

# Colpotomy in a cow to remove a fetal bone from the uterus

Eduardo Prado, Tulio Prado, Daniel Prado, Tanner Drum, Brittany Veerasammy, Joe Smith  
Department of Large Animal Clinical Sciences, College of Veterinary Medicine,  
University of Tennessee, Knoxville, TN, USA

## Abstract

A 5-year, Aberdeen Angus cow was presented to assess a hard/foreign structure that was felt in the uterus via transrectal palpation. Further diagnostics including transrectal ultrasonography were performed; a fetal bone was in the left uterine horn. Removal of the bone through the cervix was unsuccessful. Colpotomy was elected; removed bone was half of a fetal mandible, presumably a remnant from fetal maceration. Uterus was sutured with a simple continuous pattern; the cow was treated with antimicrobials and antiinflammatory drugs and recovery was uneventful. Ovum pick up was performed 5 months after surgery; several oocytes were collected from both ovaries and 6 embryos were obtained via in vitro fertilization. Cow was pregnant 6 months after surgery.

**Keywords:** Beef cow, uterine horn, macerated fetus, fetal bone, colpotomy

## Background

There is a risk of pregnancy loss in cattle and depending on the stage the embryo/fetus is resorbed or expelled. Embryonic loss results in resorption whereas fetal loss in expulsion or retention.<sup>1</sup> Fetal ossification starts ~ day 45 of pregnancy in cattle.<sup>2</sup> A retained dead fetus can become mummified or macerated. If pregnancy loss occurs after 3 months without proper fetal expulsion, the process of maceration starts in ~ 4 to 5 days.<sup>2</sup> A retained nonviable fetus can be removed medically or surgically. Hysterotomy via flank or ventral midline approach is preferred; however, if the structure in the uterus is < 30 cm, a hysterotomy via colpotomy is feasible.<sup>3</sup> Cows that had a macerated fetus have a poor prognosis for breeding and carrying pregnancy to term than cows with mummified fetus; damage by incrustated bones to the endometrium is more severe.<sup>3,4</sup>

## Case presentation

A 4-year, Aberdeen Angus, multiparous cow was presented to assess a hard/foreign structure that was felt in the uterus by the referring veterinarian via transrectal palpation. Owner stated that the cow was due to calve ~ 3 months prior to presentation. Mammary gland development was noticed around the due date but no calf was delivered and a few weeks after the due date, the cow had clinical signs of estrus. Cow was bred via artificial insemination during 2 estrous cycles, nonpregnancy was diagnosed and the cow was in estrus ~ 10 days before presentation.

Cow was bright, alert, and responsive; vital parameters were: heart rate 36 beats per minute, respiratory rate 30 breaths per minute, and temperature 100.1 F. Transrectal palpation and ultrasonography were performed; a foreign body, potentially a fetal bone (palpated as a single long piece) was in the left uterine horn. Uterine horns felt similar in size (~ 20 to 22 cm); had no fluid and were hyperechogenic. Right ovary had a 6 mm follicle and the left ovary had a corpus luteum (CL). Based on the history, top differentials were mummified or macerated fetus; latter was more possible since CL does not persist with a macerated fetus.<sup>5</sup>

## Treatment

Cow was initially treated medically; 2 intramuscular prostaglandin (Lutalyse®) injections were given 24 hours apart. Although the CL was lysed, the foreign object was not expelled and no abnormal discharge or unusual mucus secretion was observed at estrus.

Removal of fetal structure via manual extraction through the cervix was attempted. Cow was placed in a head lock and received an epidural injection (between last sacral and first coccygeal vertebrae) with 4 ml of lidocaine (lidocaine 2%). Additionally, 400 mg of synthetic prostaglandin E<sub>1</sub> (misoprostol) mixed with sterile obstetrics lube was applied to cervix for softening and dilation. However, enough dilation of the cervical rings was not possible for manual removal of the foreign body. Cow was started on oral meloxicam

(1 mg/kg once daily) to prevent any possible swelling due to vaginal and cervix manipulation.

Hysterotomy via colpotomy was elected and cow was placed in a cattle transporter chute. High and low epidurals were given with 3 ml of mepivacaine hydrochloride (Carbocaine®) on each site to block the perineal area, immobilize the tail, and reduce defecation during surgery. Cow was sedated with intravenous acepromazine 10 mg (1 ml) via left jugular. Cow's tail was bandaged with roll brown gauze and secured to her body. Perineal area was scrubbed with iodine solution and water. A 28 French foley catheter was placed in the urinary bladder to decrease its size and prevent urine contamination during the procedure. Vaginal cavity was flushed 3 times with diluted chlorhexidine and isotonic saline solution. Subsequently, a pack of sterile gauze was soaked in lidocaine, and it was attached to the surgeon's hand with a sterile umbilical tape. The gauze pack was introduced to the vaginal cavity and pressed over the proposed incision site for about 5 minutes to desensitize the area.

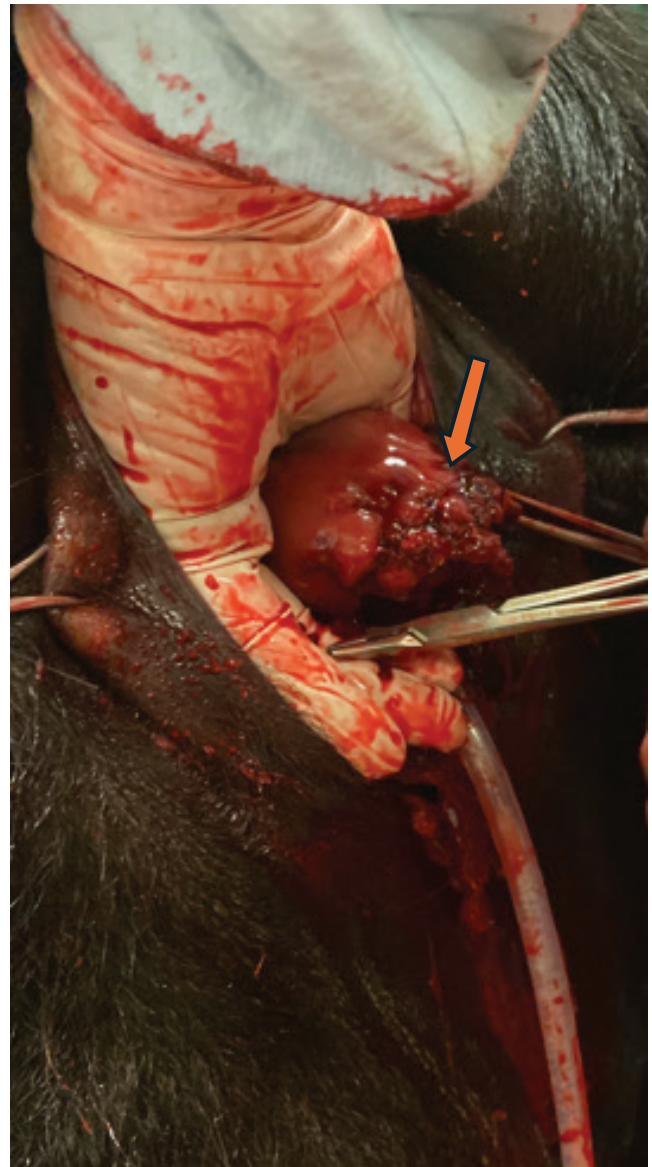
An incision was made in the vaginal cavity at 10 o'clock position; extended 1 inch horizontally and surgeon's fingers widened the incision. Surgeon's hand was introduced through the incision and uterus was reached. Uterus was carefully handled within the abdominal cavity to prevent uterine wall rupture and potential intrabdominal contamination. Thereafter, uterus was exteriorized through the vaginal incision. Traction to the uterus resulted in partial rupture of uterine horn wall; opening was widened to ~ 3 inches with # 5 scalpel blade, and the bone (half of fetal mandible; 16 x 1.5 x 7 cm) was extracted (Figure 1). Uterine incision was closed with a simple



**Figure 1.** Extracted fetal mandible (16 x 1.5 x 7 cm) from the uterine horn

continuous pattern (Figure 2), using absorbable suture (# 0 vicryl polyglactin) and returned to its normal position. Vaginal incision was left open to heal by second intention; Buhner stitch was applied around the vulva to prevent evisceration.

On the day of surgery, cow received *Clostridium perfringens* type C and D, and tetanus booster (BAR-VAC® CD/T) vaccinations. Antibiotics and antiinflammatory drugs were given. Cow was started on intramuscular penicillin G procaine (22,000 IU/kg [PenOne Pro™, 300,000 IU/ml]) twice daily for 3 consecutive days. Cow was also given (at the base of ear) 2 injections (72 hours apart) of ceftiofur crystalline free acid (6.6 mg/kg [Excede® 200 mg/ml]) after the procedure for suspected local infection observed during surgery. On the day of surgery, intravenous flunixin meglumine (1 mg/kg [Prevail™ 50 mg/ml]) was given and continued for 4 days with oral meloxicam (1 mg/kg once daily) and was reduced to 0.5 mg/kg once daily for 4 more days.



**Figure 2.** Exteriorized uterus after fetal mandible removal and incision (note incision site [arrow]) closure

## Outcome

Cow was hospitalized for a week after surgery. Transrectal palpation was performed 4 days after surgery to retract the uterus to prevent adhesion. Buhner stitch was removed 5 days after surgery. It was recommended to keep the cow confined alone in a small pasture for ~ 4-6 weeks, with no reproductive activity. Cow was examined 4 months after surgery by the university theriogenology department. Transrectal palpation and ultrasonography were performed; no abnormalities were detected. Reproductive tract was completely mobile; left ovary had a CL and right ovary had a 9 mm follicle. Vaginal speculum examination revealed a fully healed colpotomy incision. A few weeks later, ovum pick up was performed and several oocytes were collected and 6 embryos were obtained via in vitro fertilization. Cow was pregnant 6 months after surgery.

## Discussion

Fertility in cows that had a macerated fetus decreased substantially due to fetal bones damage to endometrium.<sup>6</sup> However, there has been anecdotal evidence of cows carrying pregnancy after a history of a macerated fetus. In cows that have had a mummified fetus, pregnancy rates a few months after the mummy extraction via hysterotomy was ~ 36%.<sup>7</sup> Additionally, 1 mare was diagnosed pregnant a few weeks after removal of fetal bones in a case of fetal maceration.<sup>8</sup>

Medical treatment for fetal bones expulsion can be attempted with prostaglandin treatment. However, if it is not effective, a surgical option is necessary. Hysterotomy can be performed via colpotomy or caudal flank.<sup>3-7</sup> Colpotomy is a very common technique used in mares for ovariectomy to eliminate unwanted behavior or diseased ovaries.<sup>9</sup> It is also indicated for unilateral ovariectomy in cows for removal of diseased ovaries.<sup>10</sup> Advantages of colpotomy approach is that it can be performed standing in a squeeze chute; however, it is recommended for moderately enlarged uterus with structures no larger than 30 cm in diameter.<sup>3-11</sup>

Cow in this case received multiple treatments that are considered extralabel usage in the US. Procaine penicillin G dose was extralabel. Ceftiofur product was used as an extralabel indication (localized infection to the foreign body); however, this is permissible under the third-generation cephalosporin order of prohibition, as the label route, dose, and frequency were used. Antiinflammatories were used extralabelly for postoperative pain and misoprostol was also used in an extralabel fashion. This extralabel usage is permitted in the US within a valid veterinarian-client-patient relationship, and before discharging the case, food animal avoidance databank was consulted for withdrawal recommendations.

In cows with high genetic value, assisted reproductive techniques can be applied (e.g. ovum pick up for in vitro fertilization). Embryo flushing is also an option to bypass the uterus and obtain offspring from cows that had uterine damage because of pregnancy. Fertility may continue to be normal in cows that have experienced any type of fetal abnormalities during pregnancy.

## Learning points

- Cows that exceed the due date should have reproductive tract evaluation by a veterinarian
- Hysterotomy via colpotomy is a feasible procedure to perform in cows with retained structures in the uterus
- Assisted reproductive techniques options are available to produce offspring from cows with a history of uterine damage

## Conflict of interest

None to report.

## References

1. Baumgartner W: Fetal disease and abortion: diagnosis and causes. In: Hopper RM: editor. *Bovine Reproduction*. 2<sup>nd</sup> edition, Hoboken; John Wiley & Sons: 2021. p. 667-716.
2. Roberts S: Diseases and accidents during the gestation period. In: *Veterinary Obstetrics and Genital Diseases*. 2<sup>nd</sup> edition, Ithaca; Published by the author: 1971. p. 107-198.
3. Hopper R, Hostetler D, Smith J, et al: Surgical removal of a mummified fetus via colpotomy. *Bovine Pract* 2006;40:57-58. doi: 10.21423/bovine-vol40no2p57-58
4. Hopper R: Surgical Correction of abnormalities of genital organs of cows. In: Youngquist R, Threlfall W: editors. *Current Therapy in Large Animal Theriogenology*, 2<sup>nd</sup> edition, St. Louis, Missouri; Elsevier: 2007. p. 463-472.
5. Lefebvre R: Fetal mummification in the major domestic species: current perspectives on causes and management. *Vet Med (Auckl)* 2015;6:233-244. doi: 10.2147/VMRR.S59520. PMID: 30101110; PMCID: PMC6067784.
6. Sood P, Vasishta NK, Singh M: Use of a novel surgical approach to manage macerated fetus in a crossbred cow. *Vet Rec* 2009;165:347-348. doi: 10.1136/vr.165.12.347. PMID: 19767639.
7. Lefebvre RC, Saint-Hilaire E, Morin I, et al: Retrospective case study of fetal mummification in cows that did not respond to prostaglandin F2alpha treatment. *Can Vet J* 2009;50:71-76. PMID: 19337617; PMCID: PMC2603657.
8. Morrissey J, Pinsky T, Roy MF: Fetal maceration and partial retention of fetal bones in 2 mares. *Can Vet J* 2024;65:133-137. PMID: 38304478; PMCID: PMC10783584.
9. Prado T, Schumacher J: How to perform ovariectomy through a colpotomy. *Equine Vet Educ* 2017;31:209-213. doi: 10.1111/eve.12801
10. Prado T, Schumacher J, Dawson L: Surgical procedures of the genital organs of cows. *Vet Clin North Am Food Anim Pract* 2016;32:727-752. doi: 10.1016/j.cvfa.2016.05.016
11. Irons PC: Hysterotomy by a colpotomy approach for treatment of foetal mummification in a cow. *J S Afr Vet Assoc* 1999;70:127-129. doi: 10.4102/jsava.v70i3.772