Quality of life in patients with traumatic brain injury: A single tertiary center experience

Muhammad Zafrullah Arifin

Yulius Hermanto (✉ yulius89@kuhp.kyoto-u.ac.jp)

Agung Budi Sutiono

Abstract

Introduction Traumatic brain injury (TBI) is the main cause of death in motor-vehicle accidents. Investigation on the quality of life in patients with TBI would provide essential information for the society and policy makers in seeking the optimum ways to manage this devastating injury.

Methods A total 178 of patients were involved in this study, consists of 97 patients with TBI and 81 non-TBI patients. The patients' quality of life was evaluated by using Euroqol 5D (EQ-5D) up to 3 months of follow up. Then, the results of EQ-5D were analyzed.

Results

Impairment in mobility was more profound in patients with TBI compared to non-TBI patients (23.38% vs 9.38%, p = 0.0414). In line with the impaired mobility, impairment of self-care was also more frequently observed in patients with TBI compared to non-TBI patients (25.97% vs 12.50%, p = 0.0459). Meanwhile, the other dimensions of EQ-5D were not distinct between patients with TBI and non-TBI patients (p > 0.05). There was a trend of quality of life improvement in patients with TBI during the follow up.

Conclusion

Patients with TBI are more likely to experience impairment in mobility and self-care compared to non-TBI patients. Hence, TBI potentially affect quality of life.

Introduction

Traumatic brain injury (TBI) is the main cause of mortality and morbidity in young adults, particularly in motor-vehicle accidents. Several factors such as high mobility and lack of road safety awareness contribute to the high prevalence of TBI in those group. An estimated about more than 50% of mortality in traffic accidents is due to TBI. Approximately about 50–60 million people suffered from head injuries worldwide annually, with mortality rate of 4% and morbidity rate of 5%.[1,2,3]

TBI is defined as non-degenerative and non-congenital trauma that occurs as a result of external mechanical force causing head to experience temporary or permanent psychological, cognitive and psychological disorders.[4] TBI is commonly observed in male than female with ratio of 3:2.[1,2,3] The common causes of TBI in adulthood are motor vehicle accidents and violence, while falling is frequent in elderly patients..[5]

Non-TBI patients often have persistent neurological sequelae. Thus, the patient's quality of life is strongly related to the underlying disease, success of the surgery and postoperative rehabilitation. Hence, an appropriate management planning is needed to optimize the quality of life of each patient.[6]

Despite of any complex efforts in the management of patients with TBI, mortality and morbidity among these patients remained high.[7,8] Thus, any information regarding their quality of life after treatment is important as the basic foundation for delivering informed consent for patients and their families. This study aimed to assess the quality of life in patients with TBI after their hospitalization. In order to objectively compare the role of TBI in the prognosis of TBI patients, the results from TBI patients were then compared to the results from non-TBI patients.

Methods

The ethical clearance was obtained from the Ethical Committee of the Faculty of Medicine, Universitas Padjadjaran and Hasan Sadikin General Hospital. All TBI patients who were ≥ 18 years old and treated at Hasan Sadikin Hospital in between October 2015 and March 2016 were included in this study. In the non-TBI group, all non-TBI patients who were of the same age group with TBI patients, and treated at the same neurosurgical center in the same period of times were included. Quality of life in both groups were assessed by using Euroqol-5D (EQ-5D)[7] at the time of discharge and 3 months after being discharged from the hospital. This study was a prospective cohort study, all data were analyzed then described by using tables and graphs. After discharge, the patients were then evaluated by filing in the questionnare at 3 months post hospitalization.

The data was analyzed with Graph Pad Prism 8.0 and $p < 0.05$ was considered as statistically significant.

Results

A total of 178 patients were included in this study, consisting 97 patients with TBI and 81 non-TBI patients. There was no difference in term of social and demographic baseline between two groups (Table 1, $p<0.05$). All patients were evaluated at each time point and 37 patients were died during hospitalization

Twenty patients with TBI and 17 non-TBI patients were died during hospitalization. Patients with TBI who died during hospitalization (39.21 ± 10.39 years old) tend to be younger than non-TBI patients (43.87 ± 13.21 years old), however this tendency was not significant (p=0.2379). Majority of mortality occurred in patients with low GCS (3-8) in both groups. Majority of mortality occurred in male, but there was no significant different in both groups (Table 2).

Of the remaining surviving patients (77 patients with TBI and 64 non-TBI patients), were subjected for the evaluation for the quality of life. At 3 months post hospitalization, severe impairment of mobility and self-care were commonly observed in patients with TBI than patients without TBI ($p<0.05$, Table 3). There was no difference in term of proportion of patients with severe problem of daily routine activity, pain, and anxiety or depression ($p>0.05$).

The patients with TBI had a tendency of improvement in terms of quality of life 3 months after discharged, in all 5 parameters of EQ-5D (mobility, self-care, routine activity, pain, anxiety or depression, $p<0.05$), however this trend did not reach statistically significant ($p>0.05$, Table 4)..

Discussion

TBI, remains a growing public health concern and represents the major contributor to death and disability globally among all trauma-related injuries and also known as the silent epidemic.[1,2,3] According to estimates based on literature reported numbers[1,2,3], about 50–60 million individuals are affected by TBI each year, and it is predicted that close to 50% of the world's population will sustain a TBI in their lifetime.[9]

Patients with mild, moderate or severe brain injuries suffer from physical, cognitive, behavioural, emotional and social problems, however specific instruments or objective assessment to evaluate quality of life in patients with TBI is scarce.[10] In Indonesia particularly, the information regarding the quality of life in patients with TBI is severely lacking, hence creating a gap for policy making and public health intervention.

In this study, we investigated the quality of patients with TBI and compared the findings with similar clinical characteristics from non-TBI patients. We found that patients with TBI had a tendency to die at a younger age than non-TBI patients, although it did not reach statistical significance. This finding reflect the condition in our region that majority of patients with TBI were young adults and male. These population are at high risk for having TBI due to highly mobile and lack of road safety awareness.[11,12]

In this study, we found that mortality commonly observed in patients with lower GCS either in patients with TBI and non-TBI. This finding in accordance to literatures, suggesting initial GCS value reflects the state of brain damaged or neurological insults. Low GCS value is associated with dismal prognosis.[13,14]

We found that at 3 months of follow up, patients with TBI were more frequent to have impairment in mobility and self-care than non-TBI patients. This finding indicate that the social burden of TBI might be underestimated. Impairment in mobility and self-care in patients with TBI, particularly in young adults significantly decrease the productivity, hence creating a socioeconomic burden for the society.[15] Previous study in European community, indicated the quality of life of patients with TBI is better than non-TBI, as indicated by better performance in cognitive function and daily tasks.[16] On this matter, cultural differences might have influenced the findings,[17] in our society the attention regarding TBI is severely lacking, hence public awareness of its sequel is low.[13,14]. Nevertheless, there was a trend of quality of life improvement in patients with TBI during the follow-up. Appropriate managed-care could enhance the recovery and promote better quality of life hence reducing socioeconomic burden for the society.

This finding in this study could be used for the reference for the policy making and health care intervention in Indonesia. Further study involving more participants and nationwide would be pivotal to

confirm the findings in this study.

Conclusions

There were significant differences in mobility and self-care between patients with TBI and non-TBI patients. Patients with TBI had worse quality of life than non-TBI patients.

Declarations

Ethics approval and consent to participate

The ethical clearance was obtained from the Ethical Committee of the Faculty of Medicine, Universitas Padjadjaran and Hasan Sadikin General Hospital.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors` contributions

All authors met the ICMJE criteria for authorship. MZ and AB contributed to the conception and design. MZ and YH performed the statistical analysis and drafting the manuscript. All authors approved the final manuscript.

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Abbreviations

EQ-5D Euroqol 5D

GCS Glasgow coma scale

TBI traumatic brain injury

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Tables

Table 1. Patients' social and demographic characteristics

Characteristics	TBI (n=97)	Non TBI (n=81)	p
Sex			0.7240[1]
Males	60 (61.86%)	48 (59.26%)	
Females	37(38.14%)	33 (40.74%)	
Age: mean, ± SD	41.57 ± 14.61	44.39 ± 18.38	0.2557[2]
Age group			0.2632[1]
18-29	38 (39.17%)	22 (27.18%)	
30-39	22 (22.68%)	24 (29.63%)	
40-49	20 (20.62%)	20 (24.69%)	
50-59	15 (15.46%)	10 (12.35%)	
60+	2 (2.06%)	5 (6.27%)	
Reason admission			
Trauma	97(100%)		
Infection		21 (25.93%)	
Stroke		15 (18.52%)	
Tumor		28 (34.57%)	
Spine		9 (11.11%)	
Others		8 (9.88%)	
Education			0.7894[1]
Elementary school	25 (25.77%)	26 (32.09%)	
Junior high school	38 (39.17%)	27 (33.33%)	
Senior high school	30 (30.93%)	25 (30.86%)	
University	4 (4.12%)	3 (3.70%)	
Occupation			0.9366[1]
Employees	60 (61.86%)	48 (59.26%)	
Unemployed	30 (30.93%)	27 (33.33%)	
Retired	7 (7.21%)	6 (7.41%)	
Married			0.3423[1]
Yes	70 (72.16%)	65 (80.25%)	
No	27(27.84%)	16 (19.75%)	
Living condition			0.9861[1]
Own property	60 (61.86%)	50 (61.73%)	
Others	37 (38.14%)	31 (38.27%)	
Number of family members			0.3133[1]
1-4	69 (71.13%)	63 (77.78%)	
5+	28 (28.87%)	18 (22.22%)	
Health Insurance			0.3655[1]
Yes	88 (90.72%)	70 (86.42%)	
No	9 (9.28%)	11 (13.58%)	

[1]Analyze with chi-square

[2]Analyze with t-test

Table 2. Characteristics of patients died during hospitalization

Characteristics	TBI (n=20)	Non-TBI (n=17)	p
Age (years)	39.21 ± 10.39	43.87 ± 13.21	0.2379[1]
GCS			0.9689[2]
3-8	14 (70.00%)	12 (70.59%)	
9-13	6 (30.00%)	5 (29.41%)	
14-15	0 (0.00%)	0 (0.00%)	
Sex			0.2949[2]
Male	15 (75.00%)	10 (58.82%)	
Female	5 (25.00%)	7 (41.17%)	
Surgery			0.3193[2]
Yes	12 (60.00%)	13 (76.47%)	
No	8 (40.00%)	4 (23.53%)	

[1]Analyze with t-test

[2]Analyze with chi-square

Table 3. Evaluation of EQ-5D at 3 months post hospitalization

Parameter	TBI (n=77)	Non-TBI (n=64)	p
Mobility			
Severe Impairment	18 (23.38%)	6 (9.38%)	0.0414*
Non Severe	59 (76.62%)	58 (90.62%)	
Self-Care			
Severe Problem	20 (25.97%)	8 (12.50%)	0.0459*
Non Severe	57 (74.03%)	56 (87.50%)	
Routine Activity			
Severe Problem	24 (31.17%)	12 (18.75%)	0.0922
Non Severe	53 (68.83%)	52 (81.25%)	
Pain			0.4320
Severe Problem	16 (20.77%)	10 (15.62%)	
Non Severe	61 (79.22%)	54 (84.38%)	
Anxiety/Depression			
Severe Problem	25 (32.47%)	14 (21.88%)	0.1615
Non Severe	52 (67.53%)	50 (78.12%)	

*$p<0.05$, analyze with chi-square

Table 4. Evaluation of EQ-5D of patients with TBI

Parameter	Discharged	3 months	p
Mobility			
Severe Impairment	26 (33.77%)	18 (23.38%)	0.1536
Non Severe	51 (66.23%)	59 (76.62%)	
Self-Care			
Severe Problem	25 (32.46%)	20 (25.97%)	0.3756
Non Severe	52 (67.53%)	57 (74.03%)	
Routine Activity			
Severe Problem	28 (36.36%)	24 (31.17%)	0.4955
Non Severe	49 (63.63%)	53 (68.83%)	
Pain			0.4463
Severe Problem	20 (25.97%)	16 (20.77%)	
Non Severe	57 (74.03%)	61 (79.22%)	
Anxiety/Depression			
Severe Problem	29 (37.66%)	25 (32.47%)	0.4994
Non Severe	48 (62.34%)	52 (67.53%)	

Analyze with chi-square