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THE RELATIONSHIP TETANUS SEVERITY WITH CLINICAL OUTCOME

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ABSTRACT

Introduction : Tetanus is an acute toxemia caused neurotoxin produced by *Clostridium tetani* characterized by periodic and severe muscle stiffness and spasms. Prognostic assessment is the most important thing to see the risk of mortality. Score systems are often used by clinicians such as Phillips score (1967), Ablett classification (1967), Dakar score (1975). **Aim :** to determine the relationship between the severity of tetanus and the clinical outcome of patients in Kariadi Hospital Semarang[20] **Methods:** This study a cross-sectional design in a population of tetanus patients treated from January 2019 to December 2021 in Kariadi Hospital Semarang. The inclusion criteria in this study were patients who had complete medical records. Information was taken from medical record data, including demographics, incubation period, Port of entry, Ablett score, Phillips score, type of wound, autonomic symptoms, clinical manifestations, comorbidities, vaccination history, complications, ventilator use, antibiotic management, length of stay and clinical outcome. To find out the relationship between variables using the Chi-square test. **Results:** The results of the analysis of the relationship between the grade of Phillips score and clinical outcomes p = 0.038 (p<0.05). The results of the analysis of the relationship between the grade of Ablett score and clinical outcomes p = 0.007 (p<0.05). The results of the analysis of the relationship between the use of ventilators and clinical outcome. p = 0.041 (p<0.05). **Conclusion** : there was a relationship between the degree of Phillips' score and clinical outcome, there was a relationship between the degree of Ablet's score and clinical outcome and there was a relationship between ventilator use and patient outcomes.

Keywords : *Tetanus, Philips Score, Ablet Score, Clinical Outcome*

INTRODUCTION

Tetanus is an acute toxemia caused neurotoxin produced by *Clostridium. tetani*, characterized by periodic and severe muscle stiffness and spasms. Tetanus can be defined as a state of acute hypertonia or muscle contraction that results in pain (usually in the lower jaw and neck) and complete muscle spasms without other causes, as well as a history of previous injuries or accidents. [1,2,6] *C. tetani* is an anaerobic Gram-positive bacterium found in the soil and feces of animals. [2.6] The bacterium is rod-shaped and produces spores, giving it the classic drumstick appearance, though not always visible. These spores can last several months or even several years. *C. tetani* produces two types of toxins, namely tetanospasmin and tetanolysine[11]. In developing countries, tetanus disease is still a public health problem. There are reportedly 1 million cases per year worldwide, the incidence rate is 18/100,000 population per year and the mortality rate is 300,000-500,000 per year.. [2] Prognostic assessment is the most important thing to see the risk of mortality. Score systems are often used by clinicians such as Phillips score (1967), Ablett classification (1967), Dakar score (1975).[20] The purpose of this study was to determine the relationship between the severity of tetanus and the clinical outcome of patients in Kariadi Hospital Semarang.

METHODS

The study with a cross-sectional design on the population of tetanus patients treated from January 2019 – December 2021 in Kariadi Hospital Semarang. The inclusion criteria in this study were patients who had complete medical records. Information was taken from medical record data, including demographics, incubation period, Port of entry, Ablett score, Phillips score, type of wound, autonomic symptoms, clinical manifestations, comorbidities, vaccination history, complications, ventilator use, antibiotic management, length of stay and clinical outcome. The collected data will be analyzed using the IBM SPSS *Statistics for Windows* version 26 program. The Chi-square test was used to analyze the variable. The significance value was $p < 0.05$.

RESULTS

There are 16 samples that meet the inclusion criteria in the period January 2019 - December 2021

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in Kariadi Hospital Semarang. The characteristics of the research subjects were presented in table 1.

Table 1 Characteristics of Tetanus Patients

Characteristic	Frequency (n)	%	Mean±SD	Median (min-max)
Age (Years)			54.63±10.151	58.00(28-70)
Gender				
Man	16	100		
Woman	0	0		
Incubation time			15.58±9.140	6-30
Port of entry				
Tooth	4	25		
Body	1	6		
Upper extremities	1	6		
Lower extremities	10	63		
Types of Wounds				
Lacerations	4	25		
Puncture	7	44		
Trauma	5	31		
Ablett Score				
Grade I (Mild)	2	13		
Grade II (Moderate)	8	63		
Grade III (Severe)	4	13		
Grade IV (Very Severe)	2	13		
Phillips Score				
Mild	2	13		
Moderate	8	50		
Severe	6	37		
Types of tetanus				
General	13	81		
Local	2	13		
Cephalic	1	6		
Outonom Symptoms				
Yes	14	87		
Not	2	13		
Clinical				
Trismus	16	100		
Muscle stiffness	12	75		
Dysphagia	9	56		
Muscle Spasms	11	69		
Rhisus Sardonikus	3	19		
Opistotonus	4	25		
Comorbidities				
Diabetes	3	19		
Vaccination history				
Yes	0	0		
Not	16	100		
Complications				
Urinary tract infections	2	13		
Bronchopneumonia	8	50		
Acute renal failure	5	31		
Cardiopumonary arrest	7	43		
Ventilator				
Yes	8	50		
Not	8	50		
Length of Hospitalization			11.38±8.570	9.00 (2-26)
Antibiotic				

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Metronidazole	16	100
Ampicillin	3	19
Clinical outcome		
Survival	9	56
Death	7	44

Table 2 The Relationship Phillips Score Patients and Clinical Outcomes

Phillips Score Grade	Clinical Outcomes				Total		P Value
	Survival		Death				
	N	%	N	%	N	%	
Mild	2	100	0	0	2	100	**0.038***
Moderate	6	75	2	25	8	100	
Severe	1	17	5	83	6	100	
SUM	9	56	7	44	16	100	

*Significant (p<0,05)

Phillips score In mild grades, there are 2 patients survive (100%). In the moderate grade, 6 patients survived (75%) and 2 patients died (25%). In the severe grade, 1 patient survived (17%) and 5 patients died (83%). The statistical test results obtained p = 0.038, there is a significant relationship between the grade of Phillips score and clinical outcomes.

Table 3 Relationship *of* Ablett Patient Score and Clinical Output

Ablett Score Grades	Clinical Outcomes				Total		P Value
	Survival		Death				
	N	%	N	%	N	%	
Mild	2	100	0	0	2	100	
Moderate	6	100	0	0	6	100	**0.007***
Severe	1	16	5	84	6	100	
Very Severe	0	0	2	100	2	100	
SUM	9	56	7	44	16	100	

*Significant (p<0,05)

Ablett score mild grade, there are 2 patients survive (100%). In the moderate grade, 6 patients survived (100%). In the severe grade, 1 patient survived (16%) and 5 patients died (84%). In very severe grade, 2 patients died (100%). The statistical test results obtained p = 0.007, there is a significant relationship between the grade of Ablett score and clinical outcome

Table 4 Relationship Ventilator Use and Clinical Outcome

Breather	Clinical Outcomes				Total		P Value
	Survive		Death				
	N	%	N	%	N	%	
No ventilator	7	78	1	12	8	100	0.041
Ventilator	2	25	6	75	8	100	
SUM	9	56	7	44	16	100	

*Significant (p<0,05)

In patients who were not on a ventilator, 7 patients survived (78%) and 1 patient died (12%). Of the patients on ventilators, 2 patients survived (25%) and 6 patients died (75%). The statistical test results obtained p = 0.041, there is a significant relationship between the use of ventilators and clinical outcome.

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DISCUSSION

In countries with high incomes, cases of tetanus are reported to occur frequently in the elderly (≥ 60 years). [26] Cases of tetanus in France from 2000 to 2014 had 70 patients with a median age of 80 years with the youngest age being 22 years and the oldest being 91 years. [27] Tetanus in Japan from 2010 to 2016 the average age is 74 years. [28] USA and France, patients aged 65 years and over have a 2 to 10 times higher risk of being infected with tetanus compared to young patients. [1] The group that has a high risk factor for tetanus is people who do not get vaccinated, aged 65 years and over, diabetics, users of injection drugs. [3,11] Research in Poland states that there are all tetanus patients over the age of 60 years (100%), this is because people with old age are more easily traumatized from falls or accidents and there is rarely a tetanus vaccine at a young age. [11]

Research in Brazil of 236 patients found that 188 patients (79%) were male and the rest were female. [29] Research in Uganda, 86% of tetanus patients over the age of 16 were men. [30] WHO global survey and literature study in 2016 found about 71% of hospitalized patients with tetanus were men. [31]

In the most cases, port of entry from the small skin of wounds or abrasions and in about 20–50% of cases, no entries are clearly visible. [32] Research in brazil, the wound locations of tetanus patients were 148 (62%) in the lower extremities, the upper extremities 46 (19%), the head 14 (5.9%), the body 4 (1.6%), the Uterus 2 (0.8%) and the unknown (9.3%). [33]

Tetanus is usually caused by bacteria that infect wounds: deep penetrating wounds are very susceptible to the occurrence of tetanus, but can also occur in wounds that only hit superficial parts or even those that are not realized. [27] In the vast majority of cases, tetanus arises from the small skin of wounds or abrasions and in about 20–50% of cases, no entries are clearly visible. [32]

Research at Sanglah General Hospital from January 2018 to October 2019, at most levels according to ablett scores were moderate 18 patient (54.5%), severe 9 patient (27.3%), very severe 5 patient (15.2%) and mild 1 patient (3.0%).[32]

The results of the analysis of the relationship between the Ablett score grade and the tetanus patient output after treatment obtained a p = 0.007 value, there is a significant relationship between the grade of Ablett score and clinical outcome This is similar to the study on the relationship between the grade of tetanus and the clinical output of tetanus patients at sanglah Hospital in January 2018 – October 2019 with a p value = 0.008, and in accordance with the results of a study at Felege Hiwot Hospital Ethiopia which stated that there was a relationship between the grade of tetanus and the clinical output of tetanus with a p value = 0.000. [33]

In other studies, clinical outcomes were obtained from tetanus with the highest number of groups, namely in the clinical output group of survival/recovery when discharged as many as 19 people (57.6%) and the group with clinical outcomes died as many as 14 people (42.4%). [32]

The tetanus type in this study was obtained by 13 patients (81%) general, 2 patients (13%) local and 1 patient (6%) *cephalic*. This is similar to the study conducted in Thailand, namely 43 patients (91.4%) belonged to the general type, 3 patients (6.4%) to the local tetanus type and 1 patient (2.2) to the cephalic type. [33]

In a French study, 40 sujbek (57%) tetanus patients who experienced autonomic disfusion were found to be unstable blood pressure 29 patients (41%), unstable heart rate 17 patients (24%) and ventricular arrhythmias 4 patients (6%). [27] Autonomic disorders usually begin a few days after spasm and last 1−2 weeks. Increased predominantly sympathetic tone leads to periods of vasoconstriction, tachycardia and hypertension. Autonomic storms are associated with increased catecholamine levels. This situation alternates with sudden episodes of hypotension, bradycardia and asystole. Images of other autonomic disorders include salivation, sweating, increased bronchial secretion, hyperpyrexia, stasis of the stomach and ileus. [32]

Research in France, 14% of patients suffered from diabetes mellitus. [29] The group that has a high risk factor for tetanus is people who do not get vaccinated, aged 65 years and over, diabetics, users of injection drugs. [3.11]

Tetanus vaccination programs reduce the incidence of tetanus in developing countries. However, the mortality rate due to tetanus reaches 50% in patients over 60 years old who rarely get tetanus vaccination. [11] In the USA and France, patients aged 65 years and older have a 2 to 10 times

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higher risk of being infected with tetanus compared to young patients. [1] Groups that have a high risk factor for tetanus are people who do not get vaccinated, aged 65 years and over, diabetics, users of injection drugs. [3.11] Despite the tetanus vaccine, the incidence rate is still high due to lack of information. [5] Lack of knowledge and understanding of the risk of tetanus infection causes people to be less concerned about contaminated objects, thus underestimating acquired wounds that can potentially lead to tetanus disease. [12] Immunity to tetanus does not last a lifetime so it is necessary to inject a booster in patients who have wounds who are at risk of being infected with tetanus. [10]

Research in Brazil found that the most common complications of infection were 88% of respiratory infections and 46% of urinary tract infections. [32] Study conducted in Brazil, 236 patients were found to be 19 patients (8%) using ventilators. [29]

Research focused on the optimal administration of antibiotics between procain benzyl penicillin (1.5 million units every 8 hours intramuscularly) or metronidazole (500 mg every 6 hours orally or 1000 mg every 8 hours rectal) obtained results, namely the mortality of patients who received metronidazole therapy 7%, smaller than the mortality rate of patients given procain benzyl penicillin which was 24%. [32]

Research at Sanglah Hospital in January 2018 – October 2019, clinical outcomes from tetanus with the highest number of groups survival/recovered when discharged as many as 19 people (57.6%) and the group with clinical outcomes died as many as 14 people (42.4%). [33]

CONCLUSION

Based on the results of this study, this study concluded that there was a relationship between the degree of Phillips' score and clinical outcome, there was a relationship between the degree of Ablet's score and clinical outcome and there was a relationship between ventilator use and patient outcomes. In future research, it is necessary to conduct similar research with a larger sample.

ETHICAL APPROVAL

This research has received Ethics approval from the Health Research Ethics Committee of Dr. Kariadi Hospital with number 1253 / EC / KEPK-RSDK / 2022.

CONFLICTS OF INTEREST

The author declare,there is no conflict of interest.

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