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CASE REPORT

A Case of Type II Polydactyly and Flexor Tendon Contracture in a Calf

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ABSTRACT

Polydactyly is an abnormality defined by the presence of one or more extra digits. Polydactyly may occur alone or in association with other congenital defects. Polydactyly is easily diagnosed by clinical examination. X-rays are used to identify possible bony abnormalities. A 3 days old Montafon crossbred calf was brought to our hospital with the complaint of extra digit on the left forelimb and inability to extend the same leg. The patient could stand up with three legs but had difficulty in walking. As a follow-up of clinical and radiologic examinations, a diagnosis of unilateral forelimb Type II polydactyly and arqure was made. The decision was made to operate on the patient to prevent a loss of productivity in the future. The extra digit was removed and Z tenotomy was performed for flexor tendon contracture. In conclusion, we describe a case of type II polydactyly and flexor tendon contracture of the calf which was successfully corrected surgically.

Key Words: Calves, congenital anomaly, polydactyly, treatment

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Bir Buzağıda Tip II Polidaktili ve Fleksör Tendon Kontraktürü Olgusu

ÖZ

Polidaktili, bir veya daha fazla ekstra parmağın varlığı ile tanımlanan bir anormalliktir. Polidaktili tek başına veya diğer konjenital defektlerle birlikte görülebilir. Polidaktili klinik muayene ile kolayca teşhis edilir. Olası kemik anormalliklerini belirlemek için röntgen çekilir. 3 günlük montofon melezi bir buzağı sol ön bacakta ekstra parmak ve aynı bacağı uzatamama şikâyeti ile hastanemize getirildi. Hasta üç ayağı ile ayağa kalkabiliyor ancak yürümekte zorluk çekiyordu. Klinik ve radyolojik incelemeler sonucunda tek taraflı ön bacak Tip II polidaktili ve arkür tanısı konuldu. Gelecekte üretkenlik kaybını önlemek için hastanın ameliyat edilmesine karar verildi. Ekstra parmak alındı ve fleksör tendon kontraktürü için Z tenotomi uygulandı. Sonuç olarak, buzağıda cerrahi olarak başarıyla düzeltilen tip II polidaktili ve fleksör tendon kontraktürü olgusunu tanımlıyoruz.

Anahtar Kelimeler: Buzağılar, konjenital anomali, polidaktili, tedavi

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INTRODUCTION

Polydactyly is a defect defined by the formation of one or more additional digits (Mosbah et al., 2012; Rafee, 2016). This anomaly has been reported in humans and many animal species such as birds, cats, dogs, horses, camel, and cattle (Johnson et al., 1981; Barber, 1990; Bani-Ismail et al., 1999; Paryani, 2015; Hamelin et al., 2017; Woehler & Holzmann, 2020). Polydactyly may be unilateral or bilateral and occur in combination with other congenital defects (Leipold, et al., 1972; Barber, 1990; Gugjoo et al., 2013). Polydactyly is easily diagnosed by clinical examination. A full X-ray examination of the area is necessary to detect possible osseous deformities. In an animal with polydactyly, lameness increases with age. This leads to a decrease in the animal's productivity and quality of life, and therefore to economic loss (Uygur et al., 2022). It is less common in cattle, but when it does occur, it is more common on the forelimbs of cattle. Polydactyly in cattle can be divided into seven types, graded as types I to VII (Rafee, 2016).

Congenital contracted flexor tendon is a common defect in cattle and can be seen in many breeds. Causes of contracted flexor tendons include abnormal positions in utero, genetic predisposition, malnutrition and exposure to teratogens. Contracted tendons can appear in association with other congenital anomalies such as cleft palate, dwarfism and arthrogryposis (Anderson & St Jean, 1996; Genccelep et al., 2019). Congenital contracture of the flexor tendons is defined as a congenital malformation characterized by curvature of the extremities, multiple joint stiffness and muscle dysplasia. Splinting, bandage applications such as polyvinyl chloride (PVC) and fiberglass materials, and tenotomy are generally used in the treatment of this disorder (Kiliç & Tekin, 2021).

In this case, type II polydactyly and arqure were identified in a 3-day-old calf and the operative treatment performed to prevent economic loss in the future is described.

CASE PRESENTATION

A 3-day-old, 52 kg male Montafon Crossbreed calf was brought to the Department of Surgery of Aydın Adnan Menderes University, Faculty of Veterinary Medicine due to extra digit on the left forelimb. According to the anamnesis obtained from the owner, it was learned that the calf was born from the first pregnancy of a two-year-old heifer. Clinical examination revealed that the patient could stand up with three legs but had difficulty in walking. There was an extra metacarpal bone and nail in the left forelimb and the carpal joint could not be extended. The clinical signs included; respiratory rate (28/min), temperature (38,3 °C), and heart rate (120/min) were in the normal range. Haematology and the biochemical profile were in the normal range. Orthogonal radiographic examination of the extremity was performed. The clinical examination revealed unilateral polydactyly and arqure in the calf and the diagnosis was confirmed by radiological examination. (Figure 1).

Figure 1: (A) Standing clinical view of the patient. (B) Lateral clinical view of the patient's right extremity. (C) Anterioposterior X-ray image of the patient's forelimbs.

The operation was decided in order to prevent possible productivity losses in the future. The calf was administrated Xylazine (Xylazinbio® 2%, Biovate) at a dose of 0.1 mg/kg (IM) for premedication and Ketamine (Ketasol® 10%, Richterpharma) at a dose of 2 mg/kg (IM) 10 minutes later for induction. The animal was intubated and the cuff was inflated. Anesthesia maintenance was performed with Isoflurane (Isoflurane USP100%, 100 ml, ABD) in 100% oxygen. Operation area was prepared aseptically

and covered sterile drapes. A proximal to distal skin incision was made on the medial aspect of the extra metacarpal bone. The subcutaneous connective tissues and surrounding structures were carefully dissected, with attention to vessel and muscles. The extra metacarpal bone was proximally osteotomized at its attachment site, and the claw was entirely removed (Figure 2).

Afterwards, a skin incision was made over the contracted tendon, which prevented the carpal joint from extending, and this tendon was extended by performing a Z tenetomy (Figure 3). The skin was routinely closed.

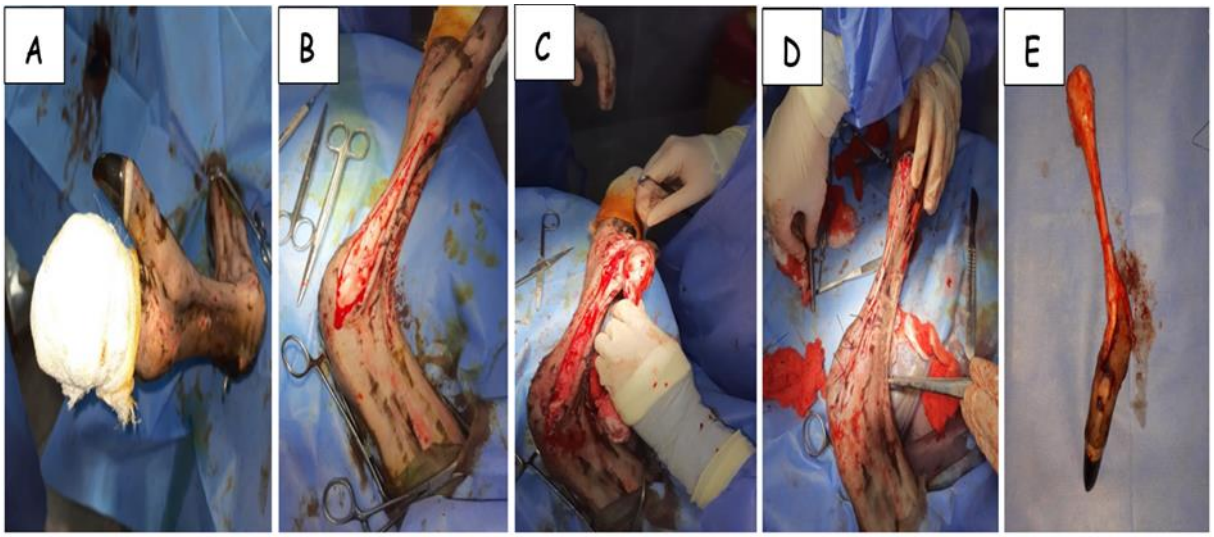

Figure 2: (A) Delimitation of the area to be operated on. (B) Skin incision over the extra bone. (C) View of the extra bone as it is removed. (D) Closure of the incision site after removal of the extra bone. (E) Removed extra bone.

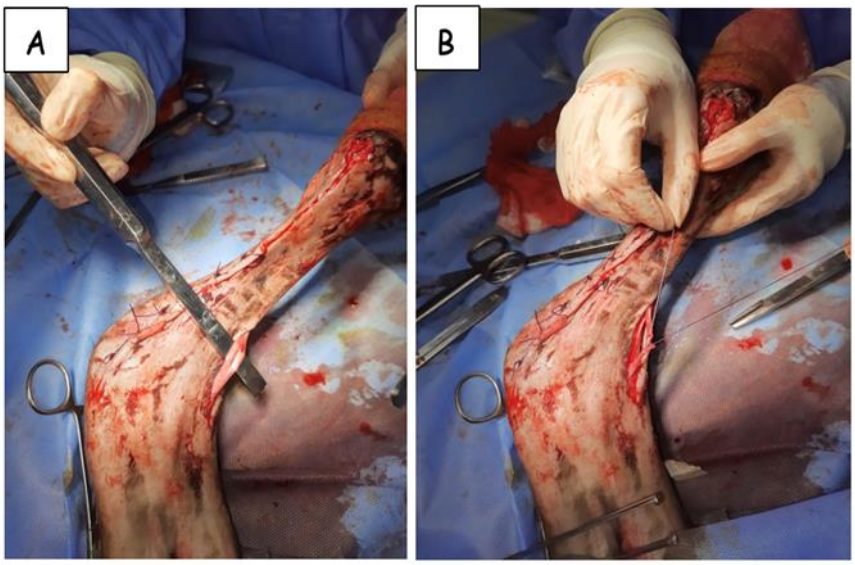

Figure 3: (A) The contracted tendon dissected from other tissues. (B) Z tenetomy of the tendon.

After the operation, a PVC (polyvinyl clorite) bandage was applied to the tenetomized extremity of this calf with carpal flexural deformity to provide more support.

Postoperatively, the calf was given Meloxicam (Bavet Meloxicam®, Turkey, 0.2 mg/kg, 5 days), Amoxicillin/Clavulanic Acid (Synulox®, 35 mg/ml Clavulanic Acid, 140 mg/ml Amoxicillin, Zoetis, 7 days) and orthogonal x-ray of the extremity was taken (Figure 4). Sutures were removed 14 days after the operation and the bandage was changed. One month later, the patient was able to use his leg comfortably but the tendon is a tissue that heals late, so the calf's forelimb was put in PVC bandage for 1 more week.

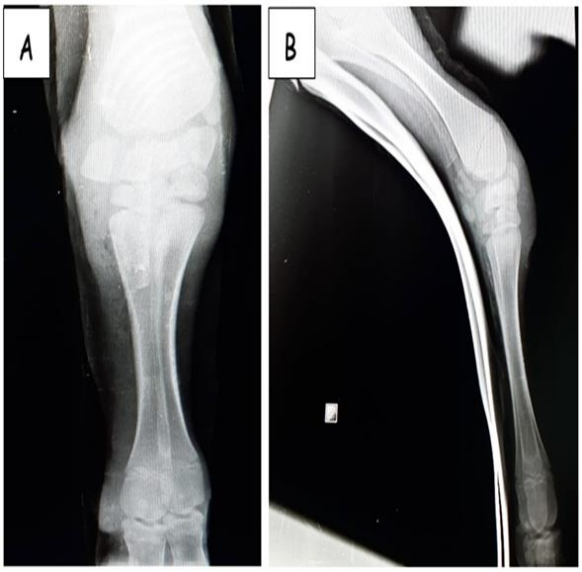

Figure 4: Postoperative (a) anterioposterior and (b) mediolateral X-ray image.

DISCUSSION

Anomalies in animals are caused by nutritional disorders, stress factors, genetic and environmental factors or a combination of these, vitamin deficiencies, errors in breeder selection, teratogens and lack of preference for artificial insemination (Newman et al., 1999; Vermunt et al., 2000; Uygur et al., 2022). Polydactyly is a congenital disorder and is increasingly common in cattle. There are seven types of polydactylism seen in cattle; Type I- bilateral polydactyly of both forelimbs with additional metacarpal bones or phalanges, Type II- unilateral polydactyly of the forelimbs or hindlimbs with additional metacarpal or metatarsal bones and phalanges, Type III- Additional digits in all four limbs, Type IV- Rarely seen, involves bilateral duplication of digits on the forelimb or hindlimb, Type V- Polydactyly, Type VI- Bilateral incomplete formation of metacarpal II and Type VII- Polydactyly with a complex of malformations. Polydactylism usually affects both forelimbs, but less frequently malformations of one or all four limbs are described (Mosbah et al., 2012).

Diagnosis is usually based on clinical examination. X-ray examinations are useful to assess the extent of bone abnormalities associated with the extra metacarpus. In this case, clinical and radiological examination was performed. As a result, Type II, i.e. unilateral additional metacarpals and phalanges in the left forelimb, as well as carpal flexural deformity are present.

According to some reports, polydactyly occurs alone or rarely in association with other developmental or inherited malformations such as tendon contracture (Crowe & Swerczek, 1985; Villagomez & Alonso, 1998). In this case, it was seen together with flexor tendon contracture.

In the treatment of polydactyly, surgical removal of the extra digits is recommended to prevent lameness, restore normal limb conformation and improve the cosmetic appearance of the limb (Bani-Ismail et al., 1999; Carstanjen et al., 2007). In this study, the excess finger was surgically removed and Z tenotomy was performed for flexor tendon contracture.

CONCLUSION

Polydactylism can be seen alone or with other congenital anomalies and is rarely seen in cattle. Our case was diagnosed with polydactyly and arqure of the forelimb based on clinical appearance and radiography. In conclusion, we describe a case of type II polydactyly and flexor tendon contracture of the calf which was successfully corrected surgically.

Conflict of interest: Authors declare that they have no financial interests or personal conflicts that may affect the study in this article.

Authors' Contributions: RY contributed Clinical case attention, Data collection, Literature review, Writing original draft, Writing review & editing of the study..ESA contributed clinical case attention, writing review & editing of the study. All authors have read and approved the finalized manuscript.

Ethical approval: This study is not subject to the permission of HADYEK in accordance with the "Regulation on Working Procedures and Principles of Animal Experiments Ethics Committees" 8 (k). The data, information and documents presented in this article were obtained within the framework of academic and ethical rules.

Explanation: This study has not been presented (as a oral, poster, abstract vs) anywhere before.

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