PROCEEDING BOOK

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“Comprehensive Dentistry in the International Community”

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ABSTRACT

“Objectives:” Traumatic ulcers is a common cases in the oral mucosa. Ulcer healing process can be seen clinically by the decrease of ulcer diameter. Extract gold sea cucumber can enhance macrophage, stimulate fibroblast and collagen so the ulcer diameter will decrease.

“Purpose:” The aim of this study was to know the effectiveness application of water extract gold sea cucumber on the ulcer diameter of oral traumatic healing process Wistar rats.

“Methods:” This study using experimental laboratory with randomized post test only control group design. Twenty Wistar rats male, weighing 200-300 g and aged 3 months, were divided into 4 group. The group are gold sea cucumber extract concentration 20%, 40%, 80% and a negative control group. The diameter of ulcer was measure with digital caliper and analyze with ANOVA.

“Result”: There is significant difference between all group (p<0,05). Animals treated with water extract gold sea cucumber showed the best results regarding the decrease of ulcer diameter after 7 days, especially in concentration 80%.

“Conclusion”: It can be conclude that water extract gold sea cucumber could be used to enhance the oral traumatic healing process by receded the ulcer diameter in oral traumatic healing process Wistar rats.

Keys words: gold sea cucumber, ulcer, diameter.

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INTRODUCTION

Traumatic ulcers in the oral cavity are relatively common and are usually found in non-keratinized surfaces such as the cheek mucosa, edge of the tongue,
lips, gingiva and hard and soft palates.\textsuperscript{1} Wounds are usual in oral cavity. that caused either by trauma or surgery.\textsuperscript{2}

Oral mucosa is covered with stratified squamous epithelium, and the connective tissue bellow the epithelium consists of fibroblasts, collagens and capillaries. The soft tissue healing process in oral proceed the same mechanism as in other area. The wound healing in oral mucosa involves hemostasis, inflammation, cell proliferation and remodeling.\textsuperscript{2,3}

There are several options for the topical treatment of ulcers that can be used in combination or as a stand-alone such as anti-inflammatory, antimicrobial, and analgesic.\textsuperscript{4} The use of traditional medicine is generally considered more secure than the use of modern medicine. This is because traditional medicine has a side effect that is relatively lower than modern medicine.\textsuperscript{5}

Indonesia is country with potential for sea cucumbers world's biggest resources. So far, Indonesia has not been able to process sea cucumbers into a product that can provide added value and economic value. Empirically gold sea cucumber has been widely used for the treatment wound healing in community.\textsuperscript{6}

The use of the gold sea cucumber extract showed an increase in proliferation of fibroblasts, this is possible because the extract of gold sea cucumber can stimulate PDGF (Platelet Derived Growth Factor) and stimulates FGF (Fibroblasts Growth Factor) to promote the proliferation of fibroblasts and promote collagen synthesis so wound healing occurs faster.\textsuperscript{7} Research using sulfated GAGs (glycosaminoglycans) of extract gold sea cucumber showed an increase in contraction through enhanced collagen synthesis it will improve wound closure that clinically characterized by the decrease or receded in ulcer diameter.\textsuperscript{8}
Another content of gold sea cucumbers that are suspected to have an influence on wound healing is omega 3.6 Omega-3 fatty acids include in unsaturated or polyunsaturated fatty acids (PUFA). PUFAs are divided into two groups namely the essential fatty acids omega-3 and omega-6 fatty acids. Omega-3 fatty acids rich of EPA and DHA, that can act as anti-inflammatory.9 EPA and DHA is known can accelerating wound healing procces. In gold sea cucumbers the content of EPA and DHA relatively high.6

The aim of this study was to know the effectiveness application of water extract gold sea cucumber on the ulcer diameter of oral traumatic healing process Wistar rats

**MATERIAL AND METHODS**

All experiments were approved by the Faculty of dentistry Animal Care Committee and performed in accordance with the guidelines of the Airlangga Council on Animal Care. Extract water of gold sea cucumber was made using freeze dried method before it the gold sea cucumber was masedated and shaked in distilled water.10 Water extract gold sea cucumber gel 80%, 40% and 20% (m/v) was made with diluted of water extract gold sea cucumber powder in PEG 400:4000 base. PEG base was added little by little until it reaches the desired concentration. For concentration 20%, 20 gram of powder mix with 100 ml PEG base.11

The material in this experiment were PEG 400, PEG 400, water extract gold sea cucumber, eter, distilled water, and chlorhexidine gluconat 2%. The tools used in this experiment were becker glass, stirrer, pipette, scales, mixer glass, vibrator, thermometer, measuring glass, dental tweezers, mouth mirror, burnisher, burner, disposable syringe 2,5 ml, plastic filling, gloves, mask, and digital caliper
Twenty Wistar rats male, weighing 200-300 g and aged 3 months, were divided into 4 groups. Namely group 1 which given water extract gold sea cucumber gel concentration 80%, group II which given water extract gold sea cucumber gel concentration 40%, group 3 given water extract gold sea cucumber gel concentration 20%, and group 4 as negative control which were not given any treatment.

The ulcer was induced with heated burnisher in lower lips. The ulcer first seen on day 3 after injury. Water extract gold sea cucumber gel were applied into the ulcer on day 3 when the ulcer first time can be observed apply once a day. The ulcer diameter was measure with digital caliper everyday from day 3 until day 7 when the ulcer healed. The measuring result were analyzed using ANOVA test. It analyzed the comparison between water extract gold sea cucumber gel treated group and negative control group (p<0.05).

RESULT

The effect of water extract gold sea cucumber shown on figure 1, the ulcer diameter shown a decrease with application of water extract gold sea cucumber extract. Ulcer diameter was measure with digital caliper on day 3 when first ulcer can be observed until day 7 when the average of rats was healed.
Figure 1. Ulcer diameter on day 3 of group 1 measure with digital caliper (A). Ulcer diameter on day 5 of group 1 measure with digital caliper (B)

Result of experimental study using twenty wistar rats with water extract gold sea cucumber shown in table 1. It shown that the best result on group 1 which had the biggest decrease of ulcer diameter.

Table 1. Average ulcer diameter on cm from day 3 until day 7

<table>
<thead>
<tr>
<th>Group</th>
<th>Day</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Δ ulcer (3-7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td></td>
<td>0.538</td>
<td>0.35</td>
<td>0.202</td>
<td>0.146</td>
<td>0.038</td>
<td>0.5</td>
</tr>
<tr>
<td>Group 2</td>
<td></td>
<td>0.556</td>
<td>0.406</td>
<td>0.304</td>
<td>0.2</td>
<td>0.07</td>
<td>0.486</td>
</tr>
<tr>
<td>Group 3</td>
<td></td>
<td>0.512</td>
<td>0.444</td>
<td>0.326</td>
<td>0.248</td>
<td>0.15</td>
<td>0.362</td>
</tr>
<tr>
<td>Group 4</td>
<td></td>
<td>0.556</td>
<td>0.486</td>
<td>0.382</td>
<td>0.278</td>
<td>0.186</td>
<td>0.37</td>
</tr>
</tbody>
</table>

When displayed in graphical form:

Figure 2. The graphic of average ulcer diameter on 3 days until 7 days after injury, using water extract gold sea cucumber concentration 80%, 40%, 20% and negative control.
The data was collected and analyzed using kolmogorov-smirnov statistical test. It showed normal distribution (p>0.05) which fulfill the requirement of parametric test. ANOVA test showed there were significant difference (p<0.05) in all groups. Analyzed continue with LSD test shown that in group 1 and to 2 the difference not to significant (p>0.05), and the comparation between group 3 and 4 not to significant either. But the comparation in other group shown a significant difference (p<0.05).

DISCUSSION

In this experiment using the oral mucosa, rats are commonly used because they had advantages in relation to other animals. Among these advantages are: cheap, the easy manipulation, maintenance in controlled environmental and sanitary conditions including special diets.\(^1\)

Traumatic ulcers are the most common inflammatory ulcerative conditions in the oral cavity, such traumas are caused by poorly adapted prosthesis or occlusal disharmony, tooth crowns or fractured restorations and even by accidental bites. There is no consensus in the literature about a definite therapeutic protocol, and many times inadequate treatments, such as the use of synthetic substances, phytotherapy and herbs are used by some of the population.\(^1\)

Regarding to the analysis of the ulcer diameter, there is decrease was observed especially in group 1, the area of the injury strated to receded at constant rate until final day in days 7. It is a well-accepted fact that wounds in most tissues heal by repair, by laying down non-specific connective tissue.\(^13\)

More than 50% of connective tissue is made up of collagen in case of sutured wounds. In excised wounds, since the edges are not in contact with each other contraction and epithelization are necessary for the repair process. Hence laying
down and weaving of the collagen material into the healing wound is an important feature. So it is understandable that substances that influence the collagen turn over or maturation enhance the process of wound healing.\textsuperscript{13} Based on the literature for existing glycosaminoglycan content in sea cucumbers may play a role as a modulator of inflammation such as macrophage become more active.\textsuperscript{14}

Proteoglycans are composed of several glikosamonoglikan can modulate the ability of heparin-binding growth factors, such as vascular endothelial growth factor (VEGF), and FGF. Proteoglycan regulate the activity of TGF-β and the preparation of collagen fibrils in type I and III. The release of TGF-β led to an increase in collagen synthesis.\textsuperscript{15} The process of wound healing will occurs faster, clinically it can shown by the decrease of ulcer diameter.

Other compound that suspected to have influence in decrease of ulcer diameter is Omega 3 that affects the production of PGE2, increasing regulation of collagen production.\textsuperscript{16} In our study it shown that the biggest decrease of ulcer diameter was measure in group 1 with treatment water extract gold sea cucumber gel concentration 80%. This may caused by active compound in concentration 80% is more greater than other group.

\textbf{CONCLUSION}

Based on the research results revealed that the treatment using water extract gold sea cucumber gel shown an increase in oral traumatic healing process by enhanced the closure of wound that clinically can be seen in decrease of ulcer diameter.
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