

Current Treatment Strategies and Future Endeavors for Traumatic Brain Injury

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Abstract

Traumatic brain injury can be developed in a person due to violent blows to the brain, and an object that can go through the skull can affect the brain cells temporarily. The issue of moving, speaking and emotional breakdown can be possible with the effects of traumatic brain injuries. Neurologist are helping patients with Traumatic brain injury by providing them with the best possible treatment to get back to normal life. TBI patients are facing difficult issues in life that can be short-term and long-term. The counselling of patients with emotional support, and proper surgical treatment by reducing the pressure from brain swelling, resting, and returning to normal activities are beneficial for patients facing the issues of traumatic brain injury. Social support can be always helpful for a person to provide treatment for TBI patients. Speech and language therapy is also helping patients suffering from the issues of TBI. Difficulties are developed by operating brain surgery due to the different complexity of the brain and nervous system. The prevention of injuries can be ensured with the help of wearing the appropriate gear, wearing helmets, and taking other preventive measures. Using the proper techniques is also beneficial for a person facing traumatic brain injury issues. Patients facing the problem of traumatic brain injury can be cured with the help of caring, support, and other appropriate treatment which are essential as per the situation of the patient. The fear and difficulties are increasing in the person facing the issues of TBI.

Keywords

Traumatic Brain Injury, Treatment for Brain Injury

INTRODUCTION

Traumatic brain injury (TBI) develops whenever a sudden trauma causes brain damage. The objects piercing the skull and creating damage to brain tissue is the primary effect of traumatic brain injury. Traumatic brain injury is divided into four parts: Brain Contusion, Second Impact Syndrome, Penetrating Injury, and Shaken Baby Syndrome. Repeated vomiting, severe headache, feeling weak, numbness, and one pupil of an eye becomes larger compared to another. It can create confusion, blurry vision, and difficulty concentrating issues for the patients. Image testing, MRI scans, CT scans, and much more are the way to detect traumatic brain injury. The best treatment that is provided for traumatic brain injury is including emotional support, surgery can also be helpful to stop the bleeding of blood from the brain, and rehabilitation also is a beneficial treatment for traumatic brain injury. Rest and return to physical activities can play a major role in the treatment of TBI. Patients suffering from TBI can be recovered within 1 week to 1 month. Several maintenances of different prevention strategies are important for gaining prevention from brain injury. Patients are provided better attention towards airways; adequate hemodynamic support system and oxygenation are helping to reduce the effect of hypoxia and hypotension. Creating significant growth in the prevention of traumatic brain injury can be possible by maintaining all the safety rules while driving. Treating the person with motivation is beneficial in TBI and can help to get back to normal life quickly. Changing behaviours as an

effect of TBI can be reduced with the help of proper treatment and support.

In the study, different treatment strategies that are beneficial for improving the condition of traumatic brain injury for people are explained. The difficulties in moving, speaking, and ensuring concentration are developed in the person these factors are expected in the TBI that are creating issues for people. Physical and emotional symptoms are also developed in the person such as headache, sleep disorder, mood changes, and nausea. These issues are observed and ensure treatment for the issues is developed and explained in the study. Those are effective and create a major part in the growth of the brain.

LITERATURE REVIEW

Treatment procedures in the TBI

The cases of brain injury require emergency head surgery which is important for stopping the bleeding of patients. Clear fluid leaking from the nose and ears can be seen as a symptom of severe brain injury. First aid treatment is the primary treatment that is provided for patients suffering from traumatic brain injury. Recovery procedure from TBI can be possible within 3 months of the accident in usual cases. The treatment procedure for patients with traumatic brain injury is explained as follows-

Counseling for emotional support- Proper counselling for emotional support is helping to reduce issues of brain injury. Treatment for a person can be possible with the help of proper

emotional support and providing counseling. These are helping to ensure growth and reduce tension from the patients and are beneficial for the treatment procedure of traumatic brain injury. The way of expressing emotion can be changed in a person due to injury in the head from accidents. The continuous emotional changes or mood changes quickly can be seen in a person facing TBI and are helped with counseling [9]. Doing different fun activities in front of the patient can be beneficial for boosting their motivation and stimulating their brain cells. Providing emotional support can be beneficial for ensuring focus on work and completion of tasks on time.

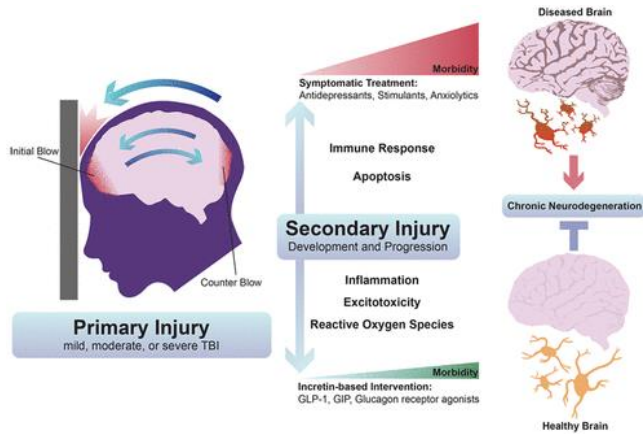


Figure 1: Different injuries in Traumatic Brain injury[9]

Surgery- The removal of clotted blood from the skull through surgery is helping to ensure life-saving for the patients. The removal of this clotted blood from the brain is helping to ensure damage reduction. Minimizing the additional damage to the brain cells is developed with the help of immediate surgery as per the need. The surgery can be beneficial for immediately reducing the effect of serious brain injury. Surgical intervention through head injury can solve the issues of TBI. Surgery is helping to reduce the pressure in the brain by draining accumulated cerebrospinal fluid from the skull. This process is beneficial for the swollen tissues of the brain. Some people can reach the same level of ability after being operated on for TBI.

Rehabilitation- The issues of difficulty in walking or talking can be reduced with the help of rehabilitation. The daily activities of a person can be improved with the help of this procedure which is beneficial for ensuring the growth of the person in life. Rehabbing support is helping to secure the growth of the person facing the difficulties of TBI. The reaction of rehabilitation affects different persons.

Return to typical activities- The physical activities are helping to create the patient's life better by ensuring growth and support. These are the benefits of returning to the activities. Music therapy, aquatic therapy, and other hobby development can be beneficial for patients suffering from brain injuries. The patients can be cured within two weeks to three months time frame which are helping to ensure the maintenance of lifestyle. Cognitive behavioral therapy is helping patients suffering from TBI. This therapy is helping

to reduce depressive symptoms and create an improvement in life satisfaction. Physical therapy, physical medicines, speech and language therapy, and social support are helping to reduce the issues of TBI patients and helping them to maintain a normal lifestyle.

Rest- Resting is creating better help for patients suffering from TBI. The resting procedure is helping patients to ensure their recovery from accidents. Rest can help to heal the activities of the brain easily which can help a patient to cure the accident [10]. Resting and recovery can also be helpful for patients by reducing the issues of accidents naturally which is also beneficial for recovery time reduction for patients.

Future treatment procedures for the TBI process

The TBI treatment can be ensured with different stages which are erythropoietin (EPO), statins, carbamylated form of EPO (CEPO), bone marrow stromal cells (MSC), progesterone, and much more. This is beneficial for creating growth for the patients and ensures their quick and secure recovery procedure which is also beneficial for developing growth for the patients. A worldwide mortality of about 1.5 million per year can be seen in the TBI. Primary and secondary injuries are creating different temporary or primary effects on the person. Primary deficit is directed toward the external impact on the brain. The secondary deficit can happen after minutes to days after the accident and can develop cerebral damage to the brain. Degradation of neuron cells can be developed by breaching the blood-brain barrier (BBB). Intracranial compartments of the brain consist of three things such as the brain parenchyma, cerebrospinal fluid, and blood. The most percentage of the skull is developed with a homeostatic environment within the skull [11]. Concussion injuries developing in a person can be understood with the help of proper imaging technologies such as computerized tomography scanning (CT), and magnetic resonance imaging (MRI) scanning are beneficial for detecting the effect of concussion.

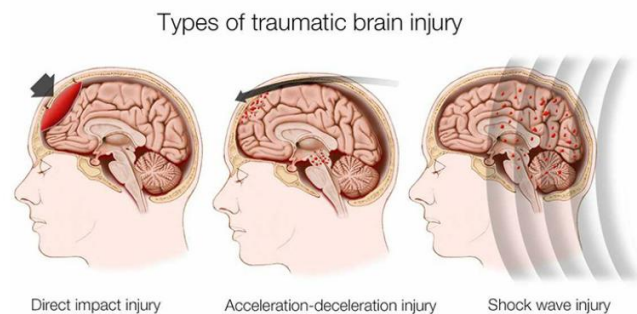


Figure 2: Traumatic Brain Injury Issues[11]

Physical therapists are also able to help persons affected with TBI by regaining their physical functions, relearning different daily tasks, and ensuring fitness and wellness for persons. The regeneration of the brain tissues cannot be possible but a repair can be done with the help of proper treatment procedures. Traumatic brain injury treatment can

be possible with the help of canes and lever door knobs voice-recognized software programs and different argumentative communication software programs that is helping to gather speech. Arterial spin tag labeling (ASL), functional MRI (fMRI), resting state, and connectivity MRI are the technologies that are used for diagnostic imaging techniques to identify traumatic brain injury [12]. Single photon emission computed tomography (SPECT) and MR spectroscopy (MRS) PET are also recognized as imaging techniques that are beneficial for diagnosis the of brain injuries for a person. The mental status of a person having head trauma can be evaluated with Glasgow Coma Scale, consciousness after TBI can be useful to understand the exact condition of the brain.

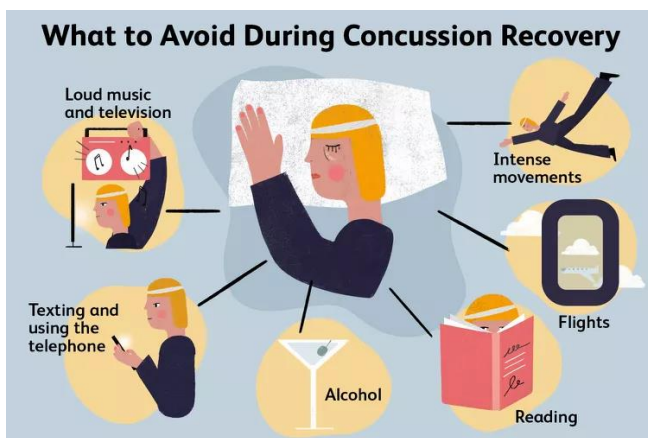


Figure 3: Avoiding the things in the process of concussion recovery[13]

The utilizing shock absorbers are used in helmets for reducing the effects of an accident. An impact on the head can be decreased after putting on the helmets and this is helping to change the effect of a concussion. Swelling and internal bleeding from the brain can be observed with the help of computed tomography (CT) imaging which is beneficial for understanding issues in the brain. MIPS technology is used in helmets for reducing accidents that can create the TBI process. This is helped by coping with anyone’s head’s protective structure. Hard hat technology is used for reducing the effect of concussions on the brain which is beneficial for preventing concussions for workers. Mouthguards and different safety gear can be beneficial for reducing the effect of traumatic brain injury issues. With the combination of cameras and sensors, the smart helmet technology is helping to record real-time information from the surroundings that are beneficial for reducing the effect of traumatic brain injury. Occupational theories for brain rehabilitation are helping to provide different processes such as emotional regulation, memory, sensory processing, and movement. Spatial computing technologies like VR are used for detecting the issues of TBI in the person which is beneficial for diagnosing accurately with the help of Intelligent Rapid Detection Software. EEG is also an effective technology that is beneficial for reducing the effect of concussions and also

understanding them [13].

Difficulties in the treatment of TBI and effects of TBI

The treatment of the brain can be difficult due to damage in the brain such as tumour growth which is not easily removable. Brain surgery can be developed as a dangerous issue for patients that is creating a risk of losing their life or being in the coma stage or becoming paralyzed person. Making surety of the person is facing the issue of enough oxygen supply, maintaining the proper blood pressure, and preventing different other injuries that can increase in the head and neck. Difficulties developed in a person facing the issues of TBI are created by the problems of social activities that are developing some mental trauma for the person facing the accidentals problems [14]. Patients with TBI are facing the issues of chronic headache, sensory impairments, weakness in the muscles, bladder and bowel difficulties, and developing long and short-term paralysis. The person facing the issues of TBI can be developing difficulty while driving a car, working on different complex machinery, or playing any kind of sports. The issues of touch, smell, and taste can be developed in a person that is created due to the effects of TBI.

Signs and Symptoms of a Skull Fracture

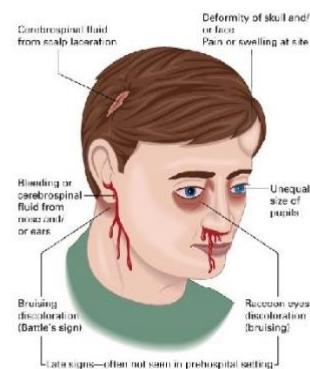


Figure 4: The various symptoms of a skull fracture[14]

Patients facing an injury in the prefrontal cortex can develop an executive dysfunction due to the TBI injury. The change of consciousness both permanently and temporarily can be developed in a person that is beneficial for reducing effect in a person. The state of coma can be developed in a person affected by altered consciousness. The coma stage is creating unconsciousness, and an inability to respond to any stimulus. The recovery procedure of a brain injury can be affected by different risk factors which are previous complicated concussions, chronic pain, headaches, anxiety, sleeping disorders, depression issues, and disabilities in learning developed in the person facing the issues of TBI [15]. The lack of motivation and social support are creating issues in providing proper help for a person facing the effect of traumatic brain injury. The disturbance in attention, executive function, and memories are hugely these are common effects that are growing in TBI. Diagnosis of brain injuries can be developed with self-reported symptoms that

are difficult to the identification. Cognitive-behavioural therapy is the most effective therapy that is provided for patients affected by TBI. Treating the emotional and mental health of a person can be easily possible with the help of this therapy. The unhealthy thinking pattern of a person can be solved with the help of Cognitive-behavioural therapy. The effects on social skills are developed in a person as it is difficult for managing the issues of emotions such as anger and excitement. The main issue that is created in a TBI patient is feeling out of the place and also feeling uncomfortable around people. Mental issues such as depression, suicidal mentality, anxiety, and substance use disorders can be developed as an effect of TBI in a person [16]. The thinking abilities, behaviour, and mental state can be affected in a person facing difficulties in TBI. The reduction in optimal decision-making can be seen as an effect of the TBI procedure. Dysarthria issues can be developed in a person facing the issues of traumatic brain injury as the major effect can be seen in the speech mechanism and which got damaged due to a major effect of the TBI. In some cases, the issues of TBI can get worse due to major changes in a person's ability that can lead to death for a person over time. The right amount of sleep, proper diet, less stress, avoiding different products of tobacco, and ensuring physical activities or back to normal lifestyle can be effective for the healing process of a person. The fear of work is developing a visible effect on the life of a person. Lack of motivation is also creating difficulties for a person facing the issues of the healing process from TBI. With the help of proper medications, the effect of TBI can be solved but the problems that are related to the recovery of initial injuries from the accidents. The difficulties treating a patient affected from TBI can be affected by their daily lifestyle, mental state, and other changes in the behaviours.

METHODOLOGY

The secondary research process has been used in this research study and it helps a lot to get the relevant information for the study. It helps to make a large progress on the research work and this process has not needed any kind of highly technical knowledge to collect information. On the other hand, this method gives the high chance to know about the treatment procedures and strategy. The secondary qualitative process has big advantages to get relevant data for the research process in a large amount and all data are high in quality. Generally, this process uses previous data that are similar to the subject matter and also assists to provide a bulk amount of data [4]. Apart from this, this kind of data is always available on the internet, and there is no need to pay money to extract information from the source. This is a much better, easy, and quick process for getting data and also better than other processes of research. This study also supports gaining lots of information and experiences. These experiences can make an innovative impact on future study and research also. This process of research study helps to gain knowledge about traumatic brain injury or TBI. This research process provides the entire and essential information about the difficulties in

the process of treatment of TBI. Apart from this, the actual cause of choosing a secondary qualitative process in this research study is, this method has the ability to save time and effort to gather data and analyze the process. It helps the candidates to donate their time and effort to the research study [3]. Accordingly, the primary key of this method is the observation that makes an effective impact on the research progress and also helps to provide authentic information for research. The other reason for selecting a secondary qualitative method for the study is budget. This process does not require money or any charges to take the information. Through internet surfing, individuals can get information and this is available for all. On the other hand, this study also provides opportunities to create the differences between past treatment processes and the present treatment process of TBI. moreover, also provides the ability to predict the future treatment process of TBI [2]. The secondary qualitative process has the facility to provide provisions to create a structured framework of the data also maintaining its patterns and sequences. Moreover, this process also maintains the ethics to get the data and also maintains authenticity that can increase the value of research work. Amed, PubMed, Medline, and various sources have been used to get authentic and relevant information for the study. For all research studies, it is essential to get authentic data, otherwise, it makes an impact negatively on the research. Information is the main resource that can change the values of the research objective and it also plays an essential role to meet the objective or goal of the research work [5]. On the other hand, these data are also able to open a new door for future researchers and it can be confessed that the secondary qualitative method is the appropriate method for this study.

DISCUSSION

The entire brain is affected by a traumatic brain injury that is creating a diffuse type of injury and swelling. Bilateral decompressive craniotomies are used as a radical surgery that is beneficial for reducing the effect of traumatic brain injury. Preventing the issues of traumatic brain injury can be developed with the help of appropriate gear that are reducing the chances of accidents. Cognitive concussions are helping to reduce the issues of different impaired reactions of memory and attention problems [1]. The ocular motor is the symptom that is creating eye pain, difficulties in judging distance, issues in focusing, blurred vision, and headaches can be developed through treatment of this issue. Headache can be created by vomiting, light, sound, and smell issues that can be treated with the help of headache management. Vestibular issues are creating dizziness, vertigo, nausea, and other issues that can be treated with the help of a physical therapist. Different mood changes can be seen in the people such as sadness, fatigue, and irritability can be seen in a person affected with TBI. Cognitive behavioural therapy and counseling are helping to reduce issues of mood change. The return to normal activities can be possible for a person by taking an adequate amount of rest both physical and mental

[6]. This is beneficial for reducing the effect and symptoms of TBI and providing a better way for backing into normal life quickly. The things such as driving

without a helmet, using proper protective gear, and always using seat belts are helping to reduce the risk of traumatic brain injury of a person. Neurological investigation for brain-injured patients can be developed with the help of a proper understanding of the Glasgow coma scale, providing the significant role of using the immediate decision-making possibilities of traumatic brain-injured patients [7]. Elevation of the head can be the medical intervention for the TBI process that is helping to provide venous outflow. Hyperventilation is the process that is helping to reduce the cerebral blood volume that is used on the occasion of acute neurological deterioration that is affecting a person. The issues of early seizure can be reduced with the help of prophylactic antiepileptics. The benefits of preventing a long-term seizure can be gained through Seizure Prophylaxis. The alternation of blood rheology can be detected with the help of Hyperosmolar Therapy which is beneficial for transient vasoconstriction. The osmotic diuretic properties mechanism used for decreasing ICP is not effective in reducing the primary effect.

The maximal management can be placing patients in the comatose stage possible for helping with bursting continuous electroencephalogram. Decrease of metabolic demand in the brain. The use of barbarities in a prophylactic way is helping to reduce the effect of hypertension defecting the maximal medical and surgical ICP- lowering therapies. Therapeutic Cooling is helping to reduce the risk of alteration in the blood sugar, coagulation factors, and platelet count can be developed in infants and children by decreasing oxidative injuries [8]. Counting platelet and coagulation factors developed in the person is helping to reduce the issues of TBI in the person. The hypothermic state can be developed for a person facing the issues of TBI. ICP monitoring is helping to understand the issues of brain-injured patients and those helping to identify the issues of emergent surgical intervention.

CONCLUSION

From the study, it can be concluded that Traumatic brain injury can have a serious effect on a person in the short-term and long term. This is also beneficial for identifying the serious issues of brain injuries and their effect on the person. TBI can be solved with the help of proper treatment and also by managing proper guidelines that are beneficial for treating the patients affected by TBI. Proper counselling for emotional support is helping to reduce the issues of TBI in a person. Resting is one of the best ways for providing proper treatment for the brain and developing a return to normal life can be done with the help of maintaining proper growth in the treatment of TBI. Rehabilitation is the best possible way for ensuring growth for patients and this is the main motive of treatment for the patients affected by TBI issues. Returning to normal life is important for the person and relearning basic

skills such as walking or talking can be useful for treating the patient facing the issues of TBI. Recovery from a brain injury can be possible with the help of neurosurgery, physical therapies, speech therapies, physiology services, and social services can be helpful for a person facing the issues of traumatic brain injuries. Wearing a helmet, using the proper gear, and other preventing things are helping to reduce the issues of TBI for a person. The treatment can be dangerous and expensive due to risk factors for treating the patients of TBI.

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