Comparison Between Glasgow Come Scale (GCS) and Systolic Pressure With Mortality In 12 Hours Of Patient severe Head Injury In The Provincial Hospital dr. Moewardi in surakarta

Anissa Cindy Nurul Afni[1], Fakhrudin Nasrul Sani[2]

[1,2] STIKes Kusum Husada Surakarta
*anissacindy88@gmail.com
*fakhrudin_ns@ymail.com

ABSTRACT

Background: Traumatic Coma Data Bank (TCDB) recorded mortality rates from head injury less than 17 for 100,000 victims outside the hospital and 6 for 10,000 victims taken to hospital. The impact of head injuries provide the more complex of disorders such as impaired neurological function, disability, and death. Primary and secondary damage occurred in 6-12 the first hour against the structure and contents of the physiological anatomik skull. The main factor of survival of the patient with head injury was the value of the GCS and the systolic pressure.
Purpose: The research of identified correlation between GCS and systolic pressure with mortality in 12 hours of patient severe head injury.
Methods : This prospective study was conducted at The Provincial Hospital Dr. Moewardi in Surakarta with medical record study descriptive correlative crossectional approach and retrospective design. Sample taken with the technique of quota sampling with 50 total sample of respondents. The bivariat analysis used in this research is Fisher test.
Conclusion : There is a relationship between GCS with mortality in 12 hours of severe head injury patient. There was no relationship between systolic blood pressure with mortality in 12 hours of severe head injury patient.

Key Words: head injury, severe head injury, mortality of head injured patient, GCS, systolic pressure.

INTRODUCTION

The distribution of cases head injuries especially involve the productive age group between 15-44 years and more dominated by men than women (Kasmaei, Asadi, Zohrevandi, Raouf, 2015). Kasmaei et al (2015) in her research also found that 485 cases of 1000 patients a head injury caused by a motor vehicle accidents, 268 cases from fall. The data from World Health Organization (WHO) in 2004, the Case Fatality Rate (CFR) trauma resulting from traffic accidents the highest found in some countries of Latin America (41.7%), South Korea (21.9%) and Thailand (21.0%).

Data from the Traumatic Coma Data Bank (TCDB) obtained mortality from head injury of approximately 17 of 100,000 victims outside the hospital and 6 of 10,000 victims who were taken to the hospital. Whereas in Indonesia, hospitalized head injury was the third leading cause of death (4.37%) after heart and stroke.

The impact of head injuries will give nuisance which is more complex than injury on other organs such as impaired neurological function, disability, and death. The worst prognosis of disability and death is most common in patients with severe head injury. Research shows value of severe head injury GCS <8 has ± 60% mortality. Boto et al (2006) in his research showed that 20% of severe head injury patients died early in the arrival of patients in the hospital. The findings were reinforced by Singh et al (2007) found that 54.4% of patient with severe head injury survive up to 6 hours first post trauma.

This is because to the primary and secondary damage that often occurs at the first 6-12 hours of the anatomic and physiological structures of the various skull contents of the brain, lining of the brain, tissue, nerves, blood vessels and bone (Boto et al 2006).

Severe head injuries have the ability to survival lower compared with moderate and mild head injury. This happens especially at 6 - 12 hours since the first trauma (Arnold, 2013). Brain injury 6 - 12 hours experiance a systemic form of initials decreased blood pressure, oxygenation, temperature, control of blood glucose, fluid status, an infection that will have an impact on early death (Boto et al 2006).

One of the main factors of survival of patients with head injured is the prehospital time that is the time the patient passes from the start of the accident occurs until the patient arrives at the Emergency Installation (IGD).

MATERIAL METHODS

1. Location and Time of Research

Research conducted at the hospital Type A Hospital Education RSUD Dr. Moewardi in Surakarta. Time Research the research implemented during the month of May 2016.

2. Population and Sample

The population data used are the patient's medical record data from January 2016 - May 2016, with a diagnosis head injury. Medical record is used that containing the initial data of the patient when it comes to emergency room with severe head injury and treatmen given during the first 12 hours. Intial data which must be include: age, baseline GCS, systolic pressure, prehospital time, pupil reactions.

Samples were taken with the technique of quota sampling with 50 total sample of respondents. Criteria for inclusion in this research are: severe head injury GCS ≤ 9, recorded as patient emergency room RS Dr. Moewardi Surakarta. While the exclusion criteria in this research are: Patients who get surgery CITO in the first 12 hours of treatment.

3. The Materials and Tools

The material and tools used in this research is the study of the patient's medical record with severe head injury. Medical records obtained from the medical record of RSUD Dr. Moewardi in Surakarta. This study is a medical record study using descriptive correlative design with crossectional approach with retrospective design.

4. Data analysis

The bivariate analysis used in this research is Fisher test.

RESULT AND DISCUSSION

1. Mortality Rate

The mortality rate is assessed through outcomes of severe head injury patients with living condition disability or death after the first 12 hours of treatment. The first 6-12 hours of patient care becomes a critical period for severe head injury patients. Results of mortality rates of respondents can be seen in the table below:

Table 5.1.7 Respondent Mortality Rate

		n(%)
Mortality Rate	Died	21 (32,3%)
	Life	44 (67,7%)
	Total	65 (100%)

The results showed that from 65 respondents got the data of respondents who during 12 hours of initial treatment died of 21 respondents (32.2%). While respondents who for 12 hours of life care that is 44 respondents (67.7%).

2. Initial GCS value

The level of consciousness of patients with eye (E), motor (6), verbal (5) responses to baseline data in determining the classification of head injury. The initial GCS score of respondents is listed in the table below:

Table 5.1.2 Initial Respondents GCS Value

		N (%)
Initial GCS	<6	26 (43,1%)
	7-9	37 (56,9%)
	Total	65 (100%)

The result of research shows that GCS <6 is 26 respondents with 43,1% procession and GTS 7-9 value is 37 respondent with percentage 56,9%.

The deterioration in GCS 2 or more indicates a worsening of the condition so that the nurse should always monitor the patient's GCS score (Japardi, 2003).

GCS scores should have been checked since the patient was found or since the patient arrived at the hospital before the patient received paralysis drugs and before intubation (Chessnut, 2000). The degree of awareness of the patient on CKB has a strong influence on the chances of survival and healing.

Sastrodiningrat (2006) reported 82% of patients with GCS> 11 within 24 hours after injury had a good outcome and only 12% died or severe disability. Outcome will automatically decrease if the initial GCS score decreases. Among patients with a baseline GCS score of 3 to 4 in the first 24 hours only 7% had good outcomes, among the remaining 87% dying.

3. Systolik Pressure

Systolic blood pressure is the peak of maximum pressure when ejection occurs. The value of systolic blood pressure of respondents can be seen in the table below:

Table 5.1.3 Respondent Systolic Pressure

		N (%)
Systolic Pressure	<90	41 (63,1%)
	>90	24 (36,9%)
	Total	65(100%)

Based on the results of research, systolic blood pressure value of respondents is> 90 mmHg with the number of 24 respondents (36.9%). While respondents with systolic blood pressure <90 41 respondents (63.1%).

Blood pressure is a lateral force in the arterial wall by blood that is pushed with pressure from the heart. Heart contraction pushes high pressure blood into the aorta. The peak of maximum pressure when ejection occurs is systolic blood pressure. At the time of relaxation of the ventricle, the blood that remains in the asterillia causes a diastolic or minimum pressure. Diastolic pressure is the minimal pressure that pushes the arterial wall at all times (Perry and Petter, 2005).

Blood pressure is categorized into high blood pressure and low blood pressure. High blood pressure (hypertension) in adults is made when the average diastolic reading is twice the measurement> 90 mmHg and systolic> 140 mmHg. While hypotension or low blood pressure occurs when systolic pressure <90 mmHg. Hypotension occurs due to arterial dilatation on the vascular floor, large volume of blood loss (eg bleeding), or failure of heart muscle to pump blood adequately (eg myocardial infarction). Hypotension is described as pale, sweating, decreased urine excision, and a threat because of the risk of death (Perry and Petter, 2005).

In trauma patients including head injury, hypotension can occur at any time. The presence of hypotension in a head injury patient may worsen the condition. The history

of patients with hypotension is associated with increased morbidity and mortality of head injury patients (Chessnut et al 2000).

Less brain perfusion can cause damage to brain cells thoroughly. If this happens, the brain will experience swelling (swelling thoroughly), with the end result of increased intracranial pressure (Japardi, 2003).

The presence of multiple systemic injuries primarily associated with systemic hypoxia and hypotension (systolic pressure <90 mmHg), worsened the prognosis of healing (Chessnut et al 2000). Among head injuries, hypotension is usually caused by blood loss due to systemic injury or direct injury to the cardiovascular reflex center in the medulla oblongata.

The hypotension found from the beginning of the injury to the duration of patient care is a major factor determining the outcome of severe head injury patients. And these blood pressure predictors are the only conditions that can be corrected with medicament in severe head injury (Sastrodiningrat, 2006).

Immediate circulation management is required for systolic pressure to be maintained > 90 mmHg. The target is brain perfusion. In children, intracranial hemorrhage can lead to hypovolemia. In adults, hypovolemia is caused by injury to other organs or brain stem damage. Post-trauma, brain autoregulation becomes damaged, so it is important to maintain CPP (Sheehay's; Haddad and Arrabi, 2010; 2012).

4. The Correlation between initial GCS and first 12-hour mortality of severe head injury patients

Table 5.2.2 Correlation between initial GCS and first 12-hour mortality of severe head injury patients

		Died	Life	Value p
Initial GCS	<6	16	12	0,000
	7-9	5	32	
	Total	21	44	

Based on the above table can be seen the relationship between the initial GCS value of respondents when coming to the ER with first 12-hour mortality of severe head injury patients premises Value p = 0.00. Because the p value <0.05 it can be concluded that there is a relationship between the initial GCS respondent when coming to the ER with the first 12 hours mortality of severe head injury patients.

The results are in line with previous research. Boto (2005) in his research found that 20% of severe head injury patients died early in hospital arrival. Research conducted by Irwan et al (2010) in 30 head trauma patients mostly came with mild head injury (early GCS 13-15). The results showed a significant correlation between initial GCS of patients with disability rates during treatment. The relationship of open GCS components and motor responses has a significant correlation with the disability of the patient, whereas the verbal component has no significant correlation.

The results of Saini et al. (2012) also supported previous studies conducted by those who found that baseline GCS values were predictors of severe head injury output. Patients with GCS 3-4 had an incidence of dying with 78.05%, whereas in patients with baseline GCS 5-6 with 52.63% and GCS 7-8 had a 26% death rate.

Recent research conducted by Kasmaei et al (2015) in 1000 patients in Iranian Poorsina Hospital showed that early GCS <9 had 3 times the risk of poor prognosis to the death of the patient. From his research, patients with GCS <9 were found to have submarine and epidural bleeding as evidenced by CT scans. Of 1000 patients found 238 patients GCS <9. And based on the findings that 233 of them died.

The conclusion is that the lower the initial GCS value of the patient when it comes to the ER, the risk of worsening the patient's output is increasing.

5. Correlation between systolic pressure and first 12-hour mortality of severe head injury patients

Table 5.2.3 The relationship between systolic pressure and first 12-hour mortality of CKB patient care

		Died	Life	P Value
Systolic Pressure	<90	16	25	0,107
	>90	5	19	
	Total	21	44	

Based on the above table can be seen the relationship between the initial systolic blood pressure value of respondents when coming to the ER with first 12 hours mortality of severe head injury patients. P Value = 0,107, because p value> 0,05 hence can be concluded that there is no relation between between value of systolic blood pressure of respondent when come to ER with first 12 hour mortality of severe head injury patient.

The results of this study contradict the research conducted by Irwan et al (2010) in his study found that systolic blood pressure and respiratory rate did not have correlation with the disability of patients. However, variables of systolic blood pressure and respiratory rate were associated with mortality of severe head injury patients. And in patients with low blood pressure have long care time in the ICU and have a higher risk of death. Based on this action nursing attempted to maintain systolic blood pressure ranged from 90-11 mmHg.

Ducrocq et al (2006) showed patients who came with hypotension, GCS decreased, and the high severity of the injury experienced by the patient became an independent factor that could increase the risk of patient death. This is supported by Tohme et al (2014) which describes the presence of hypotension causing the patient to fall into a state of severe hypoxia which further aggravates the patient's condition.

A similar study conducted by Newfield et al (2007) obtained an 83% mortality rate in severe head injury patients with systemic

hypotension at 24 hours after admission, compared with a mortality rate of 45% of patients without systemic hypotension. The increased morbidity of systemic hypotension may be as a result of secondary ischemic injury from decreased cerebral perfusion.

Supporting previous research, Susilawati (2010) also found more than half (63.2%) of patients with severe head injury had a blood pressure value> 90 mmHg. In addition there was a significant positive relationship between blood pressure value and survival in the first 6 hours in severe head injury patients.

CONCLUSION

There is a correaltion between GCS and mortality in 12 hours of severe head injury patients. There was no correlation between systolic blood pressure and mortality in 12 hours of severe head injury patients.

SUGGESTION

For further research it is hoped to develop more in-depth research and increase the number of respondents primarily in examining the impact of blood pressure on patient mortality.

REFERENCE

Arnold C. D. (2013). *Faktor-faktor yang berhubungan dengan outcome pasien pasca operasi hematoma epidural (EDH).* Bagian bedah Fakultas kedokteran universitas andalas RS Dr. M. Djamil Padang.

Boto G.R. *et al*. (2006). Severe head injury and risk of early death. *Madrid: JNeurosurg psychiatry.*

Chesnut R. M., Ghajar J., Maas A.I.R., Marion D.W, et al. (2000). Early indicators of prognosis in severe traumatic brain injury. *JIMA*

Irwan H., Setiawan F., Devi., dewanto G. (2010). Perbandingan GCS dan revised trauma score dalam memprediksi disablitas pasien trauma kepala di RS Atma Jaya. *Maj Kedokteran Indon. 60(10): 437-442.*

Japardi Iskandar. (2003). Pemeriksaan dan sisi praktis merawat pasien cedera *kepala. Jurnal Keperawatan Indonesia. Vol 7 (1): 32-35.*

Kasmaei V.M., Asadi P., Zohrevandi B., Raouf M.T. (2015). An epidemiology study of traumatic brain injuries in emergency department. *Emergency. 3(4): 141 -145.*

Perry and Potter. (2005). *Buku Ajar Fundamental Keperawatan; Konse, Proses, dan Praktik.* Jakarta: EGC.

Saini N. S., Rampal V., Dewan Y., dan Grewal S.S. (2012). Factors predisting outcome ini patients with severe head injury: Multivariate analysis. *The Indian Journal of Neurotrauma. 9; 45-48.*

Sastrodiningrat A.G. (2006). Memahami faktor-faktor yang mempengaruhi prognosa cedera kepala berat. *Suplemen. Majalah Kedokteran Nusantara. 39 (3): 307-316.*

Sheehay's, Haddad and Arabi. (2012). Critical care management of severe traumatic brain injury in adults. *Emergency Medicine. 20:1-15.*

Singh H, et al. (2007). A rivew of pedestrian traffic fatalities. *New Delhi: JIAFM.*

Susilawati desi. (2010). *Hubungan waktu prehospital dan nilai tekanan darah dengan survival dalam 6 jam pertama pada pasien cedera kepala berat di IGD RSUP Dr. M. Djamil Padang Tahun 2010.* Fakultas Keperawatan Universitas Andalas. Padang.