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Case study **OPEN ACCESS**

Dystocia in a giraffe (*Giraffa camelopardalis*) prolonged labor leading to fetal death and manual extraction

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Abstract

Background Managing dystocia in giraffes presents considerable challenges owing to the risks associated with chemical restraint, the need for timely intervention, and post-treatment recovery.

Objective This case report describes the clinical management of dystocia in a captive giraffe, focusing on the sedation strategy, obstetrical intervention, and recovery.

Case A 6-year-old primiparous giraffe (*Giraffa camelopardalis*) at Taman Safari Bali presented with dystocia 2.5 hours after strong uterine contractions following chorioallantoic sac rupture. The forelimbs and head of the fetus were visible, but no further progression occurred after 3.5 hours, indicating malposition dystocia.

Treatment Two doses of oxytocin were administered at one-hour intervals without progress. Chemical restraint was initiated using detomidine (0.04 mg/kg) and butorphanol (0.03 mg/kg), followed by azaperone (0.2 mg/kg) after unsuccessful extraction under standing sedation. The giraffe entered lateral recumbency 12 minutes later. The fetus, in an anterior-dorsal presentation with bilateral carpal flexion and nape posture, was manually extracted using traction ropes. The 45 kg male calf was delivered to the deceased. The sedation was reversed with atipamezole (0.1 mg/kg IM) and naltrexone (0.06 mg/kg IV).

Conclusion The dam stood within four minutes of reversal and recovered fully. This case highlights the importance of timely intervention, species-specific sedation protocols, and coordinated clinical management to address dystocia in giraffes.

Keywords assisted delivery | chemical immobilization | dystocia | giraffe | large wild mammal obstetrics

Introduction

Dystocia is defined as abnormal or difficult parturition that may necessitate veterinary intervention and can result in injury or death of the dam, fetus, or both (Youngquist & Threlfall, 2007). Although dystocia is uncommon in giraffes, it is still a critical condition. Giraffes have a prolonged gestation period of approximately 455 days (15 months), and delivery typically occurs in a standing position (Fowler, 1980). Under normal conditions, parturition lasts between 20 minutes and 3.5 hours. If active labor extends beyond two hours without visible progression, obstetrical assistance may be warranted.

The normal fetal presentation in giraffes is cranio-longitudinal, with a dorso-sacral orientation. The stages of parturition in giraffes are generally comparable to those observed in other artiodactyl species (Citino *et al.*, 1984). Predicting the timing of parturition in giraffes is difficult. Mammary gland

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development usually occurs during the final weeks of gestation; however, this sign is not consistently observed. Vulvar edema and mucoid vaginal discharge may appear in the days preceding labor (Miller & Fowler, 2014). In captive giraffes, animal-keeper records play a critical role in monitoring pregnancy. These records, including details such as the last observed mating event and changes in physical conditions, are valuable for estimating the timing of parturition.

The management of dystocia in giraffes often requires both chemical immobilization and physical restraint. Immobilizing giraffes presents significant challenges due to their unique anatomical and physiological characteristics, which contribute to an increased risk of morbidity and mortality during chemical restraint (Ferguson *et al.*, 2024). Their considerable body mass and height limit their ability to maintain control during both the induction and recovery phases, and complicate safe handling once the animal becomes recumbent (West *et al.*, 2007). Giraffes are particularly susceptible to regurgitation and vomiting, which elevates the risk of fatal aspiration pneumonia. Anatomically, the larynx is located deep within the pharynx, impeding the effective drainage of fluids such as saliva and rumen contents.

Extended induction or recovery times increase the likelihood of complications such as hyperthermia, capture myopathy, and trauma from uncoordinated movements. Furthermore, several species-specific physiological adaptations, including elevated systolic blood pressure, small tidal volume with large dead space, and relatively low cardiac output, pose additional challenges for anesthetic management (Bush *et al.*, 2002). While standing sedation is sometimes used, it carries the risk of sudden recumbency due to ataxia, and therefore must be approached with caution. Various drug combinations have been successfully used in giraffes for clinical procedures, including reproductive examinations, hoof trimming, minor surgical interventions, and intravenous catheter placement (Miller & Fowler, 2014).

This case report aimed to document the clinical management of dystocia in a captive giraffe, highlighting the practical considerations of obstetric intervention, sedation protocol, and post-procedure recovery in a zoological setting. This study is intended to contribute to the limited body of literature on giraffe parturition and to support best practices in wildlife reproductive medicine and welfare.

Case

A 6-year-old primiparous giraffe (Giraffa camelopardalis), Azzanti, with an estimated body weight of 600 kg, housed in Taman Safari Bali, presented with dystocia. Two and a half hours after rupture of the chorioallantoic sac, the giraffe exhibited strong and consistent uterine contractions, with the forelimbs and head of the fetus partially protruding from the vulva. However, after 3.5 hours of active labor, there was no further progression of fetal expulsion, indicating a case of malposition dystocia. Progressive changes in vulvar swelling and udder enlargement were observed over the two weeks preceding parturition, as illustrated in **Figure 1**.

Treatment

Assisted delivery and fetal extraction

Oxytocin was administered intramuscularly via Telinject® G.U.T 50 at a one-hour interval (two doses). Although uterine contractions intensified, there was no improvement in the fetal delivery. Obstetric intervention under chemical restraint was deemed necessary. The giraffe was sedated using detomidine (0.04 mg/kg; Ausrichter Pty Ltd, Australia) and butorphanol (0.03 mg/kg; VetVia Richter GmbH, Austria), administered intramuscularly using Telinject®. Sedation was achieved within 15 min. A blindfold was applied to reduce visual and auditory stimuli, and ropes were used to secure limbs. The forelimbs were tied around metacarpals to facilitate traction. Multiple attempts were made to extract the fetus under standing sedation, but these were unsuccessful, as the fetus remained lodged and the dam began to struggle.

Due to lack of progress, azaperone (0.2 mg/kg; Elanco, Australia) was administered intramuscularly. The giraffe showed signs of ataxia within 9 min and entered lateral recumbency by the 12th minute post-administration. The obstetric team immediately proceeded with fetal extraction, while the anesthesia team maintained sedation and ensured that the giraffe's neck was positioned above the level of the rumen to minimize the risk of aspiration. The lubricants were administered intravaginally to facilitate delivery. Ropes were secured around the forelimbs at the metacarpal joints and traction was manually applied by several personnel. No intrauterine fetal manipulation was performed prior to the extraction.

The fetus, a male calf weighing 45 kg, was successfully delivered but was found deceased in an antero-dorsal presentation with bilateral foot-nape posture. Skin sloughing was observed in the hindlimbs and rump. The extraction procedure and abnormal fetal posture are shown in **Figure 2**. Partial expulsion of the placenta followed, and the vaginal canal was flushed with sterile water. Local antibiotic therapy was administered intravenously. During the procedure, the limbs of the dam were secured with ropes and cushioned using sawdust-filled sacks. A muscle massage was applied to the cervical region to prevent tracheal obstruction. Intravenous fluids, including Ringer's lactate, Metabolase®, and Biodin®, were administered to support the systemic circulation.

Post procedure care

Postprocedure, oral vitamin E supplementation was provided for four days to help prevent capture myopathy. The sedation was reversed using atipamezole (0.1 mg/kg IM; Dong Bang Co. Ltd, Korea) and naltrexone (0.06 mg/kg IV; Kyron Laboratories, South Africa). The dam recovered promptly and was able to stand within four minutes post-reversal. Complete expulsion of the remaining placenta occurred in three parts, with total elimination observed at eight hours post-procedure. A minor vulvar laceration was noted and managed topically with an antibiotic spray; it remained clean and healed uneventfully within two weeks.

Postpartum treatment included methylergometrine (4 mg/kg, once daily for three days), trimethoprim-sulfadiazine

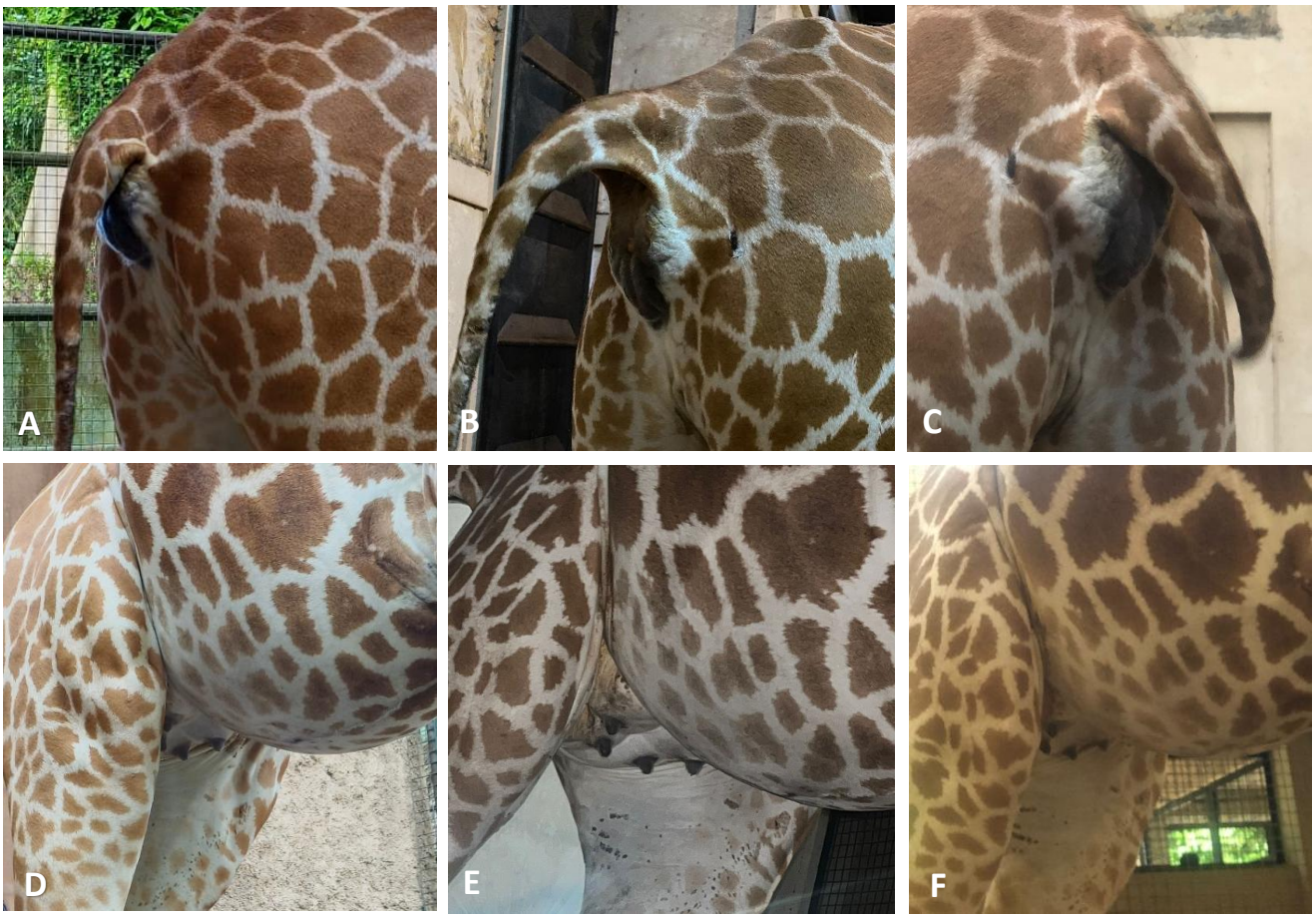

Figure 1 Vulva and udder appearance prior the labor time. (A) Vulva appearance 2 weeks prior the labor time. (B) Vulva appearance 1 weeks prior the labor time. (C) Vulva appearance 1 day prior the labor time. (D) Udder appearance 2 weeks prior the labor time. (E) Udder appearance 1 week prior the labor time. (F) Udder appearance 1 day prior the labor time.

(20 mg/kg, once daily for four days), and metronidazole (13 mg/kg, once daily for five days). The vaginal discharge persisted until the third day after delivery. Three weeks post-intervention, the dam was noted to have purulent vaginal discharge. enrofloxacin (2.5 mg/kg, twice daily for seven days) was administered orally. The discharge resolved by the third day of antibiotic therapy and no recurrence was observed thereafter.

Discussion

Accurately predicting parturition in giraffes remains a challenge, particularly in the absence of recorded mating data. Although hormonal monitoring such as progesterone assays is being explored, observational signs remain critical in practice. Kristal and Noonan (1979) reported that abdominal distension, vulvar swelling, mucous discharge, and fetal movement may appear up to three weeks prior to labor. In Azzanti's case, clear vaginal discharge, udder development, and abdominal enlargement were noted 14 days before parturition, with fetal movement observed 11 days before parturition. These progressive physical changes, particularly vulvar and udder development, have been clearly documented and may serve as valuable indicators for predicting parturition in captive giraffes (**Figure 1**). Continuous CCTV monitoring helped to reduce external stress and ensured consistent observation during the periparturient period.

Dystocia in giraffes is rare but represents a reproductive emergency with potentially fatal consequences for both the dam and the fetus. Common causes include fetal malpresentation, fetomaternal disproportion, uterine inertia, and maternal pelvic abnormalities (Weldeyohanes & Fesseha, 2020). The normal presentation in giraffes is cranio-longitudinal with dorso-sacral positioning, in which the forelimbs are extended and the head rests between them (Citino et al., 1984). In the present case, the fetus was delivered deceased in an antero-dorsal presentation with bilateral foot-nape posture and flexed elbows, which is consistent with the reported causes of dystocia in equids (Agerholm et al., 2024). The abnormal fetal position, confirmed during manual extraction (**Figure 2**), likely caused mechanical obstruction of the birth canal, leading to prolonged labor and fetal hypoxia. Citino et al. (1984) recommended obstetrical intervention when strong contractions persist for over two hours without fetal expulsion. Delayed intervention may severely compromise mater nal and fetal outcomes (Kaitho et al., 2011).

Chemical restraint is often required in dystocia management of giraffes, although it poses significant risks owing to its unique anatomy and physiology. Physical restraint without specialized facilities is rarely feasible, and presents safety hazards to both animals and personnel. Sedation with α2-agonists, such as detomidine, does not eliminate defensive re-

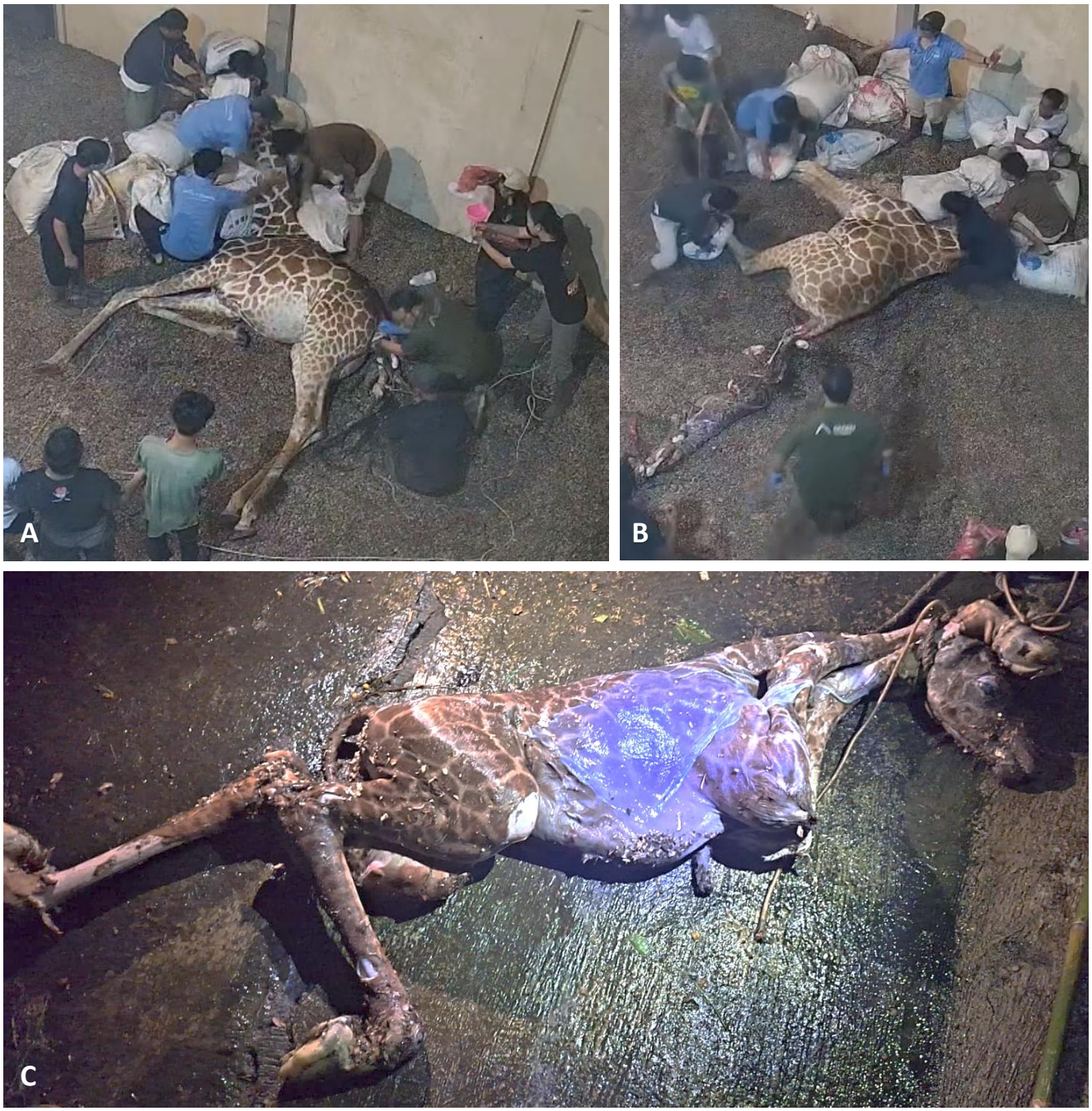

Figure 2 Manual fetal extraction procedure and presentation of the deceased calf. (A–B) Assisted extraction of the deceased fetus with the dam in lateral recumbency under chemical immobilization; (C) Extracted male fetus weighing 45 kg, presented in an antero-dorsal position with bilateral foot-nape posture. The abnormal fetal posture with flexed elbows was the suspected cause of dystocia.

sponses and may lead to unpredictable reactions (West & Caulkett, 2007). Giraffes are considered among the most challenging species to anesthetize, with the induction and recovery phases carrying the highest risk due to potential respiratory depression, airway obstruction, and capture myopathy (Miller & Fowler, 2014). Their long necks complicate cerebral perfusion and ventilation and increase susceptibility to respiratory acidosis (Geiser et al., 1992). To mitigate aspiration risks, proper neck alignment and head elevation, ideally 80–150 cm above the rumen, are essential during lateral recumbency.

Although a 12–24-hour pre-procedural fast is generally recommended, only 4 hours of food and water withholding is possible in this emergency. The initial sedative protocol using detomidine (0.04 mg/kg) and butorphanol (0.03 mg/kg) provided effective standing sedation but was insufficient for fetal extraction. The addition of azaperone (0.2 mg/kg IM) successfully facilitated lateral recumbency and allowed the manual delivery of the fetus.

Following the extraction, sedation was reversed using intramuscular atipamezole (0.1 mg/kg) and intravenous naltrexone (0.06 mg/kg). The dam stood within four minutes, demonstrating rapid and smooth recovery. Recovery is a critical period in giraffe anesthesia; an appropriate substrate and sufficient space are essential to support the natural rocking motion of the giraffe. Recovery exceeding 45 minutes is typ-

ically associated with a poor prognosis. Intramuscular administration of antagonists is often preferred to ensure gradual and controlled recovery, as intravenous administration may trigger hyperactivity and premature attempts to stand, increasing the risk of trauma (West & Caulkett, 2007).

Complications of agitated recovery may include severe hyperthermia, musculoskeletal trauma, and capture myopathy (Bush et al., 2002). Therefore, successful immobilization and intervention require careful planning, experienced personnel, appropriate drug protocols, and environmental preparedness. This case reinforces the importance of timely decision-making, species-appropriate sedation strategies, and coordinated clinical management to optimize outcomes in dystocia among large wild ungulates.

Conclusion

Timely obstetric intervention plays a critical role in managing dystocia in giraffes, directly affecting the survival of both the dam and calf. Clinical evaluation should be initiated when active labor exceeds two hours without observable fetal progression, and immobilization should be considered at this stage. An immobilization protocol must be established for all giraffe parturitions to anticipate potential complications. Manual fetal extraction, supported by appropriate sedation and a skilled team, can be an effective approach for resolving dystocia in giraffes under zoological conditions.

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Conflict of interest The authors declare no conflict of interest in relation to this case report.

Author contribution YK: Conceptualization, investigation, analysis, writing-original draft; YN: Investigation; IGA: Investigation; SB: Investigation; BHM: Conceptualization, supervision, writing-review & editing; JM: Supervision and funding.

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