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RESEARCH ARTICLE

COMPARISON OF SCALD BURN PATIENTS' OUTCOMES BASED ON BODY MASS INDEX

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ABSTRACT

Introduction: Burns are one of the most common types of wounds. Severe burns can cause morbidity and a relatively high degree of disability. The impact of obesity on the burn population has produced mixed results in several studies. Obese patients also have an increased risk of increasing the length of hospital stay. **Aim:** This study was to determine the comparison of scald burn patient outcomes based on body mass index. **Method:** This research is a comparative-analytic study with a retrospective cohort study design, using secondary data from the medical records of burn patients at RSUP H. Adam Malik from 2016 to 2018. The total sample obtained was 81 people. Then the mean comparison test was carried out for more than two groups and the data distribution was normal so that the One Way Anova test was carried out. **Result:** Patients with normal BMI the results were 12.7 + 2.0, while the results in patients with overweight categories were 19.0 + 1.9, in the obese 1 category group the results were 22.5 + 1.8, in the obese 2 group the results were 27.6 + 1.8, and in the category group Obese 3 results obtained 34.3 + 1.6, the significance of the One Way Anova test is p-value <0.001. While the BMI analysis of mortality rates was carried out by using the chi-square test, with 0% results in the normal BMI category, 0% in the overweight category group, while in the obese 1 category group 13.3%, 23.0% results in the patient group. obese category 2, and 66.7% of patients in the obese category 3 group with a significant p-value of <0.001 in the chi-square test of this study. **Conclusion:** The higher the body mass index group level, the higher the length of hospital stay and the mortality rate for patients.

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INTRODUCTION

Burns are trauma to the skin or surrounding tissue caused by heat or caused by radiation, radioactive, electricity, friction or contact with chemicals (WHO, 2018). Burns can be classified based on wound depth, burn area, and etiology. According to the depth of the burn is divided into 3 degrees, firstly degrees I (superficial), II (Partial Thickness) and III (Full Thickness). The burn area is expressed as a percent of the total area of the body. Wallace's formula 9 or rule of nine is used to calculate burn area. The Rule of Nine can give more accurate results when used in adults, while for children 15 years old and under it can give less accurate results. In children, the formula 10-15-20 can be used while in infants it can use formula 10 because the relative surface area of the child's head is larger (Hasibuan LY, 2017; Evers LH, 2010). At the first and second-degree minor burns, spontaneous healing is the main objective.

Second-degree minor burns heal from the epithelium of the residual hair follicles, which are abundant in the superficial dermis. Healing is complete within 5-7 days and scarring is almost less. In second degree deep and third degree burns, secondary healing, which involves the process of epithelization and contraction, inflammation (reactive), proliferation (reparative) and maturation (renovation) are the three phases in wound healing. This process is the same for all types of wounds, the difference is the duration in each stage. (Evers LH, 2010). Considering the prognosis of patients with burns, it is necessary to consider several components such as gender, age, inhalation trauma, full thickness and TBSA that affect the prognosis of burn patients. (Ahmed, 2018). BMI is a guideline for determining overweight based on the quatelet index {weight in kilograms divided by the square of height in meters (kg / m²)}. BMI interpretation depends on the age and sex of the child because boys and girls have different levels of body fat. BMI is the easiest way to estimate obesity and is highly correlated with body fat mass, but it is also important to identify obese patients who are at risk of medical complications (Pujiati et al, 2010).

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Obesity, a chronic disorder characterized by excess body fat, results from an imbalance between calories consumed and those needed for physical activity, growth, and metabolism. It is a global problem and is recognized as a major contributor to the worldwide burden of chronic disease and disability. (Goutos, 2012). In burn patients, lipolysis is suppressed so that the utilization of fat for energy is reduced. The increase in beta-oxidation of fat is useful for providing fuel during hypermetabolic states. However, only 30% of the free fatty acids are degraded and the rest accumulates in the liver through the reesterification process. Obesity can cause a decrease in the supply of blood vessels, thereby impairing the delivery of nutrients and other elements needed in the healing process. In addition, in obesity the fusion of fatty tissue is more difficult, complications such as dehydration and depigmentation followed by infection can occur (Pauzenberger, 2020)

(TBSA) affected in this study was 25.2%. In Table 2. The BMI analysis of the length of treatment was carried out by a mean comparison test of more than two groups and the data distribution was normal so that the One Way Anova test was carried out, in patients with normal BMI the result was 12.7 + 2.0, while in patients with the overweight category the result was 19.0 + 1.9, in the obese 1 category the results were 22.5 + 1.8, in the obese 2 group the results were 27.6 + 1.8, and in the obese 3 group the results were 34.3 + 1.6, with significance in the One Way Anova test is p-value <0.001. For the analysis of BMI on mortality, the test was carried out *chi-square*, with 0% results in the normal BMI category group, the overweight category group obtained 0% results, while in the obese 1 category group the results were 13.3%, 23.0% results were obtained in patients in the obese category 2 group, and 66.7% in the obese category group patients. 3 with a significance in the chi-square test of this study is p-value <0.001.

Table 1. Demographic Data

	Normal BMI	Overweight	Obese 1	Obese 2	Obese 3	p-value
Age, mean (SD)	33.61 (13.7)	35.21 (14.2)	33.07 (14.0)	33.85 (11.3)	41.83 (12.9)	0.710
Gender (male)	17 (60.8)	13 (68.4)	11 (68.8)	4 (33.3)	3 (50)	0.165
Gender (female)	11 (39.2)	6 (31.6)	5 (31.2)	8 (66.7)	3 (50)	
% TBSA, mean (SD)	22.11 (11.1)	25.16 (19.8)	31.4 (17.2)	25.92 (23.6)	22.83 (13.9)	0.556

Table 2. BMI Analysis of Length of Care and Mortality

	Normal BMI	Overweight	Obese 1	Obese 2	Obese 3	p-value
Length of Treatment, mean (SD)	12.7 (2.0)	19.0 (1.9)	22.5 (1.8)	27.6 (1.8)	34.3 (1.6)	<0.001
Mortality (%)	0 (0%)	0 (0%)	2 (13.3%)	3 (23.0%)	4 (66.7%)	<0.001

MATERIAL AND METHODS

This research is a comparative-analytic study with a retrospective cohort study design, using secondary data from the medical records of burn patients at RSUP H. Adam Malik from 2016 to 2018. This research was conducted at the H. Adam Malik Central General Hospital in Medan starting from May until August 2019. The sample in this study were burn patients treated at the H. Adam Malik General Hospital Medan in the period 2016 to 2018, totaling 81 people. The inclusion criteria in this study were burn patients over 18 years of age who had complete medical record data.

RESULTS

This research was conducted at the H. Adam Malik Central General Hospital Medan from May to August 2019. During the period from May to August 2019, there were a total of 115 patients who went to the H. Adam Malik General Hospital Medan with a diagnosis of burns. However, from the total sample, not all patients met the inclusion criteria, with 81 of them patients who met the inclusion criteria, namely burn patients aged 18 years and over who came for treatment at the H. Adam Malik General Hospital Medan. In Table 1. The group of patients with normal BMI was 34.6% (n = 28), in the group of overweight patients it was 23.5% (n = 19), in the patient group with obese 1 it was 18.5% (n = 15), in the patient group with obese 2 as much as 16.0% (n = 13), and finally in the category of obese group 3 as much as 7.4% (n = 6). From the available and processed data, the mean age of patients in this study was 34.5 years, with the highest prevalence of cases in the male group of 59% compared to 41% in the female group. The average percentage of total body surface area

Conclusion

This study aims to determine the incidence of burns at RSUP H. Adam Malik Medan during the period 2016 to 2018, and to assess the outcome of burn patients based on body mass index (BMI). Outcomes in this study were assessed based on length of hospital stay and patient mortality rates, compared with the patient's body mass index group. Based on the results of the research that has been done, it can be concluded that the body mass index can be used as a factor that aggravates wound healing which can be assessed through the length of patient care in the hospital and the mortality rate.

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