



Proceeding Paper

Reproductive Troubles: Cases Report in Camels—First Caesarean in Camilidae in Algeria [†]

Said Fettata

Independent Researcher, Metlili El Jadida 47000, Algeria; fettatasaid@gmail.com

[†] Presented at the 10th International Seminar of Veterinary Medicine: Camelids in Algeria & Maghreb, Constantine, Algeria, 20–21 December 2022.

Abstract: The camel is a highly valuable animal which contributes effectively to the welfare of people in difficult environments such as the Algerian Sahara. Reproduction in the camel is not as well understood as in more common species of domestic animals. Reproductive problems in the camel are not researched as, for example, in the bovine and small ruminants. Our study demonstrates a clinical case in the Ghardaïa district: cesarean section in female's camels. The incidence of camel dystocia does not differ from that of bovines. The etiologies of dystocia include uterine torsion, carpal flexion, lateral deviation of the head and hock and hip flexion of the fetus. However, the camel fetus survives dystocia better than the equine fetus, and the camel is a good subject for cesarean section. Cesarean section could be performed on the left flank using xylazine sedation and local regional or infiltration anesthesia. A camel, 17 h in dystocia, delivered a live fetus via cesarean section. The camel placenta is diffuse epitheliochorial type, and placental retention subsequent to parturition is rare. The camel placenta is expelled within 49 min to 6 h of calving.

Keywords: dromedary camel; reproductive troubles; cesarean section; Ghardaïa

1. Introduction

The first veterinary cesarean section on a cow was performed by Morange, a veterinary practitioner, in Lestern, in 1813 [1]. Cesarean section is a surgical procedure which requires good anatomical, physiological, propaedeutic as well as therapeutic knowledge.

It is the most common surgical operation in rural veterinary practice [2]. Cesarean section in mammals begins by standing or lying while restrained. It offers a choice of operating sites with shaving and disinfection, premedication (local or loco-regional anesthesia), laparotomy, hysterotomy, exteriorization of the newborn, uterine suture, abdominal wall suture and treatment post-surgery [2].

Cesarean sections on camels are less documented than cesarean sections on cows, mares, and small ruminants, which makes the operation the least common in rural veterinary practice and leaves a negative impact on the survival of dystocic camels.

The natural process of parturition in dromedary camels (*Camelus dromedarius*) can span over a variable period of time ranging from 2 to 6 h [3].

There is little clinical information regarding cesarean section in *C. dromedarius*. Therefore, the aims of this study were:

- 1—To compare the cesarean section in camels and bovines.
- 2—To present such techniques and facilitate the act.
- 3—To elaborate a guide to cesarean sections for veterinary practitioners in Algeria.

2. Materials and Methods

2.1. Pre-Operative Evaluation

The subject was a 15-year-old female dromedary camel (Sahraoui breed). General examination: the female presented a weakness and was treated with fluid therapy. Obstetric examination revealed an irreducible 180° post cervical torsion, right-hand direction.



Citation: Fettata, S. Reproductive Troubles: Cases Report in Camels—First Caesarean in Camilidae in Algeria. *Biol. Life Sci. Forum* **2023**, *22*, 20. <https://doi.org/10.3390/blsf2023022020>

Academic Editors: Amira Leila Dib, Said Boukhechem, Hithem Bougherara and El-Hacene Bererhi

Published: 13 April 2023



Copyright: © 2023 by the author. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

2.2. Surgical Instruments

Shaving equipment, disinfectant solution, a scalpel and two blades, Lister scissors, curved scissors with a foam tip and straight, a needle holder, one curved needle with a round section to sew the uterus, two S-shaped needles with triangular section for muscular and skin sutures, absorbable thread for internal and muscular sutures, non-absorbable thread for skin sutures, traumatic forceps with rubber jaws for gripping the uterus, claw pliers for gripping the peritoneum, right hemostatic forceps, compresses, 20 mL syringes for anesthesia products, local anesthetic products (lidocaine), surgical gloves, sterile drapes and drapes, high-quality ropes for restraint [4].

The objective of the intervention was to compare a cesarean in a camel and a cow.

3. Results and Discussion

- (1) Restraint: Good compression in sternal recumbent position (squatting animal).
- (2) Place of election: Hollow of the left flank.
- (3) Preparation of the place of election: The place of election must be prepared to avoid the risks of subsequent infection to the greatest extent possible. The intervention site is mowed and shaved. The region is largely soaped, then disinfected, and dried, then covered with a sterile operating drape.
- (4) Anesthesia: It is usually local anesthesia administered by infiltration (lidocaine).
- (5) Operating technique:
 - (a) Laparotomy: Skin incision over a length of 30 to 40 cm (Figure 1a). Then, the muscular skin, then the abdominal tunic, the fused fascia of the obliques, the right of the abdomen, the fascia of the transverse of the abdomen and the peritoneum.
 - (b) Hysterotomy: Externalization of the uterus. Incision of the uterus at the level of the great curvature, over a length of about 30 cm.
 - (c) Extraction of the camel (Figure 1b): We start with the extraction of the forelegs, then the head with the long neck, then the rest of the body (at this time, the camel is alive (Figure 1c)).
 - (d) Placental delivery: This is performed manually, followed by local antibiotic therapy.
 - (e) Suture of the uterus: first suture: Utrecht suture, second suture (optional): Cushing suture.
 - (f) External washing of the uterus and dusting of the wound with penicillin.
 - (g) The uterus is returned to the abdominal cavity after careful checking.
 - (h) Intra-abdominal antibiotic therapy.
 - (i) Parietal sutures. Peritoneum, muscular (single overlock), skin (in separate "U" shape).
- (6) Post-operative care: General antibiotic therapy for 8 days, non-steroidal anti-inflammatory drug for 5 days, followed by cleaning and disinfection of the skin wound.

The method of restraint in camels requires experts' involvement because of the high level of difficulty. It is very hard to carry out the operation on a standing camel. The indications for cesarean in camels are the same as in cows, and the surgical procedure of the cesarean section in the camel is the same as in the cow. The extraction of the uterus in the camel is very easy compared to that of the cow. The extraction of the newborn camel is a little difficult given the length of the neck and legs. The placenta in camels is of diffuse type and is not cotyledonary, as it is in bovines. On this occasion, the cesarean section ended with the camel living and in good health. The involution of the uterus after placental delivery in the camel is very rapid; at the end of the last sutures, the uterus reaches a very reduced size, which explains the return of ovarian cyclicity a few days to a few weeks after giving birth. On expulsion, the young dromedary is surrounded by a thin membrane called the "epidermal" membrane, which ruptures in response to the first movements. This membrane seems to play a thermoregulatory role and opposes the drying out of the organism. Unlike other species, the dromedary female does not lick her infant, but only

sniffs it. The offspring are recognized mainly by sniffing. All camel dystocia without the intervention of veterinary obstetrics ends in slaughter or death. After three weeks, the camel joins the herd in the middle of the desert, to the satisfaction of the owner.

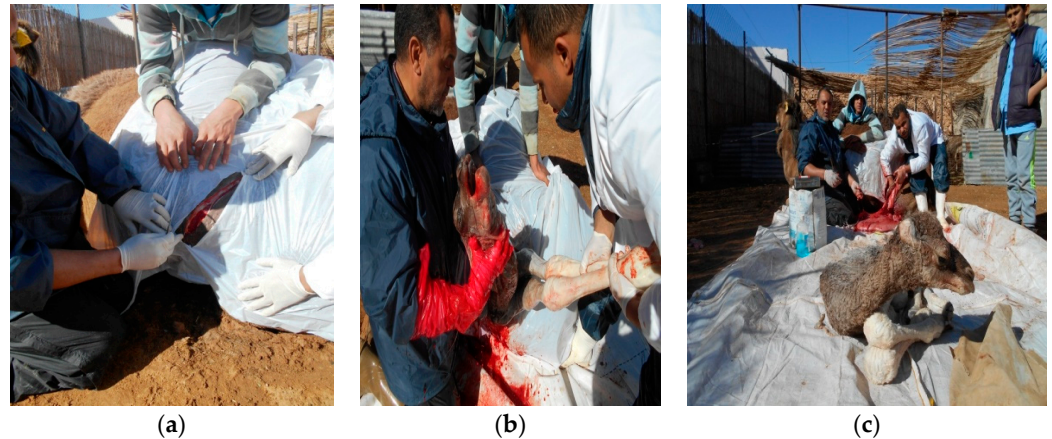


Figure 1. Cesarean section in camels. This was a great success. (a) Skin incision. (b) Extraction of the camel. (c) The camel is alive.

4. Conclusions

Camel obstetrics is very similar to that of other species, but remains unknown by the majority of Algerian veterinarians. Early surgical intervention is significantly associated with better survival rates of both the dam and calf. The application of the same cesarean protocol in cows and in camels resulted in a motivating success and contributed to the amplification of this act, which will prevent the loss of the camel herd. This first cesarean in Algeria left a positive impact on breeders, and the number of cases of interventions will increase each year.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The author declares no conflict of interest.

References

1. Titinger, P. *Historique de L'opération Césarienne: Étude Comparative de L'évolution et Obstétriques Humaine et Vétérinaire*. Ph.D. Thesis, Université Claude Bernard, Lyon, France, 1996. (In French)
2. Hanzen, C.; Lourtie, O.; Ectors, F. La césarienne dans l'espèce bovine. *Ann. Méd. Vét.* **1999**, *143*, 65–90. (In French)
3. Roberts, S. *Veterinary Obstetrics and Genital Diseases*; Literary Licensing, LLC: Whitefish, MT, USA, 2012.
4. Cardot, T. *Prise en Charge de la Douleur et de L'inflammation Postopératoires Lors de Césarienne Chez la Génisse Allaitante et Évaluation de Paramètres de Reproduction*. Ph.D. Thesis, Alfort National Veterinary School, Maisons-Alfort, France, 2018. (In French)

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.