Foot and Mouth Disease Ageing of Lesions

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Department for Environment
Food and Rural Affairs

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Contents

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Preface

This booklet contains a series of photographs which illustrate the lesions of Foot and Mouth disease in livestock, from their initial appearance until their regression and healing. It is intended to assist veterinarians carrying out clinical inquiries to estimate the age of the lesions.

The photographs were taken at the Institute for Animal Health at Pirbright and the booklet was compiled in collaboration with the Veterinary Exotic Diseases Division and the State Veterinary Service. Particular acknowledgement is made to Dr Alex Donaldson who compiled the booklet and to Jennifer Ryder for the photographs.

Introduction

When investigating Foot and Mouth Disease (FMD), the best estimate of the age of lesions, particularly of the oldest, is an essential part of the case history and a pre-requisite for epidemiological investigation of the origin of infection. Furthermore, establishment of the age of lesions and the number and species of animals affected is the basis for any assessment of the duration and weight of virus excretion and prediction of further spread.

The pictures in this booklet are those that might be expected under certain circumstances, however the clinical manifestation of particular strains of the virus may result in less typical lesions, especially in sheep. In these cases, lesions may be transient and rapid secondary infection or contamination can confuse the clinical picture.

The photographs have been taken of animals infected by contact exposure. The examples are representative of the type of lesions which might be expected at usual sites in the different species, between the stages of vesicle (blister) formation, rupture and healing. The age of the lesion in days is displayed below each image. Once the vesicles have ruptured, the rate of healing can be influenced by many factors. Therefore it is generally only possible to give an approximate estimate of the age of a lesion. Between days 0 and 5 it should be possible to date them accurately within a margin of one day, but after this period the ability to date them precisely decreases.

The following descriptions for estimating the age of legions are based on those of Kitching and Mackay (State Veterinary Journal, 5, Number 3, October 1995, pages 4 – 8).

Day of Clinical Disease	Appearance of lesion
Day 1	Blanching of epithelium followed by formation of fluid filled vesicle
Day 2	Freshly ruptured vesicles characterised by raw epithelium, a clear edge to the lesion and no deposition of fibrin
Day 3	Lesions start to lose their sharp demarcation and bright red colour. Deposition of fibrin starts to occur.
Day 4	Considerable fibrin deposition has occurred and regrowth of epithelium is evident at the periphery of the lesion.
Day 7	Extensive scar tissue formation and healing has occurred. Some fibrin deposition is usually still present.

An estimation of the age of vesicular lesions can be made using the table above. It is important to bear in mind that ageing of lesions can only be approximate as other factors, such as secondary infection, can alter the rate at which the lesions heal.

In pigs most information can be obtained by studying foot lesions, especially those involving the coronary band. If the lesion is still at the

coronary band it is unlikely to be more than about one week old, thereafter the break in continuity of the horn gradually grows down the claw at a rate of approximately 1 mm per week. Consequently by allowing a week for the lesion to grow out of the coronary band and then a week for each millimetre from the coronary band a very rough estimate of the age of an old lesion can be made.

Plates

Plate 1

Tongue of steer with 1-day-old vesicle which ruptured when the tongue was drawn from the mouth.

Plate 2

Steer with 2-day-old ruptured vesicle along upper gum and several 1-day-old unruptured vesicles on the tongue.

Plate 3

Two-day-old ruptured vesicles on the tongue, lower gum and lower lip of a steer. Note sharp edges to ulcerated areas.

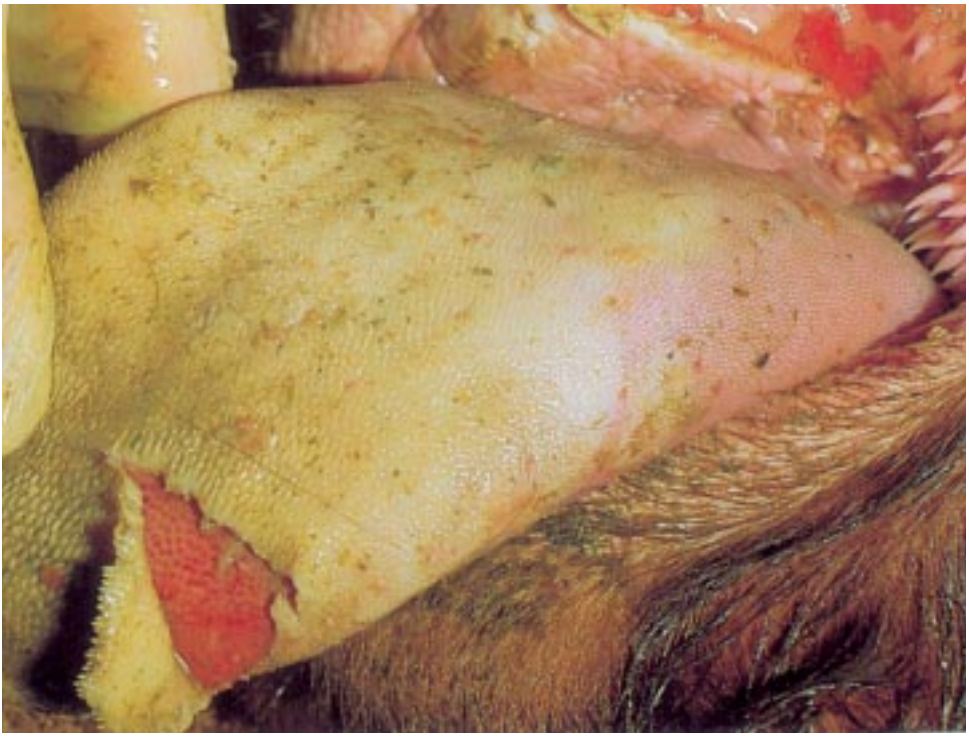

Plate 4

A further example of 2-day-old lesions in the mouth of a steer. Again note sharp margins of lesions and red raw appearance of exposed dermis.

Plate 5

Tongue of steer with 3-day-old lesions. Sero-fibrinous exudation into the lesions has resulted in a loss of earlier red raw appearance and also sharpness of margination. Early granulation evident.

Plate 6

Same animal as in plate 5 with 4-day-old lesions.
Note progressive loss of lesion margination and extensive fibrin infilling.

Plate 7

Steer's tongue with a 10-day-old lesion characterised by loss of papillae, indentation at the site of the lesion and fibrous tissue proliferation.

Plate 8

Foot of a steer with a 2-day-old unruptured vesicle in the inter-digital space.

Plate 9

A different steer also with a 2-day-old inter-digital vesicle.

Plate 10

The heel bulbs of a steer's foot with unruptured 2-day-old vesicles.

Plate 11

The same foot as in Plate 10, 1 day later. The epithelium overlying the vesicle is friable and easily stripped off.

Plate 12

A 5-day-old lesion on a steer's foot. Signs of early granulation are evident.

Plate 13

A 7-day-old lesion on a steer's foot. Healing is progressing underneath the necrotic epithelium.

Plate 14

Another example of a 7-day-old inter-digital foot lesion on a steer.

Plate 15

An 11-day-old foot lesion on the heel bulb of a steer.
Note healing and under-running of horn tissue.

Plate 16

One-day-old vesicles on the teat of a cow. Rupturing has not taken place but several vesicles have coalesced.

Plate 17

Sheep's mouth with two small unruptured vesicles on the dental pad at 1 day of age.
Note blanched, glistening appearance of lesions.

Plate 18

Two-day-old lesion on the dental pad and upper gum of a sheep. The margins of the lesion are sharp.

Plate 19

Further examples of 2-day-old lesions, in this case on a sheep's tongue.

Plate 20

A 2-day-old lesion on the dental pad of a sheep.

Plate 21

The same sheep as in Plate 20, 1 day later.
Note rapid loss of edge definition of lesion.

Plate 22

Sheep's tongue with two 12-day-old lesions only discernible by loss of papillae and indentation of tongue surface.

Plate 23

Sheep's foot with 1-day-old unruptured vesicle along the coronary band.
Note necessity to reflect hair to view the lesion.

Plate 24

Two-day-old lesions in the inter-digital space and along the coronary bands of a sheep's foot.
Note blanching and swelling.

Plate 25

Sheep's foot with coronary band vesicles of 2 days of age, one of which has ruptured.

Plate 26

Sheep's foot with 2-day-old coronary band lesion.
Note the necessity to reflect the hair in order to view the lesion.

Plate 27

Same foot as in Plate 26, one day later i.e. 3-day-old lesion.
Note sero-fibrinous exudate and swelling.

Plate 28

A 4-day-old coronary band lesion on a sheep's foot. Swelling has decreased and signs of early healing are evident.

Plate 29

A 6-day-old lesion on the coronary band of a sheep's foot.
Note scab formation and rapid rate of healing.

Plate 30

A sheep's foot with a 10-day-old healed coronary band lesion. Note under-running of horn tissue.

Plate 31

Goat with 2-day-old lesions on tongue and upper and lower lips.

Plate 32

Goat's foot with 1-day-old unruptured coronary band vesicle.
Comment: foot-and-mouth disease vesicles in goats are generally less pronounced than in sheep and heal and regress even more rapidly.

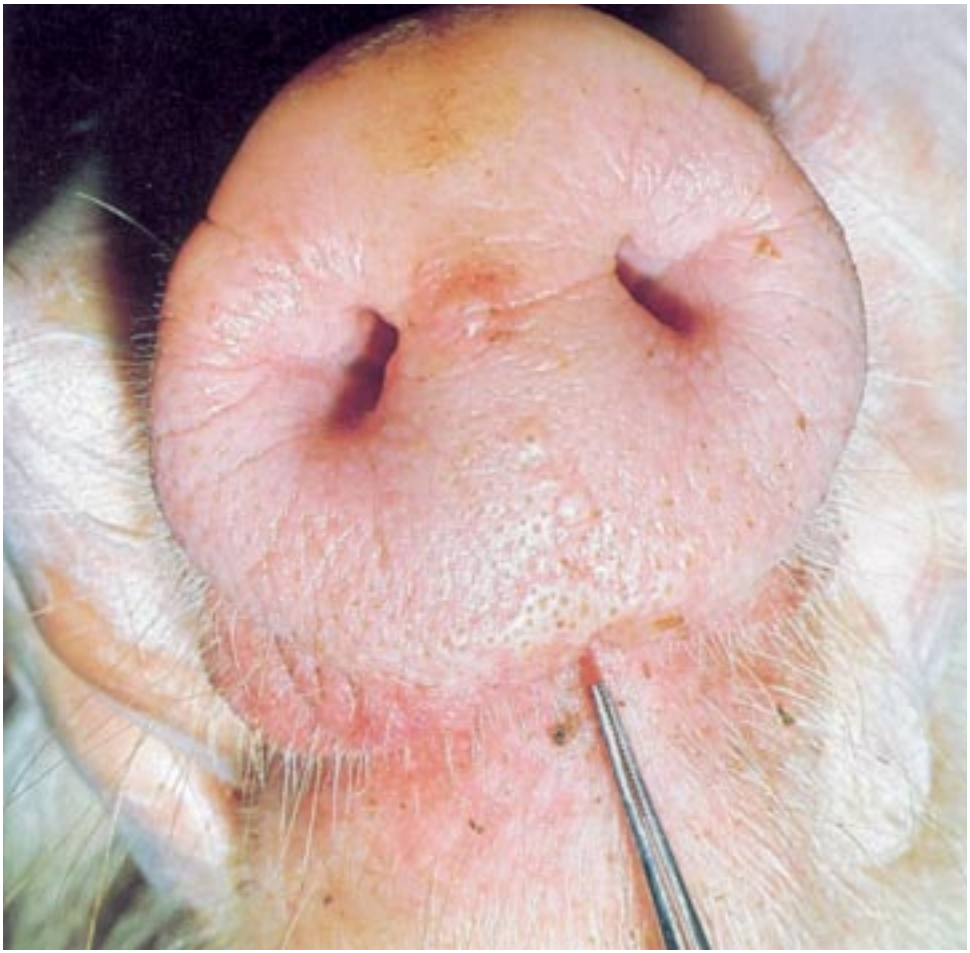

Plate 33

One-day-old unruptured vesicles on the snout of a pig.

Plate 34

One-day-old vesication of a pig's snout, gum and lips.

Plate 35

Same animal as shown in Plate 34, 1 day later, i.e. 2-day-old vesicles. Note necrosis of epithelium at lesion sites.

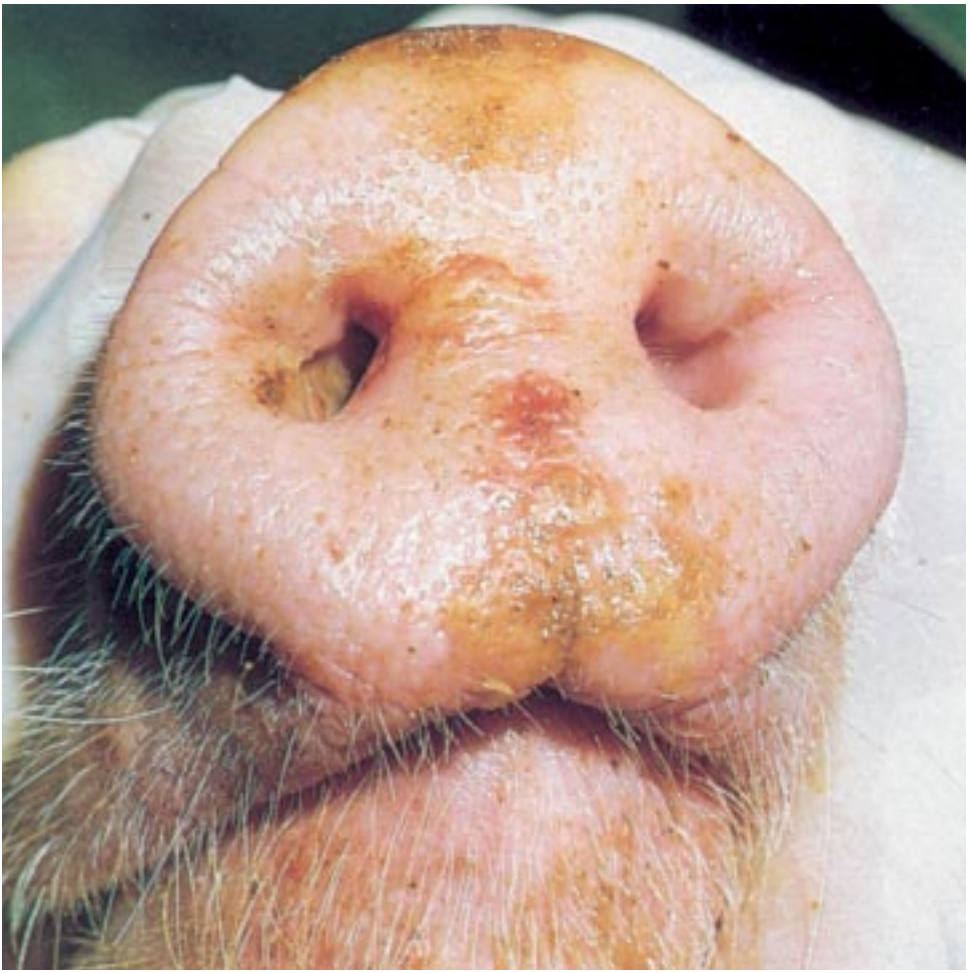

Plate 36

Same animal as in Plate 35 with 3-day-old lesions.
Note extensive necrosis of affected epithelium.

Plate 37

The same animal as in Plate 36, 1 day later i.e. 4-day-old lesions. Scab formation and healing evident.

Plate 38

Mouth of pig showing single, 1-day-old, unruptured vesicle at edge of tongue.

Plate 39

Three-day-old lesions on the tongue of a pig. Sero-fibrinous in-filling and early healing are evident in the lesions at the edge.

Plate 40

Four-day-old lesions on the tongue of a pig. Fibrinous in-filling is extensive.
Note similarity with bovine lesions of same age in plate 6.

Plate 41

Tongue of pig showing 8-day-old healed lesions.

Plate 42

One-day-old coronary band lesions on a pig's feet.

Plate 43

Unruptured vesicle on the supernumerary digit of a pig's foot. Two days of age.

Plate 44

Pig's feet with 3-day-old lesions along the coronary bands of main and supernumerary digits.

Plate 45

Six-day-old lesions on a pig's feet.
Note sero-fibrinous in-filling.

Plate 46

Pig's feet with 8-day-old lesions. Under-running of horn tissue is evident as well as extensive scab formation and healing.

Plate 47

Pig's feet with 9-day-old lesions.

Plate 48

The same pig's feet as shown in Plate 47, also at 9 days.

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