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Insight on Secondary Brain Injuries from Paramedic Treatment that are 4-Times Likely to Occur Prior to Pre-Hospital Treatment and ER Submissions

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Abstract

Inevitably, severe brain injuries occur each year. The most common cause is falls, which have become increasingly common as a source of severe traumatic brain injury. According to a Canadian report, falls account for approximately 40% of both overall trauma and injury-related deaths. According to statistics, there are additional brain injuries that can increase the risk of desaturation associated with intubation. The purpose of this study is to propose new and fast regulations that can be used or implemented by the First Response Team (FRT) in the pre-hospital setting. The amount of ER patients with head trauma or TBI and the results of aftercare have shown a gap that can be reduced with the percentage of brain damage after initial service from the FRT, even with ventilated patients, by carefully monitoring end-tidal CO_2 and preventing hyperventilation. In conclusion, It is important for the FRT to have proper training and the ability to work quickly and efficiently along with conducting proper airway management for preventing hypoxia as a priority in a pre-hospital setting (in response to a patient who has suffered TBI).

There are no prospective controlled trials being conducted to address the efficacy of paramedic FRTs for patients suffering from severe TBI. The significant evidence shown regarding the increased risks of brain injury to patients being treated in pre-hospital settings should be a concern and a cause for further research.

Keywords: TBI; Dramatic Brain Injury; Pre-hospital setting; ER, Paramedic; Hypoxia; Intubation

Introduction

Inevitably, severe brain injuries occur each year. The most common cause is falls, which have become increasingly common as a source of severe traumatic brain injury [1]. According to a Canadian report, falls account for approximately 40% of both overall trauma and injury-related deaths. Some of these falls are related to an increase in dangerous weather conditions during the fall/winter months. Additionally, there are several different types of brain injuries that occur from falls, open head injuries, closed heard injuries, and secondary injuries. (The causes for such injuries may include accidents such as drowning and drug overdose or natural causes such as a heart attack or stroke) [2-5].

A serious brain injury usually results in admission to the emergency room (ER). The goal of admission is to reduce risk and avoid the increase of dangerous arterial destructions that have a 50% mortality rate and severe disability among survivors of TBI.

According to recent research, airway obstruction and aspiration are the two major causes of death in patients who die of treatable head injuries. After three minutes without oxygen, brain cells begin to die, making the time from the onset of injury to when the injury is treated very critical [6-8].

According to statistics, there are additional brain injuries that can increase the risk of desaturation associated with intubation. The purpose of this study is to propose new and fast regulations that can be used or implemented by the First Response Team (FRT) in the pre-hospital setting. The amount of ER patients with head trauma or TBI and the results of aftercare have shown a gap that can be reduced with the percentage of brain damage after initial service from the FRT, even with ventilated patients, by carefully monitoring end-tidal CO_2 and preventing hyperventilation. The paramedics can also take additional pemititive measures to reduce brain swelling and therefore reduce the rate of further brain trauma [9] (for example, with methods such as pre-hypothermia, the cooling of the brain with ice packs because damaged brain tissue results in higher temperatures than non-injured areas).

A recent study compared 1,797 patients with severe TBI who were intubated in the pre-hospital setting with 2,301 patients who were intubated in the emergency department. In the results, being intubated in a pre-hospital setting was four times more likely to result in death in addition to a higher risk of poor neurological functionality as a result. The patients with severe TBI who were intubated in the field had a higher mortality rate and an increased risk of poor neurological functions. (The cause can be due to the delay in transport with prehospital intubation or a lack of proper training in the FRT) [10,11].

Conclusion

Neuronal function is important in order for humans to function. Trauma or injury to the brain results in energy failure after a few minutes of anaerobic metabolism. It is important for the FRT to have proper training and the ability to work quickly and efficiently along with conducting proper airway management for preventing hypoxia as a priority in a pre-hospital setting (in response to a patient who has suffered TBI).

Furthermore, there are no prospective controlled trials being conducted to address the efficacy of paramedic FRTs for patients suffering from severe TBI. The significant evidence shown regarding the increased risks of brain injury to patients being treated in pre-hospital settings should be a concern and a cause for further research.

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