

Upward Fixation of the Patella in a Brown Swiss Cow: A Case Report

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Abstract

This article describes the use of surgical dissection of the medial patellar ligament in a Swiss Brown cow. The surgical procedure offers excellent results for the patient, is a technique that is easy to use for the field veterinarian and does not require increased care for the owner. Further studies are needed to obtain epidemiological data and to determine the risk factors associated with the bovine knee in our region.

Keywords: Bos taurus, Brown Swiss Cow, Desmotomy, Animal, Surgical Procedure

1. Introduction

The bovine pelvic limb extends from the pelvis to the hoof, and is made up of the femur, patella, tibia, fibula, tarsal bones, metatarsal bones, phalanges and sesamoid bones [1]. The patella is the largest sesamoid bone of the body, it is in front of the knee joint, on the tendon of the quadriceps femoris muscle and protects the knee from damage [2]. Overall, the anatomy of the knee is very important; in this we find the patellofemoral joint that is formed between the trochlea of the femur and the articular surface of the patella, in turn, the patella is connected to the cranial tibial tuberosity by medial, middle and lateral patellar ligaments of the patellofemoral joint [3].

In cattle, lameness problems originating in the stifle joint are relatively common [4]. After mastitis, lameness problems in dairy cows are the second most important cause of negative effects on animal welfare and production [5,6]. In domestic bovines, knee disorders include fractures, septic arthritis and traumatic arthritis with lesions of the menisci and their ligaments; in the latter, hereditary factors of certain breeds, in addition to the complex arrangement of bone, joint, fibrocartilaginous and ligamentous structures and the biomechanics of the knee joint, are predisposing factors to knee lameness [7]. Particularly in beef and dairy cattle, but mainly adult females raised in an extensive system, it is possible to observe patellar luxation or dorsal displacement of the patella, a condition popularly known as cramp or hitch [8]. In this case, it is possible to perform a surgical intervention known as patellar desmotomy, where the medial patellar ligament is of great importance [9]. Here we report a surgical case of dorsal displacement of the patella in a cow from Azoyú, Guerrero, México.

2. Case Presentation

2.1. Location

The clinical case occurred in the municipality of Azoyú, Guerrero. The municipality is located in the Costa Chica region, between the parallels 16° 43' N and 98° 36' W, at an average altitude of 360 m above sea level. The climate is warm, with maximum temperatures reaching 36°C in spring and summer. Rainfall occurs in the summer, with an average of 1200 mm per year. The characteristic flora is deciduous forest and savannah, mixed with some species such as huizache, parota, cubato and cacahuananche and in the low areas, banana and coconut groves [10]. Among the most common grasses are *Chloris gayana*, *Panicum maximum*, *Cenchrus ciliaris*, *Paspalum* spp., *Axonopus* sp., *Briza* sp., and *Bromus* sp [11].

2.2. Animal

The case occurred in a 4-year-old Brown Swiss cow, with 2 pregnancies and the same number of births. The animal belongs to a production unit with 31 animals (1 bull and 30 females). The diet consists mainly of native grasses from the region, concentrated feed, supplementation with mineral salts and freely accessible water, to meet their nutritional requirements [12]. In terms of herd health management, a vaccination schedule is followed with annual boosters and internal and external deworming every 6 months. In addition, blood samples are taken from the animals every year to monitor for brucellosis and tuberculosis. The owner reports that a similar case has never occurred on the ranch. Because this is a private clinic, ethics committee approval is not required; however, the procedure was performed with the owner's consent.

2.3. Surgical Procedure

As described by Tagesu [13] the animal was first restrained and brought down, considering animal welfare aspects. As described by Weaver et al. [14], after the animal was brought down, the tendon was identified by palpation on the inside of the knee, which was very firm to the touch. Once the tendon was identified, the surgical area was properly sterilized and local anesthesia was applied. A minimally invasive procedure was then performed through a small incision in the skin and subcutaneous fascia to view the ligament. Using

a cannula placed behind the ligament, a transverse incision was made using a scalpel. A characteristic crunching sound can be heard at the time of the cut. Once the procedure was finished, sutures were used to join the tissues, and finally, a local disinfectant and treatment with analgesics and antibiotics were applied [15]. The animal was allowed to stand up and immediate normal mobility of the limb was observed. Recovery was rapid and did not require a long period of rest. Figure 1 shows the cow undergoing surgery (a), the preparation (b) and the surgical procedure (c-d).



Figure 1: a) Abnormal Position of the leg, b) Application of Local Anesthetic, c) Ligament Separation, and d) Ligament Incision

3. Discussion

Patellar fixation is a condition commonly seen in dairy cattle, where the duration and severity of lameness increases until the limb becomes stiff, and the stifle or hock cannot be flexed [16]. Anatomical factors such as intense contraction of the triceps femoris muscle and morphological changes in the knee joint are mentioned for the presentation of this condition, in addition to others such as race, hereditary factors, nutritional deficiencies, overexploitation, or external trauma [17]. Medial patellar desmotomy is the most common and successful method for correcting patellar fixation in cattle [18]. The medial patellar desmotomy method is widely recommended, it only requires making a small hole, through which there is usually not much bleeding, healing is fast, and normally does not present postoperative complications; in addition, the downtime is minimal [19].

In a study, where 115 cases were addressed, the majority occurred in castrated bulls (52%), followed by buffaloes (40%) and lastly in cows (8%); in cows, the condition was most prevalent in pregnant, parturient and lactating females between 4 - 6.5 years of age, and the majority presented a low body condition score [19]. In a longitudinal study, 350 cases of patellar fixation were attended, males and females, presented the condition but, in the latter, advanced gestation was an aggravating factor; the highest number of cases occurred in castrated bulls (49%), followed by buffaloes (40%), and to a lesser extent in cows (8%) and bulls (3%), where in the case of cows, the cases occurred in those with advanced gestation [20].

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