Comparative Efficacy of Traditional Medicine for the Healing of Aphthous Ulcers Due to Foot and Mouth Disease in Cattle

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Citation

Abstract
The experiment was conducted throughout the year, 2011 to 2015 in different dairy farm at Sadar Upazila under Dinajpur district in Bangladesh to study the comparative efficacy traditional medicine in the healing of aphthous ulcer occurred in Foot and Mouth Disease Virus (FMD). Administration of sodium perborate (traditional name sohaga) and honey, 2% Gentian violet and Riboflavin (50mg/kg/cow/day) and 1% Povidone Iodine and Coconut oil on the aphthous ulcers over 15 days. The FMD affected lactating cross bred cows were randomly divided into four groups of equal number and treatment schedule for aphthous ulcers were as follows: Group A=Controlled (Infected), Group B=1% Gentian violet and Riboflavin, Group C= Honey and Sodium perborate, and Group D=1% Povidone iodine and Coconut oil topically into the oral cavity directly daily two times after feeding and closely observed for 15 days. All the four groups salivation was completely stopped at 14th, 10th, 7th and 9th days for Group A, B, C and D respectively; development of Vesiculation was completely stop at 6th, 6th, 5th and 7th days and for Group A, B, C and D respectively and denudation of oral mucosa was completely healed at 14th, 10th, 7th and 9th days for Group A, B, C and D respectively. So it is concluded that sodium perborate honey is comparatively more effective for healing of aphthous ulcers than Povidone Iodine and Coconut oil but Gentian violet and Riboflavin is less effective for healing of aphthous ulcers.

1. Introduction

Inflammation of the mucous lining of any of the structures in the mouth, which may involve the cheeks, gums, tongue, lips and roof or floor of the mouth. This is characterized by multiple recurrent small, round or ovoid ulcers with circumscribed margins, erythematous haloes and yellow or grey floors [1].

The word "stomatitis" literally means inflammation of the mouth. Stomatitis is usually a painful condition, associated with redness, swelling and occasional bleeding from the affected area. Stomatitis affects all age groups. There are two major vesicular (blister) diseases of cattle, foot and mouth disease (FMD) and vesicular stomatitis (VS).
However, there are several diseases that can cause lesions similar to those that occur with ruptured vesicles. The most important diseases of that group are bovine viral diarrhea (BVD), bluetongue, malignant catarrhal fever (MCF) and bovine papular stomatitis [2]. Although some researchers have been performed regarding the healing of aphthous ulcers using modern synthetic drugs but in Bangladesh very few researches have been conducted about this. Some traditional substances like honey, sodium perborate (local name sohaga), gentian violet and coconut oil that are very cheap in the aspect of socio-economy of Bangladesh and have excellent healing capacity. Since till now limited investigation was performed about this traditional drugs, my interest was drawn attention towards the present research. So, the present research has been under taken to (i), Study of comparative efficacy of Honey, Sodium perborate (local name sohaga), Gentian violet, Riboflavin, Povidone iodine and Coconut oil on the healing of aphthous ulcers, (ii). Giving the cheapest and easiest way of aphthous ulcers treatment to the farmer and (iii). Ultimate improved of livestock production in Bangladesh.

2. Materials and Methods

The experiment was conducted throughout the year, 2011 in different dairy farm of Sadar, Dinajpur district of Bangladesh on 40 lactating cross bred cows (Indigenous × Holstein-Friesian cattle) of different age having viral stomatitis due to food and mouth disease (FMD) were considered to determine the comparative efficacy of sodium perborate (local name sohaga), honey, gentian violet, riboflavin, povidone iodine and coconut oil on the healing of aphthous ulcers. To complete the research work following steps were followed:

2.1. Collection of Experimental Animals

Forty lactating cross bred cows affected with foot and mouth disease (FMD) were surveyed in different dairy farm of Sadar, Dinajpur district of Bangladesh to study the comparative efficacy of sodium perborate (local name sohaga), honey, gentian violet, riboflavin, Povidone iodine and coconut oil on the healing of aphthous ulcers. The cows were supplied with soft and liquid feeds and placed in isolated barn at comfortable environment.

2.2. The Test Materials

The test materials were Honey & Sodium perborate (white crystals, local name - Sohaga), 2% Gentian violet & Riboflavin (vit.B2, Tab. Ribosina®, 5mg/Tab., Ibn Sina Pharmaceuticals Ltd. Bangladesh) and 1% Povidone iodine (Viodin® gargle & mouth wash, Square Pharmaceuticals Ltd. Bangladesh) & Coconut oil (Cocos nucifera) all was purchased from local market.

2.3. Preparation of Test Materials

The white crystals of Sodium perborate were grinded (three times) separately by grinder (Mortar and pestle) to fine particles and then by the same way Tab. Ribosina® were grinded. Then a mixture was made by 100 ml of Honey with 50 gm of Sodium perborate; 100 ml of 1% Gentian violet with 50 gm powdered Tab. Ribosina® and 100 ml of Viodin® with 50 ml of Coconut oil in separate glass bottle.

2.4. Experimental Design

All the 40 experimental cows were randomly divided into 4 individual groups (Group A, Group B, Group C and Group D) and 10 cows were placed in each group. The Group A kept as control group (infected), Group B treated with 1% Gentian violet and Riboflavin, Group C treated with Honey and Sodium perborate, Group D treated with 1% Pvidone iodine and Coconut oil. All the drugs were administered topically into the oral cavity directly daily two times (at 9-10 AM and 8-9 PM) after feeding.

2.5. Study Parameters

These experimental animals of each group were closely observed daily for 15 days (experimental period) and the effect of experimental drugs in each group were observed by some clinical symptoms, discussed below:

2.5.1. Inflammation

An inflammatory hyperemic lesion in oral mucous membrane was observed by close direct inspection for redness, swollen, pain from first day till cure.

2.5.2. Salivation

The salivation of all experimental animals under each group was observed by close direct inspection two times daily (9AM & 6 PM) from first day till complete cure. We observed the nature of salivation and amount of salivation (scanty, moderate and copious).

2.5.3. Vesiculation

The chronological development of vesicles in stomatitis was observed daily two times (9 AM and 6 PM) for the severity of vesicles with their size, shape by eye inspection during study period.

2.5.4. Denudation of Oral Mucosa

The chronological development of raw surface into the oral mucous membrane was observed during feeding from the first day till complete cure i.e.; healing takes process by regeneration of new epithelial cells in the raw surface of mucous membrane.

2.5.5. Appetite

During study period we were observed the appetite of each group of animals for their response to feed intake, nature of feed intake, amount of feed intake during feeding from the first day till complete cure.
3. Results and Discussion

The comparative effect of drugs 0.5% gentian violet and riboflavin, honey and sodium perborate and 1% povidone iodine and coconut oil on the healing of aphthous ulcers in stomatitis due to foot and mouth disease in 40 cross bred lactating cows were studied. Among all four groups (A, B, C and D) the inflammatory signs (redness, swollen and pain) were completely stopped at faster by 6th days of group C (Honey & Sodium perborate) whereas in other groups it required 8th, 9th and 13th days for group D (1% Povidone Iodine and Coconut oil), B (2% Gentian violet and Riboflavin) and A (Controlled) respectively. The salivation was ceased at 7th days in group C (Honey and Sodium perborate) whereas in group D (1% Povidone Iodine and Coconut oil) at 10th days and in group A (Controlled) at 14th days. Copious salivation was present in all groups except group C (Honey and Sodium perborate). The development of watery vesicles was completely stopped at 5th days in group C (Honey and Sodium perborate), in other three groups required 7th, 6th and 6th days for group D (1% Povidone Iodine and Coconut oil), B (2% Gentian violet and Riboflavin) and A (Controlled) respectively. Severe vesicles were developed in three groups except group C (Honey and Sodium perborate).

Healing of aphthous ulcers required 7th days for group C (Honey and Sodium perborate) whereas in group D (1% Povidone Iodine and Coconut oil), B (2% Gentian violet and Riboflavin) and A (Controlled) it required 9, 10 and 14 days respectively. Due to completely healing of aphthous ulcers, normal appetite returned at 7th days of group C (Honey and Sodium perborate) and then at 9th days of group D (1% Povidone Iodine and Coconut oil), at 10th days of group B (2% Gentian violet and Riboflavin) and at 14th days of group A (Controlled).

![Figure 1. Five day of honey and sodium perborate application, showing denudation of tongue epithelium (→).](Image)

<table>
<thead>
<tr>
<th>Group</th>
<th>Drugs</th>
<th>Experimental parameter</th>
<th>Observation (day)</th>
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<tbody>
<tr>
<td>A</td>
<td>Control (infected)</td>
<td>Salivation</td>
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<tr>
<td></td>
<td></td>
<td>Vesiculation</td>
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<td>Denudation of oral mucosa</td>
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<tr>
<td>B</td>
<td>2% Gentian violet &amp; Riboflavin (50mg/kg/cow/day)</td>
<td>Salivation</td>
<td>- * ** *** **** *** *** ** * ** ** * -</td>
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<td></td>
<td></td>
<td>Vesiculation</td>
<td>- * ** *** **** *** *** ** * ** ** * -</td>
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<td></td>
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<td>Denudation of oral mucosa</td>
<td>- * ** *** **** *** *** ** * ** ** * -</td>
</tr>
<tr>
<td>C</td>
<td>Honey &amp; Sodium perborate</td>
<td>Salivation</td>
<td>- * ** *** **** *** *** ** * ** ** * -</td>
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<td></td>
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<td>Denudation of oral mucosa</td>
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<tr>
<td>D</td>
<td>1% Povidone Iodine &amp; Coconut oil</td>
<td>Salivation</td>
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<td>Denudation of oral mucosa</td>
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</table>

Salivation: *scanty, **moderate, ***copious, - absent
Vesiculation:*low, **moderate, ***severe, - absent
Denudation of oral mucosa: *low, **moderate, ***severe, ****extreme, - absent
Likewise, the work of [12] and [13] correlated strongly to the present study, as they reported that virgin coconut oil exhibited anti-inflammatory activity in an acute, inflammation, analgesic and anti-pyretic properties. Efficacy of gentian violet solution for the healing of aphthous ulcers appear comparatively third position which also supported by the research of [14] where they describe Gentian violet solution at the concentration of 0.00165% does not stain the oral mucosa, is stable and possesses potent antifungal activity. [15] Mentioned that gentian violet is more effective than povidone iodine. The healing tendency of aphthous ulcers accelerated somewhat by riboflavin that agreed with the [16] and [17] where they found In riboflavin deficient rats reduce tensile strength and decrease total collagen content of excision and incision wounds, result delayed wound healing. Deficiency of riboflavin show syndrome characterized by angular stomatitis, a sore, magenta tongue, seborrheic dermatitis about the nose and scrotum and vascularization of the cornea [18, 19].

4. Conclusion

In conclusion, this study on aphthous ulcer in FMD affected cattle has focused the comparative efficacy of different agents that are cost effective and available. The findings of this investigation will help the field veterinarian for the treatment and control of aphthous ulcers and stomatitis of cattle. Thus, it might be helpful for our small or large-scale dairy farmers.

Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this article.

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