ISSN 2348 - 0319

Journal home page: http://www.journalijiar.com

CASE REPORT

INTERNATIONAL JOURNAL OF INNOVATIVE AND APPLIED RESEARCH

Bilateral Contracted Flexor Tendon of the Carpal Joint and Congenital Ankylosis of the Humero-Radial Joint in a 72 hours old Heifer Calf

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Abstract:

Congenital anomaly by autosomal recessive genes has been implicated as the main etiology of contracted flexor tendons in musculoskeletal deformities of new borne calves. Surgical intervention of this case revealed that ankylosis was caused by wrong origination and insertion of malformed ulnaris lateralis muscle. A stay in the form of splints was placed throughout the limb. Plasters of Paris were then applied to the whole length of the limb to enhance stability. The surgical site was fenestrated to allow aeration and dressing, the overall result of the procedure was encouraging. After seven weeks, a second surgery was performed to correct the bilateral contracted flexor tendon of the carpal joint. This was achieved by deep digital flexor tendon tenotomy of the carpal joint and placing a fiber glass cast on both joints.

Key Words: Congenital Ankylosis, flexor tendon, ulnaris lateralis muscle

Introduction

Congenital and inherited anomalies can result in the birth of diseased or deformed neonates. Congenital disorders can be due to viral infections of the fetus or to ingestion of teratogenic agents by the dam at certain stages of gestation. The musculoskeletal system can also be affected by certain neurological disorders (Encarta, 2000).Contracted flexor tendons are probably the most prevalent abnormality of the musculoskeletal system of the new borne calves. The condition is caused by an autosomal recessive gene (Encarta, 2000).

At birth, the pastern and fetlock of the fore limbs and sometimes the carpal joints are flexed to varying degrees due to shortening of the deep and superficial digital flexors and associated muscles. Slightly affected animals bear weight on the soles of the feet and walk on their toes/hooves. More severely affected animals walk on the dorsal surfaces of the joint which become damaged and supporative arthritis develop. Rupture of the common digital extensor can occur as a sequela (Horney *et al*., 1980).

Literature classified the muscles of the ante brachium into extensors and flexors. The extensors are located at the craniolateral aspect of the fore arm. The flexors are on the caudomedial aspect of the fore arm (Regal *et al*., 2000). Craniolaterally, the extensors are: Extensor Carpi radialis, extensor digitorium longus.

Extensor Carpi radialis is the most cranial muscles to the lateral surface and largest. It originates from the epicondyliod crest of the humerus and inserts on the metacarpal tuberosity. It extends the carpal joint and is innervated by the radial nerve (Chibuzo *et al*., 1999).

While ulnaris lateralis which is a flexor muscle is a long fusiform muscle which lies between the lateral digital extensor cranially and the ulnar head of the deep digital flexor caudally. The ulnaris lateralis arises from the lateral epicondyle of the humerus. It inserts by two tendons on the accessory carpal bone. It flexes the carpal joint; it is the only flexor of the carpus that is innervated by the radial nerve which usually innervates the extensors of the carpus and digits (Chibuzo *et al*., 1999).

Case Report

A 72 hour old female calf weighing 45kg belonging to a client was presented to the Veterinary Hospital, Gombe with a twisted left fore limb that appears to be congenitally malformed (Fig 1). On the physical examination, animal

appeared alert and full of energy. Vital parameters, such as temperature (39.5^0C), pulse rate (37.0 beat/min), respiratory rate (12 cycles/min) were taken and these were within normal range. The animal was apparently normal and suckles well.

Fig. 1- calf at presentation

Plan of Action

Surgical correction of the ankylosed elbow joint and carpal joint tenotomy at a later date

Surgical Procedure

1st Surgery

Proper shaving and disinfection of the area was carried out. Acepromazine/Xylazine was given as a muscle relaxant/sedative at a dose of 0.02-0.04mg/kg and 0.05-0.08mg/kg i/m respectively. A cruciate incision was made on the lateral aspect of the elbow joint and extends to the cranial part of the extensor carpi radialis (Van-Veet et.al; 2007).

After exposing the joint, it was noticed that the ankylosis was caused by wrong origination and insertion of malformed ulnaris lateral muscle. After removal of the rudimentary muscle that was responsible for the ankylosis, the extensor carpi radialis muscle was inverted and closed to give strength to the area after healing. Skin was closed routinely using size 1 nylon. A stay in form of splint was placed throughout the limb (from the distal aspect of the elbow joint to the metacarpal joint). Plaster of Paris (P.O.P) was then applied to the whole length of the limb to enhance stability (Fig.2). The surgical site was fenestrated for dressing. Seven weeks after 1st surgery, and following good prognosis from post operative follow ups, the 2nd surgery was performed to correct the bilateral contracted flexor tendon.

2nd Surgery

The calf was anaesthetized and prepared for surgery. A 2.5cm longitudinal midline incision was made over the palmer aspect of the right pastern just proximal to the bulb of the heels (Wagner et al., 1985). The distal synovial sheath was opened and the deep digital flexor tendon was elevated and incised transversely. The ends of the severed tendons retracted approximately lcm and sutured together using size 1 nylon. Fiber glass cast was applied from the metacarpal joint to the pastern joint leaving the surgical site fenestrated for dressing and post operative follow ups. The same procedure was performed for the other limb. Four months following second surgery, the calf was ambulating well and appeared to have a normal foot axis (Fig.4).

Fig.2- calf 20 minutes after first surgery.

Fig 3- 2 months after second surgery.

Fig. 4- calf ambulating 4 months after second surgery.

Discussion

The etiology of this case was probably due to genetic malformation that led to wrong origination and insertion of this muscle leading to ankylosis of the metacarpal joint. The faulty origination emanated from the medial part of the epicondyliod crest of the humerus and inserts proximally to the accessory carpal bone therefore shortening the axis/angle of the elevation of the joint. This is in line with work carried out by Mcllwraith et al., (1978).

As the result of the complexity of the above surgical procedure, it became necessary to do the surgery in two phases. Because of the nature of the ankylosed elbow joint, we opted for that as our first procedure. This enhanced the straightening of the limb.

After this, the limb was fixed using splints and plaster of Paris. The animal was left to recover fully and a tentative date (7 weeks after first surgery) was agreed upon for the second surgery which was also a success. After six weeks following first surgery and good prognosis noticed, the cast was removed in preparatory for second surgery. Following the second surgery, the animal showed signs of pain and discomfort, this was managed with oral administration of phenylbutazone (4.4mg/kg, orally bid). Three months after 2nd surgery, the calf was ambulating well and there was absence of pain when digital pressure was applied to the joint. The fiber cast was removed a month later.

In majority of affected horses/cattle, deep digital flexor tendon deformities can be corrected by non surgical treatment or by inferior check ligament desotomy (Sonnichsen, 1992).

However, these procedures may not produce a normal hoof axis when the dorsal surface of the hoof wall is flexed past vertical (Mcllwraith *et.al*; 1978). According to Fackelman, (1983), deep digital flexor tenotomy has been reported in horses as a treatment for severe inter- phalangeal joint flexural deformity.

Conclusion and recommendations

In conclusion surgical intervention has proved very useful in managing this case, although cumbersome. The post operative care is very intensive and requires slinging the animal to enable it to stand most of the time. Deep digital flexor tendon is a relatively simple surgical procedure but post operative care is of uttermost importance in the outcome. Genetically influenced deformities like this can be prevented with proper breeding methods in place where suspected animals with bad traits are culled (Leipold et al., 1993).

Acknowledgement

We sincerely appreciate the contributions of the following; Dr's Tosin Oluwadare, Chinyere Nbanefor, staff and management of Gombe State Veterinary Hospital, the Government and people of Gombe State for providing the enabling environment that made this work possible, Finally we are grateful to Professor Oladele Sunday blessing of Department of Veterinary Pathology, Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria for reading and editing this manuscript.

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