

Prognosis and outcome assessment in patients with GCS 3 and BDFP

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Abstract :

Traumatic brain injury is one of the leading health issues worldwide. Survival of patients with severe brain trauma with Glasgow Coma Score (GCS) 3 and bilateral dilated and fixed pupils (BFDP) is not yet known. Recent studies and articles in the world have recently and seldom mentioned the treatment of these patients. In this study, the survival of patients with GCS3 and BFDP who referred to medical centers was investigated. In this retrospective descriptive cross-sectional study, 13 patients with GCS3 and BFDP were studied and treated for 16 years. Of these 13 patients with hemorrhage, 11 patients (84.6%) survived. There was a significant relationship between GOS score between patients at the time of discharge and 4 years after discharge ($p = 0.015$) that GOS score increased significantly after 4 years. Our study hypothesizes that patients with brain trauma with BFDP and GCS 3 have a better chance of survival. Knowing the factors involved in trauma may help patients' prognosis to some extent. Larger prospective studies are needed to examine the effect of other variables such as old age and delay in surgery. However, the present study is promising for the recovery of patients with fixed and dilated bilateral pupils and GCS 3 by adopting appropriate care, management and treatment methods.

Keywords: Glasgow scale, bilateral fixed and dilated men, brain trauma, prognosis

Introduction :

Traumatic brain injury is one of the leading health issues around the world and according to the announcements of the World Health Organization in 2020, it has overtaken the majority of diseases and has become one of the leading causes of death and disability. Has been (1,2). Patients with brain injuries generally have significant changes in their level of consciousness and are exposed to the risk of sensory stimulation due to the discrepancy in their ability to respond to internal and environmental stimuli as well as exposure to closed spaces from the perspective of sensory stimulation (3). . Early onset of sensory stimuli, including hearing, smell, sight, taste, and touch, within the first 72 hours improves patient acceptance, quality of life, and prognosis (4, 5). It is difficult to record and deal with fluctuations in the level of consciousness in patients in the intensive care unit (6). One of the most important tools to assess the level of consciousness in patients with traumatic injuries in patients admitted to the special ward of the Glasgow Coma Scale (GCS) and then to assess the condition of the pupils (7). Today, GCS is commonly used in specialized departments, however, in recent decades, the scale has been reviewed by critics to describe the advantages and disadvantages of this scale. Among these, opening the eyes can be mentioned as full consciousness, while despite the full opening of the eyes, it is possible that the consciousness is not complete and the patient has a plant life (8). The scale at high scores may not have the sensitivity required for prognosis in the healing of patients, and also various factors such as ear and eye injuries, spinal cord trauma, and the inability to speak are likely to be involved in incorrectly determining the GCS score. (9,10). Numerous studies have shown the prognostic power of FOUR and GCS scores in patients with brain injuries. Suffer from brain damage (11). The incidence of bilateral fixed and dilated pupils (BFDP) in comatose patients has been well established and is associated with a poor prognosis (12). If this does not occur as a result of a local trauma or the use of a specific drug, BFDP indicates damage or compression of the third cranial nerve and the upper part of the brainstem, which is mainly due to intracranial mass lesion or due to the spread of brain damage. (13) According to the necessary modern guidelines, almost all patients with a history of head trauma or stroke with severe unconsciousness are intubated in the hospital emergency department. Therefore, a complete evaluation is not possible for all these patients at the time of hospitalization, so pupil examination can be considered as a very important tool for clinical evaluation of the level of consciousness. Observing BFDP conditions in patients indicates an emergency situation, and decisions about diagnostic and therapeutic approaches must be made promptly, based primarily on the personal experience of neurosurgeons (14).

The prognosis of these patients is important from different points of view, because it causes the prediction of their problems and complications, followed by planning to prevent, cure or refer them to other specialists, and ultimately

leads to a reduction in complications, costs and improvement. →Quality and living conditions in patients (15). There are a variety of scoring methods for analyzing disease severity and prognosis. In patients with impaired consciousness and impairments, the prognosis is mainly in accordance with the score obtained from a criterion used to estimate the level of consciousness of patients (16,17). In this regard, there are several studies and articles that show that patients with GCS3 and BDFP have no chance of survival. However, the results of some articles have suggested that patients with these symptoms may also have a chance of survival (18, 8). To date, no study has been conducted to evaluate the use of GCS 3 and BDFP scores in predicting outcome in an adult population entirely in the intensive care unit. The aim of this study was to evaluate the prognosis and outcome in patients with GCS 3 and BDFP.

Method:

The present study is a descriptive cross-sectional retrospective study involving 13 patients who were studied with GCS3 and BDFP and were treated and cared for for 16 years. People taking sedatives or muscle relaxants (no vital signs in the heart, complete cardiac arrest, breathing), as well as people over the age of 80 (severe heart, kidney, liver failure) and people with advanced cancer The study goes out By observing the ethical principles in studying and coordinating with the hospital officials, all the information obtained from the files was considered confidential and also when referring to the hospital while explaining the objectives of the plan and how to examine and emphasizing the confidentiality of the collected information, consent sheet The sample entry letter in the design was seen and signed by the patient or his companion. Purposeful sampling was performed. First, by referring to the archives of the selected hospital ... the files of patients who were admitted to the hospital with a diagnosis of brain injury during the years 1385 to 1397, then the cases were reviewed and among them were patients who met the inclusion criteria. Selection and selection as samples included in the research and for each sample a checklist with a specific code was set. The studied variables of each sample including demographic characteristics, cause of accident, hospitalization, physical and cognitive function of the patient based on the outcome criteria at the time of discharge, address and contact number, Glasgow score (GOS) were recorded in a checklist. Then with their families. The necessary examination was called and the coordination was made to examine the samples, and then the examiner, who had received the necessary training on how to examine the patient, was present at home and examined each of the samples according to the outcome criterion scoring table. And physical performance and GOS recorded each sample in the relevant checklist (Table 1) (18).

Table (1): Glasgow outcome measure scoring studied

Variable	Description of criteria	Points
Deceased	The patient has died	1
Vegetable life	Inability to interact with the patient's environment that does not show significant responses to environmental stimuli.The patient has spontaneous breathing and may move his or her limbs or open his or her eyes and mouth, swallow saliva, or suck if the material is in the mouth, or may even cry.Or smile but all his behaviors are involuntary	2
Severe disability	Able to carry out orders, but unable to continue living independently. In this state, the person is conscious but needs the help of others to carry out daily affairs, including his health and daily needs.Dependence on helping others can be in all activities including personal hygiene or eating and bathing or only in some activities such as getting dressed.	3
Moderate disability	The patient is able to live without dependence on others, but is not able to perform his previous activities, including going to school or his previous job. Failure to perform activities before the onset of the disease can be either due to physical or mental disorders.	4
Recovery	The patient is able to return to his previous job or continue his education as before	5

The results were analyzed by GOS analysis using descriptive statistics and paired t-test to compare changes in patients after 4 years.

findings :

The present study lasted from 2006 to 1397. In 16 medical centers during 13 years and on 13 patients ranging in age from 16 to 65. According to the results of Table (2), among 13 patients, 12 patients (92.3%) were male and one (7/7). 7% were women with a mean age of 42.76 18 18.30 years. The most common type of injury in these patients was EDH with a frequency of 38.5%, mean bleeding volume (119.23 75 75.76) ml. According to the results of Figure (1), among the subjects in the first and fourth year after discharge, 11 (84.6%) were alive and 2 (15.4%) died. According to the results of Table (3) at the time of discharge from the hospital, 3 patients in vegetative living status (GOS = 2), 2 in severe disability (GOS = 3), 2 in moderate disability (GOS = 4) and 6 The mean GOS score of the subjects at the time of discharge was 3.84 1 1.28, the mean GOS score of the subjects in the year after discharge was 4.46 33 1.33 and the mean The GOS score of the subjects was announced as 5.00. 0.81 4 years after discharge According to the results of Table (4), the use of paired t-test to determine the relationship between GOS between patients at the time of discharge and 1 year later showed that GOS and (p = 0.071) showed no significant difference. But the mean increased . However, the relationship between GOS between patients at the time of discharge and 4 years after GOS shows that (p = 0.015) there is a significant difference and the mean has increased, which indicates the relative improvement of patients over 4 years.

Table (2): Descriptive demographic statistics of the studied patients

		Frequency
Gender	Man	92.3
	Female	7.7
Age	Less than 23 years	23.1
	Between 23 and 37 years	30.8
	Between 23 and 37 years	23.1
	Over 62 years	23.1
Type of injury	EDH	38.5
	SDH	23.1
	ICU/SDH	23.1
	IVH/ICU	15.5
Bleeding volume	Less than 60 ml	23.1
	Between 60 and 130	30.8
	Between 131 and 160	30.8
	More than 160	15.4



Graph (1): Percentage of frequency and mean of living and dead patients in the period from discharge to 4 years after recovery

Table (3): Frequency percentage, mean and standard deviation and significance of GOS score in the period of discharge up to 4 years after recovery

GOS (Clearance)	1	-	84.31.28±	0.035
	2	23.1		
	3	25.4		
	4	15.4		
	5	42.2		
GOS (1 year later)	1	-	46.41.33	0.002
	2	15.4		
	3	7.7		
	4	7.7		
	5	53.8		
GOS (4 years later)	1	-	00.50.81±	0.00
	2	-		
	3	7.7		
	4	7.7		
	5	61.5		

Table (4): Comparison of the significant level of GOS score in the interval of 1 year after discharge with 4 years after discharge in recovery

	Average	Standard deviation	Statistic t	p-value
GOS (clearance) -	3.864	1.28	-1.979	.071
GOS (1 year after clearance)	4.461	1.33		
GOS (clearance) -	3.846	1.28	-2.843	0,015
GOS (4 years after clearance)	5.0	0.81		

Discussion:

Traumatic brain injury (TBI) - the "silent epidemic" - is more involved in death and disability worldwide than any other traumatic hemorrhage. Epidemiological studies related to the outbreak of this problem in 2020 estimate that 69 million people worldwide are exposed to TBI annually. The overall incidence of TBI per 100,000 people was in North America (1299 cases) and Europe (1012 cases) and the lowest in Africa (801 cases) and the Eastern Mediterranean (897 cases) (19). The extent of mortality and disability depends on the severity and mechanism of brain trauma, but the adverse outcome (death, coma, and severe disability) following TBI can be as high as 20% (20). Preliminary determination of the severity of injury in patients with traumatic brain injury is the primary guideline for medical treatment and adjuvant to determine the prognosis of trauma (4, 8). The most common clinical tool for determining the severity of brain trauma is the Glasgow Coma Score (GCS) (21). In addition to this tool, the appearance of a fixed and dilated pupil on both sides can be a sign of brain death (22) and from the perspective of specialists and brain surgeons, this person has no chance of survival. However, there are studies that show that a person admitted with GCS3 and BFDP may survive and recover. Therefore, the obligation to evaluate the survival of individuals with GCS3 and the incidence of BFDP with the help of different therapies is felt, which the present study examined. The present study was performed on 13 patients in the range of 16 to 65 years of age from 2006 to 1397 in several medical centers. In the present study, the highest incidence of traumatic brain injury was in men and the active and young groups (37-23 years) in the population. The reason for the vulnerability of this group of people is high-risk behaviors and traffic accidents. De Silva et al. Conducted a study on brain injury patients among forty-six high-, middle-, and low-income countries and found that most of the patients surveyed in all countries were male, with a mean age in high-income countries. The low and average were 36 years and in high-income countries 40 years (23). The results of another study by researchers also indicate that the mortality rate between women and men under 65 years of age is not significantly different (24), On the other hand, the most common type of bleeding

in these patients was epidural hematoma (EDH) bleeding, the incidence of which was significantly different from other types of bleeding such as SDH, IVH and ICH. Also, our study, contrary to the expectations of other specialists, showed that only 2 out of 13 cases died after 4 years from the time of discharge, which shows the appropriate treatment process and the promise of continuous improvement of patients. In line with this result, comparing the significant level of GOS score at the time of discharge, one and four years after discharge, also indicates that the GOS score is approaching 5. This result shows the recovery of patients after 4 years of discharge.

Studies show that appropriate recovery is possible in selected patients with head injuries and BFDPs after the management of invasive surgery, and pathology is an important factor influencing the outcome, while patients with external cavitory hematoma achieve better results. They show trauma to patients with intracavitary hematoma. In fact, more than two-thirds of patients with traumatic brain injury who underwent surgery survived, and the majority continued to recover better. However, this poor prognosis of BFDPs (for whatever reason) has influenced surgery decisions in some cases. These findings indicate the unique pathophysiology of the disease. But in many cases, the external hematoma is accompanied by slight parenchymal damage. Therefore, early surgical intervention can greatly reduce the risk of complications and mortality (8,25). Numerous studies have been conducted in different countries, all of which show inadequate care of patients with injuries and the result is death and disability, many of which can be prevented with adequate care (26). According to the results of the present study, few studies indicate that patients with stroke with GCS3 and BFDP have a better chance of survival. The aim of the 2016 study by salottolo et al. Was to describe the results in a community with cerebral trauma (TBI) and GCS3 who underwent craniotomy or craniectomy (CRANI) neurosurgery. There were 541 patients with TBI and GCS3. 19% had CRANI, of which 83% started within 4 hours. In those with a mass lesion, 27% of CRANI was observed, which, after adaptation, showed significant survival with CRANI versus those without CRANI. Survival was seen in 65% of patients with GCS3 who underwent surgery for subdural and epidural hematomas. These results showed that pragmatic management of rapid neuromuscular surgery was accessible to selected patients with GCS3, which contributes fourfold to the survival rate, and in the absence of massive lesion, the effect of brain surgery and Fast nerves are ineffective on results (27). Another case study conducted by Garcia et al. In 2013 on two patients admitted to St Mary's London was a 23-year-old man with GCS 3 and fixed, dilated pupils undergoing extensive unilateral decompression craniectomy for hypertension. Intracranial resistance was exacerbated, cared for. The results showed that this patient was decanulated in less than one month and fully cognitively recovered (9). The results of a 2009 study by Chamoun et al. Also showed that pupil size and response are the most important prognostic factors, as the mortality rate in bilateral reactive pupils is 23.5% and in the case of fixed and dilated pupils. Bilateral was 79.7%. They believe that patients with brain injury with CCS3 and BFDP still need to be treated aggressively, because in some cases good performance can be achieved (28). Also, the results of meta-analysis of Scotter et al. In 2014 showed that in patients with BFDP and undergoing surgery due to extradrall hematoma, the mortality rate was 29.7% and in patients with subdural hematoma was 66.4%. They acknowledged that despite the poor prognosis of patients with closed head injuries and fixed and dilated pupils on both sides, if surgery is chosen in selected cases, especially in patients with extra radial hematoma, good recovery is possible (29).

In contrast to the results of the current study, there are numerous studies that show that patients with GCS3 and BFDP have no chance of survival with complete certainty. Tien et al. In 2006 compared the survival rates of patients with GCS3 and BFDP over a period of time, as well as patients with GCS3 and the reactive pupil, which showed that all BFDP patients died, while only 42.0%. Reactive pupil (RP) patients died (22). Chaudhuri et al. Also conducted a study in 2009 in Melson, Australia, entitled "Survival of Patients with Coma and Pubic Fixed Bilateral Pupil," which showed trauma patients with GCS 3 and bilateral fixed and dilated pupils. They have no significant chance of survival (8). In 2018, Karishna et al. Conducted a study on the survival rate of patients with acute subdural hematoma with GCS3 and BFDP, which, as in previous studies, showed that patients with GCS 3 and BFDP were 100% more likely to die (30). Calibration for GCS or other scoring systems varies from study to study. These differences in different amounts in studies highlight the fact that by considering population changes, quality of care and intensive care management, adopting models and methods in correct mani can be useful to overcome these problems (31). Development and improvement of reliable models through training, education and standardization of evaluation in different environments and disagreement on how to deal with distorted factors and customization of an appropriate model, the role of the predictive model in future research and clinical practice Will maintain (32). One of the limitations of this study is the shortage of patients and the number of cases. If this study is conducted with a larger number, the study will be more comprehensive. Also, due to the patients' condition and long time, it is not possible to follow up a number of patients' concerns, including the result of CT scan due to missing, and it is not possible to photograph patients between surgery and before surgery. The present study showed that despite various limitations, including limitations in documentation due to patients' super-emergency conditions, the effect of sample

size on model calibration, quality of care, new technologies, guidelines and policies, treatment limitations and objections of researchers and owners. With this treatment around the world, the method used in this research can lead to valuable achievements in medical science.

Conclusion As a result, our study hypothesizes that patients with bilateral and dilated pupillary brain trauma and GCS 3 have a better chance of survival. Knowing the factors involved in trauma may help the prognosis of these patients to some extent. Larger prospective studies are needed to examine the effect of other variables such as old age and delay in surgery. However, the present study promises to improve patients with fixed and dilated pupils and GCS 3 by adopting appropriate care, management and treatment methods.

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