injury with sequential executive dysfunction was identified in a psychiatric hospital and provided with the means to improve her social wellbeing. If the patient was given appropriate follow-up and connected with clinicians

who could have prevented her social outcome, homelessness and mental health decline could have both been avoided [12].

There are important questions one must investigate prior to discharge patient with brain injuries. Does this patient have a support system that will assist their mental and physical recovery? Does this patient have stable housing to return to? Does this patient have the means to financially support themselves? Ensuring that TBI patients have checked these boxes may be our solution to drastically improving a growing public health crisis that has a global impact [13-14].

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