P-ISSN: 2304-3075; E-ISSN: 2305-4360
International Journal of Veterinary Science
www.ijvets.com; editor@ijvets.com

Research Article

Epidemiological, therapeutic and surgical studies on Tail necrosis in Egypt

Fayez A Salib[1*] and Haithem A Farghali[2]

[1]Department of Medicine and Infectious Diseases; [2]Department of Surgery, Anaesthesiology and Radiology, Faculty of Veterinary Medicine, Cairo University, Egypt
***Corresponding author:** fayez_vetmed@hotmail.com

Article History: Received: January 05, 2016 Revised: January 18, 2016 Accepted: January 24, 2016

ABSTRACT

Tail necrosis is a neglected multi-factorial problem in animals. The economical losses resulted from tail necrosis are variable including reduced animal price, annoyance, loss of animals communication tool, deaths due to septicemia and gangrene. The diagnosis of this problem and investigation of their causes were done by clinical, manual, skin smears, skin scrapings examinations of tail, fecal examinations, ration analysis and X-rays examinations. The prevalences of tail necrosis were recorded as 7.89, 2, 0.5, 0.51, 0.78% in buffaloes, cattle, sheep, dog, cat respectively. Two clinical forms of tail necrosis were recorded as dry mild and moist severe. The causes of tail necrosis were recorded as tail crushing, tail fracture, zinc and vitamin A deficiencies, external parasitic infestations, bacterial skin infections, bad hygiene (accumulation of manure), tail nerve paralysis, tail hair tourniquet, tail allergic dermatitis, very cold climates and fungal toxins. Two regimes of the treatment were applied according to the clinical forms of tail necrosis: the medicinal treatment was carried out for dry mild while the surgical amputation of affected part of tail was done for the moist severe form. It was concluded that tail necrosis is a problem in most animal species initiated by different causes, it have two clinical forms and it could be treated medicinally and surgically.

Key words: Tail, necrosis, epidemiology, causes, treatment

INTRODUCTION

Tail functions could be summarized in horses, and other farm animals like buffaloes and cows as follows:
(i) using tails primarily to aid in their comfort, (ii) their swishing action can help keep annoying flies from biting the animal (iii) locomotion and important signaling device, (iv) cows will wag their tails as a threat to a calf before kicking.

In cats and dogs, tail has several functions such as (i) its mechanism allows it to "land on its feet" if the cat falls, (ii) cat may swish his tail, too, which adds to his skill as a hunter, (iii) dogs and cats use theirs to communicate emotions, (iv) the tail is important as a means of counterbalance when the dog is carrying out complicated movements such as leaping, walking along narrow structures or climbing, (v) some dogs use their tails as rudders when swimming, (vi) dogs breeds that could be swimming frequently have tails that are thick, strong and very flexible, which helps them to move easily through the water and make quick turns, (vii) Some dogs use their tails for insulation where Nordic and Arctic breeds have bushy or plumed tails with long dense fur when lying down they may pull their tails over their faces to keep out the cold, (viii)They also use their tails as rudders when pulling a sled across the ice.(Phillips, internet).

Tail-tip necrosis occurs in cattle housed in confinement on slatted floors. The disease has occurred in steers, heifers, and bulls being fed for beef production. The lesion is caused by a traumatic injury of the tail caused by tramping of the tail. The lesion begins at the tip of tail followed by varying degrees of extension proximally. Initially, the tip of the tail is swollen, followed by inflammation and suppuration. Histopathological changes are compatible with cutaneous ischemia as a pathogenetic mechanism. Extension of the infection can result in metastases to other parts of the body resulting in abscesses and osteomyelitis. Affected cattle do not grow normally and deaths from pyemia may occur. The morbidity is about 5%. Approximately 10% of affected animals may be condemned for osteomyelitis and abscessation (Radostitis *et al.*, 2007).

The economical losses from tail necrosis is summarized in the reduced price of the affected animal, the cost of the treatment, predisposing the affected animals to infections and gangrene, loss of communication way and loss of the animal beauty.

In mature dogs, tail amputation is most commonly performed for treatment of traumatic skin loss, ischemia, or denervation. Combined with other therapies, tail amputation may also improve outcome in dogs with perianal fistulas that do not resolve with immune-

Cite This Article as: Salib FA and HA Farghali, 2016. Epidemiological, therapeutic and surgical studies on Tail necrosis in Egypt. Inter J Vet Sci, 5(2): 58-63. www.ijvets.com

suppressive treatment. Pyoderma resulting from ingrown or "screw" tails will also improve after amputation of the tail and associated skin folds. Surgical resection for this condition can be complicated; therefore, referral is recommended.

The goals of this research are to investigate the possible causes, the epidemiology and to evaluate the medicinal and surgical approaches of the treatment of the tail necrosis in different animal species in Egypt.

MATERIALS AND METHODS

Table 1: Overall two year, the following animal populations were investigated for the detection of tail necrosis as presented.

Animal species	The examined animals
Buffaloes	304
Cattle	100
Sheep	400
Goat	150
Equines	210
Dog	389
Cat	380
Total	1933

Samples: Skin smears and scrapings, feces, rations were collected to investigate the causes of tail necrosis in different animals species.

Faecal examination by direct and concentration fecal techniques were done as summarized by Pugh and Baird (2012) to investigate internal parasitism.

Tail examination

Manual examination of tail to detect tail fracture, crushing, loss of sensation and external parasites (ticks, lice and fleas).

X-rays examinations of tails affected with necrosis were made at department of surgery, anesthesiology and radiology.

Skin scrapings examinations were carried out as technique described by Schaer (2003) to investigate mange.

Bacterial smears, isolation and identification were performed as illustrated by Aitken (2007).

Taking impression smears from skin lesions then staining with Gram stain to demonstrate the bacteria microscopically, then bacterial swab was cultivated to isolate and identify bacteria.

Ration analysis to detect vitamins and minerals defeciencies and mycotoxins.

Therapy

It firstly depends on the correction and treatment of the predisposing causes if it was possible. Then the tail necrosis affected animals were treated by the two following regimes:

Medicinal treatment: Curetting of the affected tail part and local spraying oxytetracycline–gentian violet (Oxy-g spray®) (Arabco company, Egypt) that were applied for dry mild form of tail necrosis.

Surgical amputation of affected tail part: it was applied for the treatment of moist severe form of tail necrosis where treatment consists of early amputation combined with intensive antimicrobial therapy. Early detection is important (Radostitis *et al*., 2007).

Tail amputation was carried out according to Rigg and Schwink (1983) and Van Ee and Palminteri (1987). Tail amputation is usually performed at the intervertebral space. The joint space is identified by palpating the verterbral bodies while flexing and extending the tail near the proposed amputation site. The joint will be at the site of greatest motion and just cranial to the mammillary processes, which are located on the dorsolateral surfaces of the cranial vertebral bodies. The joint regions are palpably wider and thicker than the veterbral midbodies. The skin is incised distal to the joint space to leave a flap of tissue that can be rolled over the bone end. The flap should be long enough so that there is no tension on the skin closure. Tail skin adheres tightly to underlying structures and can be difficult to elevate; sharp transection of fibrous attachments is usually required to free the skin. Major vessels of the tail include the lateral caudal arteries, which are near the transverse processes, and the median caudal artery ventral to the tail. Occasionally these vessels can be identified during dissection. More commonly, they are buried in muscle; hemostasis is then provided by mass ligation of the vessels and surrounding muscle bundles cranial to the level of the amputation. Smaller vessels are located dorsolaterally and ventrolaterally along the vertebra, anastomosing intermittently with the other vessels. These may be ligated or cauterized before or after transection.

Surgical technique of tail amputation as previously described by Tobias and Karen (2010).

On the dorsal surface of the tail, V or U - shaped skin incision 1 to 2 cm distal to the joint space at the proposed amputation site was made. The skin on the ventral surface in a similar fashion was incised. Using curved Mayo scissors or a scalpel blade, attachments between the skin and vertebrae were transected. The skin and subcutaneous tissues cranial to the intervertebral space were elevated. The blood vessels lateral and ventral to the vertebral body cranial to the amputation site were ligated. For ligation, 3-0 absorbable suture on a taper needle was used. A large bite of tissue in the area of the vessel was taken, passing the needle down to the bone. When the suture was tied, the vessel would be encircled along with surrounding muscle.

The tail was amputated cranial enough to the skin incision to provide a tension - free closure. With thumb nail and fingers, the bone was palpated to find its thickest portion. A scalpel blade was inserted perpendicular to the long axis of the tail into the ventral or dorsal joint space and the connecting ligaments and muscle was cut. Alternatively, the vertebra mid body was transected with bone cutters. Any remaining soft tissue attachments were cut and then the bone end was smoothening with a rongeur.

The tourniquet was removed and the surgery site was evaluated for bleeding. Any bleeding vessels were ligated or cauterized. The skin was pulled over the bone end to evaluate flap length. If excessive, the ventral flap was trimmed so that the dorsal flap can be pulled over the bone tip. If possible, muscle and subcutaneous layers were opposed with interrupted buried sutures of 3-0 monofilament absorbable material. The skin was close

with interrupted sutures. Bites were taken only through the epidermis and dermis, so that the subcutaneous tissues were inverted and covered with skin. If tension was encountered during skin closure, excess bone was removed with rongeurs before completing the closure. Post-operative care was applied by frequent dressing with betadine and injection of cephalosporines broad spectrum antibiotic to avoid sepsis of the wound.

RESULTS AND DISCUSSION

The recorded causes of the tail necrosis are varied and they includes. Tail crushing that causes blood clots and traumatization of tail tissues that were followed by invasion by *staph aureus* and/or *Clostridium septicum* that lead to necrosis, gangrene and sloughing of tail tissues including bones.

Tail loss of sensation and ischemia that are usually caused by tail fracture, very cold climates, tail tourniquet where tail sensation reduced and tail blood flow decreased that consequently lead to tail necrosis.

Damage of tail skin barrier where tail exposed to cracks and fissures that induced by zinc and vitamin A deficiencies, external parasitic infestations and bad hygiene (accumulation of manure that produce excessive amount of ammonia which dry and cracks the skin of tail). All of previous facilitate bacterial infection and runs in the same fate of tail necrosis. The role of slatted floors in the occurrence of tail necrosis was recorded by Madsen and Nielsen (1985), where as in solid floor tail necrosis was not recorded as a problem. However some cases of tail necrosis were reported in other floor types (Kunz and Vogel (1978), Hunermund, *et al.* (1980)).

Mouldy roughages that contains mycotoxins lead to necrosis and gangrene of extremities including tail that also was recorded by (Fowler, 2010) and (Khamis *et al.*, 2002) who proved the moldy hay is the cause of tail tip necrosis in cattle and buffaloes. Dandapat *et al.* (2011) suggested the role of mycotoxins as a cause of tail necrosis in buffaloes. Especially Deg Nala disease, which was believed to be a mycotoxicosis, was characterized by development of edema, necrosis and gangrene of the tail, legs, ears in cattle and buffaloes was recorded by Ural *et al.* (2007) who found that Saprophytic fungi causing infestation of rice straw, produce mycotoxins resulting in vasoconstriction, therefore the lesions of the disease occurs.

The prevalence of tail necrosis in the totally examined animals was 1.7 %. The prevalences were varied in buffaloes, cattle, sheep, dog, cat and were recorded as 7.89, 2, 0.5, 0.51, 0.78% respectively. The prevalence of tail necrosis in cattle were also recorded by Drolia *et al.* (1991) who found that the prevalence of tail tip necrosis from 1982-1986. As 96% of 71 feedlots with slatted floors, but only 5% of 184 feedlots with solid floors. Among animal species there were differences in the prevalences that may be returned to system of raising and genetic predisposition. The highest prevalence was recorded in buffaloes (7.89%) whereas the lowest prevalence was recorded in sheep (0.5%). There were no recorded cases in the examined equines and goats.

We did not recorded sexes or breeds effect for the occurrence of tail necrosis in cattle that was agreed with Ural *et al.* (2007) who reported that no difference between sexes for occurrence of tail tip necrosis and it was detected both in dairy and beef cattle.

The imbalanced rations, or bad quality ration which were deficient in vitamins and minerals playing a role in the pathogenesis of tail necrosis especially in farm animals. The disease was in association with the rice straw feeding, and was believed to be induced by fungal infestation of straw that was recorded by Ural *et al.* (2007).

The vitamin A and zinc have role in the health of the skin so their deficiency lead to weak and cracked skin that were followed by bacterial infection to lead to tail necrosis. That was also recorded by Barakat *et al.* (1960) who reported that the characteristic lesions of tail necrosis of Egyptian buffaloes could be produced experimentally in rats by feeding diets devoid of essential fatty acids. Treatment with 10% formalin in both buffaloes and rats had no effect, but when diets were supplemented with egg yolk and linseed oil, lesions completely cleared. The imbalanced ration had a role in tail necrosis that was reported by Kaur *et al.* (2005) they recorded that chronic selenosis was associated with rough hair coat, alopecia, swelling of coronet, enlargement of the hooves, interdigital lesions and gangrene at the tip of tail. That also was described by Ural *et al.* (2007) who suggested the causes of tail necrosis as selenium toxicosis, fly strike, ergotism ,fescue toxicosis , mycotoxicosis, tail-biting especially in veal calves, trauma and Deg-Nala disease.

Authors observed that farms vaccinated with clostridial vaccine are not suffering from tail necrosis (moist severe form) that confirm the role of *Cl.septicum* in tail necrosis especially after damage of skin barrier due to crushing or defeciencies or any other causes.

The clinical forms of tail necrosis were recorded as dry mild and moist severe as illustrated in table (3) and figure-1(A and B) and figure-6(A).

Table 2: The recorded causes of tail necrosis are summarized.

The recorded causes	Buffalo	Cattle	Sheep	Dog	Cat
Tail crushing	+	+	+	+	-
Tail fracture	+	+	-	-	-
Zinc and vitamin A deficiencies	+	+	-	-	-
External parasitic infestations	+	+	+	+	+
Bacterial skin infections	+	+	+	+	+
Bad hygiene (accumulation of manure)	+	+	-	-	-
Tail nerve paralysis	+	+	-	-	-
Tail hair tourniquet	+	+	-	-	-
Tail allergic dermatitis	+	+	+	+	+
Very cold climates	+	+	+	+	+
mycotoxins (dried barseem)	+	+	+	-	-

(+: present, - : absent).

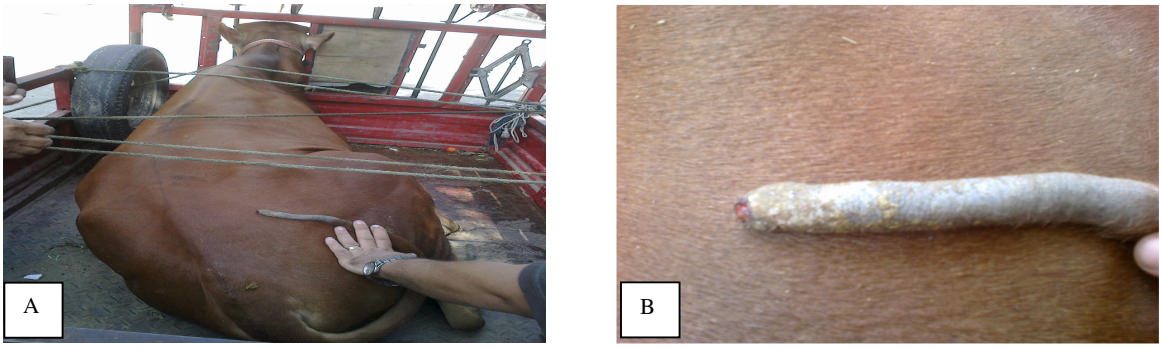

Fig 1: Tail necrosis in native Egyptian cattle (A and B).

Fig. 2: Tail necrosis in cattle: amputated tail

Fig. 3: tail necrosis in buffalo.

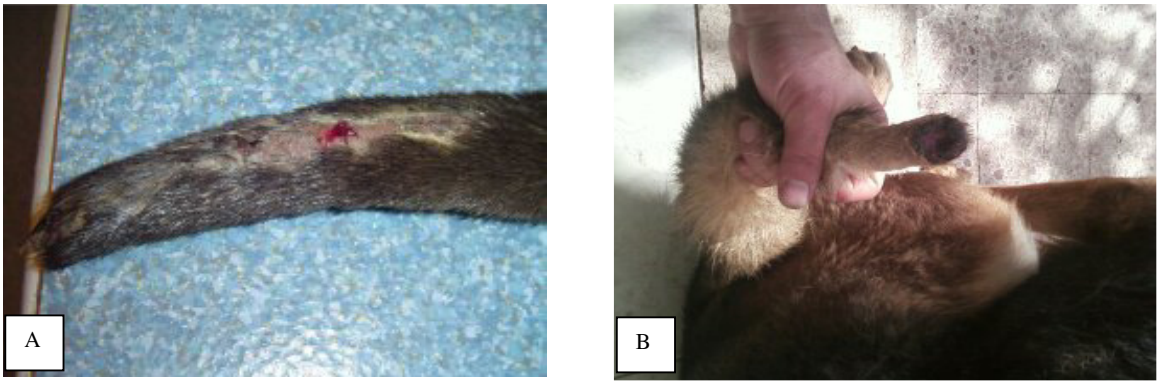

Fig. 4: Tail necrosis in German shepherd dogs (A and B)

Fig 5: A case of one year old mixed breed tom cat suffered from tail necrosis.

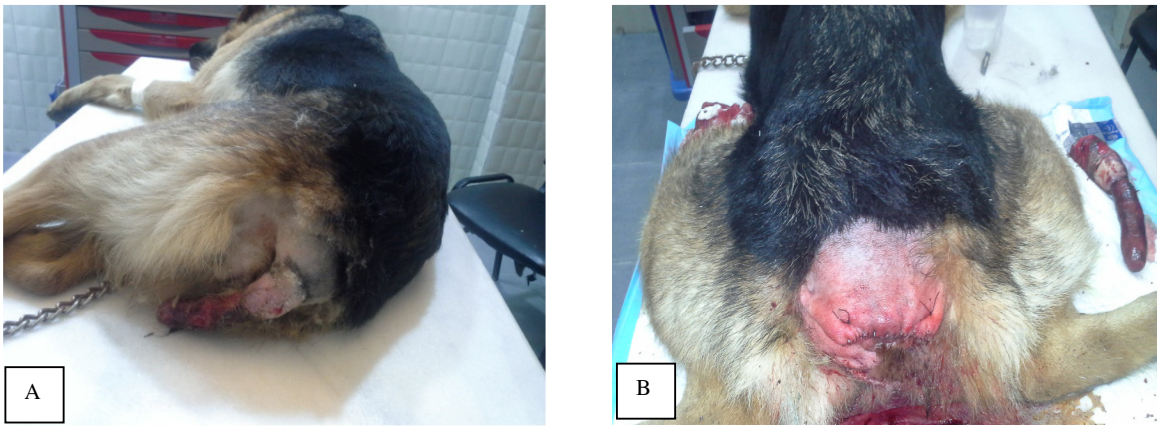

Fig. 6: A case of two years old Germen shepherd dog suffered from tail necrosis at the base of the tail (A) preoperative and (B) postoperative.

Table 3: Clinical findings of tail necrosis are summarized.

Clinical signs	Two clinical forms were recorded	
Clinical form	Dry mild	Moist severe
Loss of tail hair	+	+
Pus and offensive odor	-	+
Cracks and crusts in tail skin	+	-
Itching	+	+
Fever	-	+

N.B: the affected buffaloes, cattle, sheep, dog, cat were suffered from both forms (moist severe and dry mild). Sheep (Tail tip) is usually the affected part of tail, the myiasis was also recorded in sheep suffered from tail necrosis due to traumatization (accident).

Table 4: Prevalence of tail necrosis in different animals species is illustrated.

Animal species	Totally examined	Tail necrosis suffered	
		Number	%
Buffaloes	304	24	7.89
Cattle	100	2	2
Sheep	400	2	0.5
Goat	150	0	0
Equines	210	0	0
Dog	389	2	0.51
Cat	380	3	0.78
Total	1933	33	1.7

*No sexes or breeds effect for the occurrence of tail necrosis in cattle and buffaloes.

Table 5: Evaluation of the treatment of tail necrosis is summarized.

Animal	Medicinal treatment		Surgical amputation		
Species	No	%	No	%	Total
Buffaloes	22	91.66	2	8.33	24
Cattle	2	100	0	0	2
Sheep	0	0	2	100	2
Dog	1	50	1	50	2
Cat	3	100	0	0	3
Total	28*	84.84	5**	15.15	33

*28(84.84%) tail necrosis suffered animal were treated medicinally while **5 (15.15%) tail necrosis suffered animals were treated surgically.

The treatment of tail necrosis was depend on the severity of lesions, two regimes of treatment were adopted: (i) medicinal treatment was applied for the early mild tail necrosis whereas (ii) surgical treatment was carried out for the severe gangrenous tail necrosis that were also adopted by Ural *et al.* (2007) who employed antibiotic administration or amputation of the affected area of the tail for severely affected cattle.

The treatment of tail necrosis was depend on the severity of lesions, two regimes of treatment were adopted: (i) medicinal treatment was applied for the early mild tail necrosis whereas (ii) surgical treatment was carried out for the severe gangrenous tail necrosis that were also adopted by Ural *et al.* (2007) who employed antibiotic administration or amputation of the affected area of the tail for severely affected cattle.

Medicinal treatment was made by curetting of tail lesions and spraying Oxy-G spray that was reported by Hokonohara *et al.* (2003) who found that the administration of oxytetracycline is effective at early stage of Degnala disease in buffaloes.

In conclusion, the tail necrosis was recorded in different animal species, the two clinical forms were observed (dry mild and moist severe). The variable causes of tail necrosis were recorded. The medicinal and surgical treatment could be used according to the clinical form of tail necrosis. The problem of tail necrosis is multi-factorial and still neglected and need more research efforts.

REFERENCES

Aitken ID, 2007. Textbook of Diseases of sheep, fourth edition, Blackwell Publishing, UK, pp: 317.

Barakat MZ, AM Wahby and A Abdalla, 1960. Necrosis of the tail in the buffalo. A deficiency disease?. Brit Vet J, 116: 151-155.

Drolia H, UA Luescher, AH Meek and BP Wilcock, 1991. Tail tip necrosis in Ontario beef feedlot cattle. Can Vet J, 32: 23-29.

Dandapat P, PK Nanda, PK Bandyopadhyay, S Kaushal and A Sikdar, 2011. Prevalence of Deg Nala disease in eastern India and its reproduction in buffaloes by feeding *Fusarium oxysporum* infested rice straw. Asian Pacif J Trop Med, pp: 54-57.

Fowler ME, 2010. Medicine and Surgery of Camelids. Third Edition, Blackwell Publishing, pp: 576.

Hokonohara S, UM Singh, VC Jha, A Pradhan, S Dev and RK Mandar, 2003. Clinical and haemtological

findings on Degnala, a disease of buffalo in eastern Nepal. J Vet Med Sci, 65: 719-722.

Hunermund G, H Romer, F Wagenseil and E Albrecht, 1980. Schwanz-Spitzennekrose-Erfahrungsbericht des Rindergesundheitsdientes Sudwurttemberg. Tieraerzt Umsch, 35: 238-245.

Khamis Y, HA Hammad, G Hosni, R Salem and G Gamil, 2002. Mycotoxicosis as a cause of tail-tip necrosis in cattle. XXII World Buiatrics Congress Hannover, pp: 18-23.

Kaur R, S Rampal and HS Sandhu, 2005. clinical and haematological studies on experimentally induced selenosis in crossbred cow calves. Pak Vet J, 25: 127-133.

Kunz W and O Vogel, 1978. Schwanzspitzenentzündung-ein neues Gesundheitsproblem in der Rindermast. Tieraerzt Umsch, 6: 344-353.

Madsen EB and KA Nielsen, 1985. A study of tail tip necrosis in young fattening bulls on slatted floors. Nord Vet Med, 37: 349-357.

Phillips C, 2015. Textbook of Cattle Behaviour and Welfare. Social behavior: http://www.wisegeek.org/ what-is-the-purpose-of-a-tail-in-animals.htm, edit. By wiley. pp.89.

Pugh DG and Baird AN, 2012. Sheep and goat medicine. 2nd ed.ition, Saunders, an imprint of Elsevier Inc, pp: 119.

Radostits OM, CC Gay, KW Hinchcliff and PD Constable, 2007. Veterinary medicine textbook, A textbook of the diseases of cattle, horses, sheep, pigs and goats, 10th edition, pp: 2036-2037.

Rigg DL and KL Schwink, 1983. Tail amputation in the dog. Compend. Contin. Educ Pract Vet, 5: 719-724.

Schaer M, 2003. Textbook of Clinical medicine of the dogs and cats. Second impression, Manson publishing Ltd, pp: 14.

Tobias A and M Karen, 2010. Manual of small animal soft tissue surgery. Edition first published 2010 by Wiley-Blackwell © 2121 State Avenue, Ames, Iowa 50014-8300, USA, pp: 353-357.

Ural K, D Alic, MC Karakurum, MS Aktas, AE Haydardedeoglu and CC Cingi, 2007. Tail-Tip Necrosis in Beef and Dairy Cattle: A Report of Seven Cases in Ankara. Kafkas Üniv Vet Fak Derg, 13: 203-207.

Van Ee RT and A Palminteri,1987. Tail amputation for treatment of perianal fistulas in dogs. J Am Anim Hosp Assoc, 23: 95-100.