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DANGER OF SOME FOREIGN OBJECTS PENETRATION AND THEIR MIGRATION IN ANIMAL TISSUES

(With 2 Tables and 12 Figures)

By

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خطر اختراق وانتقال بعض المواد الغريبة الصلبة عبر أنسجة جسم الحيوان

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تناول هذا البحث المشكلات المختلفة التي تنتج عن اختراق أنسجة جسم الحيوان بمواد غريبة صلبة وانتقالها من مكان الى اخر داخل الجسم. تضمن هذا البحث عدد ١٦ حيوانا من حيوانات المزرعة من الفصيلة الخيلية (٨ حيوانات) ومن المجترات (٨ حيوانات). تم تسجيل التاريخ المرضي والاعراض الأكلينيكية لكل حالة ولتأكيد التشخيص في ١٠ حالات تم استخدام الأشعة التشخيصية. أظهرت نتائج البحث ان أكثر المشكلات التي تحدث نتيجة اختراق الأنسجة بالمواد الغريبة وتحركها داخل أنسجة جسم الحيوان هو تكرار حدوث الخرايرج والناصور وكذلك الجروح صعبة الالتئام والعرج المتكرر. أعتمد العلاج الجراحي لهذه الحالات على الفحص الدقيق لمكان الإصابة مع زيادة توسيع الجرح وتحسس مكان الاختراق وعمقة خاصة في الحالات التي لم يفيد فيها استخدام الأشعة التشخيصية. أما تحديد نوع و مكان المواد الغريبة المخترقة ذات الأصل المعدني كان يسيرا عن طريق استخدام الأشعة التشخيصية. خلص هذا البحث الى ضرورة توقع احتمال وجود اختراق من مواد غريبة صلبة في حالات تكرار حدوث الخرايرج في نفس المكان وكذلك الناسور والجروح صعبة الالتئام او تكرار العرج ، ومن الضروري ازالة هذه المواد حتى يمكن ان يحدث التئام لمثل هذه الاصابات.

SUMMARY

This article describes different complications which occur due to injury of body tissues with foreign objects and/or their migration through the animal's body in farm animals. The Study was performed on 16 farm animals of different species (eight equines and eight ruminants). The case history and the clinical signs were recorded for each case; radiography was used to confirm the diagnosis in 10 cases. The most common forms of complications recorded to occur due to the injury with

foreign objects and their migration through the body tissues were: recurrent abscesses, fistulae, hard to heal wounds and recurrent lameness. Surgical management was based mainly on thorough exploration of the site of lesion with widening and finger palpation of the site of lesion. Determination of the site and type of the foreign object was easily determined with the use of radiographic examination. In conclusion foreign objects should be suspected to be the real cause in any case of recurrent abscesses, fistulae, or hard to heal wounds or in cases of recurrent lameness. Removal of these materials is important to allow complete recovery of the lesion.

Key words: *Foreign objects, migration, tissue injury*

INTRODUCTION

Injuries of healthy body tissues with foreign materials are very common in all animal species and human (Hunter and Mihra 2003, Brisson *et al.* 2004, Staudte *et al.*, 2004). These foreign materials may be inserted into a body cavity, or enlodged into the body tissues. Splinters, needles, glass, thorns and plant materials are the main causes of vague clinical signs at the time of initial presentation but can progress to cause persistent abscessation, sinus tract formation and debilitating diseases due to their migration (Staudte *et al.*, 2004).

Foreign objects inserted into the body tissues may cause only minor injury but sometimes they may provide a great deal of amusement as they may be overlooked leading to harm to the patient (Hunter and Mihra 2003). Migration of objects through the body tissues results in many complications which manifested by clinical symptoms that differ according to their nature and type of injury (Chee and Sethi 1999, Calfee and Manning 2002).

The common complications which occur due to injury of body tissues with foreign objects and their migration through the body tissues in farm animals, as well as the methods of their diagnosis and the surgical management of these cases are discussed in this article.

MATERIALS and METHODS

The present study was carried out on 16 farm animals of different species (seven donkeys, one horse, four cows, one buffalo, two sheep and one goat).

The diagnosis was based mainly on case history, physical examination and in 10 of these cases which were admitted to the

university teaching hospital, Assiut University; diagnostic radiography was done to confirm the diagnosis. The other 6 animals were examined in the surrounding field outside the clinic and radiographic examination was not possible.

Anesthesia:

Surgical management was done under the effect of xylazine* sedation in ruminants in a dose rate of 0.1 mg/kg, I.M. for cattle and buffalo, and 0.05 mg/kg for sheep and goat. For equines 10% chloral hydrate narcosis in a dose rate of 6 gm/50 kg BW. I.V. was used. In addition, local infiltration analgesia in the form of field block around the affected area by using 2% xylocaine Hcl was used.

Surgical management

In all examined animals, the wounds, abscesses, and/or the fistulae opening were widened. The depth of these lesions was examined deeply by finger's palpation to detect the presence of foreign materials. Extraction of the foreign object was done by using a long artery forceps (Fig. 1). The soft tissues surrounding the affected area were curetted and the edges were refreshed. The site of lesion was cleaned up and disinfected with 3% Tincture of iodine. The wound was left opened to heal by second intention and a gauze drain was applied for three days. Systemic antibiotic was applied for all cases for four days.

In one animal suffered from a nail penetration of the deep tissue of the sole. Paring and thinning of the sole using a hoof knife was done deeply through the sole till the head of the nail was found and the nail was extracted. The perforated sole was disinfected using hydrogen peroxide followed by 3% Tincture of iodine, and then sulphanilamide powder and pressure hoof bandage was applied, which changed every 4 days.

Intestinal fistula on the ventral abdominal wall was diagnosed in two animals; the area around the fistula was prepared for aseptic surgery. The fistula's opening was dissected from the surrounding tissues. The abdominal layers were widened by scissor. A needle was found penetrating the intestinal wall in one animal and in the another one a piece of wire was found attached to the tissues surrounding the fistulas opening. The intestinal wall around the fistula's opening appeared necrosed. After removal of the foreign object, the affected part of the intestine was resected and an end to side anastmosis was applied using No. 0 catgut in a simple interrupted pattern (Fig. 2). The peritoneum,

* Xylazine 2%®, Medistar, Holzwicked

abdominal muscles and the skin were sutured separately by using No. 0 catgut and No. 1 silk for the skin. The skin stitches were removed 10 days post operation.

RESULTS

The main case history recorded in the examined cases was the presence of a chronic recurrent affection in the form of: lameness, recurrent suppuration, abscess and intestinal fistula. Several trials for treatment of these lesions were done before but without success. The duration of the affection varied from four days to one year. In 15 of the examined animals, the case history mentioned by the owners was not clear for the veterinarian to identify the possibility of presence of a foreign object as a main cause of the lesion.

Radiographic examination was successfully diagnostic in three cases (a nail penetrating the sole in one donkey, a needle in the lateral thoracic wall in a cow and a wire piece at the level of the pastern joint in a cow). Other foreign objects as thorn, plastic rope and glass could not be diagnosed radiographically. However, increased soft tissue density around the site of the foreign object was seen radiographically in six cases.

The case history, physical examination and the results of radiographic examination of each case are summarized in Table 1.

In the present study no predilection seat in the animal body was recorded for the presence of the foreign objects. The type of foreign objects causing the lesions was varied from one animal to another. These foreign objects and their locations were summarized in Table 2.

Widening of the wound openings, abscess and/or fistula with thorough examination of the depth of the lesion with finger palpation and removal of all necrotic tissues in the affected area allowed easier access to the foreign objects and their extraction in all examined animals. Curetting of the wound surface after extraction of the foreign object, allowed removal of any remnants from the foreign object especially in cases of thorn or plastic rope foreign objects.

In the two cases of the intestinal fistula in sheep, resection of the affected part of the intestine and the application of an end to side anastomosis allowed normal passage of the intestinal contents and the animal was survived without any postoperative complications. Follow up of the cases recorded no post-treatment complications and healing of the lesions took place dramatically.

Table 1: Summarization of case history, physical and radiographic examinations in each animal.

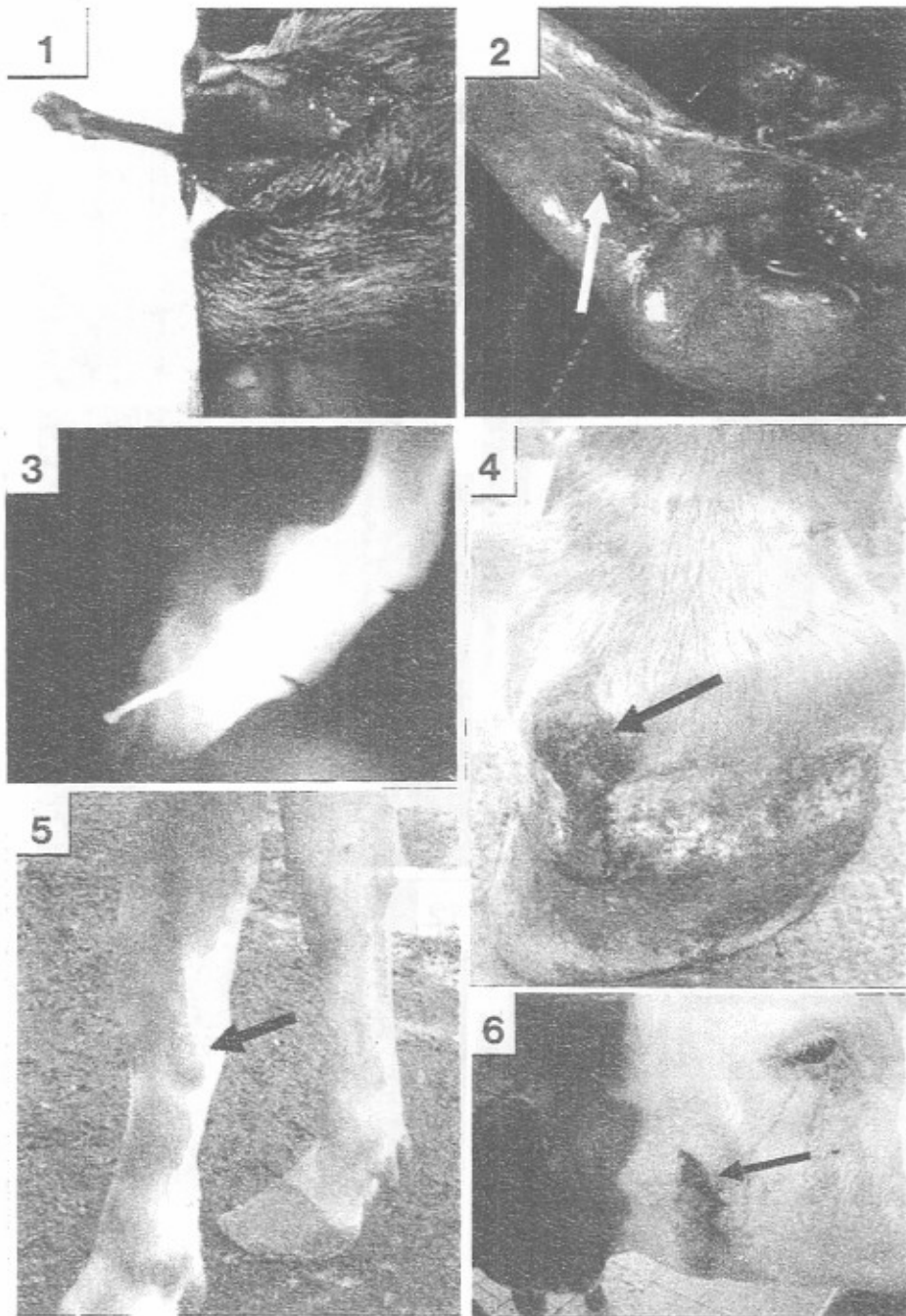
Animal	No	Case history	Physical examination	Radiographic examination
Donkey	1	Lameness on the right forelimb since one month	Old small wound opening at the level of the carpal joint with pain on palpation and swelling of the joint	Increased soft tissue density around the joint
Donkey	1	Left hind limb lameness since two weeks after injury with a thorn which was not extracted completely	The affected area was swollen, painful on palpation with presence of a small wound opening	_____
Donkey	4	Intermittent lameness in the fore limb since one month with swelling at the area of the digit	The swelling was painful on palpation, did not cover with hair and had a small opening	increased soft tissue density at the area of the digits
Donkey	1	lameness without weight bearing on the right hind limb since four days	Swelling above the coronet and Pain on palpation of the hoof with a hoof tester	A nail penetrating the sole (Fig.3)
Horse	1	Recurrent swelling discharging pus above the coronet since one year	Suppurative painful swelling extending deep into the hoof and bleed easily with manipulation (Fig. 4)	_____
Cow	1	Lameness on the left forelimb with recurrent abscesses formation	An old abscess on the lateral aspect of the upper third of the metacarpal region, it was painful and hot on palpation (Fig. 5)	No clear radiographic changes were observed
Cow	1	Swelling discharging pus on the right mandible wall since two months (Fig. 6)	Old abscess with thickened capsule and swelling of the tissues surrounding, the lesion extends caudally till the mandibular lymph node	Increased soft tissue density in the whole area around the bone of the mandible
Cow	1	Non healed wound on the left thoracic wall since three months	Small wound opening on the left thoracic wall with thickening of the tissues surrounding it	10 cm needle at the level of the left thoracic wall (Fig. 7)
Cow	1	lameness on the right hind limb with inability to bear weight and an old wound at the level of the heel (Fig. 8)	Pain on palpation of the area of the heel and the interdigital space with suppurative inflammation, the lesion extended deeply	Wire piece at the level of the pastern (Figs. 9&10)
Buffalo	1	Recurrent abscess caudal to the left elbow joint since two months	Doughy swelling caudal to elbow joint with a small opening about two cm caudal to it (Fig. 11)	_____
Sheep	2	Small ventral abdominal opening discharging injesta	A fistula connecting through the intestine and the skin passing injesta (Fig. 12)	_____
Goat	1	Recurrent abscess formation on the ventral abdominal area	Old umbilical abscess with thick capsule with a small opening discharging pus	_____
Total	16			10

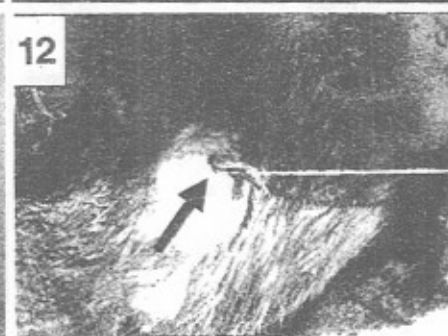
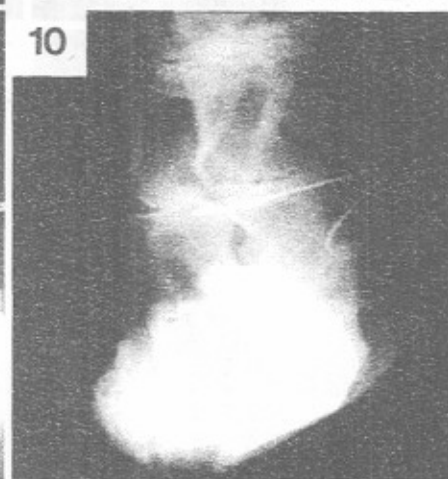
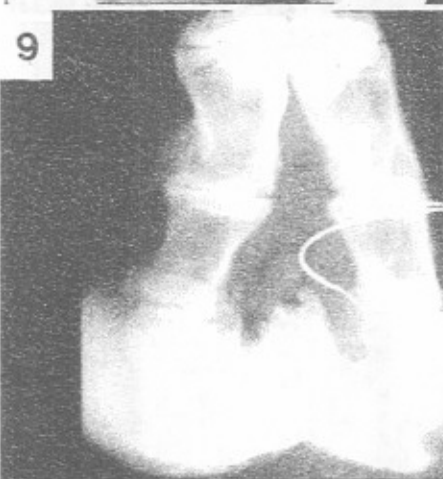
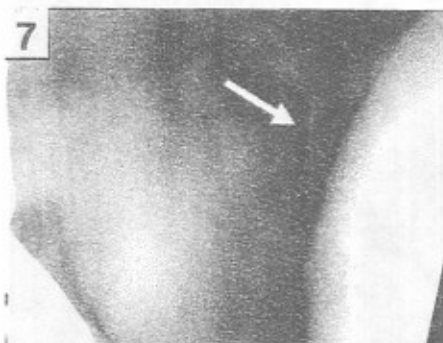
Table 2: Types of foreign objects found in each examined animal and the site of it.

Animal	No	Type of foreign body	Site of lesion
Donkey	1	Glass piece	Right Carpal joint
Donkey	1	Thorn	Lower left meta tarsal region
Donkey	4	Plastic rope	At the level of the digits
Donkey	1	Nail	Sole of the right hind limb
Horse	1	Thorn	above the coronet in the left forelimb
Cow	1	Needle	Left thoracic wall
Cow	1	Thorn	Right mandible wall
Cow	1	Thorn	Upper third of the Left metacarpus
Cow	1	Wire piece	The heel of the right hind limb
Buffalo	1	Needle	Behind the left elbow joint
Sheep	1	Needle	Ventral abdominal wall
Sheep	1	Wire piece	Ventral abdominal wall
Goat	1	Needle	Umbilicus
TOTAL	16		

LEGENDS OF FIGURES

- Fig. 1:** Removal of a thorn impeded into the soft tissue
Fig. 2: The end to side intestinal anastomosis of the intestine in a sheep
Fig. 3: Radiographic examination of the hoof showing a nail impeded into the sole
Fig. 4: Suppurative inflammation at the level of the coronet in the horse (arrow)
Fig. 5: An abscess on the lateral aspect of the left metacarpal region just under the carpal joint in a cow (arrow)
Fig. 6: An old abscess on the right mandibular area in a cow (arrow)
Fig. 7: Radiographic examination showing a long needle at the level the thorax in a cow
Fig. 8: An abscess at the level of the heel of the right hind limb in a cow
Fig. 9& 10: Radiographic examination showed a wire enlodged at the level of the pastern joint in a cow
Fig. 11: A swelling located just behind the left elbow joint in a buffalo
Fig. 12: An abdominal fistula discharging ingesta in a sheep (arrow)





DISCUSSION

Foreign objects may be deposited into the body by a traumatic or iatrogenic injury. In the majority of cases the owners are unable to remember or did not know if their animals are injured with foreign objects or not. This condition results in overlooking the foreign object during treatment and recurrence of the lesion is then common. In the present study the main case history reported by the owners was the presence of a chronic recurrent affection in the form of: lameness, suppurative inflammation, abscess intestinal fistula and hard to heal wounds which did not respond to treatment.

Many authors reported that entrance and migration of foreign objects through the body tissues lead to many complications that differ according to the nature of the foreign body and the way of its entrance into the tissues (Chee and Sethi 1999, Calfee and Manning 2002). The most ingested foreign bodies were recorded to migrate from the stomach after its perforation to the diaphragm, causing inflammatory changes in the abdominal and thoracic cavities as well as intestinal perforation (Vasapollo *et al.*, 1997, Hunt *et al.*, 2004 and Koutinas *et al.*, 2004). In the present study migration of the foreign body from the gastrointestinal tract is thought to be the cause of the abscess occurred in three animals (one cow, one buffalo and one goat) and also to be the cause of the intestinal fistula in two sheep.

Some foreign bodies injure the animal tissues resulting in formation of wounds that do not respond to treatment due to the formation of a sinus tract where the foreign body is located (Brennan *et al.*, 2004, Staudte *et al.*, 2004). The same condition was recorded to occur as a result of migration of a bone sequestrum from a fractured bone (Calfee and Manning 2002, Brennan *et al.*, 2004). Hard to heal wound was diagnosed in two of the examined animals in the present study, in one animal the wound formed at the level of the carpal joint as a result of its penetration with a glass piece and on the second animal the wound formed due to penetration of the heel with a wire piece.

Many types of foreign bodies were recorded to cause tissue injury in different animal species and human including chicken bones, wooden skewer, fish bones, grass pieces and metal objects (Chee and Sethi 1999, Armbrust *et al.*, 2003, Hunter and Mihra 2003, Young *et al.*, 2004, Gnudi *et al.*, 2005). The main types of foreign objects found to cause tissue injury in the present study were thorns (four animals), nails

(one animal), needles (four animals), glass pieces (one animal), wire piece (two animals) and plastic ropes (four animals).

Diagnosis of foreign objects causing tissue injury is sometimes difficult as they may be overlooked and could be harm to the patient (Hunter and Mihra 2003). Radiographic diagnosis of metallic foreign bodies is a helpful diagnostic technique otherwise non-opaque foreign bodies could be diagnosed with the use of other diagnostic tools as Computed tomography and Ultrasound examinations (Fornage *et al.*, 1986, Spouge *et al.*, 1990, Hunt *et al.*, 2004). In the present study radiographic examination was successfully used in diagnosis of 3 cases of the 10 cases examined radiographically. The foreign objects seen on radiographic examination were the radiopaque objects as wire piece, nail and needle. Otherwise radiolucent foreign bodies as thorn, glass pieces and plastic rope with minimal tissues reaction could not be seen radiographically. Similar findings were also recorded by Hunt *et al.*, (2004). However, the results of the present study showed that thorough surgical exploration of the affected area with widening of the affected part with deep exploration and the use of finger palpation is the best method for detection and removal of the foreign object especially on the field where other diagnostic techniques as radiography are not available. These findings sustain the results of Koutinas *et al.* (2003), Brennan *et al.* (2004), Hunt *et al.* (2004) and Giraldo and Redding (2005).

In conclusion, foreign objects should be always suspected to be the main cause in cases suffering from chronic recurrent affection with recurrent suppurative inflammation, recurrent abscess, and intestinal fistula and hard to heal wounds. Removal of these foreign objects is the main way to get complete and correct recovery of such lesions.

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