ASSESSMENT AND TOPICAL TREATMENT OF LESIONS OF FOOT AND MOUTH DISEASE IN CATTLE

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ABSTRACT

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The present study was carried out on a total number of 1106 cattle (females = 935 and males = 171) of an age varied between one year and eleven years. Animals were presented to the clinic within a range of 10 days of infection with different lesions of FMD outbreak occurred at April 2012 at Beni-Suef province, Egypt. The aim of the present study is to describe different lesions of foot and mouth disease (FMD) in cattle. The location and frequency of occurrence of lesions were recorded. Topical and systemic treatment was discussed as an alternative policy for control of FMD lesions in endemic countries. The main lesions of the affected cases were recorded in the dental bad (1053), tongue (1020), and inner aspect of the lower lip (713). A moderate number of lesions were recorded on the gum of lower jaw (318), coronary band and interdigital space (518) and teats (303). Lesions were seen in small number of cases on the muzzle (104), nostrils (17), and hard palate (15). Recovery of all lesions was obtained within 3-10 days with variable degree of scar tissue formation. Slight teat dysfunction and mastitis was supervene in 33 cases. Slight degree of lameness due to thimbling of the claws was recorded in 220 animals. Early management of FMD lesions decreases the economic losses and speeds returning of the animal to normal condition.

Key Words: *Topical treatment, FMD, Cattle, Beni-Suef province, Egypt.*

INTRODUCTION

Foot and mouth disease (FMD) is a severe highly contagious disease of cattle, sheep, goats, pigs and other cloven-hooved ruminants (Davies 2002). The disease is characterized by an acute febrile reaction, off food, profuse salivation and formation of blister-like lesions (vesicles) followed by erosion on the tongue and lips, on the teat and between hooves, reduction of milk production, mastitis and infertility. Most affected animals recover but the disease leaves them debilitated (Alexandersen, Zhang *et al.*,2003).

In countries like Great Britain, the accepted policy with affected animals is to stamp them out by slaughtering all affected stock. The success of slaughtering policy depends on the prompt reporting of all suspected cases of the disease (Thompson and Muriel *et al.*, 2002; Kitching and Hutber *et al.*, 2005).

The disease is considerably less obvious in breeds of cattle indigenous to Africa and Asia including Egypt, where FMD is mostly endemic that's why the disease is so-called chronic FMD (Catley and Okoth *et al.*, 2001). However, FMD is also economically important in these regions, further reducing an already low milk yield, causing the death in young calves and interfering with the work of adult animals (Kitching 2002).

In spite of the detailed description of FMD lesions in literatures, the frequency of their occurrence in different body regions were not considered. In addition, little attention was encountered with the topical management and medical treatment of FMD lesions. The aim of the present study is to describe FMD lesions, recording the frequency of occurrence of the lesions in different body regions and assessment of a suggested regime for treatment.

MATERIALS and METHODS

The present study was carried out on a total number of 1106 cattle (females=935, males=171) of an age

varied between one and eleven years. Animals were presented to the clinic within a range of ten days of infection with different FMD lesions, history of acute febrile condition, off food, and perfuse salivation due to FMD outbreak, Abril 2012, Beni-Suef province in Egypt.

The location, extension, and distribution of the lesions were recorded for all cases. Topical and systemic treatment for all lesions were applied as follow. The results of treatment were recorded and documented.

1. Flushing of the lesions with sodium bicarbonate solution 4%.
2. Trimming and freshening of the wound edges and removal of mucous membrane shreds.
3. Drying the lesions with sterile gauze.
4. Spraying for three successive days with a mixture of:
   a. 200 ml of Gentian violet 1% paint E.P. 84.(Gentian violet ®)[1]
   b. 100 ml Lidocaine HCL 20mg/ml (Xylocaine®)[2].
   c. 250 ml Metronidazole 5 mg/ml (Flagyl®)[3].
   d. 200 ml Oxytetracycline 5% (Oxytetracycline®)[4].
5. Single deep intramuscular injection of oxytetracycline and Flunixin Meglumine mixture (Hexasol LA®)[5] in a dose of 1ml per 10kg bodyweight (equivalent to 30mg/kg oxytetracycline and 2mg/kg flunixin).
6. Parenteral Ringer's and Dextrose 5% infusion[6]2 liters of both for three successive days.

[1]Gentian violet-philopharm pharmaceuticals, 10th of Ramadan City –Egypt
[2]Xylocaine- Astra Zenece – Egypt.
[3]Flagyl (Metronidazol) EI-Amreia Company, Alexandria, Egypt.
[4]Oxytetracycline 5% -Delta pharm - veterinary sector, 10th of Ramadan City – Egypt.
[5]Hexasol LA -Norbrook – Egypt.
[6]Ringer's and Dextrose 5% -ADWIC- El-Nasr pharmaceutical chemicals, Abu Zaabal, Egypt.

RESULTS

Location and frequency of occurrence of FMD lesions at different body organs were illustrated in table 1.

Table 1: Illustrates the location and frequency of occurrence of FMD lesions.

	Location of lesion	Frequency of occurrence
1	Dental bad	1053
2	Tongue	1020
3	Inner aspect of the lower lip	713
4	Gum of the lower lip	318
5	Muzzle	104
6	Nostrils	17
7	Hard palate	15
8	Coronary band and interdigital space	518
9	Teats	303

Lesions on the dental pad appear as a one or two rounded, oval or irregular ulcer with denuded mucous membrane and velvety red surface (Figure 1). Coalesce of ulcers may occur forming a large longitudinal ulcer along the whole length of the dental pad (Figure 2). Accumulation of crusts, desquamated epithelial tissues, and coagulated exudate may found covering the ulcer surface (Figure 3). Healing occurs in a form of a rounded or longitudinal pale scar, sometimes with irregular pigmentation at the center (Figure 4). Lesions of the dental bad mayinclude the inner surface of the upper lip.

Lesions of the tongue appear at the dorsal surface, less frequently affecting the lateral borders and the tip

of the tongue, and rarely observed on the ventral surface. They appear as a row surface surrounded by ragged fragments of a loose epithelial tissues. Large shreds of mucous membrane were seen separated and detached form the underling muscles (Figure 5-6). When healing occurs, they appear as a rounded or irregular scar slightly elevated lesions (Figure 7).

Lesions at the inner aspect of the lower lipusually seen in a form of rounded, oval or irregular areas of red discoloration with denuded mucous membrane (Figure 8). Non-pigmented scar tissue was formed in treated cases. Lesions of the gum appear on the lingual and labial surfaces as irregular or oval ulcers (Figure 9).

Lesions on the muzzle appear as a one vesicle that ruptured later(Figure 10 A, B). The whole muzzle may get inflamed and covered by desquamated and contaminated epithelial shredding (seven cases) (Figure 11 A, B). Lesions at the nostrils appear in a form of a large area of inflammatory mucous membrane with red discoloration and muco-purulant discharge (Figure 12). Rarely, Lesions were seen at the periphery of the hard palate in a form of longitudinal ulcers (Figure 13).

Separation of the claws at the coronary band with prolapse of the coronary corium were recorded and leads to a moderate degree of lameness. Thimbling of the claws was resulted and obvious1ly seen after 2 months of infection as a transverse line separating the old claws from the new ones. Slight degree of lameness due to thimbling of the claws was continued until separation of the old claws occurred few months later. Lesions of the skin at the interdigital space weredetected in 96 cases (Figure 14 A, B - 15). Multiple ulcers were also detected on the teats (Figure 16-17). Infection may develop leading to mastitis in neglected cases.

The results of topical and systemic therapy were encouraging. Recovery of all lesions on the mouth cavity wasseen within 3-10 days with variable degree of scar tissue formation. The scars appear as irregular pale de-pigmented areas on the surface of mucous membrane. The process of prehension and mastication return gradually in a parallel line with healing of mouth lesions. Slight teat dysfunction and mastitis was supervene in 33 cases. In addition, slight lameness due to thimbling of the claws was recorded in 220 animals and subsides after complete spontaneous sloughing of the old claws within 4-6 months of occurrence.

Legends of figures

Figure 1: Ulcers on the dental pad before sheading of epithelium (A) and after sloughing (B).

Figure 2: Large longitudinal ulcer along the whole length of the dental pad and at the latro-ventral aspect of the tongue.

Figure 3: A large ulcer on the dental pad before removal of desquamated epithelial tissues and coagulated exudate.

Figure 4: Healed dental pad ulcers with irregular pigmentation at the center.

Figure 5: A large area of denuded epithelium at the dorsum of the tongue.

Figure 6: A complete sloughing of the epithelial covering of the dorsal surface of the free end of the tongue.

Figure 7: Several rounded healed ulcers at the dorsum of the tongue.

Figure 8: Multiple rounded ulcers at the mucous membrane atthe inner aspect of the lower lip.

Figure 9: A. Irregular ulcers at the lingual surface of the gum of lower incisors.

Figure 9: B. Irregular ulcers at the labial surface of the gum of lower incisors.

Figure 10: A. A rounded vesicle on the muzzle before rupture (A) and after rupture (B).

Figure 10: B. A rounded vesicle on the muzzle after rupture.

Figure 11: A. Inflamed muzzle covered by desquamated epithelial shredding

Figure 11: B. Inflamed muzzle after removal of necrotic tissues.

Figure 12: Ulcers at the lateral aspect of the nostrils.

Figure 13: Irregular longitudinal ulcers at the lateral borders of the hard palate.

Figure 14: A. A separation of the claw at the level of the coronary band.

Figure 14: B. A separation of the claw at the level of the coronary band with prolapse of the coronary corium.

Figure 15: Thimbling of the claw with interdigital ulcer.

Figure 16: Multiple small ulcers at the teat.

Figure 17: Mammillitis at the four teats as a complication of FMD.

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Figure 16: Multiple small ulcers at the teat.

Figure 17: Mammillitis at the four teats as a complication of FMD.

DISCUSSION

Lesions of FMD were seen on the dental pad, lips, gum, and tongue and also seen on the coronary band, interdigital space, and teats (Kitching 2002). The present study revealed presence of FMD lesions at the same aforementioned locations in addition to the muzzle (104 cases), nostrils (17 cases), and hard palate (15 cases) (Alexandersen, Zhang e*t al.*, 2003).

The most commonly affected organs were the tongue, dental pad and the upper and lower lips. Moderately affected organs were the gum of the lower incisors and the coronary band. The least affected organs were muzzle, nostrils and hard palate.

Many authors due to governmental rules and regulations dealing with incoming non-endemic infectious diseases did not recommend treatment of affected animals. The policy is to stamp them out by slaughtering of all affected stock and others, which have been exposed to such risk of infection (Garner and Lack 1995; Paarlberg, Lee *et al.,* 2002; Muroga, Hayama *et al.*,2012). In developing countries, where the disease is endemic, medical treatment is the economic choice.

The treatment aims to return the affected animals to normal appetite quickly and decrease the weight loss through treatment of FMD lesions at the mouth and claws as well as to prevent development of

complications like mastitis, teat dysfunction (Sharma 2010), and lameness.

In a former study, ethnoveterinary remedies of natural soda ash solution (97% sodium bicarbonate) with honey and finger millet flour were used to manage FMD lesions (Gakuya, Mulei *et al.,* 2011). They reported that the fast healing of the lesions vindicates the use of these cheap locally available and easy to apply products in the management of FMD lesions. In the present study flushing of lesions with only 4% sodium bicarbonate was sufficient. Trimming and freshening of wound edges and removal of mucous membrane shreds were essential before spraying to increase the contact between the medicaments and the lesions surface. Gentian violet was applied as a topical antiseptic and Lidocaine HCL as a local anesthetic for temporary relieve of pain while Flagylto act as antimicrobial agent for anaerobes and Oxytetracycline as a topical antibiotics. In addition, systemic therapy was suggested in a form of single dose of antibiotic and anti-inflammatory. Ringer's solution and Dextrose 5% were used to support the general condition of the animal during the first period of illness and off food. This treatment protocol was applied for all patients with good results. Only few cases developed mastitis due to late intervention with mammary gland and teat lesions. Early treatment of lesions will decrease the economic losses and speed returning the animal to normal condition.

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تقيم الإصابات الناجمة عن مرض الحمى القلاعية والعلاج الموضعي لها في الأبقار

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تهدف الدراسة إلى وصف الإصابات الجراحية لمرض الحمى القلاعية في الأبقار وتكرار تواجد الإصابات علي أعضاء الجسم المختلفة. كما تم أيضا تقييم معالجه هذه الإصابات بالعلاج الموضعي كسياسة بديله للتحكم في المرض في الدول الموبوءة بدلا من سياسة إعدام الحيوانات التي تتبع في الدول المتقدمة الخالية من المرض. وقد تمت هذه الدراسة على عدد ١١٠٦ من الأبقار من عمر عام حتى إحدى عشر عاماً (٩٣٥ من الإناث و١٧١ من الذكور) وتم تشخيص مرض الحمى القلاعية خلال الوباء الذي تعرضت له محافظه بني سويف في ابريل ٢٠١٢ وتم التعامل مع هذه الحيوانات خلال عشره أيام من بدء الإصابة بالمرض وتم تسجيل تكرار أماكن الإصابة وامتدادها وتوزيعها على الحيوان وكانت النتائج كالتالي: ١٠٣٥ أصابه على المخدة السنية و١٠٢٠ أصابه على اللسان و٧١٣ على السطح الداخلي للشفة السفلى و٣١٨على لثة الفك السفلى و٥١٨ عند اتصال الأظلاف بالقوائم وبين الأظلاف و٣٠٣ على حلمات الضرع و١٠٤ على المخطم و١٨ على فتحه الأنف و١٥ على حواف سقف الحلق. كما تم أيضا تسجيل نتائج العلاج الموضعي لهذه الحالات وقد تماثلت للشفاء في فتره ما بين ثلاثة إلى عشره أيام مع تكوين ندبات في أماكن الإصابة وكذلك تسجيل عدد ٣٣ حالة تعاني من التهابات الضرع نتيجة لالتهاب الحلمات وأيضا عرج بسيط لعدد ٢٢٠ حيوان نتيجة تكوين أظلاف جديدة أعلى القديمة. وخلصت الدراسة إلى أن العلاج المبكر للإصابات الجراحية الناجمة عن الحمى القلاعية يؤدى إلى عوده الحيوان إلى طبيعته الإنتاجية سريعا كما تقلل من الأضرار الاقتصادية الناجمة عن الإصابة بالمرض.