Direct Application of Magnesium Sulphate in Treating Foot and Nail Abscesses in Asian Elephants

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Introduction

Veterinarians working with elephants often have limited access to modern diagnostic and treatment procedures. Hence, effective alternate therapies, which are accessible, affordable and offer ease of application, provide the most efficient answer to managing common diseases.

Foot problems potentially represent the single-most important clinical disease of captive elephants. Predisposing factors include obesity, lack of exercise, nail or sole overgrowth, improper foot care, poor hygiene, inappropriate enclosure surfaces, poor body conformation, malnutrition and secondary skeletal disorders such as degenerative joint disease. Furthermore, elephant management philosophy, disposition of elephants, facilities and competency of staff in caring for elephant's feet contribute significantly to foot health (Zuba *et al*. 2006). Limitation of free access to clean water for bathing and spraying, to twigs or posts for scratching, and inappropriate duration and type of tethering may also lead to foot ailments. The conditions of maintaining captive elephants in many facilities in Asia constantly expose elephants' feet to mud and moisture. Constant covering of feet with dirt and soil may block sweat glands around toenails, preventing drainage and causing infection. Once an infection starts, limitations of maintaining the elephant in a clean environment can result in re-contamination.

Magnesium sulphate, often referred to as Epsom salt is commonly used for whole body-soaking, foot baths, splinter removal, bee stings, sun burn and skin exfoliation in humans. It is absorbed through the skin. Its hygroscopic and anti-inflammatory effects draw out interstitial fluid, reducing oedema and tissue pressure. It improves local circulation and drainage, and thereby facilitates healing (Borle & Richa 2014).

Here I report a case study on the use of magnesium sulphate in the treatment of foot abscesses in elephants.

Case study

Two elephants with partial healing and recurring foot (Fig. 1) and nail (Fig. 2) abscesses were reported from an elephant tourist camp in Chiang Mai, Thailand. The abscesses may have formed as a consequence of arthritis from over-work during logging, causing limitation of movement due to stiffness of the carpal joints of the front legs. The stiffness or joint fixation was evidenced by inability to flex the joints during gait. The prolonged lack of movement and constant covering with mud may have blocked the sweat glands and caused infection, leading to formation of abscesses on one front leg in one elephant and both the front legs in the other. The abscesses were similar to that described by Zuba *et al*. (2006) and initially had a cauliflower-like appearance which later became a proliferative outgrowth of 'crab meat-like' tissue.

Isolation and antibiotic sensitivity tests from pus samples revealed *Klebsiella, Streptococcus, Staphylococcus* and *Pseudomonas*, sensitive to amoxicillin and clavulenic acid. Subsequently amoxicillin was injected intramuscularly (11 mg/kg) once a day for 11 days (Schmidt 1978) and phenylbutazone (1 mg/kg) given orally once a day for 7 days (Blair *et al*. 2001). Foot soaks in luke warm magnesium sulphate solution (225 g/2 L) (Fowler 2006) were conducted for 15 minutes once a day for 30 days. Antiseptic dressing,

initially with tincture of Iodine and subsequently with povidone iodine was carried out twice a day for 30 days.

As the abscesses did not heal with this treatment, after 30 days, magnesium sulphate was applied directly on the abscesses following a footbath and wound cleaning with povidone iodine. Noticeable changes with gradual shrinkage and a clearly visible opening on each abscess were evident within a week and the abscesses dried up completely in a month. These previously unnoticed openings may have remained unexposed owing to inflammation, oedema and tissue pressure but were revealed because of the drying out and shrinking of tissue caused by magnesium sulphate. This could have led to gradual drainage of foreign material, necrotic tissue and pus out of the abscesses. Simultaneous flushing with povidone iodine probably acted as an antiseptic barrier, preventing relapse and resulting in complete healing (Fig. 3). After complete healing, antiseptic scrubbing twice a day and footbaths once a day for 15 minutes were continued and there was no recurrence. Thus, direct application of magnesium sulphate without lancing was found to be successful in treating foot abscesses in elephants.

Together with administration of intramuscular antibiotics and anti-inflammatory drugs, the technique was tried out on elephants with abscesses on the back, shoulder, thigh and temporal regions using magnesium sulphate alone or mixed with glycerine. However, in contrast to the foot abscesses, it did not result in noticeable improvement after one month, and were subsequently lanced. The difference in response may have been due to the greater skin thickness and the absence of 'crab meat-like' tissue in abscesses of other regions.

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Figure 1. Foot abscess.

Figure 2. Nail abscess.

Figure 3. Appearance after a year.