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THE EFFECTIVENESS OF GIVING SNAIL SLIME (ACATINA FULICA) ON THE HEALING OF POCKET ON THE WISTAR RATS WITH PERIODONTITIS

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ABSTRACT

Objective: Periodontitis is an inflammatory disease of dental support tissue caused by certain groups of microorganisms, resulting in progressive destruction of the periodontal ligament and alveolar bone, with pocket formation, recession, or both. Snail slime contains beta-agglutinin (antibody) in plasma (serum), achacin protein, glycoconjugate and sulphate acting, which play a role in the wound healing process by assisting blood clotting process and fibroblast proliferation. This study aims to prove that the provision of snail slime can cure pocket in wistar rats with periodontitis.

Methods: This type of research is an experimental test with pre and post test control group design and involves three treatment groups, each group with five subjects. The first group of debridement, the second group of debridement and orally snail slime and the third group of debridement and topically snail slime, previously rats as subjects were conditioned to periodontitis by the installation of silk ligature in the cervical area of the incisors and injection with *actinobacillus actinomycetemcomitans* bacteria. The pocket depth is checked with a periodontal probe. Examination on day 11 occurs chronic periodontitis. The eighth day after treatment was examined on the periodontal pocket.

Results: The first group occurred a reduction in pocket depth from 3 mm to 1,00 mm, while in the second group periodontitis healing was characterized by the absence of a pocket, the third group still had pockets with a depth of 0.5 mm. Analysis of significance data using *Kruskal-Wallis* test, then *Mann-Whitney* test to know the differences between groups, The average pocket depth in group 1 was 0.00±1.00, while in group 2 was 0.00±0.00, and group 3 was 0.00±0.5 p-value = 0.001 this mean different healing significantly ($p<0.05$).

Conclusion: Provision of peroral snail slime more quickly cure pocket in wistar rats with periodontitis.

Keywords: Snail slime, Pocket, Periodontitis

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INTRODUCTION

Periodontitis is an inflammatory disease of dental support tissue caused by certain groups of microorganisms, resulting in progressive destruction of the periodontal ligament and alveolar bone, with pocket formation, recession, or both [1]. Aetiology of chronic periodontitis, accumulation of plaque and calcification of the supra and subgingival calculus on the gingival boundary, organisms that cause chronic periodontitis, among others: Porphiromonas gingivalis (P. gingivalis), Prevotella intermedia (P. intermedia), Capnocytophaga, A. actinomycetemcomitans (Aa) Eikenella corrodens, Campylobacter rectus (C. rectus) [2].

Periodontitis treatment is the removal of periodontal pathogens by scaling and root planing (SRP) is removing the hard and soft deposits and bacteria attached to the tooth surface and in subgingiva, thus eliminating bacteria. Cleaning of periodontal pathogens and products with SRP is sometimes not optimal because there are parts that cannot be accessed by SRP devices, so systemic or local antioxidant supplementation is recommended to improve the outcome of SRP therapy [1]. Additional treatment with antibiotics is required to support mechanical treatment, although mechanical treatment of scaling root planing has been able to reduce the amount of bacteria in the pocket, but periodontopathogenic bacteria in the dentinal tubules, gingiva and cementum are still left behind [3]. The method of administration of drugs in periodontitis are two topically and systemically (orally). Oral/systemic drugs administered through the serum to the bottom of the pocket and affect invasive tissue organisms such as Actinobacillus actinomycetemcomitans bacteria, but may also affect the reinfection of bacteria, saliva, tonsils and mucosa. Localized drug administration is ineffective against invasive tissue organisms such as Actinobacillus actinomycetemcomitans bacteria [4].

Periodontal disease patients have high levels of Polymorphonuclear (PMN) and excessive Reactive Oxygen Species (ROS) and cause the destruction of gingival tissues, periodontal ligaments, and alveolar bone through various means including Deoxyribo Nucleic Acid (DNA) damage and stimulating the formation of proinflammatory cytokines. Antioxidants as one of the body's defence systems, then the existing free radicals in the body will be neutralized. Antioxidants neutralize free radicals in the body by providing an electron to form a stable molecule and end free radical reactions [5].

The tendency of people to use traditional medicine is higher, so the utilization of natural materials tends to increase, including some types of plants and animals used as traditional medicines, one of which is snail slime. Snail slime is very useful to treat various diseases such as abortion, menstrual pain, tooth pain and wound healing. Snail slime contains beta-agglutinin (antibody) in plasma (serum), achasin protein, glycoconyugate, and sulphate which play a role in the wound healing process by assisting the blood clotting process and fibroblast proliferation [6]. Snail slime from Cryptomphalus aspersa (also known as H. aspersa or garden snail) contains antioxidant superoxide dismutase (SOD) and glutathione-S-transferase activity (GST) [7]. Preliminary Swastini research, snail slime has effectiveness in vitro with mucosal inhibition test against Actinobacillus actinomycetemcomitans bacteria with 100% concentration on average 17.925 strong criteria. The research was conducted at Airlangga University Microbiology research Center Surabaya July 27, 2017 [8].

Based on the description and no previous research, the research wanted to do research on the effectiveness of snail slime provision (achatina fulica) can healing pocket on wistar rats with periodontitis.

MATERIALS AND METHODS

Materials

This study used slime snail extracted from the garden in Banjar Umaanyar Nyalian Village Banjarangkan District of Klungkung. 50

snails were picked up by slime touching or stimulating snail meat with the tip of the straw, before the snail shell sterilized first with alcohol to prevent bacterial contamination to the slime. Slime is stored in a bottle and then added ethanol then centrifuged for 30 min at the analytical laboratory Faculty of Chemistry, Udayana University, Denpasar Bali. The design of this study is true experimental pre and post test control group design.

Methods

Preparation of research subjects

Show that 15 wistar rats aged 2-3 mo weighing 200-250 grams were divided into three treatment first groups second group (debridement and orally snail slime) and third group (debridement and topically snail slime).

Preparation for making periodontitis rats

Each group was induced by *Actinobacilus actinomycetemcomitans* bacterium 2.42 x 10^8 CFU/ml, as much as 0.22 ml in the mandibular gingival sulcus, before the rats were injected with intramuscular Hcl ketamine, previously rats as subjects were conditioned to periodontitis by the installation of silk ligature in the cervical area of the incisors. On the eleventh day, all rats were diagnosed with chronic periodontitis with a 3 mm pocket depth and three degrees of tooth agitation, then treated in each group.

Giving of snail slime

Provision of topical snail slime is given 3 times a day for 7 d. The first giving at 07.00 pm, both at 13.00 pm, and third at 19.00. The irrigated sockets are given slime snails by syringe until the socket is fully loaded±0.1 ml, the rats scalp was held so that the mouth is facing upwards and the ingredients were inserted easily. Provision of Orally administered snail slime given 1 times a day for 7 d. Snail slime is sucked with sonde made of rubber with a dose of 300 mg/kg/day [9] (Swastini preliminary research), the scalp of the rats is held so that the mouth is facing upward, the goal is that the material can be inserted easily, the sonde enters through the mouth slowly to the stomach. Snail slime is sprayed slowly. Application time is only one time a day at 08.00-09.00 Wita. The seventh day of examination depth pocket with periodontal probe. Analysis of significance data using *Kruskal-Wallis* test, then *Mann-Whitney* test to know the differences between groups.

The effect of giving snail slime

The healing process of periodontitis is indicated by a decrease in pocket depth in both the control and treatment groups (orally and topically), but the pocket depth is different for each group.

RESULTS

Shows that 15 Wistar rats as a sample, divided into three groups, namely the first group was given debridement, treatment second group given debridement and orally snail slime, and group treatment third group given debridement and topically snail slime.

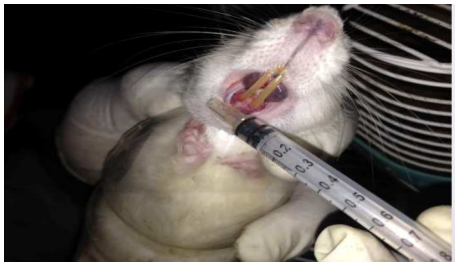

Fig. 1: Rat with periodontitis pocket depth 3 mm

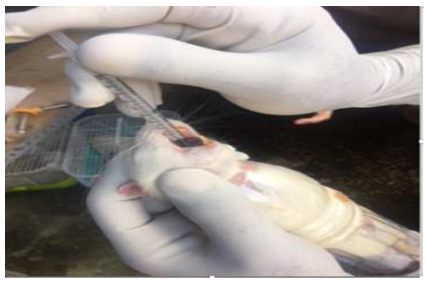

Fig. 2: Application topically snail slime

Fig. 3: Application orally snail slime

Fig. 4: Pocket depth 0 mm

Table 1: Median differences depth pocket intergroup after treatment debridement and snail slime

Subject group	N	Median depth pocket	Range quartile (Q1-Q3)	X^2	P
Debridement	5	1.0	(1.0-1.0)	14.00	0.001
debridement+orally snail slime	5	0.0	(0.0-0.0)		
debridement+topically snail slime	5	0.5	(0.5-0.5)		

Table 1, showed that the median into pocket in the three groups after treatment was significantly different ($p<0.05$), to know the different groups need to be tested further by *Mann-Whitney* test. Test results are presented table 2.

Table 2: Comparative analysis of pocket depth after treatment between groups

Groups	Median difference	P	Interpretation
Debridement and Debridement+orally snail slime	1.0	0.003	Different
Debridement and debridement+topically snail slime	0.5	0.003	Different
Debridement+orally snail slime and debridement+topically snail slime	0.5	0.003	Different

The median depth of the debridement group pockets differed significantly with the debridement group and orally snail slime (median group debridement and orally snail slime lower than the median debridement group). The median pore depth of the debridement group was significantly different from the topically debridement group and of the snail slime (median group debridement and snail slime were topically lower than the median debridement group). The median depth of the debridement group pocket and snail slime is topically different with the orally debridement group and the orally snail slime (median group debridement+orally snail slime lower than median group debridement+topically snail slime).

DISCUSSION

This study used 15 wistar rats divided into three groups. The first group with debridement, the second group of debridement and orally snail slime, the third group of debridement and topically snail slime. Based on the analysis with *Kruskal-Wallis* test in the debridement group there was a decrease of the pocket depth from 3 mm to 1 mm, meaning that there has ot been healing periodontitis, whereas in the debridement group and orally snail slime by the absence of pockets, for the third group 0.5 mm pocket depth. The difference in pocket depth between groups was continued by *Mann-Whitney* test, the difference between the debridement and debridement group of orally snail slime was 1.00, the debridement and the topically snail slime was 0.5, in accordance with the results of research Herryawan that, topical application of red betel leaf gel after scaling and root planning in patients with chronic periodontitis enhances the clinical attachment level better than the treatment option of using scaling and root planning only [10]. The debridement of the orally and topically snail slime was 0.5. The decrease in pocket depth to 0 mm after treatment with debridement and orally administred snail slime is caused by the snail slime containing beta-agglutinin (antibody) in plasma (serum), achacin protein, glycoconjugate, and sulfuric strains. The content of snail slime is most influential on the proliferation of fibroblasts such as acharan sulfate which is useful in accelerating the wound healing process by helping the blood clotting process and the proliferation of fibroblast cells [7]. Snail slime also contains antioxidant superoxide dismutase (SOD) and glutathione-S-transferase activity (GST) enhances the migration and expression of cell adhesion molecules, fibroblast substrates, and cell keratinocytes, whereas glutathione in the blood has a function in protecting the body from oxidation or tissue damage caused by free radicals [5]. The provision of snail slime in periodontal treatment can be done orally or topically. Provision orally provides many advantages because it can be given through the serum to the bottom of the pocket and affects invasive tissue organisms such as bacteria *Actinobacilus actinomycetemcomitans,* but it also can affect the source of reinfection of bacteria, namely tonsils, saliva and mucosa, and shorten maintenance time [4].

CONCLUSION

Pocket care with debridement and orally snail slime can accelerate the depletion of pocket depth, since antibiotic-containing snail slime and antioxidants may provide many advantages because it can be administered through the serum to the pocket base and affect invasive tissue organisms such as *Actinobacilus actinomycetemcomitans* bacteria, affect the source of bacterial reinfection, ie tonsils, saliva, and mucosa, and shorten maintenance time. It is necessary to the test toxicity to be applicable to humans.

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This study was conducted after the approval of the ethics committee of the Faculty of Veterinary Medicine Udayana University Denpasar Bali.

CONFLICT OF INTERESTS

The authors received no external finding is conducting this study. The authors report that there is no conflict of interest to declare.

AUTHORS CONTRIBUTIONS

All the authors have made substantial contributions to the work reported in the manuscript.

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