Surgical Treatment of Bilateral Polydactyly in a Camel (Camelus dromedarius).

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ABSTRACT. Congenital malformations and defects of the limbs are among the most frequent congenital anomalies found in humans and animals. The present case report is to describe diagnosis and surgical treatment of bilateral polydactyly in a dromedary camel. A two-years-old, 250 kg male camel was admitted for surgical removal of bilateral supernumerary digits associated with the medial aspects of the metacarpals. Radiographic examination revealed bilateral polydactyly with complete fusion at the mid-shaft of metacarpal bones. Amputation of the supernumerary digits was performed under sedation with local infiltration anaesthesia. The follow-up 6 months post-operatively revealed a sound camel without complications and proper outcome.

Keywords: Camel, Polydactylly, Surgical, Treatment.
INTRODUCTION
Polydactyly is a congenital anomaly characterised by the presence of one or more supernumerary digits. This anomaly has been described in man (Clark et al., 2000) and domestic animals; in cats (Sis and Getty, 1968), dogs (Hansen, 1972), horses (Barber, 1990; Weinhart, et al., 1996), cattle (Vermunt et al., 2000; Bahr et al., 2003), sheep (Zohre, 2012), llamas (Zapata et al. 2008) and in camels (Ahmed, 2014). Unilateral or bilateral polydactyly has been reported as a single anomaly or in combination with other congenital defects (Camon et al. 1990; Talamillo et al. 2005).

A number of different congenital anomalies are known to occur in domestic animals (Noh et al., 2003). These anomalies are associated with genetic factors (transgenic, chromosomes), environmental agents (infections, toxins, management, abnormal fertilization techniques), or a combination of factors (Newman et al. 1999).

Polydactylism is easily diagnosed by clinical examination, but radiographic examination is necessary to evaluate the extent of the osseous abnormalities associated with the extra digit, especially if surgical removal is being considered. The degree of development of the accessory digits varies, but it may be complete, with a full complement of tendons, ligaments, and bones, including metacarpals and metatarsals (Zapata et al. 2008).

Surgical removal of the supernumerary digit is recommended to restore normal limb conformation, thus preventing lameness (Carstanjen et al., 2007). Polydactyly is rare in the dromedary camel with only two reports of a unilateral and bilateral cases thus far (Bani-Ismail et al., 1999 and Ahmed, 2014). The purpose of this case report is to describe the clinical appearance, surgical treatment and prognosis of bilateral polydactyly in the forelimbs of a dromedary camel.

CASE DESCRIPTION
A two-years-old, 250 kg male camel was referred to the Veterinary Teaching Hospital, College of Agriculture and Veterinary Medicine, Qassim University, Saudi Arabia, for evaluation of bilateral polydactyly. On admission, the camel appeared to be in good health. Clinical examination was normal and the camel showed no signs of lameness. Inspection and palpation of both forelimbs revealed an additional supplementary mobile foots at the site of MC III at the proximal aspects of both fetlock joints (Fig. 1A), the supernumerary digits had been presented since birth according to the owner inquiry, and it had increased in size as the camel grew. Oblique radiographs of both metacarpal regions and phalanges revealed a supernumerary digit composed of proximal, middle and distal phalanges at the mid-shaft of both metacarpus (MC III) of both forelimbs (Fig. 1B). The supernumerary digits originated from the medial aspects of the mid-shaft of the third metacarpal bones and extended distally with Cornified hooves present at their distal ends (Fig. 1A).
Surgical technique:
Bilateral amputation of the supernumerary digits was performed at the owner’s request, the camel was sedated with xylazine hydrochloride (Seton 2%, Laboratorios Calier, S.A., Barcelona, Spain) at a dose rate of 0.2 mg/kg, IV and was positioned in right lateral recumbency to operate the right forelimb. The forelimbs were prepared aseptically from the carpus and distal to the foot pad for surgery. Local infiltration analgesia was applied around the supernumerary digit using lidocaine hydrochloride 2% (Norbrook Laboratories, UK). A tourniquet was applied distal to the carpal joint and a straight incision was performed over the medial aspect of the right limb. The incision started about 20 cm distal to the carpus, continued distally up to the supplementary digit, and ended 5 cm distally. The subcutaneous tissue and fascia was bluntly dissected from the supernumerary digit. Blood vessels were ligated as they were encountered during the dissection with using braided coated polyglactin 910 No. 1 (United medical industries Co. Ltd. Riyadh. Kingdom of Saudi Arabia). The digit was elevated. No tendon or muscle was associated with it. The supernumerary digit was isolated completely from the third metacarpus before its amputation. A sterile obstetrical wire was placed under the supernumerary digit starting distally and proceeding proximally for osteotomy (Fig. 1C). The surgical site was lavaged with normal saline solution 0.9% before closing the fascia and subcutaneous tissues in two separate layers using braided coated polyglactin 910 No. 1 (United medical industries Co. Ltd. Riyadh. Kingdom of Saudi Arabia), with a simple continuous suture pattern. The skin was closed with silk No. 2 (United medical industries Co. Ltd. Riyadh. Kingdom of Saudi Arabia) using an interrupted suture pattern (Figs. 1D, E). The tourniquet was removed, and a full-limb pressure bandage was placed over the wound. Post-operative radiograph was taken to be sure that proper removal of the extra digit was performed (Fig. 2). The same procedures were carried out on the left forelimb after positioning the camel in left lateral recumbency for amputation of the supernumerary digit by osteotomy.

Postoperative care:
The camel was given postoperative therapy with penicillin-streptomycin (Pen & Strep, Norbrook Laboratories, UK) at a dose rate of 30,000 IU/kg for the penicillin and 10mg/kg streptomycin and phenylarhtrite at dose rate of 1ml/15 kg (Vetoquinol S. A., Veterinary pharmaceuticals, France) for 5 days. The camel was confined to a box for 4 weeks before allowing exercise and to keep the limb bandaged during the period of stall confinement. Follow-up information obtained 6 months after surgery revealed a completely sound camel. Upon calling of the owner, the cosmetic appearance of both forelimbs was good, without signs of lameness and the owner was satisfied with the outcome.
Fig. 1 (A): Bilateral polydactyly in a 2 year old male camel (arrows).

Fig. 1 (B): Oblique radiograph of Polydactyly in a 2 year old male camel (arrows).

Fig. 1 (C): Intra-operative image of surgical removal of the supernumerary digit (arrows).

Fig. 1 (D): The skin was closed with simple interrupted sutures.

Fig. 1 (E): The amputated extra digits are seen beside the closed skin.
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Fig. 2): Postoperative oblique radiograph showing removal of polydactyly in a 2 year old male camel (arrows).

DISCUSSION AND CONCLUSIONS

Polydactyly is a congenital anomaly that has been described in man and domestic animals; it has been reported as a single anomaly or in combination with other congenital defects (Camon et al. 1990; Talamillo et al. 2005). It is rare in the dromedary camel with only two reports of a unilateral and bilateral cases (Bani-Ismail et al., 1999 and Ahmed, 2014) respectively. This malformation can occur as an isolated anomaly or together with rare developmental or inherited anomalies (Crowe and Swerczek, 1985; Villagomez and Alonso, 1998). Regarding to the present case report, the studied camel had no other congenital anomalies and no hereditary predisposition to polydactyly according to the owner’s knowledge.

The diagnosis of polydactyly is normally based on clinical examination. A complete radiographic evaluation of the metacarpal and metatarsal regions and adjacent joints, e.g. the carpus, is necessary to determine possible osseous abnormalities (Barber, 1990). In the above described case, clinical examination and palpation of both forelimbs revealed an additional supplementary mobile digit at the mid-shaft of MC III at the proximal aspects of both fetlock joints. Oblique radiograph of both metacarpal regions and phalanges revealed that these digits composed of proximal, middle and distal phalanges at the mid-shaft of both metacarpus (MC III) of both forelimbs.

Both supernumerary digits of this described camel were medial to the third metacarpal bones, which was similar to the reported unilateral and bilateral cases (Bani-Ismail et al., 1999 and Ahmed, 2014). The vast majority of polydactyly in horses and cattle has been reported to be medial in the forelimbs (Bähr et al. 2003; Carstanjen et al. 2007).
Surgical removal of the supernumerary digits is provided to improve cosmetic appearance and to prevent injury to the digit (McGavin and Leipold, 1975) but should not destabilize the involved articulation. In the above described case, the removal of the extra digit and its adherence to MC III and resulted in a good cosmetic outcome.

The purpose of surgical removal of supernumerary digits in this described case report is to restore normal limb conformation and to improve the cosmetic appearance of the limb (Carstanjen et al. 2007). Animals with supernumerary ectopic limbs and supernumerary digits can survive successfully with normal locomotion if the surgical excision is performed under proper aseptic conditions and appropriate postoperative care is taken (Alam et al., 2007), the above described case report agreed with this matter.

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Disclosure statement
No potential conflict of interest was reported by the author.

REFERENCES
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